

QUESTION

| Which among the following organism is the cause of necrotizing fasciitis?

A Streptococcus pneumoniae

B Streptococcus pyogenes

CORRECT

C Clostridium perfringens

D Clostridium tetani

RIGHT ANSWER

OK

B. Streptococcus pyogenes

WHY THIS IS RIGHT

Necrotizing fasciitis is a rapidly progressive, life-threatening soft tissue infection most commonly caused by Group A β -hemolytic Streptococcus.

- Type II (monomicrobial) necrotizing fasciitis -> classically due to Streptococcus pyogenes
- Produces exotoxins (streptococcal pyrogenic exotoxins) -> tissue destruction, systemic toxicity, toxic shock
- Clinical features:
 - o Severe pain out of proportion to findings
 - o Rapid spread along fascial planes
 - o Skin necrosis, bullae, crepitus (late)
 - o Systemic toxicity (fever, shock)

Why not others:

- Streptococcus pneumoniae -> pneumonia, meningitis
- Clostridium perfringens -> gas gangrene (myonecrosis), not classic necrotizing fasciitis
- Clostridium tetani -> tetanus (neurotoxin-mediated disease)

QUESTION

A patient presents 2 days after a road traffic accident with severe muscle pain and palpable crepitus over the injured area. Which of the following organisms is the most likely cause of gas gangrene in this case?



A Clostridium haemolyticum

B Clostridium welchii

CORRECT

C Clostridium botulinum

D Clostridium tetani

RIGHT ANSWER

OK

B. Clostridium welchii

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$19" here and does not include a written explanation for this item.

QUESTION

A patient presented with complaints of diarrhea and vomiting for >3 hours after consuming salads and milk at a picnic. Which of the following organisms is the most likely cause?

A Bacillus cereus

B Staphylococcus aureus

CORRECT

C Salmonella enterica

D Clostridium perfringens

RIGHT ANSWER

OK

B. Staphylococcus aureus

WHY THIS IS RIGHT

Staphylococcus aureus food poisoning is caused by ingestion of preformed enterotoxin in contaminated food, leading to rapid-onset gastroenteritis.

- Incubation period: short (1-6 hours) -> symptoms within a few hours
- Food sources: salads (e.g., mayonnaise), milk, cream-based foods, pastries
- Mechanism: ingestion of heat-stable enterotoxin (toxin formed in food before consumption)

· Clinical features:

- o Prominent vomiting
- o Diarrhea
- o Usually no fever
- o Self-limiting (resolves within 24 hours)

Why not others:

- Bacillus cereus: can cause rapid vomiting type, but classically associated with reheated rice
- Salmonella enterica: longer incubation (12-48 hours), inflammatory diarrhea with fever
- Clostridium perfringens: incubation 8-16 hours, mainly diarrhea with minimal vomiting

QUESTION

A street food (pani puri) vendor presents with a black, necrotic eschar on his back. Which of the following organisms is the most likely causative agent?

A Rickettsia typhi

B Scrub typhus

C Bacillus anthracis

CORRECT

D Coxiella burnetii

RIGHT ANSWER

OK C. Bacillus anthracis

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

A young male came to the hospital with a clean-cut wound without any bleeding. The patient received a full course of tetanus vaccination 10 years ago. What is the best management for this patient?

A Human tetanus immunoglobulin and full course of vaccine

B Human tetanus immunoglobulin only

C Single-dose tetanus toxoid

CORRECT

D Full course tetanus toxoid

RIGHT ANSWER

OK

C. Single-dose tetanus toxoid

WHY THIS IS RIGHT

A clean-cut wound is classified as a clean, minor wound with low risk of tetanus.

In an individual who has completed the full primary tetanus immunization, a booster dose of tetanus toxoid is recommended if more than 10 years have elapsed since the last dose.

Human tetanus immunoglobulin is not required for clean wounds in adequately immunized individuals, and restarting the full course is unnecessary.

Category	Clean Wound <6H	Other Wounds
A. CC/B<5 years	None	None
B. CC>10 years	1 Dose	1 Dose + TIG
C. Incomplete course/unknown	Complete course	Complete course + TIG

QUESTION

A woman presents with high-grade fever and signs of shock. She has a history of prolonged tampon use. What is the most likely diagnosis?

A Staphylococcal scalded skin syndrome

B Toxic shock syndrome toxin

CORRECT

C Septic shock

D Streptococcal pharyngitis

RIGHT ANSWER

OK

B. Toxic shock syndrome toxin

WHY THIS IS RIGHT

Toxic Shock Syndrome (TSS) is an acute, life-threatening illness caused by toxin-producing *Staphylococcus aureus*, classically associated with prolonged tampon use.

- Causative toxin: TSST-1 (toxic shock syndrome toxin-1)
- Mechanism: acts as a superantigen -> massive, non-specific T-cell activation -> cytokine storm -> shock
- Clinical features:
 - o Sudden high-grade fever
 - o Hypotension (shock)
 - o Diffuse erythematous rash -> later desquamation
 - o Multiorgan involvement (renal, hepatic, CNS)

Why not others:

- Staphylococcal scalded skin syndrome: exfoliative toxin, mainly in children, no shock
- Septic shock: may occur, but tampon use + toxin-mediated features point to TSS
- Streptococcal pharyngitis: localized throat infection

QUESTION

Chocolate agar is primarily used to culture which of the following organisms?

A *Listeria monocytogenes*

B *Haemophilus influenzae*

CORRECT

C *Staphylococcus aureus*

D *Escherichia coli*

RIGHT ANSWER

OK

B. *Haemophilus influenzae*

WHY THIS IS RIGHT

Chocolate agar is an enriched medium used to culture fastidious organisms, especially *Haemophilus influenzae*.

- Prepared by heating blood agar, which lyses RBCs -> releases growth factors:

- o Factor X (hemin)

- o Factor V (NAD)

- *Haemophilus influenzae* requires both X and V factors, hence grows well on chocolate agar

- Also supports growth of *Neisseria* species (e.g., *N. gonorrhoeae*, *N. meningitidis*)

Why not others:

- *Listeria monocytogenes*: grows on standard media (e.g., blood agar)

- *Staphylococcus aureus*: grows on simple media (blood agar)

- *Escherichia coli*: grows on routine media (e.g., MacConkey agar)

QUESTION

A child was brought with complaints of high fever, multiple seizures, headache, and neck rigidity. CS analysis showed low glucose, high protein, and many polymorphs. The CSF culture showed pleomorphic gram-negative bacilli. What is true about the causative organism?

- A** It is bacitracin sensitive
- B** Produces non-lactose fermenting colonies on MacConkey agar
- C** Exhibits satellitism around *Staphylococcus aureus* colonies CORRECT
- D** It exhibits alpha hemolysis on sheep blood agar

RIGHT ANSWER

- OK** **C. Exhibits satellitism around *Staphylococcus aureus* colonies**

WHY THIS IS RIGHT

The described organism is *Haemophilus influenzae*, a pleomorphic Gram-negative bacillus causing pyogenic meningitis in children, and it characteristically shows satellitism around *Staphylococcus aureus* on blood agar.

- CSF findings in bacterial meningitis:
 - o ↓ glucose, ↑ protein
 - o Neutrophilic (polymorph) predominance
- Organism characteristics: Requires Factor X (hemin) and Factor V (NAD) for growth
- Satellitism phenomenon: Grows around *Staphylococcus aureus* colonies because *S. aureus* releases NAD (Factor V)

Why not others:

- Bacitracin sensitivity: seen in Group A *Streptococcus*
- Non-lactose fermenter on MacConkey: applies to some Gram-negative bacilli, not *H. influenzae*
- Alpha hemolysis: seen in *Streptococcus pneumoniae*



QUESTION

A sewage worker presented with abdominal pain, jaundice, conjunctival suffusion, and blood in the urine for the past 5 days. Which of the following is the investigation of choice?

A Widal test

B Microscopic agglutination test

CORRECT

C Weil-Felix reaction

D Paul-Bunnell test

RIGHT ANSWER

OK

B. Microscopic agglutination test

WHY THIS IS RIGHT

Leptospirosis (e.g., in sewage workers exposed to contaminated water) is best confirmed by the Microscopic Agglutination Test (MAT), which is the gold standard serological test.

- Etiology: *Leptospira interrogans* (spirochete)
- Risk factors: exposure to water contaminated with animal urine (rats, sewage)
- Clinical features (Weil disease):
 - o Fever, abdominal pain
 - o Jaundice + renal involvement (hematuria)
 - o Conjunctival suffusion (red eyes without discharge)
- Diagnosis:
 - o MAT (Microscopic Agglutination Test) -> detects antibodies against leptospira (gold standard)
 - o Early phase: PCR may be used

Why not others:

- Widal test: typhoid fever
- Weil-Felix reaction: rickettsial infections
- Paul-Bunnell test: infectious mononucleosis (EBV)

QUESTION

A woman with recurrent diarrhea is prescribed a broad-spectrum antibiotic. Which of the following is not true regarding *Clostridium difficile* infection?

- A Oral fidaxomicin is used for treatment
- B It is toxin mediated
- C IgM assay is used to confirm the diagnosis**
- D Pseudomembrane consists of leukocytes, fibrin, and cellular debris

CORRECT

RIGHT ANSWER

- OK
- C. IgM assay is used to confirm the diagnosis**

WHY THIS IS RIGHT

Clostridioides difficile infection (CDI) is an antibiotic-associated, toxin-mediated colitis characterized by formation of pseudomembranes in the colon.

- Pathogenesis:
 - o Overgrowth after broad-spectrum antibiotics
 - o Produces toxin A (enterotoxin) and toxin B (cytotoxin) -> mucosal damage
- Clinical features:
 - o Watery diarrhea
 - o Abdominal pain
 - o Fever
 - o Severe cases -> toxic megacolon
- Diagnosis:
 - o Stool toxin detection (ELISA/PCR for toxin genes)
 - o IgM assay is NOT used -> hence incorrect statement
- Pseudomembrane composition: Leukocytes + fibrin + necrotic epithelial debris
- Treatment: Oral vancomycin or fidaxomicin (first line)

QUESTION

Which of the following is considered to be the best for the detection of *Clostridium difficile*?

- A Aerobic culture of stool
- B Glutamate dehydrogenase and toxin assay**
- C Glutamate dehydrogenase assay
- D None of the above

CORRECT

RIGHT ANSWER

- B. Glutamate dehydrogenase and toxin assay**

WHY THIS IS RIGHT

The best diagnostic approach for *Clostridioides difficile* infection is a combination test: Glutamate dehydrogenase (GDH) antigen + toxin assay.

- GDH antigen test:
 - o Highly sensitive
 - o Detects presence of *C. difficile* organism (both toxigenic & non-toxigenic strains)
- Toxin assay (A & B):
 - o Highly specific
 - o Confirms toxin production -> clinically relevant disease
- Why combination is best:
 - o GDH screens -> toxin assay confirms
 - o Improves diagnostic accuracy (high sensitivity + specificity)

Why not others:

- Aerobic culture: organism is anaerobic -> not suitable
- GDH alone: cannot differentiate toxigenic vs non-toxigenic strains

QUESTION

A newly joined teacher develops rice water stools. The causative agent acts on which of the following receptors?

A GM1 ganglioside receptor

CORRECT

B GM2 ganglioside receptor

C Sphingomyelin

D Cerebroganglioside

RIGHT ANSWER

OK A. GM1 ganglioside receptor

WHY THIS IS RIGHT

Vibrio cholerae causes rice-water diarrhea by producing cholera toxin, which binds to the GM1 ganglioside receptor on intestinal epithelial cells.

· Mechanism of action:

- o Cholera toxin (AB toxin) binds GM1 receptor
- o Activates adenylate cyclase -> ↑ cAMP
- o Leads to massive Cl^- and water secretion -> profuse watery diarrhea

· Clinical features:

- o "Rice-water stools" (watery, flecks of mucus)
- o Severe dehydration
- o No invasion -> no inflammation

Why not others: GM2, sphingomyelin, cerebroganglioside -> not involved in cholera toxin binding

QUESTION

A 12-year-old boy presents with right upper quadrant pain, calf pain, conjunctival suffusion, icterus, and fever. Examination shows tender hepatomegaly. What is the most likely diagnosis?

- A Chikungunya
- B Leptospirosis**
- C Dengue hemorrhagic fever
- D Encephalopathy caused by hepatitis A

CORRECT

RIGHT ANSWER

OK **B. Leptospirosis**

WHY THIS IS RIGHT

Leptospirosis (caused by *Leptospira interrogans*) should be suspected in patients with fever + myalgia (especially calf pain) + conjunctival suffusion + jaundice (Weil disease).

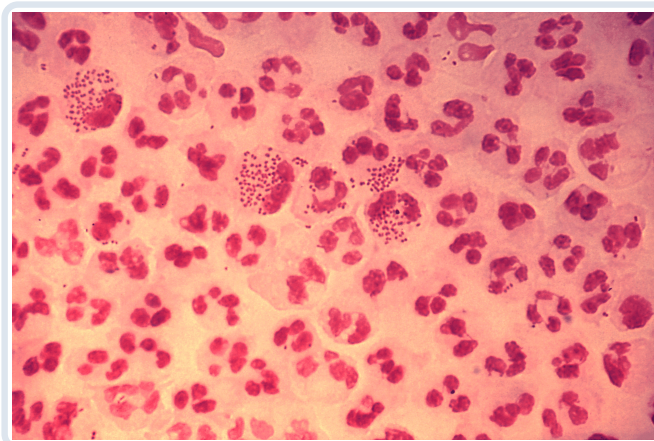
- Transmission: exposure to water/soil contaminated with animal urine (rats, livestock)
- Biphasic illness:
 - o Septicemic phase: fever, headache, severe calf muscle pain, conjunctival suffusion
 - o Immune phase: meningitis, hepatic and renal dysfunction (Weil disease)
- Characteristic triad (Weil disease): Jaundice + renal failure + hemorrhage
- Distinctive clue: Conjunctival suffusion (red eyes without discharge) -> highly suggestive

Why not others:

- Chikungunya: severe joint pain, no jaundice
- Dengue hemorrhagic fever: bleeding, thrombocytopenia, no calf pain or suffusion
- Hepatitis A: jaundice but no calf pain or conjunctival suffusion

QUESTION

A patient presented with pus discharge from the urethra and dysuria. He had a history of unprotected sexual intercourse. The best culture media for the following organism is:



A Blood agar

B MacConkey agar

C Thayer Martin agar

CORRECT

D Wilson Blair agar

RIGHT ANSWER

OK

C. Thayer Martin agar

WHY THIS IS RIGHT

Neisseria gonorrhoeae is cultured on Thayer-Martin agar, a selective chocolate agar used for isolating pathogenic *Neisseria*.

- Organism: Gram-negative intracellular diplococci
- Clinical: urethral discharge, dysuria after unprotected sexual exposure
- Fastidious organism -> requires enriched media
- Grows best on chocolate agar with CO₂ (5-10%)

Selective medium: Thayer-Martin agar contains antibiotics:

- o Vancomycin -> inhibits Gram-positive bacteria
- o Colistin -> inhibits Gram-negative rods
- o Nystatin -> inhibits fungi
- o Trimethoprim -> inhibits *Proteus*

Why not others:

- Blood agar -> not selective
- MacConkey agar -> for enteric Gram-negative bacilli
- Wilson-Blair agar -> for *Salmonella*

QUESTION

| What does 'H' indicate in a patient presenting with a history of EHEC O157:H7?

- A** Capsule
- B** Fimbriae
- C** Flagella
- D** Lipopolysaccharide

CORRECT

RIGHT ANSWER

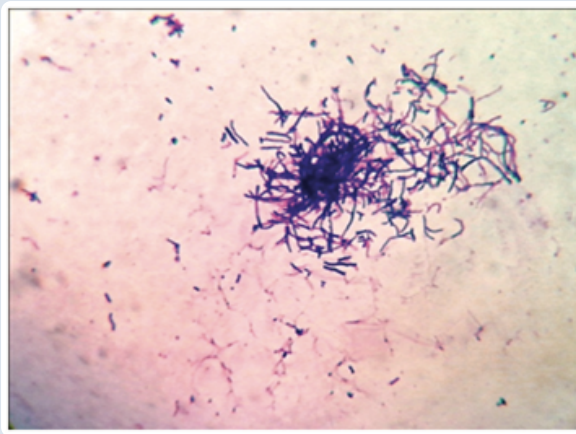
OK C. Flagella

WHY THIS IS RIGHT

Antigen	Represents	Location / Structure
O antigen	Somatic antigen	LPS (cell wall)
H antigen	Flagellar antigen	Flagella (motility)
A antigen	Fimbrial (pili) antigen	Surface pili or fimbriae

QUESTION

A farmer suffered from a subcutaneous wound on the dorsum of the foot which later involved the subcutaneous tissue and produced a discharging ulcer. Microscopic examination of the discharge showed gram-positive filamentous rods with branching. The organism responsible is:



A Candida

B Sporotrichosis

C Histoplasma

D Nocardia

CORRECT

RIGHT ANSWER

OK D. Nocardia

WHY THIS IS RIGHT

A chronic subcutaneous infection with discharging sinuses showing Gram-positive, branching filamentous rods is characteristic of Nocardia infection (often presenting as mycetoma).

- Gram-positive, branching filamentous bacteria
- Weakly acid-fast (important distinguishing feature)
- Aerobic organism found in soil -> common in farmers

Clinical features:

- Chronic subcutaneous swelling
- Discharging sinuses with granules
- May extend to deeper tissues (mycetoma)

Differentiation:

- Actinomyces -> branching but non-acid-fast, anaerobic
- Candida / Histoplasma -> fungi (yeast forms)
- Sporotrichosis -> nodular lesions along lymphatics ("rose gardener's disease")

QUESTION

A traveler consumed oysters. He later presented with bloody diarrhea, abdominal pain, and vomiting. The organism seen on microscopy exhibited Kanagawa phenomenon. The likely causative organism is:

A Staphylococcus aureus

B Salmonella typhi

C Vibrio parahaemolyticus

CORRECT

D Vibrio cholera

RIGHT ANSWER

OK

C. Vibrio parahaemolyticus

WHY THIS IS RIGHT

Vibrio parahaemolyticus is a marine, halophilic organism that causes acute gastroenteritis after ingestion of raw or undercooked seafood (especially oysters).

- Bloody diarrhea, abdominal pain, vomiting
- Exposure to seafood (oysters, shellfish)
- Gram-negative, curved rod

Diagnostic hallmark:

- Kanagawa phenomenon -> β -hemolysis on Wagatsuma agar
- Due to thermostable direct hemolysin (TDH) -> virulence factor

Differentiation:

- Vibrio cholerae -> profuse watery "rice water" diarrhea, not bloody
- Staphylococcus aureus -> toxin-mediated, rapid onset vomiting
- Salmonella typhi -> enteric fever, not seafood-associated diarrhea

QUESTION

A patient presented with abdominal pain since 4 days with a history of remitting fever and bradycardia after having meals outside frequently. Which test can be done in the patient to confirm the diagnosis?

A Widal test

B Blood culture

CORRECT

C Urine culture

D Stool culture

RIGHT ANSWER

OK B. Blood culture

WHY THIS IS RIGHT

Enteric (Typhoid) fever - *Salmonella typhi*/paratyphi: presents with step-ladder fever, abdominal pain, and relative bradycardia (Faget sign) after outside food intake.

Week of Illness	Test of Choice
1st week	Blood culture
2nd week	Agglutination (Widal test)
3rd week	Stool culture
4th week	Urine culture

QUESTION

A 40-year-old farmer presented with retro-orbital pain, conjunctival suffusion, night fever and chills, calf tenderness, cervical lymphadenopathy, hypokalemia, and joint pain. What can be the most likely diagnosis?

A Malaria

B Leptospirosis

CORRECT

C Filariasis

D Dengue

RIGHT ANSWER

OK

B. Leptospirosis

WHY THIS IS RIGHT

Leptospirosis should be suspected in patients with fever, conjunctival suffusion, and calf muscle tenderness, especially with occupational exposure (e.g., farmers).

- Conjunctival suffusion (redness without discharge)
- Severe calf muscle tenderness (characteristic)
- Fever with chills, myalgia, joint pain
- Retro-orbital pain may be present
- Electrolyte abnormalities (e.g., hypokalemia)

Transmission: Exposure to water/soil contaminated with urine of infected animals (especially rodents)

Severe form: Weil's disease -> jaundice, renal failure, hemorrhage

Differentiation:

- Dengue -> retro-orbital pain but no calf tenderness or conjunctival suffusion
- Malaria -> periodic fever, no conjunctival suffusion

Filariasis -> lymphatic involvement

QUESTION

A 30-year-old male travels frequently and has food during his travels. He presents to PHC OPD with abdominal pain, fever for 4 days. He has bradycardia too. Test for confirmation of diagnosis:

A Blood culture

CORRECT

B Widal test

C Stool culture

D Urine culture

RIGHT ANSWER

OK

A. Blood culture

WHY THIS IS RIGHT

Enteric fever (typhoid) should be suspected in a patient with prolonged fever, abdominal pain, and relative bradycardia (Faget sign) and is caused by *Salmonella typhi*.

Blood culture is the best confirmatory test in the first week of illness

Timeline of investigations:

- 1st week -> Blood culture (highest yield)
- 2nd week onward -> Widal test becomes positive
- Later stages -> Stool and urine cultures may become positive

Why not others:

- Widal test -> not reliable in early phase
- Stool/urine culture -> useful later

QUESTION

A child presents with pharyngitis, and Group A Streptococcus is isolated from the throat specimen. Which bacterial factor facilitates the binding of fibronectin on host cells, thereby aiding in bacterial attachment?

A Lipoprotein

B Lipoteichoic acid

CORRECT

C Capsule

D Flagella

RIGHT ANSWER

OK B. Lipoteichoic acid

WHY THIS IS RIGHT

Group A Streptococcus (*Streptococcus pyogenes*) adheres to host epithelial cells via lipoteichoic acid, which binds to fibronectin on host cells.

- Lipoteichoic acid (LTA) on bacterial surface binds fibronectin
- Fibronectin acts as a bridge to host epithelial cells
- Facilitates colonization of the pharynx

Other virulence factors:

- M protein -> anti-phagocytic, major virulence factor
- Capsule (hyaluronic acid) -> immune evasion
- Streptolysins -> tissue damage

Why not others:

- Lipoprotein -> not primary adhesion factor here
- Capsule -> prevents phagocytosis, not adhesion

Flagella -> GAS is non-motile

QUESTION

A patient is brought to the emergency department with pneumonia and hypotension and later succumbs to the illness. There is a history of meningitis. Postmortem examination of the brain reveals petechial hemorrhages and thrombosed vessels. What is the most likely causative organism?



A *Neisseria meningitidis*

CORRECT

B *Cryptococcus neoformans*

C *Haemophilus influenzae*

D *Streptococcus pneumoniae*

RIGHT ANSWER

OK

A. *Neisseria meningitidis*

WHY THIS IS RIGHT

Neisseria meningitidis causes fulminant meningococemia characterized by septic shock, petechial/purpuric rash, and disseminated intravascular coagulation (DIC).

- Gram-negative diplococcus
- Causes meningitis and rapidly progressive septicemia
- Petechial hemorrhages -> can progress to purpura fulminans
- Endotoxin (LOS) -> massive cytokine release
- Leads to DIC -> thrombosis + hemorrhage

Complication: Waterhouse-Friderichsen syndrome (adrenal hemorrhage)

Differentiation:

- *Streptococcus pneumoniae* -> meningitis without petechial rash
- *Haemophilus influenzae* -> meningitis, less severe septicemia
- *Cryptococcus* -> chronic meningitis in immunocompromised

QUESTION

A patient presents with a brain abscess involving the parieto-occipital region. Laboratory examination reveals Gram-positive, branched, filamentous bacteria that are positive on modified acid-fast staining and grow using the paraffin bait technique. What is the most likely causative organism?

A Mycobacterium species

B Nocardia

CORRECT

C Actinomyces israelii

D Neisseria meningitidis

RIGHT ANSWER

OK

B. Nocardia

WHY THIS IS RIGHT

Nocardia species are aerobic, branching, filamentous Gram-positive bacteria that are weakly acid-fast and characteristically identified by the paraffin bait technique.

- Gram-positive, branching filamentous organisms
- Partially acid-fast (modified Ziehl-Neelsen stain)
- Aerobic organism

Diagnostic clue: Paraffin bait technique -> Nocardia can utilize hydrocarbons (paraffin) for growth

Clinical relevance:

- Causes opportunistic infections
- Common presentations:

- o Pulmonary nocardiosis
- o Brain abscess (classically in immunocompromised patients)
- o Cutaneous infections

Differentiation:

- Actinomyces -> non-acid-fast, anaerobic
- Mycobacterium -> strongly acid-fast, non-branching rods
- Neisseria -> Gram-negative diplococci

QUESTION

An abattoir worker develops a cutaneous ulcer on the dorsum of the hand. Culture of the lesion yields a Gram-positive organism that shows a positive McFadyean's reaction. What is the most likely causative organism in this case?

A Leptospira interrogans

B Clostridium perfringens

C Bacillus anthracis

CORRECT

D Listeria monocytogenes

RIGHT ANSWER

OK C. Bacillus anthracis

WHY THIS IS RIGHT

Bacillus anthracis causes cutaneous anthrax, classically seen in individuals handling animal products (e.g., abattoir workers).

- McFadyean reaction -> demonstrates capsule (polypeptide capsule) using special staining
- Appears as blue bacilli with a pink capsule
- Painless ulcer -> progresses to black eschar with surrounding edema

Key microbiological features:

- Gram-positive, spore-forming rod
- Non-motile
- Forms characteristic "Medusa head" colonies

Differentiation:

- Leptospira -> spirochete (not Gram-positive rod)
- Clostridium perfringens -> gas gangrene, not eschar
- Listeria -> intracellular pathogen, no capsule demonstration by McFadyean

QUESTION

An elderly resident of an old-age home consumed raw milk along with other residents. Shortly after, several individuals developed abdominal pain, bloody diarrhea, and vomiting. Microscopic examination of the stool revealed Gram-negative curved rods. What is the most likely causative organism responsible for this outbreak?

A Clostridium perfringens

B Staphylococcus aureus

C Vibrio parahaemolyticus

D **Campylobacter jejuni**

CORRECT

RIGHT ANSWER

OK **D. Campylobacter jejuni**

WHY THIS IS RIGHT

Campylobacter jejuni is a common cause of foodborne gastroenteritis associated with consumption of unpasteurized milk and presents with bloody diarrhea.

- Gram-negative, curved or “comma-shaped” rods
- Microaerophilic organism
- Transmitted via contaminated food (especially unpasteurized milk, poultry)

Important complications:

- Guillain-Barré syndrome
- Reactive arthritis

Differentiation:

- Clostridium perfringens -> toxin-mediated watery diarrhea, no blood
- Staphylococcus aureus -> rapid-onset vomiting due to preformed toxin

Vibrio parahaemolyticus -> seafood-associated diarrhea

QUESTION

A farmer presents with fever, jaundice, and conjunctival hemorrhage, and later succumbs to the illness. What is the most likely disease responsible for this clinical presentation?

A Brucellosis

B Hepatitis A

C **Weil's disease**

CORRECT

D Dengue hemorrhagic fever

RIGHT ANSWER

OK C. **Weil's disease**

WHY THIS IS RIGHT

Weil's disease is the severe form of leptospirosis caused by *Leptospira interrogans*, typically seen in individuals exposed to contaminated water (e.g., sewage workers). Key clinical triad:

- Fever
- Jaundice
- Hemorrhage (classically conjunctival suffusion/hemorrhage)

Important features:

- Exposure to contaminated water or animal urine (especially rodents)
- Biphasic illness -> septicemic phase followed by immune phase
- Severe disease -> hepatic dysfunction, renal failure, hemorrhage

Differentiation:

- Brucellosis -> undulant fever, no hemorrhage
- Hepatitis A -> jaundice without hemorrhagic features
- Dengue hemorrhagic fever -> thrombocytopenia, no prominent jaundice

QUESTION

A farmer presents with multiple draining sinuses on the foot, with black granules discharging from the lesions. Based on this presentation, what is the most likely microscopic finding expected in this case?



- A Arthrospores
- B Septate hyphae with 4-5-micron width**
- C Yeast with pseudohyphae
- D Tender flower rosette

CORRECT

RIGHT ANSWER

- B. Septate hyphae with 4-5-micron width**

WHY THIS IS RIGHT

No explanation was provided in the source quiz.

Type	Pathology
Madura mycetoma (Eumycetoma)	Caused by fungi; produces black or pale grains.
Actinomycetoma (Actinomycetes mycetoma)	Caused by filamentous bacteria (actinomycetes); produces white/yellow/red grains.
Bacterial mycetoma (non-actinomycetes)	Caused by true bacteria; grains usually absent or minimal, more acute inflammation.

QUESTION

| Which extracellular cell adhesion is disrupted by *Vibrio cholerae*?

- A Integrin
- B Cadherin
- C Occludens**
- D None of the above

CORRECT

RIGHT ANSWER

- OK C. Occludens**

WHY THIS IS RIGHT

Vibrio cholerae disrupts tight junctions between intestinal epithelial cells, specifically affecting zonula occludens.

- Cholera toxin -> ↑ cAMP via activation of adenylate cyclase
- Leads to massive chloride and water secretion
- Also disrupts tight junction proteins (occludens), increasing intestinal permeability

Key concept:

- Tight junctions (zonula occludens) maintain paracellular barrier integrity
- Their disruption contributes to profuse watery diarrhea

Differentiation:

- Integrins -> cell-matrix adhesion
- Cadherins -> adherens junctions (cell-cell adhesion)

QUESTION

| Which organism moves transcellularly by utilizing actin filaments?

A Listeria

CORRECT

B EIEC (Enteroinvasive E. coli)

C Salmonella

D Vibrio

RIGHT ANSWER

OK

A. Listeria

WHY THIS IS RIGHT

Listeria monocytogenes spreads from cell to cell by polymerizing host actin filaments.

- Uses ActA protein to induce actin polymerization
- Forms “actin comet tails” that propel the bacterium within and between cells
- Allows transcellular spread without exposure to extracellular immune defenses

Key points:

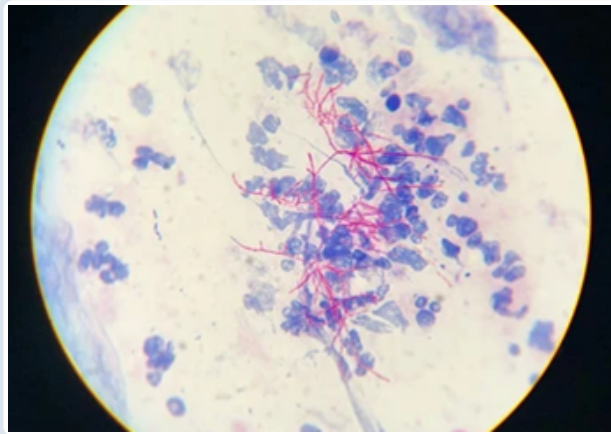
- Facultative intracellular organism
- Causes meningitis and sepsis in neonates, elderly, and immunocompromised
- Shows tumbling motility and grows at low temperatures

Differentiation:

- EIEC -> intracellular but does not use actin-based motility
- Salmonella -> resides in vacuoles (no actin comet tails)
- Vibrio -> extracellular organism

QUESTION

Identify the organism and the staining method used in the provided image.



A Nocardia acid fast stain

CORRECT

B Streptococcus gram stain

C Cryptococcus india ink

D Coccidioidomycosis PAS stain

RIGHT ANSWER

OK

A. Nocardia acid fast stain

WHY THIS IS RIGHT

Nocardia is a partially acid-fast, filamentous, branching Gram-positive bacterium identified using modified acid-fast staining.

- Shows thin, branching, filamentous structures
- Weakly acid-fast due to mycolic acids (demonstrated by modified Ziehl-Neelsen stain)
- Appears as red filaments against blue background

Clinical relevance:

- Causes opportunistic infections, especially in immunocompromised patients
- Common presentations: pulmonary infection, brain abscess, cutaneous disease

Differentiation:

- Actinomyces -> non-acid-fast, anaerobic
- Mycobacteria -> strongly acid-fast, non-branching rods
- Fungi -> seen with PAS/GMS stains, not acid-fast

QUESTION

| Which bacterial toxin acts by interfering with EF-2 function?

A Diphtheria

CORRECT

B Clostridium

C Bacillus

D Vibrio

RIGHT ANSWER

OK

A. Diphtheria

WHY THIS IS RIGHT

Diphtheria toxin inhibits protein synthesis by inactivating elongation factor-2 (EF-2).

- Catalyzes ADP-ribosylation of EF-2
- Blocks translocation step in protein synthesis -> cell death

Key points:

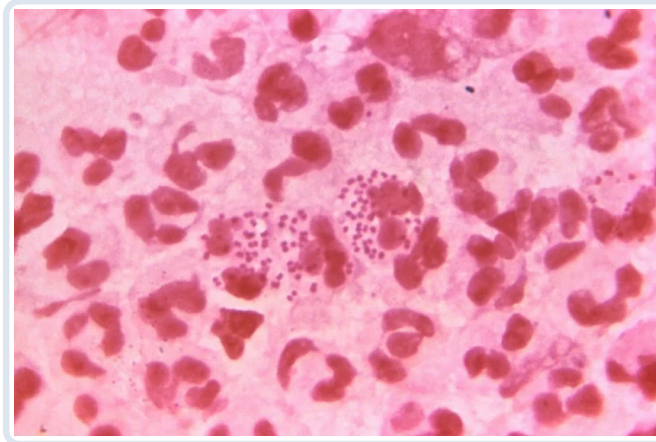
- Produced by *Corynebacterium diphtheriae*
- Responsible for systemic complications such as myocarditis and neuropathy
- Acts as an exotoxin (A-B toxin)

Differentiation:

- Clostridium toxins -> neurotoxins (tetanus, botulinum) affecting neurotransmitters
- Bacillus (e.g., anthrax) -> edema and lethal toxins
- Vibrio cholerae -> activates adenylate cyclase -> ↑ cAMP

QUESTION

A woman presents with dysuria and yellowish discharge. Gram staining is shown below. What is the diagnosis?



A Trichomoniasis

B **Neisseria**

CORRECT

C Chlamydia

D Bacterial vaginosis

RIGHT ANSWER

OK **B. Neisseria**

WHY THIS IS RIGHT

Gram-negative diplococci seen on Gram stain in a patient with dysuria and yellowish discharge is characteristic of *Neisseria gonorrhoeae* infection.

- Appears as kidney-shaped Gram-negative diplococci, often intracellular within neutrophils
- Causes gonorrhea, presenting with urethritis, cervicitis, and purulent discharge
- Transmitted sexually

Differentiation:

- Trichomoniasis -> motile protozoa, not seen on Gram stain
- Chlamydia -> intracellular organism not visible on Gram stain
- Bacterial vaginosis -> clue cells, mixed flora, not diplococci

QUESTION

Drug resistance is seen in which of the following STDs:

- A** Syphilis
- B** Chancroid
- C** Donovanosis

D **Gonorrhea**

CORRECT

RIGHT ANSWER

OK **D. Gonorrhea**

WHY THIS IS RIGHT

Antimicrobial resistance is a major concern in sexually transmitted infections, especially with *Neisseria gonorrhoeae*.

- *Neisseria gonorrhoeae* shows high levels of drug resistance
- Resistance has been reported to penicillin, tetracycline, fluoroquinolones, and even emerging resistance to cephalosporins
- Mechanisms include β -lactamase production, altered penicillin-binding proteins, and efflux pumps

Clinical relevance:

- Requires updated treatment guidelines (currently ceftriaxone-based regimens)
- Regular surveillance of resistance patterns is essential

Differentiation:

- Syphilis (*Treponema pallidum*) -> remains sensitive to penicillin
- Chancroid -> some resistance reported but not as significant
- Donovanosis -> treated effectively with antibiotics like azithromycin

QUESTION

Which among the following is the most specific disease caused by *Streptococcus agalactiae*?

A Neonatal sepsis

CORRECT

B Infective endocarditis

C Dental caries

D Pharyngitis with or without tonsillitis

RIGHT ANSWER

OK
A. Neonatal sepsis

WHY THIS IS RIGHT

Streptococcus agalactiae (Group B *Streptococcus*) is classically associated with neonatal infections.

- Most specific disease: neonatal sepsis (early- and late-onset)
- Also causes neonatal meningitis and pneumonia
- Transmitted from colonized maternal genital tract during delivery

Clinical relevance:

- Screening of pregnant women (35-37 weeks) is recommended
- Intrapartum antibiotic prophylaxis prevents neonatal infection

Differentiation:

- *Streptococcus pyogenes* -> pharyngitis, rheumatic fever
- *Streptococcus mutans* -> dental caries
- Infective endocarditis -> more commonly due to viridans streptococci or *Staphylococcus aureus*

QUESTION

A patient was injured with a rusted metal object. What is the mechanism of action of tetanus toxin in such cases?

A Inhibit the release of GABA and glycine

CORRECT

B Inhibit the release of Acetylcholine

C Inhibit the release of epinephrine

D Inhibit the release of norepinephrine

RIGHT ANSWER

OK A. Inhibit the release of GABA and glycine

WHY THIS IS RIGHT

Tetanus toxin (tetanospasmin) causes spastic paralysis by blocking inhibitory neurotransmission. Inhibits release of inhibitory neurotransmitters GABA and glycine from interneurons in the spinal cord

Loss of inhibitory control -> continuous motor neuron excitation -> muscle rigidity and spasms

Clinical features:

- Trismus (lockjaw)
- Opisthotonus
- Generalized muscle spasms

Differentiation:

- Botulinum toxin inhibits acetylcholine release -> flaccid paralysis
- Tetanus causes spastic paralysis due to inhibition of inhibitory neurotransmitters

QUESTION

Assertion - Reason:**(A) Myocarditis is the common known complication of faucial diphtheria****(R) It is due to bacteremia by diphtheria**

- A** Assertion is true, reason is true; reason is the correct explanation for the assertion
- B** Assertion is true, reason is true; reason is not the correct explanation for the assertion
- C** Assertion is false and reason is true
- D** Assertion is true and reason is false CORRECT

RIGHT ANSWER

OK **D. Assertion is true and reason is false**

WHY THIS IS RIGHT

Myocarditis is a well-known and serious complication of faucial diphtheria, but it is not due to bacteremia.

- *Corynebacterium diphtheriae* produces a potent exotoxin
- The toxin spreads hematogenously and causes damage to distant organs, especially the heart and nerves
- Myocarditis occurs due to toxin-mediated inhibition of protein synthesis (via EF-2 inactivation), not due to direct bacterial invasion

Concept clarification:

- Diphtheria is primarily a toxemia, not a bacteremia
- Local infection remains in the throat, while systemic effects are toxin-mediated

QUESTION

A female patient presents with swollen Bartholin glands. Discharging pus showed Gram-negative intracellular diplococci. Which is the organism?

A *Neisseria gonorrhoeae*

CORRECT

B Chlamydia

C Chancroid

D Syphilis

RIGHT ANSWER

OK **A. *Neisseria gonorrhoeae***

WHY THIS IS RIGHT

Gram-negative intracellular diplococci seen in pus from an infected Bartholin gland are characteristic of *Neisseria gonorrhoeae*.

- Appears as kidney-shaped Gram-negative diplococci inside neutrophils
- Causes gonorrhea, a sexually transmitted infection
- Commonly presents with urethritis, cervicitis, and can involve Bartholin glands
- Culture on selective media (e.g., Thayer-Martin) confirms diagnosis

Differentiation:

- *Chlamydia trachomatis* -> intracellular but not visible on Gram stain
- Chancroid (*Haemophilus ducreyi*) -> Gram-negative coccobacilli ("school of fish")
- *Treponema pallidum* -> spirochete, not seen on Gram stain

QUESTION

A 10-year-old child has been diagnosed with diphtheria and is being treated in the ward. His 2.5-year-old brother, who lives in the same house, has received all due vaccinations according to NIS. What is the next best step for the management of the younger sibling?

- A DPT booster
- B Reassure as he is vaccinated
- C Erythromycin + diphtheria toxoid
- D Erythromycin only**

CORRECT

RIGHT ANSWER

- OK D. Erythromycin only**

WHY THIS IS RIGHT

For contacts of diphtheria:

1. Antibiotic prophylaxis -> eradicate carriage
2. ± Vaccine (toxoid) depending on immunization status

Why ONLY erythromycin here?

- Child is fully immunized -> already has protective antibodies
- So NO need for booster/toxoid immediately
- Only need to eliminate possible colonization

☐ Hence: Erythromycin only

QUESTION

Match each disease with the correct causative agent from the options provided:

Disease	Options
a. Donovanosis	1. <i>Treponema carateum</i>
b. Oroya fever	2. <i>Klebsiella granulomatis</i>
c. Rat bite fever	3. <i>Bartonella bacilliformis</i>
d. Pinta	4. <i>Streptobacillus moniliformis</i>

A a-1, b-2, c-3, d-4

B a-2, b-3, c-4, d-1

CORRECT

C a-2, b-4, c-3, d-1

D a-3, b-2, c-1, d-4

RIGHT ANSWER

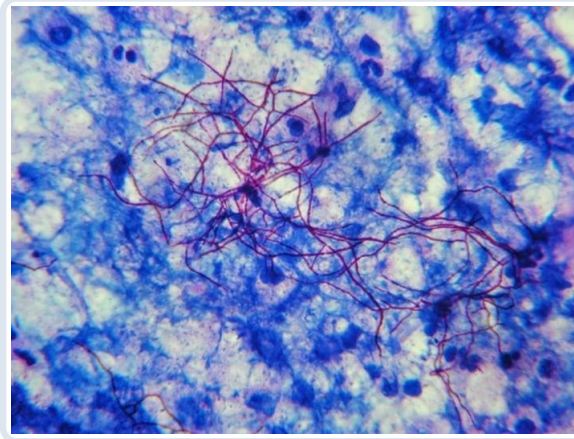
OK B. a-2, b-3, c-4, d-1

WHY THIS IS RIGHT

Condition	Organism
Donovanosis	*Klebsiella granulomatis*
Oroya fever	*Bartonella bacilliformis*
Rat bite fever	*Streptobacillus moniliformis*
Pinta	*Treponema carateum*

QUESTION

A farmer presents with history of blunt trauma to the chest. There is formation of pus from the wound. Microscopy showed mildly acid-fast bacteria with branching. What is the most likely organism?



A Mycobacterium tuberculosis

B Nocardia species

CORRECT

C Listeria

D Anthrax

RIGHT ANSWER

OK

B. Nocardia species

WHY THIS IS RIGHT

Mildly acid-fast, branching filamentous bacteria in a pus sample are characteristic of Nocardia species.

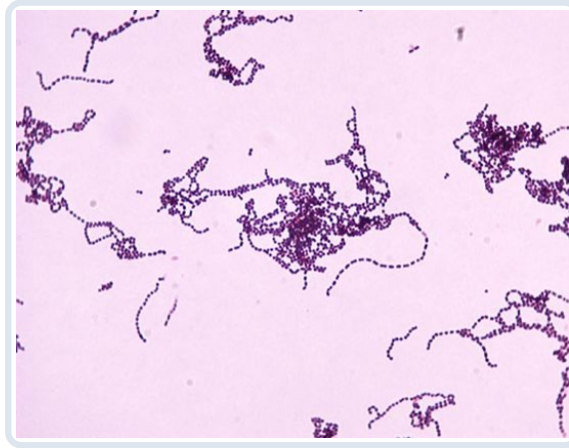
- Nocardia are Gram-positive, branching filamentous bacteria
- They are weakly acid-fast due to mycolic acids in the cell wall
- Found in soil and enter through traumatic implantation or inhalation
- Cause cutaneous infections, mycetoma, and pulmonary disease

Differentiation:

- Mycobacterium tuberculosis -> strongly acid-fast, non-branching rods
- Actinomyces -> branching but non-acid-fast
- Listeria -> short Gram-positive rods
- Bacillus anthracis -> large Gram-positive rods in chains

QUESTION

A 20-year male had a pustule which rapidly progressed to necrotizing fascitis. On microscopy findings were seen. What is the most likely organism involved in this case?



A Streptococcus pyogenes

CORRECT

B Staphylococcus aureus

C Enterococcus

D Micrococcus

RIGHT ANSWER

OK

A. Streptococcus pyogenes

WHY THIS IS RIGHT

Rapidly progressive necrotizing fasciitis with Gram-positive cocci arranged in chains on microscopy is characteristic of Streptococcus pyogenes (Group A Streptococcus).

- Gram-positive cocci in chains -> Streptococcus species
- Streptococcus pyogenes is the most common cause of necrotizing fasciitis ("flesh-eating disease")
- Produces exotoxins (streptolysins, pyrogenic exotoxins) causing rapid tissue destruction
- Can lead to streptococcal toxic shock syndrome

Differentiation:

- Staphylococcus aureus -> Gram-positive cocci in clusters
- Enterococcus -> pairs/short chains, less aggressive soft tissue infection
- Micrococcus -> tetrads, usually non-pathogenic

QUESTION

| Which of the following test is used for antibiotic sensitivity?

A Elek's test

B E-test (Epsilometer test)

CORRECT

C Latex agglutination test

D CAMP test

RIGHT ANSWER

OK

B. E-test (Epsilometer test)

WHY THIS IS RIGHT

The E-test (Epsilometer test) is used to determine antibiotic sensitivity by providing a quantitative measure of the minimum inhibitory concentration (MIC).

- A plastic strip impregnated with a gradient of antibiotic is placed on an inoculated agar plate
- An elliptical zone of inhibition forms after incubation
- The MIC is read where the ellipse intersects the strip

Why not others:

- Elek's test detects diphtheria toxin production
- Latex agglutination is used for antigen detection
- CAMP test identifies Group B Streptococcus

QUESTION

Choose the correct statements from the following options:

- a. Widal test done in first week of illness
- b. Microscopic agglutination test in *Leptospira*
- c. Weil Felix test in typhus fever
- d. Standard agglutination test in Brucellosis
- e. VDRL used for *Treponema pallidum*

A a, b, c, d

B b, c, d, e

CORRECT

C a, c, d

D c & d only

RIGHT ANSWER

OK B. b, c, d, e

WHY THIS IS RIGHT

Understanding the appropriate serological tests for different infections is essential for diagnosis and exam questions.
Correct associations:

- *Leptospira* -> Microscopic agglutination test (MAT)
- Typhus (rickettsial infections) -> Weil-Felix test
- Brucellosis -> Standard agglutination test (SAT)
- *Treponema pallidum* -> VDRL (non-treponemal screening test)

Incorrect statement:

- Widal test is not useful in the first week of illness; it becomes positive only after 7-10 days

QUESTION

Match the following pairs between column 1 and column 2 correctly.

Column 1	Column 2
1. Elek's gel precipitation	a. Streptococcus pneumoniae
2. Quellung reaction	b. Corynebacterium diphtheriae
3. String test	c. Staphylococcus
4. Coagulase	d. Vibrio cholerae

A 1-a, 2-d, 3-c, 4-b

B 1-d, 2-c, 3-a, 4-b

C 1-a, 2-b, 3-c, 4-d

D 1-b, 2-a, 3-d, 4-c

CORRECT

RIGHT ANSWER

OK D. 1-b, 2-a, 3-d, 4-c

WHY THIS IS RIGHT

Organism	Test	Purpose
Corynebacterium diphtheriae	Elek's gel precipitation test	Detects diphtheria toxin via immunodiffusion.
Streptococcus pneumoniae	Quellung reaction	Demonstrates capsular swelling with specific antisera.
Vibrio cholerae	String test	Shows mucoid "string" formation confirming Vibrio colony.
Staphylococcus aureus	Coagulase test	Differentiates S. aureus by fibrin clot formation.

QUESTION

The Kanagawa phenomenon, demonstrated using Wagatsuma agar, is characteristic of which bacterial organism?

- A Vibrio cholerae
- B Vibrio parahaemolyticus**
- C Shigella sonnei
- D Burkholderia pseudomallei

CORRECT

RIGHT ANSWER

- OK **B. Vibrio parahaemolyticus**

WHY THIS IS RIGHT

The Kanagawa phenomenon is a hemolysis reaction seen on Wagatsuma agar and is characteristic of *Vibrio parahaemolyticus*.

- Demonstrates beta-hemolysis due to thermostable direct hemolysin (TDH)
- TDH is a major virulence factor responsible for enterotoxic effects
- Associated with seafood-related gastroenteritis (especially raw/undercooked seafood)

Differentiation:

- *Vibrio cholerae* -> causes rice-water diarrhea via cholera toxin (no Kanagawa phenomenon)
- *Shigella* -> invasive dysentery, no hemolysis on Wagatsuma agar
- *Burkholderia pseudomallei* -> causes melioidosis, unrelated

QUESTION

Identify the organism by this Test?



- A** Group B streptococcus
- B** **Haemophilus influenzae**
- C** Corynebacterium diphtheriae
- D** Clostridium tetani

CORRECT

RIGHT ANSWER

OK

B. Haemophilus influenzae

WHY THIS IS RIGHT

The image represents the satellitism test, used to identify *Haemophilus influenzae*.

- *Haemophilus influenzae* requires both X factor (hemin) and V factor (NAD) for growth
- On blood agar, it shows satellitism around *Staphylococcus aureus* colonies, which provide V factor
- Appears as small colonies growing around a streak of *S. aureus*

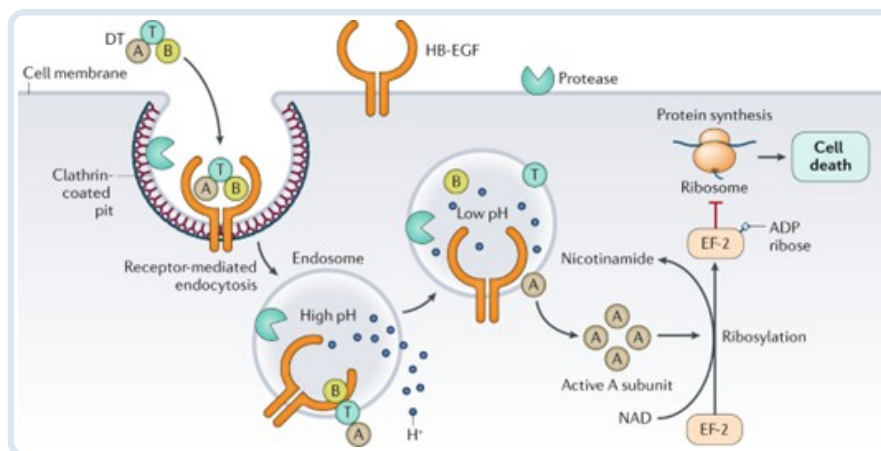
Clinical relevance:

- Causes meningitis, pneumonia, epiglottitis, and otitis media
- Encapsulated type b (Hib) is most virulent

Thus, satellitism on blood agar is a key diagnostic feature of *Haemophilus influenzae*.

QUESTION

Which of the following statements about the toxin shown (Diphtheria toxin mechanism) is incorrect?



A Most toxic known to man

CORRECT

B Causes myocarditis

C It is an exotoxin

D Vaccine is available

RIGHT ANSWER

OK

A. Most toxic known to man

WHY THIS IS RIGHT

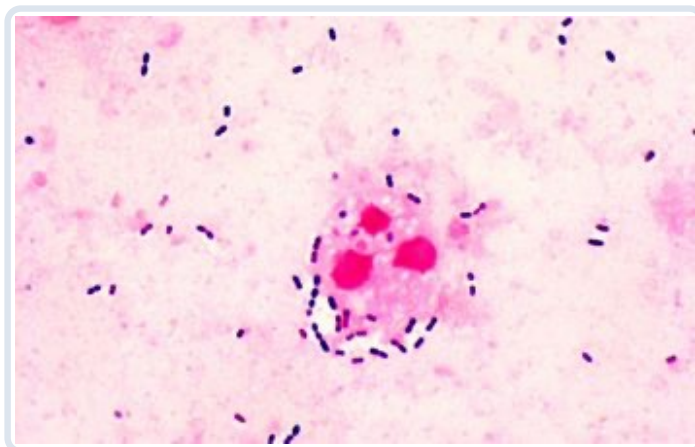
Diphtheria toxin is an AB exotoxin that inhibits protein synthesis by ADP-ribosylation of elongation factor-2 (EF-2), leading to cell death.

- It is an exotoxin produced by *Corynebacterium diphtheriae*
- Mechanism: inactivates EF-2 → blocks protein synthesis
- Causes systemic complications, especially myocarditis and neuropathy
- Vaccine is available (toxoid vaccine) and provides effective protection
- It is highly potent but not the most toxic substance known (botulinum toxin is more potent)

Thus, diphtheria toxin is an exotoxin causing inhibition of protein synthesis, with vaccine availability, and the incorrect statement is that it is the most toxic known to man.

QUESTION

A 65-year-old man presents with fever, productive cough with rusty-colored sputum, and shortness of breath for 3 days. Gram staining is shown. Which test confirms the organism?



A Catalase test

B Coagulase test

C Bile solubility test

CORRECT

D Novobiocin sensitivity

RIGHT ANSWER

OK C. Bile solubility test

WHY THIS IS RIGHT

A patient with fever, productive cough with rusty sputum, and lobar pneumonia is suggestive of *Streptococcus pneumoniae*.

The confirmatory test is the bile solubility test.

- *Streptococcus pneumoniae* is a Gram-positive, lancet-shaped diplococcus
- It is alpha-hemolytic and optochin sensitive
- Bile solubility test differentiates it from viridans streptococci
- *Pneumococcus* is bile soluble due to autolytic enzyme activation

Why not others:

- Catalase test differentiates Staphylococci (positive) from Streptococci (negative)
- Coagulase test identifies *Staphylococcus aureus*
- Novobiocin sensitivity differentiates *Staphylococcus saprophyticus* (resistant) from *Staphylococcus epidermidis*

QUESTION

| Which of the following is an obligate intracellular organism?

A Campylobacter jejuni

B Tropheryma whipplei

C Ehrlichia chaffeensis

CORRECT

D Serratia marcescens

RIGHT ANSWER

OK

C. Ehrlichia chaffeensis

WHY THIS IS RIGHT

Obligate intracellular organisms are bacteria that must live and multiply inside host cells because they lack the ability to generate sufficient energy independently.

- Ehrlichia chaffeensis is an obligate intracellular bacterium
 - > Infects monocytes
 - > Forms morulae (intracytoplasmic inclusions)
 - > Transmitted by tick bite

Other obligate intracellular organisms:

- Chlamydia
- Rickettsia
- Coxiella
- Ehrlichia
- Anaplasma

Why not others:

- Campylobacter jejuni -> extracellular
- Tropheryma whipplei -> intracellular but not obligate
- Serratia marcescens -> extracellular

QUESTION

| Which of the following microbes is also referred to as Friedlander's bacillus?

A Klebsiella pneumoniae

CORRECT

B Corynebacterium diphtheria

C Chlamydia trachomatis

D Mycoplasma pneumoniae

RIGHT ANSWER

OK

A. Klebsiella pneumoniae

WHY THIS IS RIGHT

Friedländer's bacillus is the historical name for *Klebsiella pneumoniae*, a gram-negative, encapsulated, non-motile rod belonging to the Enterobacteriaceae family.

- Prominent polysaccharide capsule -> gives colonies a mucoid appearance
- Lactose fermenter on MacConkey agar
- Non-motile
- Urease positive

Klebsiella pneumoniae commonly causes:

- Severe lobar pneumonia, especially in alcoholics, diabetics, and debilitated patients
- Thick "currant jelly" sputum
- Urinary tract infections
- Hospital-acquired infections and multidrug resistance (e.g., ESBL, carbapenemase producers)

QUESTION

| Which of the following is not a characteristic feature of El Tor vibrio?

A Resistant to El Tor phage V

CORRECT

B Intrinsic resistance to polymyxin B

C Voges-Proskauer test is positive

D Not susceptible to group IV phage

RIGHT ANSWER

OK

A. Resistant to El Tor phage V

WHY THIS IS RIGHT

Vibrio cholerae biotype El Tor differs from the classical biotype in several microbiological characteristics used for laboratory identification.

Characteristic features of El Tor biotype

- Sensitive to El Tor phage V
- Resistant to polymyxin B
- Voges-Proskauer (VP) test positive
- Hemolytic activity present
- Resistant to classical cholera phage IV

QUESTION

A farmer presenting with fever off and on for the past 4 years was diagnosed to be suffering from chronic brucellosis. All of the following serological tests would be helpful in the diagnosis at this state except:

A Standard Agglutination test

CORRECT

B 2 Mercaptoethanol test

C Complement fixation test

D Coomb's test

RIGHT ANSWER

OK

A. Standard Agglutination test

WHY THIS IS RIGHT

Chronic brucellosis often shows low or absent IgM antibodies, while IgG and incomplete (blocking) antibodies predominate. Therefore, some serological tests become more useful than others in chronic infection.

Serological tests in brucellosis

- Standard Agglutination Test (SAT)
 - o Mainly detects IgM antibodies.
 - o Useful in acute brucellosis, but may be negative in chronic disease.
- 2-Mercaptoethanol (2-ME) test
 - o Destroys IgM antibodies and measures IgG levels.
 - o Helpful for chronic or persistent infection.
- Complement Fixation Test (CFT)
 - o Detects IgG antibodies.
 - o Useful in chronic brucellosis.
- Coombs (antiglobulin) test
 - o Detects incomplete or blocking antibodies that may not agglutinate normally.
 - o Important for diagnosing chronic cases.

QUESTION

All of the following are features of the secondary stage of lymphogranuloma venereum except:

- A Groove sign
- B Esthiomene of vulva**
- C Intra-abdominal LN
- D Painful lymphadenopathy

CORRECT

RIGHT ANSWER

- OK
- B. Esthiomene of vulva**

WHY THIS IS RIGHT

Lymphogranuloma venereum (LGV) is a sexually transmitted infection caused by *Chlamydia trachomatis* serovars L1, L2, and L3. The disease progresses through three stages:

1\ Primary stage

- Small painless genital papule or ulcer
- Often transient and may go unnoticed

2\ Secondary stage (inguinal stage)

Characterized by lymphatic spread and lymphadenitis, with features such as:

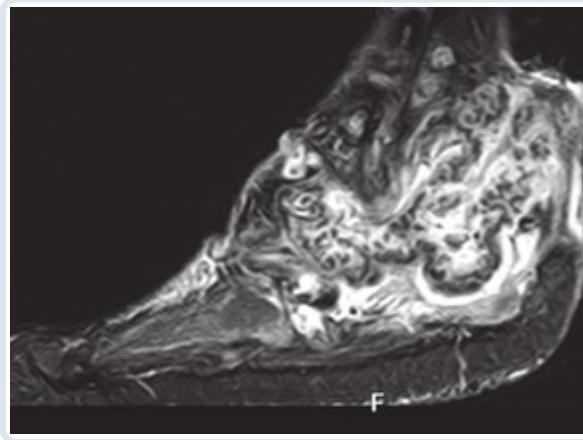
- Painful inguinal lymphadenopathy (buboes)
- Groove sign - depression between inflamed inguinal and femoral lymph nodes
- Pelvic or intra-abdominal lymphadenopathy
- Fever and systemic symptoms

3\ Tertiary stage (late stage)

- Chronic lymphatic obstruction
- Esthiomene of vulva (elephantiasis-like swelling of genitalia)
- Genital strictures and fibrosis

QUESTION

A farmer presents with a swollen foot and multiple sinuses. MRI is shown below. What is the most likely diagnosis?



A Mycetoma

CORRECT

B Squamous cell carcinoma

C Diabetic foot

D Chromoblastomycosis

RIGHT ANSWER

OK A. Mycetoma

WHY THIS IS RIGHT

Mycetoma (Madura foot) is a chronic granulomatous infection of skin, subcutaneous tissue, and bone commonly seen in farmers who walk barefoot in tropical regions. Classic clinical triad

1. Painless swelling of the affected foot
2. Multiple draining sinuses
3. Discharge containing colored grains

Etiology

- Eumycetoma (fungal): *Madurella mycetomatis*, *Pseudallescheria boydii*
- Actinomycetoma (bacterial): *Nocardia*, *Actinomadura*, *Streptomyces*

Characteristic MRI finding

- "Dot-in-circle sign" representing fungal/bacterial grains within inflammatory granulomas.

QUESTION

| Which of the following statement is false about biofilms?

- A** Responsible for prosthetic infections
- B** Bacteria that form biofilms are usually metabolically more active CORRECT
- C** Glycocalyx enclosed bacteria
- D** Associated with quorum sensing

RIGHT ANSWER

- OK** **B. Bacteria that form biofilms are usually metabolically more active**

WHY THIS IS RIGHT

A biofilm is a structured community of microorganisms attached to a surface and embedded in a self-produced extracellular matrix (glycocalyx/exopolysaccharide).

Key characteristics of biofilms:

- Glycocalyx-enclosed bacterial communities that adhere to surfaces.
- Commonly form on medical devices and prosthetic materials (eg, prosthetic valves, catheters, joint prostheses).
- Bacterial communication within biofilms occurs through quorum sensing, which regulates gene expression and biofilm formation.
- Bacteria within biofilms are metabolically less active and slow-growing, making them highly resistant to antibiotics and host immune responses.

QUESTION

Match the following conditions with their causative agents:

I. Pinta	A. Streptobacillus moniliformis
II. Rat bite fever	B. Treponema <u>pertenue</u>
III. Yaws	C. T. <u>endemicum</u>
IV. <u>Bejel</u>	D. Treponema <u>carateum</u>

A I-A, II-B, III-D, IV-C

B I-D, II-A, III-B, IV-C

CORRECT

C I-B, II-A, III-D, IV-C

D I-C, II-B, III-D, IV-A

RIGHT ANSWER

OK B. I-D, II-A, III-B, IV-C

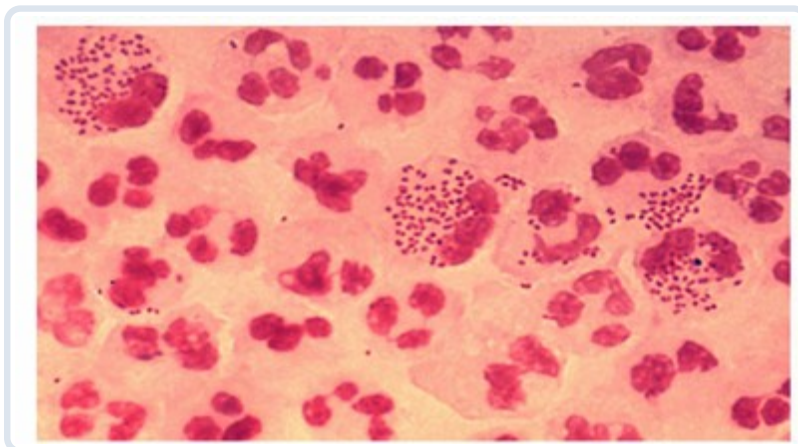
WHY THIS IS RIGHT

No explanation was provided in the source quiz.

Disease	Causative organism	Key feature
Pinta	Treponema <u>carateum</u>	Causes hypopigmented or hyperpigmented skin lesions without systemic involvement
Yaws	Treponema <u>pertenue</u>	Produces papillomatous skin lesions ("raspberry-like") in children in tropical climates
<u>Bejel</u> (Endemic syphilis)	Treponema <u>endemicum</u>	Causes mucocutaneous lesions, transmitted through close nonsexual contact
Rat-bite fever	Streptobacillus moniliformis	Infection after rat bite or exposure to rodents

QUESTION

A 25-year-old man presents with a history of urethral discharge for the last three days. A gram stain smear of the discharge is shown below. All of the following are true regarding the likely etiology except:



A Catalase negative, oxidase positive

CORRECT

B Pili is a virulence factor

C Facultative intracellular organism

D Shows twitching motility

RIGHT ANSWER

OK A. Catalase negative, oxidase positive

WHY THIS IS RIGHT

The smear shows intracellular gram-negative diplococci within neutrophils, which is characteristic of gonococcal urethritis caused by *Neisseria gonorrhoeae*.

Key microbiological features

- Gram-negative, kidney-shaped diplococci
- Found inside neutrophils in urethral discharge
- Oxidase positive and catalase positive
- Facultative intracellular organism
- Pili (fimbriae) act as important virulence factors, helping attachment to mucosal epithelial cells and antigenic variation.

QUESTION

A 58-year-old man on multiple antibiotics is suspected to have pseudomembranous colitis. The criteria for the diagnosis of the suspected condition include all, except:

- A Detection of toxin in stool by PCR
- B Stool wet mount microscopy to visualize the organism**
- C ≥ 3 unformed stools per 24 h for ≥ 2 days)
- D Pseudomembranes on colonoscopy or sigmoidoscopy

CORRECT

RIGHT ANSWER

- B. Stool wet mount microscopy to visualize the organism**

WHY THIS IS RIGHT

Pseudomembranous colitis is an antibiotic-associated colitis caused by *Clostridioides difficile*, resulting from disruption of normal gut flora and production of toxins A and B that damage the colonic mucosa. Diagnosis is based on:

1. Clinical criteria
 - o ≥ 3 unformed stools in 24 hours without another identifiable cause.
2. Laboratory confirmation
 - o Detection of *C. difficile* toxin or toxin gene in stool (e.g., PCR or toxin immunoassay).
3. Endoscopic findings (if required)
 - o Pseudomembranes seen on colonoscopy or sigmoidoscopy.

Why option B is incorrect:

- Stool wet mount microscopy is not used to diagnose *C. difficile* infection, because the organism cannot be reliably identified by routine stool microscopy and diagnosis depends on toxin detection rather than visualization.

QUESTION

A 25-year-old male went for trekking, came with a history of rash. Weil Felix test revealed elevated Ox 2 and Ox 19 titers. What is the most likely organism?

A Rickettsia Rickettsiae

CORRECT

B Rickettsia prowazekii

C Rickettsia typhi

D Scrub typhus

RIGHT ANSWER

OK

A. Rickettsia Rickettsiae

WHY THIS IS RIGHT

The Weil-Felix test is a heterophile agglutination test that detects antibodies produced against Rickettsial infections by their cross-reaction with Proteus O antigens.

Key interpretation pattern:

OX-2 and OX-19 titers elevated -> indicates spotted fever group. The most common organism in this group is Rickettsia rickettsii, which causes Rocky Mountain spotted fever.

Weil-Felix antigen	Associated disease
OX-2 and OX-19 positive	Spotted fever group rickettsiae
OX-19 positive only	Typhus group rickettsiae
OX-K positive	Scrub typhus

QUESTION

22-year-old woman, gravida 1 para 0, at 12 weeks gestation comes to the OPD due to 3 days of rash, fever, and malaise. The rash seems to be getting larger but does not hurt or itch. Two weeks ago, the patient went camping. Temperature is 38.3 C (101 F), blood pressure is 110/80 mm Hg, pulse is 88/min, and respirations are 16/min. The rash is shown in the image below. Which of the following is the most appropriate next step in the management of this patient?



A Amoxicillin

CORRECT

B Doxycycline

C Ceftriaxone

D Observation

RIGHT ANSWER

OK
A. Amoxicillin

WHY THIS IS RIGHT

An expanding annular rash with central clearing (erythema migrans) following recent tick exposure and accompanied by fever and malaise is diagnostic of early localized Lyme disease caused by *Borrelia burgdorferi*.

- Treatment should be started immediately to prevent progression to disseminated disease (neurologic, cardiac, or arthritic complications).
- Doxycycline is first-line in most adults, but it is contraindicated in pregnancy because it can affect fetal bone growth and tooth development.
- Therefore, pregnant patients with early Lyme disease should be treated with oral amoxicillin.

QUESTION

A 49-year-old man comes to the OPD due to a 3-week history of fever, weight loss, and anorexia. Both blood cultures grow *Streptococcus gallolyticus*. Echocardiogram reveals vegetations on the mitral valve. Other than antibiotic treatment, what additional step is recommended in this patient?

A Bronchoscopy

B Colonoscopy

CORRECT

C Repeat blood culture

D Cystoscopy

RIGHT ANSWER

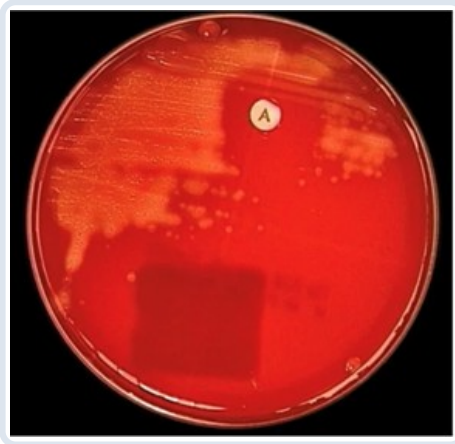
OK B. Colonoscopy

WHY THIS IS RIGHT

Streptococcus gallolyticus (formerly *Streptococcus bovis*) bacteremia or infective endocarditis is strongly associated with colorectal neoplasia, including colorectal cancer and adenomatous polyps. Therefore, all patients diagnosed with *S. gallolyticus* bacteremia or endocarditis should undergo colonoscopy to evaluate for an underlying colorectal malignancy or premalignant lesion, even if gastrointestinal symptoms are absent. Early detection allows identification and treatment of occult colorectal cancer.

QUESTION

The test shown below, which uses a bacitracin disk, is useful in identifying?



- A Staphylococcus aureus
- B Streptococcus pyogenes**
- C Clostridium botulinum
- D Bacillus

CORRECT

RIGHT ANSWER

- B. Streptococcus pyogenes**

WHY THIS IS RIGHT

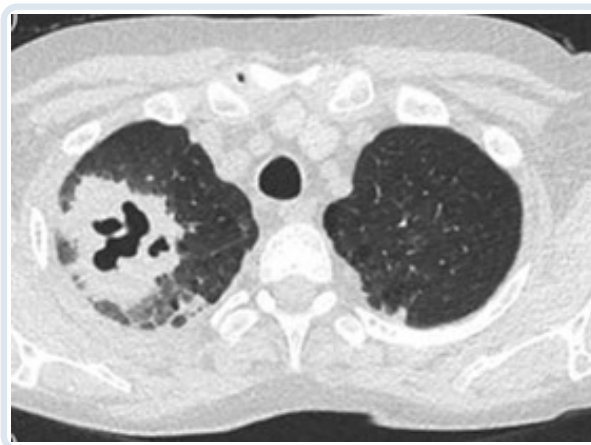
The bacitracin disk test is used to identify Group A β -hemolytic Streptococcus (*Streptococcus pyogenes*), which is bacitracin sensitive, helping differentiate it from other β -hemolytic streptococci (eg, Group B *Streptococcus agalactiae*, which is resistant).

Why not other options:

- *Staphylococcus aureus*: Identified by coagulase test, not bacitracin.
- *Clostridium botulinum*: Identified by toxin detection, anaerobic culture.
- *Bacillus*: Identified by spore formation, motility, culture features.

QUESTION

A 46-year-old man comes to the emergency department due to a week of fever, chills, productive cough with yellow-white sputum, and shortness of breath. The patient received an allogenic renal transplantation 6 months ago and currently takes maintenance immunosuppressive therapy. Chest imaging is shown below. Sputum Gram stain and culture are negative. Bronchoalveolar lavage cultures yield light growth of branching, filamentous rods that are partially acid-fast. Which of the following is the most likely causative organism of this patient's condition?



A TB

B Nocardiosis

CORRECT

C Histoplasma

D Mucormycosis

RIGHT ANSWER

OK

B. Nocardiosis

WHY THIS IS RIGHT

Nocardia causes opportunistic pulmonary infection in immunocompromised patients (eg, transplant recipients). It appears as branching, filamentous, weakly acid-fast gram-positive rods and can produce cavitary lung lesions with possible dissemination to the brain.

Why not other options:

- TB: Acid-fast bacilli but not branching filamentous rods.
- Histoplasma: Intracellular yeast in macrophages, not acid-fast.
- Mucormycosis: Broad non-septate fungal hyphae, not filamentous bacteria.

QUESTION

A 19-year-old man comes to the OPD due to a week of persistent dry cough that disturbs his sleep. He has also had a sore throat, headaches, and fatigue. Yesterday, he noticed a rash on his arms and legs. Temperature is 37.8 C (100 F), blood pressure is 115/78 mm Hg, pulse is 86/min, and respirations are 16/min. Mild pharyngeal erythema is present. There is no cervical lymphadenopathy. A faint macular rash is present on the extremities. Chest x-ray reveals increased interstitial markings and a small right-sided pleural effusion. Which of the following organisms is most likely causing this patient's condition?

A Epstein-Barr virus

B *S. pneumoniae*

C *Legionella pneumophila*

D *Mycoplasma pneumoniae*

CORRECT

RIGHT ANSWER

OK

D. *Mycoplasma pneumoniae*

WHY THIS IS RIGHT

Mycoplasma pneumoniae causes atypical pneumonia in adolescents and young adults, characterized by persistent dry cough, mild fever, interstitial infiltrates on chest X-ray, and extrapulmonary manifestations such as maculopapular rash or hemolytic anemia. It lacks a cell wall and commonly causes “walking pneumonia.”

Why not other options:

- EBV: Infectious mononucleosis -> lymphadenopathy, splenomegaly.
- *S. pneumoniae*: Typical pneumonia -> productive cough, lobar consolidation.
- *Legionella*: Severe pneumonia with diarrhea, hyponatremia.

QUESTION

What is the mechanism of action of the toxin produced by the bacterium whose biochemical tests are shown in the figure below?



A Increase in cAMP

CORRECT

B Zonula occludens toxin

C ADP-ribosylation of EF2

D SNARE protein

RIGHT ANSWER

OK A. Increase in cAMP

WHY THIS IS RIGHT

The biochemical profile shown (Indole +, Methyl red +, Voges-Proskauer -, Citrate -) is the IMViC pattern of *Escherichia coli* (++).

Enterotoxigenic *E. coli* (ETEC) produces heat-labile toxin (LT) that activates adenylate cyclase, leading to increased intracellular cAMP. This causes increased chloride and water secretion into the intestinal lumen, resulting in watery diarrhea.

Why not other options:

- Zonula occludens toxin: Produced by *Vibrio cholerae*, which disrupts tight junctions of intestinal epithelial cells.
- ADP-ribosylation of EF-2: Mechanism of diphtheria toxin from *Corynebacterium diphtheriae*, inhibiting protein synthesis.
- SNARE protein cleavage: Seen with *Clostridium Botulinum* and *Clostridium tetani* toxins, which block neurotransmitter release.

QUESTION

A 26-year-old man comes to the OPD due to a 3-day-history of dysuria and urethral discharge. Gram stain of the discharge reveals numerous neutrophils with intracellular diplococci. A sample of the discharge is placed on an antibiotic-containing medium, and bacterial colonies are cultured. Which of the following terms best describes the medium?

A Differential

B Enrichment

C Reducing

D Selective

CORRECT

RIGHT ANSWER

OK

D. Selective

WHY THIS IS RIGHT

Selective media contain antibiotics or inhibitory substances that suppress the growth of unwanted organisms while allowing the desired pathogen to grow.

For *Neisseria gonorrhoeae*, specimens are commonly cultured on Thayer-Martin medium, a selective medium containing antibiotic that inhibit normal flora but permit growth of *N. gonorrhoeae*.

Why not other options:

- Differential medium: Distinguishes organisms based on biochemical reactions (e.g., lactose fermentation on MacConkey agar) but does not inhibit other bacteria.
- Enrichment medium: Enhances growth of a particular organism from a mixed sample without necessarily suppressing others (e.g., tetrathionate broth for *Salmonella*).
- Reducing medium: Used for anaerobic bacteria by removing oxygen (e.g., thioglycolate broth).

QUESTION

A 3-year-old child presents with fever, loose stools, and blood in the stool. What is the enrichment medium used to isolate the organism from the stool sample?

A Robertson cooked meat broth

B Alkaline peptone water

C Tetrathionate broth

CORRECT

D Brain heart infusion broth

RIGHT ANSWER

OK

C. Tetrathionate broth

WHY THIS IS RIGHT

Tetrathionate broth is an enrichment medium used to isolate *Salmonella* species from stool samples. It suppresses the growth of normal intestinal flora while allowing *Salmonella* to multiply, increasing the likelihood of detection.

Clinically, *Salmonella* infection can present with fever, diarrhea, and sometimes blood in stool, especially in children.

Why not other options:

- Robertson cooked meat broth: Used for anaerobic bacteria (e.g., *Clostridium*), not for enteric pathogens from stool.
- Alkaline peptone water: Enrichment medium for *Vibrio cholerae*.
- Brain heart infusion broth: General-purpose enrichment medium for fastidious organisms, not specific for *Salmonella*.

QUESTION

A 3-year-old boy is brought to the emergency department due to high fever, vomiting, and lethargy. His symptoms started 1 day ago but rapidly worsened over the last few hours. Physical examination shows hypotension, tachycardia, neck stiffness, and a petechial rash over the trunk and lower extremities. While being evaluated, the patient develops apnea and systole. Despite aggressive resuscitation efforts, the patient dies. Autopsy would most likely reveal which of the following?

A Adrenal hemorrhage

CORRECT

B Cardiac tamponade

C Intracerebral hemorrhage

D Necrotizing pancreatitis

RIGHT ANSWER

OK A. Adrenal hemorrhage

WHY THIS IS RIGHT

Neisseria meningitidis infection can cause meningococcemia, characterized by high fever, petechial rash, hypotension, and rapid progression to septic shock in children. Severe endotoxemia may lead to Waterhouse-Friderichsen syndrome, which involves bilateral adrenal hemorrhage, resulting in acute adrenal insufficiency and cardiovascular collapse.

QUESTION

| Match the following:

A. BCYE agar	1. Legionella
B. EMJH agar	2. Campylobacter
C. PEMBA agar	3. Leptospira
D. Butzler's agar.	4. <u>B. cereus</u>

A A-1, B-2, C-3, D-4

B A-1, B-3, C-2, D-4

C A-1, B-3, C-4, D-2

CORRECT

D A-3, B-2, C-1, D-4

RIGHT ANSWER

OK C. A-1, B-3, C-4, D-2

WHY THIS IS RIGHT

Certain bacteria require special culture media for optimal growth and identification:

- BCYE agar (Buffered Charcoal Yeast Extract) -> used to culture Legionella pneumophila.
- EMJH medium (Ellinghausen-McCullough-Johnson-Harris) -> used for Leptospira.
- PEMBA agar (Polymyxin Egg Yolk Mannitol Bromothymol Blue agar) -> selective for Bacillus cereus.
- Butzler's agar -> selective medium for Campylobacter.

QUESTION

A 6-year-old boy is brought to the OPD due to sore throat and fever. Examination shows mild tonsillar erythema with exudates. A sample from the exudates is obtained. On microscopic evaluation, there are clumped, gram-positive bacteria with polar granules that stain deeply with aniline dyes. Which of the following best explains the pathogenicity of the organism most likely responsible for this patient's condition?

- A** Increase cAMP
- B** Blockade of neurotransmitter release
- C** Widespread T cell activation
- D** Impairment of protein synthesis

CORRECT

RIGHT ANSWER

- OK** **D. Impairment of protein synthesis**

WHY THIS IS RIGHT

Corynebacterium diphtheriae appears as gram-positive, club-shaped bacilli arranged in clusters ("Chinese letter" pattern) with metachromatic (Babes-Ernst) polar granules that stain deeply with aniline dyes.

Its pathogenicity is due to the diphtheria toxin, an A-B exotoxin that ADP-ribosylates elongation factor-2 (EF-2), leading to inhibition of protein synthesis and cell death.

Why not other options:

- Increase cAMP: Seen with cholera toxin and pertussis toxin, which increase intracellular cAMP causing secretory diarrhea.
- Blockade of neurotransmitter release: Seen with *Clostridium botulinum* (blocks acetylcholine release) and *Clostridium tetani* (blocks inhibitory neurotransmitters).
- Widespread T-cell activation: Caused by superantigens such as *Staphylococcus aureus* TSST-1 or *Streptococcus pyogenes* exotoxins.

QUESTION

A child was brought with complaints of high fever, multiple seizures, headache, and neck rigidity. CS analysis showed low glucose, high protein, and many polymorphs. The CSF culture showed pleomorphic gram-negative bacilli. What is true about the causative organism?

- A** It is bacitracin sensitive
- B** Produces non-lactose fermenting colonies on MacConkey agar
- C** Exhibits satellitism around *Staphylococcus aureus* colonies
- D** It exhibits alpha hemolysis on sheep blood agar

CORRECT

RIGHT ANSWER

- OK** **C. Exhibits satellitism around *Staphylococcus aureus* colonies**

WHY THIS IS RIGHT

Haemophilus influenzae is a pleomorphic gram-negative coccobacillus that can cause bacterial meningitis in children, presenting with fever, seizures, neck rigidity, and CSF findings of low glucose, high protein, and neutrophilic predominance.

The organism requires factor X (hemin) and factor V (NAD) for growth. On blood agar, it demonstrates satellitism around *Staphylococcus aureus* colonies because *S. aureus* lyses RBCs to release factor V, enabling the growth of *H. influenzae*.

Why not other options:

- Bacitracin sensitive: Characteristic of *Streptococcus pyogenes*, not *Haemophilus influenzae*.
- Non-lactose fermenting colonies on MacConkey agar: Seen in organisms like *Salmonella*, *Shigella*, *Pseudomonas*; *H. influenzae* does not grow on MacConkey agar.
- Alpha hemolysis on sheep blood agar: Characteristic of *Streptococcus pneumoniae*, not *H. influenzae*.

QUESTION

A 26-year-old man develops dysuria and purulent urethral discharge following unprotected sex with a new partner. Nucleic acid amplification testing is positive for *Neisseria gonorrhoea* infection. The patient develops antibody against the bacterial pili that enhance attachment to host cells. His symptoms resolve with adequate treatment. His partner does not receive treatment. Several weeks later, the patient develops *N. gonorrhoeae* reinfection after repeat exposure to the same partner. Which of the following is the most likely reason for the lack of long-lasting immunity against the bacteria despite antibody formation in this patient?

A Antigenic mimicry

B Antigenic variation

CORRECT

C Conjugative plasmid

D Low molecular weight antigen

RIGHT ANSWER

OK

B. Antigenic variation

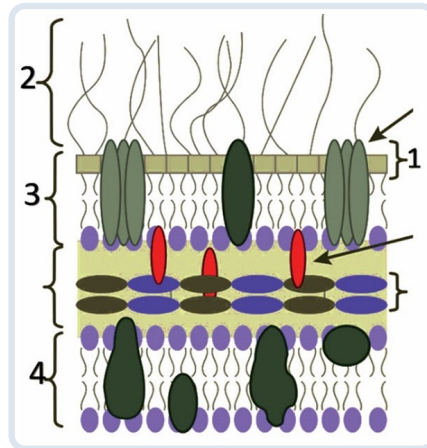
WHY THIS IS RIGHT

Neisseria gonorrhoeae frequently causes reinfection despite prior antibody formation because it undergoes antigenic variation of its surface pili and outer membrane proteins.

These genetic changes alter antigenic structures, allowing the bacteria to evade previously formed antibodies and preventing the development of long-lasting protective immunity.

QUESTION

Identify the component responsible for endotoxic shock in gram-negative bacteria?



A 1

CORRECT

B 2

C 3

D 4

RIGHT ANSWER

OK A. 1

WHY THIS IS RIGHT

Endotoxic shock in gram-negative bacteria is caused by lipopolysaccharide (LPS) present in the outer membrane. The toxic component is Lipid A, which triggers release of inflammatory cytokines (TNF- α , IL-1), leading to fever, hypotension, and septic shock.

In the diagram:

- 1 - Lipopolysaccharide (LPS)
- 2 - O antigen side chain
- 3 - Peptidoglycan layer
- 4 - Inner (cytoplasmic) membrane

QUESTION

A 13-year-old boy is brought to the emergency department by his mother because of a 6-hour history of severe eye pain and blurry vision. He wears soft contact lenses and has not removed them for 2 days. Ophthalmologic examination shows a deep corneal ulcer, severe conjunctival injection, and purulent discharge on the right. Treatment with topical ciprofloxacin is initiated. A culture of the ocular discharge is most likely to show which of the following?

A Gram-negative, oxidase-positive bacilli

CORRECT

B Gram-positive, coagulase-positive cocci

C Gram-negative spiral bacteria visible on dark-field microscopy

D Gram-positive, bacitracin-sensitive cocci

RIGHT ANSWER

OK **A. Gram-negative, oxidase-positive bacilli**

WHY THIS IS RIGHT

Contact lens-associated keratitis is most commonly caused by *Pseudomonas aeruginosa*, especially when lenses are worn for prolonged periods. *Pseudomonas aeruginosa* is a gram-negative, oxidase-positive bacillus that can rapidly cause corneal ulcers, severe pain, purulent discharge, and vision impairment.

Why not other options:

- Gram-positive, coagulase-positive cocci: *Staphylococcus aureus*; causes skin infections and some keratitis but not classically linked to contact lens-associated ulcers.
- Gram-negative spiral bacteria on dark-field microscopy: *Treponema pallidum*; causes syphilis, not acute purulent corneal ulcer.
- Gram-positive, bacitracin-sensitive cocci: *Streptococcus pyogenes*; causes pharyngitis and skin infections, not typical contact lens keratitis.

QUESTION

A 70-year-old man with a history of chronic smoking presented with fever, confusion, diarrhea and cough. Chest X-ray revealed bilateral infiltrates. Gram stain, immunofluorescence testing was done on sputum sample and came negative for organisms. Serology findings are given below. Which of the following organisms is responsible for this presentation?

Serum Na⁺ - 120 meq/L

AST - 62 IU/L

ALT - 56 IU/L

HIV - Positive

A Streptococcus

B Legionella

CORRECT

C Klebsiella

D Pneumocystis carinii pneumonia

RIGHT ANSWER

OK B. Legionella

WHY THIS IS RIGHT

Legionella pneumophila causes atypical pneumonia characterized by high fever, confusion, diarrhea, and cough, often seen in elderly or immunocompromised patients (e.g., HIV).

Typical laboratory clues include:

- Hyponatremia (low serum sodium)
- Elevated liver enzymes (AST/ALT)
- Negative Gram stain and routine sputum cultures because the organism is intracellular and stains poorly

Why not other options:

- Streptococcus: Gram-positive diplococci seen on Gram stain; typical lobar pneumonia.
- Klebsiella: Currant-jelly sputum; Gram-negative bacilli visible on Gram stain.
- Pneumocystis: Causes dry cough and dyspnea in HIV; no diarrhea or hyponatremia.

QUESTION

A patient develops prosthetic valve endocarditis 2 years after valve replacement surgery. Which of the following organisms is the most likely cause?

A Streptococcus viridans

CORRECT

B Staphylococcus aureus

C Coagulase negative staphylococci

D HACEK organisms

RIGHT ANSWER

OK A. Streptococcus viridans

WHY THIS IS RIGHT

Late prosthetic valve endocarditis (occurring >1 year after valve replacement) is most commonly caused by *Streptococcus viridans*, which originates from the oral cavity and enters the bloodstream after dental procedures or poor oral hygiene.

Key Point:

- Early prosthetic valve endocarditis (<1 year): usually *Staphylococcus epidermidis* (coagulase-negative staphylococci) from surgical contamination.
- Late prosthetic valve endocarditis (>1 year): resembles native valve endocarditis, most commonly due to *Streptococcus viridans*.

QUESTION

A 30-year-old man presents with severe pain in his gums, foul breath, and bleeding during brushing for the past week. On examination, his gingivae are red, edematous, and covered with ulcers and a necrotic membrane. The patient reports poor oral hygiene and stress due to a recent workload increase. Which of the following organisms is most commonly associated with this condition?

A Streptococcus mutans

B Fusiform bacilli

CORRECT

C Actinomyces israelii

D Treponema pallidum

RIGHT ANSWER

OK B. Fusiform bacilli

WHY THIS IS RIGHT

Acute necrotizing ulcerative gingivitis (ANUG) presents with painful, bleeding gums, foul breath, ulceration, and a gray necrotic pseudomembrane on the gingiva. It is strongly associated with poor oral hygiene, stress, smoking, and immunosuppression.

The condition is classically caused by a fusospirochetal infection, most commonly fusiform bacilli (*Fusobacterium* species) along with spirochetes.

Why not other options:

- *Streptococcus mutans*: Causes dental caries, not necrotizing gingivitis.
- *Actinomyces israelii*: Causes actinomycosis with sulfur granules and sinus tracts.
- *Treponema pallidum*: Causes syphilis.

QUESTION

| Which of the following tests is a type of ring precipitation test?

A VDRL test

B Rose Bengal test

C Ascoli's thermoprecipitation test

CORRECT

D Elek test

RIGHT ANSWER

OK

C. Ascoli's thermoprecipitation test

WHY THIS IS RIGHT

Ascoli's thermoprecipitation test is a ring precipitation test used for the rapid detection of *Bacillus anthracis* antigen in infected animal tissues (e.g., hides, wool, hair).

Principle:

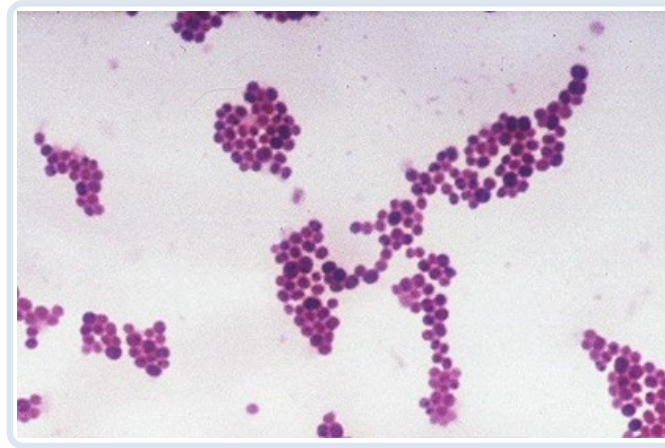
- Tissue extract containing anthrax antigen is layered over specific anti-anthrax serum in a test tube.
- If antigen is present, an antigen-antibody precipitation ring forms at the interface.

*

Test	Type
Ascoli test	Ring precipitation
VDRL	Flocculation
Rose Bengal	Agglutination
Elek test	Gel precipitation (immunodiffusion)

QUESTION

Gram staining from pus of a 30 year old with chronic osteomyelitis is shown. Identify the incorrect statement about the causative organism.



A The organism is catalase negative

CORRECT

B The organism is tube coagulase positive

C On culture, golden yellow pigments are produced on nutrient agar

D Beta-hemolysis is seen on blood agar

RIGHT ANSWER

OK

A. The organism is catalase negative

WHY THIS IS RIGHT

Gram-positive cocci arranged in grape-like clusters on Gram stain are characteristic of *Staphylococcus* species, most commonly *Staphylococcus aureus* in chronic osteomyelitis.

Key microbiological features of *Staphylococcus aureus*:

- Catalase positive (distinguishes *Staphylococcus* from *Streptococcus*)
- Coagulase positive
- Produces golden yellow colonies on nutrient agar
- Shows β -hemolysis on blood agar
- Common cause of osteomyelitis, skin infections, abscesses

QUESTION

I All are caused by staphylococcal infection except:

A Impetigo contagiosa

B Ritter syndrome

C Ecthyma

D Erysipelas

CORRECT

RIGHT ANSWER

OK

D. Erysipelas

WHY THIS IS RIGHT

Staphylococcus aureus commonly causes pyogenic skin infections due to its toxin production and invasive properties. Conditions caused by *Staphylococcus aureus*:

- Impetigo contagiosa: Superficial skin infection producing honey-colored crusts (may also be caused by *Streptococcus pyogenes*).
- Ritter syndrome (Staphylococcal scalded skin syndrome): Caused by exfoliative toxins of *S. aureus*.
- Ecthyma: A deeper ulcerative form of impetigo that may involve *Staphylococcus* or *Streptococcus*.

Exception:

- Erysipelas is classically caused by *Streptococcus pyogenes* (Group A *Streptococcus*), not *Staphylococcus*.

QUESTION

A 34-year-old woman comes to the OPD due to 3 days of discomfort and swelling in the right axilla. She is a veterinarian and volunteers as a swim coach at her children's school. Temperature is 36.9 C (98.4 F). On physical examination, there is an enlarged, tender axillary lymph node on the right, measuring about 3 cm and with slight surrounding erythema but no skin breakdown. There is no other area of lymphadenopathy. Several scratch marks are seen on the right arm. The organism responsible for the lymphadenopathy is also associated with which of the following conditions?

A Bacillary angiomatosis

CORRECT

B Oroya fever

C Condylomata acuminata

D Toxoplasma

RIGHT ANSWER

OK A. Bacillary angiomatosis

WHY THIS IS RIGHT

The patient likely has cat-scratch disease, caused by *Bartonella henselae*. It presents with localized painful lymphadenopathy (often axillary) following a cat scratch or bite.

- Regional lymphadenopathy near the site of scratch
- Mild fever or malaise
- History of cat exposure or scratches

Associated condition:

- Bacillary angiomatosis, a vascular proliferative disease seen mainly in immunocompromised patients (especially HIV), also caused by *Bartonella henselae*.

QUESTION

Identify the correct agent-disease pairings from the list provided:

1. Lyme disease - *Borrelia burgdorferi*
2. Cat-scratch disease - *Bartonella henselae*
3. Glanders - *Burkholderia mallei*
4. Rat bite fever - *Borrelia recurrentis*
5. Trench fever - *Bartonella bacilliformis*

A 1, 3, 4

B 1, 2, 3

CORRECT

C 2, 3, 4

D 3, 4, 5

RIGHT ANSWER

OK B. 1, 2, 3

WHY THIS IS RIGHT

Correct agent-disease associations are important for identifying zoonotic and vector-borne infections.

Correct pairs:

- Lyme disease - *Borrelia burgdorferi*

o Transmitted by Ixodes ticks and causes erythema migrans and multisystem disease.

- Cat-scratch disease - *Bartonella henselae*

o Transmitted via cat scratches or bites, causing regional lymphadenopathy.

- Glanders - *Burkholderia mallei*

o Zoonotic infection transmitted from infected horses or donkeys, causing pulmonary or septic disease.

Incorrect pairs:

- Rat bite fever is caused by *Streptobacillus moniliformis* (common) or *Spirillum minus*, not *Borrelia recurrentis*.
- Trench fever is caused by *Bartonella quintana*, not *Bartonella bacilliformis* (which causes Carrion's disease).

QUESTION

A 31-year-old pregnant lady comes with dysuria and urethral discharge for 3 days. NAAT for gonorrhea was negative. What is the true statement regarding the condition the patient is most likely to have?

A The elementary body is the infectious form of the causative organism

CORRECT

B Applying erythromycin to the newborn's eyes prevents the disease

C Infection in pregnant women is treated with doxycycline

D Genital disease is caused by serotypes A, B, and C

RIGHT ANSWER

OK

A. The elementary body is the infectious form of the causative organism

WHY THIS IS RIGHT

The most likely diagnosis is *Chlamydia trachomatis* infection (nongonococcal urethritis/cervicitis) since NAAT for gonorrhea is negative.

- *Chlamydia trachomatis* has two forms in its life cycle:

- o Elementary body (EB): Infectious form that enters host cells.

- o Reticulate body (RB): Metabolically active replicative form inside host cells.

Clinical relevance:

- In pregnancy, azithromycin or amoxicillin is used for treatment (not doxycycline).
- Neonates may develop conjunctivitis or pneumonia if infected during delivery.

QUESTION

| What is the most likely mode of transmission of Q fever in humans?

- A Tick bite
- B Unpasteurized milk consumption
- C Aerosol inhalation**
- D Skin contact with infected animal

CORRECT

RIGHT ANSWER

- OK C. Aerosol inhalation**

WHY THIS IS RIGHT

Q fever is caused by *Coxiella burnetii*, an obligate intracellular bacterium transmitted mainly from infected livestock (sheep, goats, cattle).

Primary mode of transmission:

- Inhalation of contaminated aerosols containing organisms from animal birth products, urine, feces, or milk.

Key features:

- Highly infectious organism
- Can survive in the environment as spore-like forms
- Occupational risk in farmers, veterinarians, abattoir workers

QUESTION

A 70-year-old diabetic woman comes to the physician complaining of progressive, severe pain and discharge from her left ear for the past 2 days. On examination, moving or touching the pinna produces extreme pain. Otoscopic examination shows granulation tissue in the left ear canal with a scant amount of discharge. Which of the following microbiological characteristics best describes the infecting organism?

A Comma-shaped and grows well in high pH

B Fast lactose fermenter

C Motile and oxidase positive

CORRECT

D Nonmotile and a lactose nonfermenter

RIGHT ANSWER

OK

C. Motile and oxidase positive

WHY THIS IS RIGHT

A severe, painful ear infection with granulation tissue in the external auditory canal in an elderly diabetic patient suggests malignant (necrotizing) otitis externa.

Causative organism: *Pseudomonas aeruginosa*

- Gram-negative bacillus
- Motile
- Oxidase positive
- Non-lactose fermenter
- Produces blue-green pigments (pyocyanin, pyoverdine)

Clinical significance:

- Occurs mainly in elderly diabetic or immunocompromised patients
- Infection can spread to skull base causing osteomyelitis

QUESTION

A freshly passed stool sample suspected of containing *Shigella* needs to be transported to the microbiology lab with minimal viability loss. Which transport medium is most appropriate?

A Carry-Blair medium

B Stuart medium

C Sach's Buffered Glycerol Saline

CORRECT

D Wilson-Blair medium

RIGHT ANSWER

OK

C. Sach's Buffered Glycerol Saline

WHY THIS IS RIGHT

Shigella is a fragile enteric pathogen that rapidly loses viability outside the body. Therefore, stool samples suspected of containing *Shigella* require a special transport medium to preserve the organism during transport.

Sach's Buffered Glycerol Saline (SBGS) is the preferred transport medium for *Shigella* because:

- Buffered saline maintains a stable pH.
- Glycerol protects the bacteria and maintains viability.
- It prevents overgrowth of commensal organisms during transport.

Why not other options:

- Carry-Blair: General stool transport medium; not ideal for fragile *Shigella*.
- Stuart: Transport medium for swab specimens, not stool.
- Wilson-Blair: Selective culture medium for *Salmonella*, not a transport medium.

QUESTION

A 64-year-old diabetic male presents with rapidly progressive pain, swelling, and foul-smelling discharge from a foot wound. Examination reveals crepitus, bullae, skin discoloration, and extensive necrosis, and the patient is hypotensive. The image below shows the affected foot. Which organism is the most likely cause of this infection?



A Clostridium tertium

B Clostridium difficile

C Clostridium sordellii

D Clostridium novyi

CORRECT

RIGHT ANSWER

OK

D. Clostridium novyi

WHY THIS IS RIGHT

Clostridial myonecrosis (gas gangrene) is a rapidly progressive, life-threatening infection characterized by severe pain, crepitus, bullae, foul-smelling discharge, tissue necrosis, and systemic toxicity.

- Caused by anaerobic spore-forming Gram-positive bacilli of the genus Clostridium.
- Organisms produce potent exotoxins and gas from carbohydrate fermentation, leading to muscle necrosis and crepitus.
- Infection commonly occurs in traumatic wounds, diabetic foot infections, or ischemic tissue.

Clostridium novyi is one of the species associated with clostridial soft-tissue infections and gas gangrene.

QUESTION

A 32-year-old man presents with high-grade fever, hypotension, tachycardia, and altered mental status after a traumatic wound infection. Blood cultures grow gram-negative bacilli, and endotoxin-mediated septic shock is suspected. Which innate immune receptor is primarily responsible for recognizing the endotoxin component of these organisms?

A RIG-I-like receptor

B Toll-like receptor 4

CORRECT

C C-type lectin receptor

D NOD-like receptor 1

RIGHT ANSWER

OK

B. Toll-like receptor 4

WHY THIS IS RIGHT

Endotoxin (lipopolysaccharide, LPS) from Gram-negative bacteria is recognized by Toll-like receptor 4 (TLR4) on innate immune cells such as macrophages and dendritic cells.

- LPS binds to LPS-binding protein (LBP) in plasma.
- The complex interacts with CD14 and TLR4-MD2 receptor complex on immune cells.
- This activates NF- κ B signaling, leading to release of pro-inflammatory cytokines (TNF- α , IL-1, IL-6).
- Excessive cytokine release results in systemic inflammation, vasodilation, hypotension, and septic shock.

Why not other options:

- RIG-I-like receptors: Detect viral RNA in the cytoplasm, mainly involved in antiviral immunity.
- C-type lectin receptors: Recognize fungal cell wall carbohydrates (e.g., β -glucans, mannans).
- NOD-like receptor 1: Detects bacterial peptidoglycan fragments inside the cytoplasm, not LPS.

QUESTION

A 3-year-old child presents with acute abdominal pain and bloody diarrhea. Stool culture on egg yolk agar shows opaque, opalescent colonies which display loss of opacity when grown on a medium containing anti-alpha toxin. This phenomenon is known as Nagler's reaction. What type of reaction is it?

- A Agglutination
- B Precipitation
- C Complement fixation test

D Neutralisation

CORRECT

RIGHT ANSWER

D. Neutralisation

WHY THIS IS RIGHT

Nagler's reaction is a neutralization test used to identify *Clostridium perfringens* based on the activity of its alpha toxin (lecithinase).

- *C. perfringens* produces alpha toxin, which hydrolyzes lecithin in egg yolk agar, producing opaque, opalescent colonies.
- When anti-alpha toxin antibodies are added to one half of the medium, the toxin is neutralized, resulting in loss of opacity on that side.

Interpretation:

- Opacity present on the control side
- Opacity inhibited on the antitoxin side -> positive Nagler reaction

QUESTION

| Which test becomes positive earliest in syphilis infection?

A VDRL

B RPR

C TPHA

D Dark-field microscopy

CORRECT

RIGHT ANSWER

OK D. Dark-field microscopy

WHY THIS IS RIGHT

Dark-field microscopy is the earliest test to become positive in syphilis, as it directly demonstrates motile spirochetes (*Treponema pallidum*) from the exudate of a primary chancre.

- Detects live spirochetes before antibodies are formed.
- Serological tests (VDRL, RPR, TPHA) become positive later after seroconversion.

Order of positivity:

1. Dark-field microscopy (direct detection)
2. Nontreponemal tests - VDRL, RPR
3. Treponemal tests - TPHA, FTA-ABS

QUESTION

A butcher develops a painful malignant pustule on his hand after handling a sick animal carcass. The lesion is suspected to be caused by *Bacillus anthracis*. Before surgical handling and further wound care, the exposed surface is disinfected using a method called duckering, which involves:

A 0.5% sodium hypochlorite at room temperature for 10 minutes

B 2% formaldehyde at 30-40°C for 20 minutes

CORRECT

C 70% alcohol for 2 minutes

D Steam sterilization at 121°C for 15 minutes

RIGHT ANSWER

OK B. 2% formaldehyde at 30-40°C for 20 minutes

WHY THIS IS RIGHT

Duckering is a surface disinfection method used in suspected anthrax lesions before surgical handling or laboratory examination to prevent contamination by *Bacillus anthracis* spores.

Method:

- Application of 2% formaldehyde
- At 30-40°C
- For 20 minutes

Purpose:

- Inactivates *Bacillus anthracis* spores on the surface of the lesion.
- Prevents environmental contamination and laboratory-acquired infection.

QUESTION

A 68-year-old chronic smoker with known COPD presents with sudden worsening of dyspnea, increased sputum volume, and sputum turning purulent and mucopurulent. He has low-grade fever and bilateral wheeze. Chest X-ray shows no new consolidation, but there is hyperinflation. Gram stain of sputum shows Gram-negative, kidney-shaped diplococci. Culture grows an organism that commonly produces β -lactamase and is a frequent cause of acute COPD exacerbations. Culture is shown below. Which organism is MOST likely responsible?



A Streptococcus pneumoniae

B Haemophilus influenzae

C Moraxella catarrhalis

CORRECT

D Pseudomonas aeruginosa

RIGHT ANSWER

OK

C. Moraxella catarrhalis

WHY THIS IS RIGHT

Moraxella catarrhalis is a Gram-negative, kidney-shaped diplococcus that commonly causes acute exacerbations of COPD, especially in elderly smokers.

- Gram-negative diplococci
- Frequently produces β -lactamase
- Causes purulent sputum and worsening dyspnea in COPD exacerbations
- Common respiratory pathogen along with Haemophilus influenzae and Streptococcus pneumoniae

Clinical relevance:

- Because many strains produce β -lactamase, treatment often requires β -lactamase-stable antibiotics (e.g., amoxicillin-clavulanate, macrolides, or cephalosporins).

QUESTION

Enzyme derived from a bacteria that acts by converting plasminogen to plasmin, thereby promoting clot lysis. The enzyme was originally isolated from β -hemolytic streptococci belonging to Lancefield Group C. The most likely bacterial source of this enzyme is:

- A Streptococcus pyogenes
- B Streptococcus equisimilis
- C Streptococcus pneumoniae
- D Streptococcus agalactiae

CORRECT

RIGHT ANSWER

- OK B. Streptococcus equisimilis

WHY THIS IS RIGHT

Streptokinase = fibrinolysin enzyme (activates plasminogen $\rightarrow$ plasmin)
Historically obtained from Group C β -hemolytic streptococci
The key species is Streptococcus equisimilis
Streptokinase is used clinically as a thrombolytic agent

QUESTION

A patient with a deep soft-tissue abscess caused by *S. aureus* fails to clear infection despite adequate neutrophil response. The organism is known to express a virulence factor that binds the Fc portion of IgG, preventing opsonization and phagocytosis.

Which virulence factor is responsible?

- A** M protein
- B** Protein A CORRECT
- C** Capsule antigen K
- D** Streptolysin O

RIGHT ANSWER

B. Protein A

WHY THIS IS RIGHT

Staphylococcus aureus evades immune clearance using Protein A, an important virulence factor present on its cell wall.

- Protein A binds the Fc portion of IgG antibodies.
- This prevents the Fc region from interacting with Fc receptors on phagocytes.
- As a result, opsonization and phagocytosis are inhibited, allowing the bacteria to persist despite neutrophil presence.
- Contributes to persistent infections and abscess formation caused by *S. aureus*.

Why not other options:

- A. M protein: Virulence factor of *Streptococcus pyogenes*, prevents phagocytosis by inhibiting complement deposition.
- C. Capsule antigen K: Seen in *E. coli* and some other bacteria; helps resist phagocytosis but does not bind Fc of IgG.
- D. Streptolysin O: A hemolysin toxin of *Streptococcus pyogenes* that damages cell membranes, not involved in IgG binding.

QUESTION

| Which of the following organisms is NOT an exception to Koch's postulates?

A Mycobacterium leprae

B Treponema pallidum

C Neisseria gonorrhoeae

D Staphylococcus aureus

CORRECT

RIGHT ANSWER

OK

D. Staphylococcus aureus

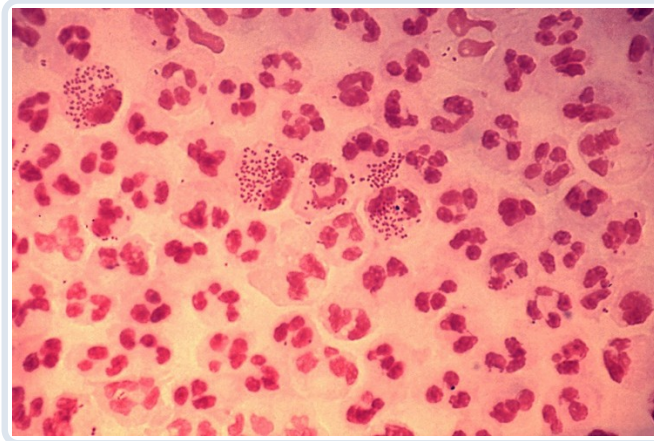
WHY THIS IS RIGHT

- Mycobacterium leprae - can grow in animals (armadillos, mouse footpads) but not on artificial culture media.
- Treponema pallidum - can grow in animals (rabbits) but not on artificial culture media.
- Neisseria gonorrhoeae - grows well on artificial culture media (e.g., chocolate agar, Thayer-Martin) but does not reliably produce disease in experimental animals, so it fails the animal-inoculation step.

Therefore, All three are exceptions to Koch's postulates because Koch required growth both in artificial culture AND in experimental animals.

QUESTION

A man presents with a history of dysuria and urethral discharge after having unprotected sexual intercourse. Gram-staining of the purulent discharge is seen in the following image. What is the treatment of choice for this infection?



A Erythromycin

B Azithromycin

C Ceftriaxone

CORRECT

D Penicillin G

RIGHT ANSWER

OK C. Ceftriaxone

WHY THIS IS RIGHT

Treatment Component	Details
DOC for uncomplicated gonorrhoea	Third-generation cephalosporins; treat both partners
Ceftriaxone	250 mg IM, single dose
Cefixime	400 mg orally, single dose
If coexisting Chlamydia	Add azithromycin or doxycycline

QUESTION

An adult male patient presented with the following condition on his private parts. A gram-negative diplococcus was found in the gram stain. The drug of choice for treatment is:



A Tab Azithromycin

B Tab Cefixime 400 mg

CORRECT

C Tab Doxycycline 200 mg

D Inj. Benzathine Penicillin

RIGHT ANSWER

OK

B. Tab Cefixime 400 mg

WHY THIS IS RIGHT

A genital lesion with Gram-negative diplococci on smear indicates *Neisseria gonorrhoeae* infection (gonorrhea).

- Gram-negative intracellular diplococci (inside neutrophils) -> diagnostic clue
- Common presentation: urethritis, discharge, dysuria; may also present with genital lesions

Treatment:

- Cefixime (oral) or Ceftriaxone (preferred IM)
- Often combined with azithromycin/doxycycline to cover possible *Chlamydia* co-infection

Why not others:

- Azithromycin alone -> insufficient for gonorrhea
- Doxycycline -> used for *Chlamydia*, not gonorrhea
- Benzathine penicillin -> for syphilis

QUESTION

A 3-week-old infant is brought to OPD with complaints of cough and sore throat. The mother reports that the infant develops a paroxysm of cough followed by apnea. Blood investigations reveal total leucocyte count to be $>50,000$ cells/L. Which of the following drugs is appropriate for this patient?

A Azithromycin

CORRECT

B Amoxicillin

C Cotrimoxazole

D Ciprofloxacin

RIGHT ANSWER

OK A. Azithromycin

WHY THIS IS RIGHT

Pertussis (whooping cough) in infants presents with paroxysmal coughing, apnea, and marked lymphocytosis, and requires prompt macrolide therapy.

- Caused by *Bordetella pertussis*
- Features: paroxysmal cough, inspiratory “whoop” (may be absent in infants), apnea, post-tussive vomiting
- Marked leukocytosis with lymphocyte predominance is characteristic

Treatment:

- Azithromycin is the drug of choice in infants (preferred over erythromycin due to better safety profile)
- Early treatment reduces transmission and severity

Clinical importance:

- Infants are at high risk of complications such as apnea and pneumonia
- Close contacts should also receive prophylaxis

QUESTION

A 50-year-old male presents with complaints of leg swelling and pain in the heel, which started a few days after he began an antibiotic course for a lower respiratory tract infection. Examination reveals signs suggestive of Achilles tendinitis. Which of the following best describes the mechanism of action of the drug most likely responsible for his condition?

- A** Inhibition of bacterial protein synthesis
- B** Inhibition of bacterial cell wall synthesis
- C** Inhibition of bacterial DNA gyrase
- D** Inhibition of bacterial folic acid synthesis

CORRECT

RIGHT ANSWER

- OK** **C. Inhibition of bacterial DNA gyrase**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

A woman presenting with symptoms of urinary tract infection was prescribed a drug that causes tendon rupture and arthropathy. What is the mechanism of action of the drug?

CORRECT

A

DNA gyrase inhibition

B

Ribosomal inhibition

C

Cell wall synthesis inhibition

D

Inhibition of folic acid synthesis

RIGHT ANSWER

OK

A. DNA gyrase inhibition

WHY THIS IS RIGHT

“Tendon rupture + arthropathy”

This is a signature adverse effect of Fluoroquinolones. Targets -

- DNA gyrase (Topoisomerase II) -> Gram-negative bacteria
- Topoisomerase IV -> Gram-positive bacteria

Tendon rupture and arthropathy are classic adverse effects of fluoroquinolones. These drugs act by inhibiting bacterial DNA gyrase (topoisomerase II) and topoisomerase IV. This blocks DNA replication and transcription. The toxicity clue points to the fluoroquinolone mechanism.

Mechanism	Drug Class	Example
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DNA gyrase inhibition	Fluoroquinolones	Ciprofloxacin
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Protein synthesis inhibition	Aminoglycosides	Gentamicin
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Cell wall inhibition	β -lactams	Penicillin
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Folate inhibition	Sulfonamides	TMP-SMX
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QUESTION

A 25-year-old male presents to the clinic with complaints of burning sensation during urination and a purulent discharge from the penis for the past 5 days. He has had unprotected sexual intercourse with a new partner two weeks ago. On examination, the urethral meatus is erythematous, and there is a noticeable purulent discharge. A Gram stain of the discharge reveals intracellular gram-negative diplococci. The patient is otherwise healthy and has no known drug allergies. What is the most appropriate treatment for this patient?

A Benzathine penicillin G 2.4 million Units intramuscularly

B Cefixime 400 mg orally

CORRECT

C Metronidazole 500 mg thrice a day

D Doxycycline 100 mg twice a day

RIGHT ANSWER

OK B. Cefixime 400 mg orally

WHY THIS IS RIGHT

Urethritis + purulent discharge

↓

Gram stain -> GN diplococci

↓

Gonorrhea

↓

Use cephalosporin

↓

Cefixime

Intracellular gram-negative diplococci indicate *Neisseria gonorrhoeae*. Third-generation cephalosporins are first-line therapy for uncomplicated gonorrhea. Oral cefixime is an accepted alternative when parenteral therapy is not used. Penicillin resistance is common, and doxycycline/metronidazole do not treat gonorrhea.

| Infection | Drug |

| ----- | --- |

| Gonorrhea | Ceftriaxone / Cefixime |

| Chlamydia | Doxycycline / Azithromycin |

| Syphilis | Penicillin |

| Trichomonas | Metronidazole |

QUESTION

A 63-year-old diabetic woman presents with fever, flank pain, dysuria, and elevated WBC count. Imaging reveals mild hydronephrosis. Urinalysis shows pyuria and bacteriuria. She is diagnosed with a complicated urinary tract infection (UTI). Which of the following is the parenteral drug of choice for empirical treatment of a complicated UTI?

A Ceftriaxone

B Meropenem

CORRECT

C Amoxicillin-clavulanate

D Nitrofurantoin

RIGHT ANSWER

OK B. Meropenem

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

A 24-year-old sexually active male presents to the outpatient department with complaints of painful urination and a thick yellow urethral discharge for the past 3 days. He denies any fever, chills, or flank pain. He reports multiple unprotected sexual encounters in the past month. A urethral swab is sent for Gram stain, which shows intracellular gram-negative diplococci within polymorphonuclear leukocytes. The organism is resistant to penicillins. Which of the following is the most appropriate treatment?

A Ceftriaxone

CORRECT

B Vancomycin

C Amoxicillin

D Tetracycline

RIGHT ANSWER

OK

A. Ceftriaxone

WHY THIS IS RIGHT

Disseminated Gonococcal Infection (DGI): Triad:

- Dermatitis
- Tenosynovitis
- Migratory polyarthritis

Resistance Mechanisms for penicillin

1. β -lactamase production (penicillinase)
2. Altered PBPs ($\downarrow$ binding affinity)
3. Efflux pumps

Penicillins (amoxicillin) become ineffective

Intracellular gram-negative diplococci in urethral discharge indicate *Neisseria gonorrhoeae*. Penicillin resistance is common due to β -lactamase production. A third-generation cephalosporin like ceftriaxone is the drug of choice for resistant gonorrhea. It provides reliable activity and high cure rates for uncomplicated infection.

| Condition | Treatment |

| ----- | ----- |

| Uncomplicated gonorrhea | Ceftriaxone IM single dose |

| With possible Chlamydia | Ceftriaxone + Azithromycin/Doxycycline |

QUESTION

| All are true about cephalosporins except:

- A** Cefazolin is a first generation parenteral cephalosporin
- B** Cefoperazone has anti-pseudomonal activity
- C** Cefixime has poor activity against Staph aureus
- D** **Cefoxitin has no activity against anaerobes**

CORRECT

RIGHT ANSWER

OK

D. Cefoxitin has no activity against anaerobes

WHY THIS IS RIGHT

Cephalosporins are β -lactam antibiotics classified into generations based on their antimicrobial spectrum.

- Cefazolin
 - First-generation cephalosporin
 - Given parenterally
 - Good activity against gram-positive cocci
 - Commonly used for surgical prophylaxis
- Cefoperazone
 - Third-generation cephalosporin
 - Has antipseudomonal activity
- Cefixime
 - Third-generation oral cephalosporin
 - Poor activity against Staphylococcus aureus
- Cefoxitin
 - A second-generation cephamycin
 - Good activity against anaerobes, especially Bacteroides fragilis
 - Used in intra-abdominal and pelvic infections

QUESTION

Which of the following drugs does not require dose reduction in patients with renal failure?

- A Gentamicin
- B Vancomycin
- C Amphotericin B

D Doxycycline

CORRECT

RIGHT ANSWER

D. Doxycycline

WHY THIS IS RIGHT

Cef in: Cefoperazone, Ceftriaxone

The: Tigecycline

R: Rifampicin

E: Erythromycin

N: Nafcillin

A: Ampicillin

L: Lincosamide (Clindamycin)

D: Doxycycline

Why the other drugs require dose adjustment

- Gentamicin - eliminated almost entirely by the kidneys; accumulation can cause nephrotoxicity and ototoxicity.
- Vancomycin - renally excreted, requiring dose adjustment and therapeutic drug monitoring.
- Amphotericin B - causes significant nephrotoxicity, so dosing must be carefully adjusted and monitored in renal impairment.

QUESTION

A 45-year-old patient with a penicillin allergy presents with enterococcal endocarditis. Which of the following drugs can be used safely in this patient?

A Aztreonam

B Vancomycin

CORRECT

C Ceftriaxone

D Piperacillin

RIGHT ANSWER

OK B. Vancomycin

WHY THIS IS RIGHT

Enterococcal endocarditis is commonly caused by *Enterococcus faecalis* or *Enterococcus faecium*. Standard therapy usually involves β -lactam antibiotics (e.g., penicillin or ampicillin) often combined with an aminoglycoside. However, in patients with a penicillin allergy, an alternative drug must be used.

Vancomycin is effective against gram-positive organisms including *Enterococcus* and is commonly used for:

- Enterococcal endocarditis
- MRSA infections
- Patients with severe β -lactam allergy

Why other options are incorrect

- Aztreonam - active mainly against gram-negative bacteria, not *Enterococcus*.
- Ceftriaxone - a cephalosporin; may cross-react in penicillin allergy and has limited activity against *Enterococcus*.
- Piperacillin - a β -lactam penicillin, contraindicated in penicillin-allergic patients.

QUESTION

| Which of the following drug is an anti pseudomonal penicillin ?

A Cephalalexin

B Dicloxacillin

C Piperacillin

CORRECT

D Cloxacillin

RIGHT ANSWER

OK C. Piperacillin

WHY THIS IS RIGHT

Antipseudomonal penicillins are extended-spectrum penicillins that have activity against *Pseudomonas aeruginosa*, a common cause of hospital-acquired infections.

Piperacillin belongs to the ureidopenicillin group and has broad gram-negative coverage, including *Pseudomonas aeruginosa*. It is often combined with a β -lactamase inhibitor (tazobactam) to enhance activity against β -lactamase-producing organisms.

Why other options are incorrect

- Cephalalexin - first-generation cephalosporin, mainly gram-positive coverage, no activity against *Pseudomonas*.
- Dicloxacillin and Cloxacillin - penicillinase-resistant penicillins used mainly for *Staphylococcus aureus*, not *Pseudomonas*.

QUESTION

A patient presents with mental confusion, visual and auditory hallucinations, perceived changes of body shape, swelling of the tongue and a fear of impending death after he was treated for primary chancre of syphilis with an intramuscular injection. What is the likely diagnosis?

- A Adjustment reaction
- B Undiagnosed psychosis
- C Jarisch-Herxheimer reaction
- D Hoigne syndrome**

CORRECT

RIGHT ANSWER

- OK
- D. Hoigne syndrome**

WHY THIS IS RIGHT

Hoigne syndrome (pseudoanaphylactic reaction) is a rare neuropsychiatric reaction that occurs shortly after intramuscular injection of procaine penicillin, commonly used in the treatment of syphilis.

- Sudden mental confusion
- Visual and auditory hallucinations
- Feeling of impending death
- Perceptual disturbances (e.g., altered body shape)
- Anxiety, agitation
- Sometimes tongue swelling or dysarthria

Feature	Hoigne syndrome	Jarisch–Herxheimer reaction
Cause	Procaine toxicity after IM penicillin	Cytokine release from rapid spirochete destruction
Onset	Immediately after injection	1–12 hours after treatment
Symptoms	Hallucinations, anxiety, fear of death	Fever, chills, myalgia, worsening rash

QUESTION

New Delhi metallo-beta-lactamase (NDM-1) confers resistance to which class of antibiotics?

A Tetracyclines

B Macrolides

C Aminoglycosides

D Carbapenems

CORRECT

RIGHT ANSWER

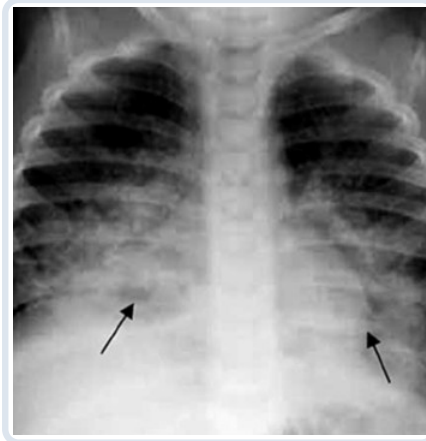
OK **D. Carbapenems**

WHY THIS IS RIGHT

New Delhi metallo- β -lactamase-1 (NDM-1) is a metallo- β -lactamase enzyme produced by certain gram-negative bacteria (e.g., *Klebsiella pneumoniae*, *Escherichia coli*). It hydrolyzes β -lactam antibiotics, particularly carbapenems, which are usually considered last-line drugs for multidrug-resistant infections.

QUESTION

56-year-old woman comes to the emergency department due to a week of fever, dyspnea, and cough with productive, foul-smelling sputum. She underwent an upper gastrointestinal endoscopy 10 days ago for a long history of heartburn. Temperature is 38.7 C (101.7 F), blood pressure is 130/80 mm Hg, pulse is 108/min, and respirations are 22/min. Dentition is poor. Crackles are heard over the right upper lung field. Complete blood count shows leukocytes of 14,500/mm³. Chest x-ray is shown below. Which of the following additional therapies would be most helpful for this patient's condition?



A Ampicillin and gentamicin

B Ciprofloxacin

C Clindamycin

CORRECT

D Doxycycline

RIGHT ANSWER

OK C. Clindamycin

WHY THIS IS RIGHT

This patient likely has aspiration pneumonia following a recent upper GI endoscopy with poor dentition and foul-smelling sputum, suggesting infection with oral anaerobic bacteria (e.g., *Bacteroides*, *Fusobacterium*, *Peptostreptococcus*).

The most appropriate treatment is clindamycin, which provides excellent coverage against anaerobic organisms commonly responsible for aspiration pneumonia.

Why not other options:

- Ampicillin + gentamicin: Covers many gram-positive and gram-negative bacteria but poor anaerobic coverage, which is essential in aspiration pneumonia.
- Ciprofloxacin: Mainly active against gram-negative aerobes; limited activity against anaerobes.
- Doxycycline: Used for atypical pathogens (e.g., *Mycoplasma*, *Chlamydia*), not typical for aspiration pneumonia.

QUESTION

Which of the following BEST differentiates mutational from transferable drug resistance?

- A Mutational resistance involves plasmids; transferable resistance involves chromosomes
- B Mutational resistance commonly affects multiple drugs simultaneously
- C Transferable resistance is usually associated with high-degree enzyme-mediated resistance CORRECT
- D Transferable resistance often results in decreased virulence

RIGHT ANSWER

OK C. Transferable resistance is usually associated with high-degree enzyme-mediated resistance

WHY THIS IS RIGHT

No explanation was provided in the source quiz.

Feature	Mutational Drug Resistance	Transferable Drug Resistance
Genetic basis	Chromosome mediated	Plasmid mediated
Drug spectrum	Resistance to one drug	Resistance to multiple drugs
Transferability	Resistance non-transferable	Resistance transferable
Effect on virulence	Virulence of organism lowered	Virulence of organism not lowered
Degree of resistance	Low-degree resistance	High-degree resistance
Mechanism	Due to decreased permeability, development of alternative metabolic pathway, or inactivation of drug	Due to production of many degrading enzymes

QUESTION

Which of the following is an indication for short-course bedaquiline-containing regimen in the treatment of tuberculosis?

A Rifampicin resistance with katG and inhA mutations

B Extrapulmonary TB with hydrocephalus

C Rifampicin resistant but FQ sensitive TB

CORRECT

D Rifampicin sensitive TB

RIGHT ANSWER

OK C. Rifampicin resistant but FQ sensitive TB

WHY THIS IS RIGHT

The short-course bedaquiline-containing regimen (shorter MDR/RR-TB regimen) is indicated in rifampicin-resistant TB (RR-TB) that is sensitive to fluoroquinolones.

• Eligibility criteria:

- o Rifampicin-resistant / MDR-TB
- o Confirmed fluoroquinolone sensitivity
- o No prior significant exposure to second-line drugs
- o No extensive or severe extrapulmonary disease

• Rationale:

- o Fluoroquinolones are the backbone drugs -> resistance reduces efficacy
- o Bedaquiline improves outcomes in eligible RR-TB patients

• Why not others:

- o katG/inhA mutations: indicate isoniazid resistance, not criteria for shorter regimen
- o Extrapulmonary TB (e.g., hydrocephalus): excluded due to poor drug penetration
- o Rifampicin-sensitive TB: treated with standard first-line regimen

QUESTION

A 35-year-old homeless man presented with a 1-month history of fever, cough, and weight loss. Both sputum smears turned out to be negative, but the chest x-ray ordered was suggestive of tuberculosis. According to the recent NTEP guidelines, which is the next best line of management?

- A Repeat sputum smears
- B CBNAAT**
- C Line probe assay
- D Wait until TB culture results to start ATT

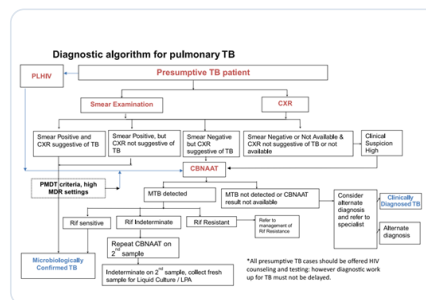
CORRECT

RIGHT ANSWER

OK
B. CBNAAT

WHY THIS IS RIGHT

In a patient with clinical and radiological features suggestive of tuberculosis but negative sputum smear microscopy, the next recommended diagnostic step under NTEP is CBNAAT (Cartridge-Based Nucleic Acid Amplification Test). CBNAAT has higher sensitivity, detects *Mycobacterium tuberculosis* DNA, and simultaneously identifies rifampicin resistance, enabling early initiation of appropriate therapy. Waiting for culture delays treatment, while repeating smear or performing LPA is not the preferred next step in smear-negative presumptive TB.



QUESTION

Which of the following is an inclusion criterion for the shorter bedaquiline regimen in the treatment of tuberculosis?

- A Extrapulmonary TB like Tubercular meningitis
- B Rifampicin resistance with both KatG and inhA mutation
- C Rifampicin-sensitive TB
- D Rifampicin-resistant but fluoroquinolone-sensitive TB**

CORRECT

RIGHT ANSWER

- D. Rifampicin-resistant but fluoroquinolone-sensitive TB**

WHY THIS IS RIGHT

The shorter bedaquiline-containing regimen (all-oral shorter regimen) is indicated in rifampicin-resistant TB (RR-TB) that is sensitive to fluoroquinolones.

• Eligibility criteria:

- o Rifampicin-resistant TB (RR-TB) or MDR-TB
- o No resistance to fluoroquinolones
- o No prior exposure to second-line drugs that could cause resistance

• Rationale:

- o Fluoroquinolones are the core drugs of the shorter regimen
- o Resistance to them -> poor outcomes -> regimen not suitable

• Why not others:

- o Extrapulmonary TB (e.g., TB meningitis): excluded due to poor drug penetration
- o Rifampicin-sensitive TB: treated with standard first-line regimen
- o KatG/inhA mutations: relate to isoniazid resistance, not criteria for shorter regimen

QUESTION

I Multidrug-resistant (MDR) TB shows resistance to which of the following drugs?

A Isoniazid, rifampicin, and fluoroquinolone

B Fluoroquinolones

C Isoniazid and rifampicin

CORRECT

D Isoniazid, rifampicin, and kanamycin

RIGHT ANSWER

OK

C. Isoniazid and rifampicin

WHY THIS IS RIGHT

Multidrug-resistant tuberculosis (MDR-TB) is defined as resistance to at least both isoniazid (INH) and rifampicin, the two most potent first-line anti-TB drugs. These are the backbone of standard TB therapy -> resistance makes treatment difficult

· Related terms:

o XDR-TB (Extensively drug-resistant TB):

• MDR-TB + resistance to any fluoroquinolone + at least one second-line injectable drug (e.g., amikacin, kanamycin, capreomycin)

· Causes of resistance:

o Incomplete/irregular treatment

o Poor compliance

o Inadequate drug regimens

Why not others:

· Fluoroquinolone resistance alone ≠ MDR

· Resistance to INH + rifampicin + others -> goes beyond MDR (e.g., XDR)

QUESTION

A patient with HIV with a CD4 count of 250 cells/mm³ is newly diagnosed to have rifampicin resistance TB. Which of the following is the appropriate regimen, and what should be monitored?

- A** Isoniazid, Ethambutol, Streptomycin, Pyrazinamide for 9 months and optic neuritis
- B** Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin for 6 months and immune reconstitution syndrome CORRECT
- C** Isoniazid, Ethambutol, Levofloxacin, Pyrazinamide for 6 months and hepatotoxicity
- D** Isoniazid, Ethambutol, Clarithromycin, Pyrazinamide for 12 months and pyridoxine deficiency

RIGHT ANSWER

- OK** **B. Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin for 6 months and immune reconstitution syndrome**

WHY THIS IS RIGHT

In HIV patients with rifampicin-resistant TB (RR/MDR-TB), the preferred treatment is a short, all-oral regimen-BPaLM (Bedaquiline + Pretomanid + Linezolid + Moxifloxacin) for 6 months.

- Rifampicin resistance = treat as MDR-TB
- Avoid standard first-line regimens (HRZE) -> ineffective
- Prefer shorter, oral regimens over older injectable-based therapies

HIV-specific considerations:

- Start ATT first, then initiate ART early (within 2-8 weeks)
- CD4 = 250 -> ART should still be started early
- Monitor for immune reconstitution inflammatory syndrome (IRIS) after ART initiation

Drug monitoring:

- Bedaquiline -> QT prolongation
- Linezolid -> myelosuppression, neuropathy
- Pretomanid -> hepatotoxicity
- Moxifloxacin -> QT prolongation

QUESTION

A 40-year-old man, newly diagnosed with HIV infection, presents with low-grade fever, productive cough, and weight loss. A chest X-ray reveals miliary nodules throughout both lung fields. Sputum GeneXpert reveals *Mycobacterium tuberculosis* with rifampicin resistance. He is not yet started on ART. His CD4 count is 110 cells/mm³. What is the most appropriate management?

A Start BPaLM regimen for 6 months and follow up for immune reconstitution inflammatory syndrome (IRIS) CORRECT

B Start HEZ plus levofloxacin for 9 months and monitor for optic neuritis

C Start HEZ plus linezolid for 9 months and monitor for hepatotoxicity

D Start kanamycin-based MDR regimen for 20 months and continue ART without interruption

RIGHT ANSWER

OK **A. Start BPaLM regimen for 6 months and follow up for immune reconstitution inflammatory syndrome (IRIS)**

WHY THIS IS RIGHT

In HIV patients with rifampicin-resistant (RR/MDR) tuberculosis, the recommended management is an all-oral, shorter regimen such as BPaLM (Bedaquiline + Pretomanid + Linezolid + Moxifloxacin) for ~6 months.

- GeneXpert showing rifampicin resistance = treat as MDR-TB
- BPaLM regimen is now preferred:

- o Shorter duration (≈6 months)
- o Fully oral (no injectables)
- o Higher success rates

HIV considerations:

- Start ATT immediately
- Initiate ART early (within 2 weeks for CD4 <200)
- Monitor for IRIS after ART initiation

Why not other options:

- HEZ regimens -> ineffective in rifampicin-resistant TB
- Kanamycin-based regimens -> outdated, toxic (ototoxicity), longer duration
- Injectable regimens are no longer preferred

QUESTION

A 38-year-old man presents with chronic cough, fever, and significant weight loss. Chest X-ray shows right upper lobe infiltrates, and sputum is positive for acid-fast bacilli (AFB). During evaluation, he is found to be HIV positive. What is the most appropriate management plan?

A Start anti-tubercular therapy (ATT) and ART simultaneously

B Start ATT first, and initiate ART after 2 weeks

CORRECT

C Start ART first, and add ATT after 2 weeks

D Complete ATT first, then start ART

RIGHT ANSWER

OK

B. Start ATT first, and initiate ART after 2 weeks

WHY THIS IS RIGHT

In patients with HIV-tuberculosis coinfection, the priority is to start anti-tubercular therapy (ATT first), followed by early initiation of ART (within 2 weeks)-especially in those with advanced immunosuppression.

- ATT is started immediately to control active TB (reduces mortality and transmission)
- ART is delayed briefly (≈2 weeks) to:

- o Reduce risk of immune reconstitution inflammatory syndrome (IRIS)
- o Improve drug tolerance and adherence

Timing of ART:

- CD4 < 50 cells/mm³ -> start ART within 2 weeks
- CD4 > 50 -> start ART within 2-8 weeks

Why not other options:

- Simultaneous start -> ↑ risk of severe IRIS
- ART first -> worsens untreated TB
- Delay ART till ATT completion -> ↑ HIV progression and mortality

QUESTION

A 40-year-old woman presents with a slowly progressive lesion on her cheek showing central atrophy for the past 2 years. A chest X-ray reveals apical calcification of the right lung. Which diagnostic test should be performed to confirm the underlying cause of this condition?



- A Mantoux test
- B Split skin smear
- C PCR
- D Skin biopsy with AFB

CORRECT

RIGHT ANSWER

OK
C. PCR

WHY THIS IS RIGHT

Chronic, slowly progressive facial skin lesions with central atrophy and evidence of past pulmonary tuberculosis (apical calcification) suggest lupus vulgaris (cutaneous tuberculosis).

- Lupus vulgaris is a paucibacillary form of cutaneous TB (hence no role of AFB and skin biopsy)
- Presents as slowly enlarging plaques with central atrophy ("apple jelly nodules")
- Often associated with prior TB focus (e.g., lung calcification)

Diagnosis:

- PCR is the most sensitive test for detecting *Mycobacterium tuberculosis* DNA in paucibacillary lesions
- Smear/culture often negative due to low bacillary load

Why not others:

- Mantoux test -> indicates exposure, not confirmatory
- Split skin smear -> used for leprosy
- Probe test -> not relevant here

QUESTION

A patient undergoing antitubercular therapy reports joint pain 10 days after initiation of treatment. Laboratory tests reveal normal AST and ALT levels, a serum creatinine of 0.9 mg/dL, and an elevated serum uric acid level of 10 mg/dL. What is the most appropriate next step in managing this patient's treatment?

- A** Stop pyrazinamide and continue the rest of the drugs with kidney function test (KFT) monitoring. **CORRECT**
- B** Add uric acid-lowering drugs and continue antitubercular therapy (ATT) as such with liver function test (LFT) and KFT monitoring.
- C** Continue all drugs and monitor serum uric acid level as well as LFT and KFT.
- D** Stop all ATT drugs until laboratory values return to normal.

RIGHT ANSWER

- OK** **A. Stop pyrazinamide and continue the rest of the drugs with kidney function test (KFT) monitoring.**

WHY THIS IS RIGHT

Pyrazinamide commonly causes hyperuricemia by decreasing renal excretion of uric acid, leading to acute gouty arthritis early in ATT.

- Onset within days to weeks of starting therapy
- Joint pain with elevated serum uric acid
- Normal LFT and KFT (isolated hyperuricemia)

Management principle:

- Symptomatic hyperuricemia (with joint pain) -> stop pyrazinamide
- Continue remaining ATT drugs
- Monitor renal function
- Asymptomatic hyperuricemia -> no need to stop drug

Why not others:

- Adding uric acid-lowering drugs is not first-line
- Continuing drug despite symptoms worsens gout
- Stopping all ATT is unnecessary

QUESTION

| Which of the following statements is true regarding pretomanid?

- A** Its use is contraindicated along with CYP2C9 inducers
- B** It can be used for resistant malaria
- C** It is approved for treatment of XDR tuberculosis in combination with Bedaquiline and Linezolid **CORRECT**
- D** It acts by formation of reactive oxygen species

RIGHT ANSWER

OK

C. It is approved for treatment of XDR tuberculosis in combination with Bedaquiline and Linezolid

WHY THIS IS RIGHT

Pretomanid is a newer antitubercular drug used in drug-resistant tuberculosis.

- Approved for use in XDR-TB and MDR-TB as part of the BPaL regimen (Bedaquiline + Pretomanid + Linezolid)
- It is a nitroimidazole prodrug that acts against Mycobacterium tuberculosis under both aerobic and anaerobic conditions
- Mechanism: releases reactive nitrogen species (not primarily reactive oxygen species), leading to inhibition of mycolic acid synthesis and bacterial killing

Why not others:

- Not used for malaria
- Drug interactions are mainly with CYP3A4 inducers (not specifically CYP2C9)
- Mechanism is via reactive nitrogen species, so ROS statement is incorrect

QUESTION

| Mycobacterium tuberculosis is typically cultured in which medium?

A Lowenstein-jensen medium

CORRECT

B Macconkey agar

C Sabouraud dextrose agar

D Muller hinton

RIGHT ANSWER

OK

A. Lowenstein-jensen medium

WHY THIS IS RIGHT

Mycobacterium tuberculosis is cultured on Lowenstein-Jensen (LJ) medium, a specialized medium designed for mycobacterial growth.

- LJ medium is an egg-based medium containing malachite green, which inhibits contaminating bacteria
- MTB grows slowly, producing rough, buff-colored colonies in 2-8 weeks
- Culture is the gold standard for diagnosis and drug susceptibility testing

Why not others:

- MacConkey agar -> for Gram-negative enteric bacteria
- Sabouraud dextrose agar -> for fungi
- Mueller-Hinton agar -> for antibiotic sensitivity testing

QUESTION

Which of the following methods are appropriate for identifying different strains of the same species of *Mycobacterium tuberculosis*?

- a. RFLP (Restriction Fragment Length Polymorphism)
- b. Chromosomal mutation detection
- c. Spoligotyping
- d. Multiple interspaced repetitive unit typing (MIRU-VNTR)

A a, b, c & d

B a, c & d

CORRECT

C a, b & c

D b Only

RIGHT ANSWER

OK

B. a, c & d

WHY THIS IS RIGHT

Strain typing methods are used to differentiate between strains of the same species of *Mycobacterium tuberculosis* for epidemiological tracking and outbreak analysis.

Correct methods:

- RFLP (Restriction Fragment Length Polymorphism) -> analyzes DNA fragment patterns
- Spoligotyping -> detects spacer sequences in the DR (direct repeat) region
- MIRU-VNTR -> evaluates variable number tandem repeats at multiple loci

Incorrect option:

- Chromosomal mutation detection is mainly used for identifying drug resistance, not for strain typing

QUESTION

Which of the following statements regarding Rifampicin are true?

1. It should be taken with fatty meals
2. Resistance is associated with the *rpoB* gene mutation
3. It undergoes enterohepatic circulation
4. It is pumped out of the CNS mainly by P-glycoprotein pumps

A 1, 2, and 3

B 2 and 3

CORRECT

C 2, 3, and 4

D 1, 3, and 4

RIGHT ANSWER

OK B. 2 and 3

WHY THIS IS RIGHT

Rifampicin pharmacology and resistance patterns are important for exam-based elimination.

Correct concepts:

- Resistance is due to mutation in the *rpoB* gene encoding DNA-dependent RNA polymerase
- Rifampicin undergoes enterohepatic circulation, prolonging its half-life

Incorrect concepts:

- It should not be taken with fatty meals; food decreases its absorption, so it is taken on an empty stomach
- CNS penetration is good in inflamed meninges, and it is not primarily limited by P-glycoprotein pumps

QUESTION

A patient being treated for multidrug-resistant tuberculosis (MDR-TB) presents with bilateral tingling and numbness in both lower limbs below the knees. Which of the following drugs is the most likely cause?

A Bedaquiline

B Levofloxacin

C Linezolid

CORRECT

D Clofazimine

RIGHT ANSWER

OK C. Linezolid

WHY THIS IS RIGHT

Peripheral neuropathy (bilateral tingling and numbness) in a patient receiving MDR-TB therapy is classically associated with Linezolid toxicity.

- Linezolid causes dose- and duration-dependent peripheral neuropathy
- It may also cause optic neuropathy with prolonged use
- Mechanism: mitochondrial protein synthesis inhibition (affects neuronal function)
- Neuropathy may be irreversible if not detected early

Differentiation:

- Bedaquiline -> QT prolongation
- Levofloxacin -> tendinopathy, QT prolongation
- Clofazimine -> skin discoloration (reddish-brown pigmentation)

Thus, peripheral neuropathy in MDR-TB treatment strongly suggests linezolid toxicity.

QUESTION

A young patient undergoing treatment for multidrug-resistant tuberculosis (MDR-TB) presents with symptoms of weight gain, cold intolerance, and lethargy. Laboratory investigations reveal high levels of thyroid-stimulating hormone (TSH) and low levels of T3 (triiodothyronine) and T4 (thyroxine). Which of the following drugs is likely responsible for these symptoms?

A Cycloserine

B Ethionamide

CORRECT

C Streptomycin

D Pyrazinamide

RIGHT ANSWER

OK B. Ethionamide

WHY THIS IS RIGHT

Symptoms point to hypothyroidism:

Feature	Meaning
Weight gain	↓ metabolism
Cold intolerance	↓ heat production
Lethargy	↓ energy
↑ TSH + ↓ T3/T4	Primary hypothyroidism

Ethionamide commonly causes drug-induced hypothyroidism, especially in MDR-TB regimens. It interferes with thyroid hormone synthesis, leading to ↑TSH and low T3/T4. Symptoms include weight gain, cold intolerance, and lethargy. Thyroid dysfunction is a classic adverse effect of ethionamide.

Anti-TB Side Effects Table-

Drug	Side Effect
Ethionamide	Hypothyroidism
PAS	Hypothyroidism
Isoniazid	Neuropathy
Rifampicin	Hepatotoxicity
Pyrazinamide	Hyperuricemia
Streptomycin	Ototoxicity

QUESTION

Which of the following is an inclusion criterion for the shorter bedaquiline regimen in the treatment of tuberculosis?

- A Extrapulmonary TB like Tubercular meningitis
- B Rifampicin resistance with both KatG and inhA mutation
- C Rifampicin-sensitive TB

D Rifampicin-resistant but fluoroquinolone-sensitive TB

CORRECT

RIGHT ANSWER

OK D. Rifampicin-resistant but fluoroquinolone-sensitive TB

WHY THIS IS RIGHT

The shorter bedaquiline-containing regimen is used for the treatment of multidrug-resistant or rifampicin-resistant tuberculosis (MDR/RR-TB) under specific eligibility criteria.

Key inclusion criteria:

- Rifampicin-resistant TB
- Sensitive to fluoroquinolones
- No previous exposure or resistance to second-line drugs used in the regimen
- Absence of extensive extrapulmonary disease such as TB meningitis

QUESTION

A 45-year-old man with pulmonary tuberculosis presents after 3 months of anti-tubercular therapy with complaints of tingling, numbness, and burning sensation in both feet, in a stocking distribution. His regimen includes isoniazid, rifampicin, pyrazinamide, and ethambutol. Which of the following is the most likely cause of his symptoms?

A Ethambutol

B Isoniazid

CORRECT

C Pyrazinamide

D Rifampicin

RIGHT ANSWER

OK B. Isoniazid

WHY THIS IS RIGHT

Isoniazid (INH) commonly causes peripheral neuropathy, presenting as tingling, numbness, and burning sensation in a stocking-glove distribution. INH interferes with vitamin B6 (pyridoxine) metabolism. Pyridoxine deficiency impairs neuronal function, leading to sensory neuropathy. Risk factors:

- Malnutrition
- Diabetes
- Alcoholism
- HIV infection
- Pregnancy
- Chronic kidney disease

Why not other options:

- A. Ethambutol: Causes optic neuritis -> decreased visual acuity and red-green color blindness, not peripheral neuropathy.
- C. Pyrazinamide: Causes hyperuricemia -> gout/arthritis, not neuropathy.
- D. Rifampicin: Causes hepatotoxicity, orange discoloration of body fluids, drug interactions, not neuropathy.

QUESTION

Which of the following is the most peripheral centre under the Revised National Tuberculosis Control Programme organization structure?

- A District TB centre
- B Intermediate Reference Laboratory
- C Tuberculosis Unit

D Designated Microscopy Centre

CORRECT

RIGHT ANSWER

OK
D. Designated Microscopy Centre

WHY THIS IS RIGHT

Under the Revised National Tuberculosis Control Programme (RNTCP)/National Tuberculosis Elimination Programme (NTEP), the TB control system is organized in a hierarchical structure for diagnosis and management. Structure (from higher to peripheral level):

1. Intermediate Reference Laboratory (IRL) - performs advanced testing and quality control.
2. District TB Centre (DTC) - supervises TB control activities at the district level.
3. Tuberculosis Unit (TU) - covers a population of ~2.5 lakh and supervises field activities.
4. Designated Microscopy Centre (DMC) - the most peripheral unit, where sputum smear microscopy for TB diagnosis is performed.

QUESTION

| The following are types of rapid molecular tests under NTEP except:

A LPA

B TrueNAAT

C CBNAAT

D **MGIT960**

CORRECT

RIGHT ANSWER

OK

D. MGIT960

WHY THIS IS RIGHT

Under the National Tuberculosis Elimination Programme (NTEP), rapid molecular diagnostic tests are used for early detection of *Mycobacterium tuberculosis* and drug resistance. Rapid molecular tests include:

- CBNAAT (Cartridge-Based Nucleic Acid Amplification Test / GeneXpert)
- TrueNAAT (chip-based real-time PCR test)
- LPA (Line Probe Assay) for detecting resistance to rifampicin and isoniazid

These tests detect mycobacterial DNA and resistance mutations quickly.

MGIT 960, however, is a liquid culture system used for mycobacterial culture and drug susceptibility testing, not a rapid molecular test.

QUESTION

A 4-year-old child is brought with complaints of persistent fever, and cough without sputum for 3 weeks. As per the National Tuberculosis Elimination Programme guidelines, what should be the next step in management?

A Sputum CBNAAT

B Chest X ray

CORRECT

C Smear microscopy

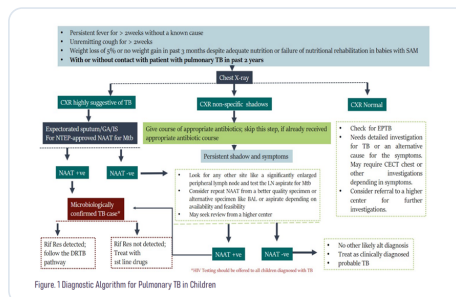
D Mantoux test

RIGHT ANSWER

OK B. Chest X ray

WHY THIS IS RIGHT

No explanation was provided in the source quiz.



QUESTION

| Terizidone acts mainly by inhibiting:

- A** DNA gyrase
- B** RNA polymerase
- C** Cell wall synthesis
- D** Protein synthesis at the 30S ribosome

CORRECT

RIGHT ANSWER

- OK** C. Cell wall synthesis

WHY THIS IS RIGHT

Terizidone is a second-line antitubercular drug used in the treatment of multidrug-resistant tuberculosis (MDR-TB). It is a prodrug of cycloserine.

- Inhibits bacterial cell wall synthesis by blocking enzymes involved in peptidoglycan formation, particularly:

- o Alanine racemase

- o D-alanine-D-alanine ligase

This prevents formation of D-alanine, an essential component of the mycobacterial cell wall.

QUESTION

Rickettsia typhi is the causative agent of which of the following diseases?

A Epidemic typhus

B Endemic typhus

CORRECT

C Scrub typhus

D Indian tick typhus

RIGHT ANSWER

OK B. Endemic typhus

WHY THIS IS RIGHT

Rickettsia typhi causes endemic (murine) typhus, a flea-borne rickettsial infection associated with rodents.

- Vector: rat flea (*Xenopsylla cheopis*)
- Reservoir: rodents (especially rats)
- Transmission: inoculation of infected flea feces into skin via scratching
- Clinical features:
 - o Fever, headache, myalgia
 - o Rash (less prominent, starts on trunk)
 - o Milder disease compared to epidemic typhus

Differentiate from others:

- Epidemic typhus: caused by *Rickettsia prowazekii* (louse-borne, severe)
- Scrub typhus: caused by *Orientia tsutsugamushi* (mite/chigger-borne, eschar present)
- Indian tick typhus: caused by *Rickettsia conorii* (tick-borne)

QUESTION

A farmer presents with fever, malaise, and diarrhea. There is a history of direct exposure to livestock. Which of the following organisms is the most likely causative agent?

A Rickettsia typhi

B Coxiella burnetii

CORRECT

C Orientia tsutsugamushi

D Rickettsia prowazekii

RIGHT ANSWER

OK

B. Coxiella burnetii

WHY THIS IS RIGHT

Coxiella burnetii causes Q fever, a zoonotic infection transmitted from livestock (cattle, sheep, goats), typically via inhalation of contaminated aerosols from animal products (placenta, urine, feces).

- Risk factor: farmers, veterinarians, slaughterhouse workers
- Transmission: inhalation (NOT via arthropod bite -> important distinction from rickettsiae)
- Clinical features:
 - o Acute: fever, malaise, headache, atypical pneumonia, hepatitis ± diarrhea
 - o Chronic: endocarditis (especially in patients with valvular disease)
 - o Obligate intracellular organism
 - o Survives in harsh conditions (spore-like form)
 - o No rash (helps differentiate from rickettsial infections)

Why not others:

- Rickettsia typhi: flea-borne (endemic typhus)
- Orientia tsutsugamushi: mite-borne (scrub typhus, eschar present)
- Rickettsia prowazekii: louse-borne (epidemic typhus)

QUESTION

A militant living in overcrowded conditions presents with high fever and a centrifugal rash that spares the palms and soles, along with evidence of body louse infestation. What is the most likely causative organism?

A Rickettsia typhi

B Rickettsia prowazekii

CORRECT

C Rickettsia akari

D Rickettsia conorii

RIGHT ANSWER

OK

B. Rickettsia prowazekii

WHY THIS IS RIGHT

Rickettsia prowazekii causes epidemic typhus, a severe rickettsial infection associated with overcrowding and poor hygiene, transmitted by the human body louse.

- Transmission: inoculation of infected louse feces into skin (scratching)

- Clinical features:

- o High-grade fever, severe headache
- o Centrifugal rash (starts on trunk -> spreads outward)
- o Spares palms and soles
- o May progress to delirium, shock

- Risk factors:

- o Overcrowding (e.g., war zones, refugee camps, prisons)

Why not others:

- Rickettsia typhi: endemic (murine) typhus, flea-borne, milder
- Rickettsia akari: rickettsialpox (mite-borne, eschar present)
- Rickettsia conorii: Indian tick typhus (tick-borne, involves palms/soles)

QUESTION

During a field visit, an epidemiologist observes mosquito larvae resting parallel to the water surface, without a siphon tube, and having palmate hairs on their abdominal segments. Based on these characteristics, which mosquito species do these larvae most likely belong to?

A Anopheles

CORRECT

B Aedes

C Culex

D Mansonia

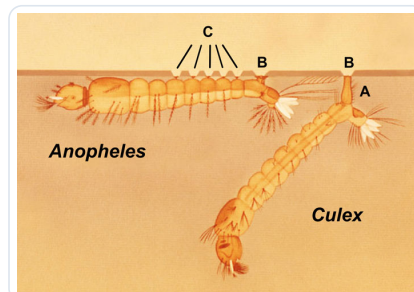
RIGHT ANSWER

OK

A. Anopheles

WHY THIS IS RIGHT

Anopheles mosquito larvae characteristically rest parallel to the water surface due to the absence of a siphon tube. They possess palmate hairs on abdominal segments, which help maintain this horizontal position. In contrast, Aedes and Culex larvae have siphon tubes and hang at an angle, while Mansonia larvae attach to aquatic plants for respiration.



QUESTION

A 28-year-old man presents with a rash after a trip. You observe a vector on his skin. Considering common vector-borne diseases, what is the disease transmitted by the vector shown in the image.



- A Babesiosis
- B Anaplasmosis
- C Scrub typhus**
- D Ehrlichiosis

CORRECT

RIGHT ANSWER

OK **C. Scrub typhus**

WHY THIS IS RIGHT

Scrub typhus is transmitted by chiggers (larval mites), not ticks, and should be suspected in patients with fever and rash after exposure in endemic areas.

- Causative organism: *Orientia tsutsugamushi*
- Vector: chigger (larval stage of mite)
- Classic feature: eschar at bite site
- Symptoms: fever, rash, lymphadenopathy
- Treated with doxycycline

Important distinction:

- Tick-borne diseases -> Babesiosis, Anaplasmosis, Ehrlichiosis
- Mite-borne disease -> Scrub typhus

QUESTION

A 30-year-old woman with no significant past medical history presents to the emergency department with symptoms that have persisted for five days, including high-grade fever, severe headache, generalized body aches, and a new cough accompanied by mild shortness of breath. She also reports noticing a blackish lesion at the site of an insect bite on her thigh after returning from a camping trip in a region known for chigger infestation. On physical examination, she is found to have a fever of 39°C, regional lymphadenopathy, and a well-defined eschar at the site of the lesion. Lung auscultation reveals mild diffuse rales. Laboratory tests show a normal white blood cell count and elevated liver enzymes. A chest X-ray indicates interstitial infiltrates, suggestive of atypical pneumonia that may be related to her primary infection. What is the most appropriate treatment for this patient?



- A** Intravenous doxycycline only
- B** Intravenous doxycycline and ceftriaxone
- C** Intravenous ceftriaxone and azithromycin
- D** Intravenous doxycycline and azithromycin

CORRECT

RIGHT ANSWER

- OK** **A. Intravenous doxycycline only**

WHY THIS IS RIGHT

Scrub typhus (caused by *Orientia tsutsugamushi*) should be suspected in a patient with fever, eschar, lymphadenopathy, and history of chigger exposure.

- Eschar at bite site (pathognomonic)
- Fever, headache, myalgia
- Lymphadenopathy
- Elevated liver enzymes
- Interstitial pneumonia (atypical pneumonia picture)

Management:

- Drug of choice: doxycycline
- Rapid clinical response is typical ("doxycycline test")
- Monotherapy is sufficient even with pulmonary involvement

Why not others:

- Ceftriaxone -> for bacterial pneumonia/sepsis, not rickettsial infections
- Azithromycin -> alternative in pregnancy or doxycycline intolerance
- Combination therapy -> not required

QUESTION

Which of the following diseases is not transmitted by the vector shown below?



A Orientia

CORRECT

B Babesia

C Ehrlichia

D Crimean congo hemorrhagic fever

RIGHT ANSWER

OK

A. Orientia

WHY THIS IS RIGHT

Ticks are important vectors transmitting multiple infections, but not all rickettsial diseases are tick-borne.

Tick-borne diseases include:

- Babesia -> causes babesiosis
- Ehrlichia -> causes ehrlichiosis
- Crimean-Congo hemorrhagic fever -> transmitted by Hyalomma ticks

Not transmitted by ticks:

- Orientia tsutsugamushi (scrub typhus) -> transmitted by chigger (larval mites), not ticks

QUESTION

A 24-year-old male presented with fever and myalgia. On examination, he had a diffuse maculopapular rash. Labs revealed a Hb of 14 g/dL, Hematocrit of 55%, Total WBC count of 4000, and platelet count of 25,000. Which of the following is the best prognostic indicator?

A Platelets

B Hematocrit

CORRECT

C Total Leukocyte Count

D Albumin

RIGHT ANSWER

OK

B. Hematocrit

WHY THIS IS RIGHT

Correct answer is B because rising hematocrit in the setting of thrombocytopenia and leukopenia suggests hemoconcentration due to plasma leakage, which is a key marker of severity and poor prognosis in dengue.

Dengue infection

↓

Endothelial dysfunction

↓

Plasma leakage

↓

Hemoconcentration

↓

↑ Hematocrit

Platelet count helps assess bleeding risk but is not the best prognostic indicator. Leukopenia is common but not predictive of severity. Albumin may fall in plasma leakage but hematocrit rise is the primary monitoring parameter.

Parameter	Finding
Platelets	↓↓↓
WBC	↓
Hematocrit	↑
Hb	Normal/↑

Dengue severity depends on:

- Capillary permeability, not just platelet count

Marker	Significance
Hematocrit ↑	Plasma leakage (most important)
Platelets ↓	Bleeding risk
AST/ALT ↑	Liver involvement

QUESTION

A patient presented with retro-orbital pain and rash since the 5 days. Most appropriate test to be done now is:

A NS1 Ag ELISA

B Dengue RNA by PCR

C Antibody detection by ELISA

CORRECT

D Viral culture

RIGHT ANSWER

OK

C. Antibody detection by ELISA

WHY THIS IS RIGHT

Selection of dengue diagnostic tests depends on the day of illness.

Key timeline:

- Early phase (Day 1-5):

- o NS1 antigen detection

- o RT-PCR (viral RNA detection)

- Late phase (after Day 5):

- o Antibody detection (IgM ELISA) becomes the test of choice

Clinical application:

- This patient is on Day 5 with retro-orbital pain and rash -> entering antibody phase

- IgM antibodies start appearing around Day 5

Key points:

- NS1 and PCR are useful early when viremia is present

- IgM ELISA is preferred after Day 5

- IgG indicates past infection or secondary infection

QUESTION

Match the following vectors with their most commonly associated Rickettsial diseases:

1-Tick	A-Epidemic typhus
2-Mite	B-Endemic typhus
3-Louse	C-RMSF
4-Flea	D-Rickettsial pox

A 1-D, 2-C, 3-B, 4-A

B 1-D, 2-C, 3-A, 4-B

C 1-C, 2-D, 3-A, 4-B

CORRECT

D 1-A, 2-C, 3-D, 4-B

RIGHT ANSWER

OK C. 1-C, 2-D, 3-A, 4-B

WHY THIS IS RIGHT

Rickettsial diseases are classically associated with specific arthropod vectors, which helps in diagnosis.

Correct matching:

- Tick -> Rocky Mountain spotted fever (RMSF)
- Mite -> Rickettsial pox (and scrub typhus in general context)
- Louse -> Epidemic typhus
- Flea -> Endemic (murine) typhus

Key points:

- Vector identification is crucial for clinical suspicion
- Rickettsial diseases often present with fever, rash, and eschar (in some cases)
- All are obligate intracellular organisms

QUESTION

A 20-30-year-old man presents with NS1 positivity and has with fever for 5 days. There are no bleeding manifestations. The Hb is 9 gm/dL, platelet count is 20,000, and ALT is 112 U/L. Which of the following should be used in the management of this patient?

1. Paracetamol
2. Platelet transfusion
3. PRBC transfusion
4. Steroids

A 1 only

CORRECT

B 1 and 2

C 1, 2, and 3

D 1, 2, 3, 4

RIGHT ANSWER

OK A. 1 only

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$19" here and does not include a written explanation for this item.

QUESTION

Which of the following drugs are used for clinical cure of malaria?

1. Artemether
2. Sulfadoxine-pyrimethamine
3. Chloroquine
4. Primaquine

A 1 and 2

B 1, 2 and 3

CORRECT

C 3 and 4

D 1, 2 and 4

RIGHT ANSWER

OK B. 1, 2 and 3

WHY THIS IS RIGHT

Term	Meaning	Target stage
Clinical cure	Relief of symptoms (fever ↓)	Blood schizonts
Radical cure	Prevent relapse	Liver hypnozoites
Suppressive cure	Prevent symptoms	Blood stage
Gametocidal	Prevent transmission	Gametocytes

Clinical cure requires drugs that clear erythrocytic schizonts, which produce symptoms. Artemether, chloroquine, and sulfadoxine-pyrimethamine act on blood stages and achieve symptomatic cure. Primaquine mainly eradicates hepatic hypnozoites and gametocytes for radical cure. Hence only 1, 2, and 3 are used for clinical cure.

Students think: "antimalarial = include primaquine"

BUT: It is for radical cure, NOT clinical cure

QUESTION

| Which of the following is not true regarding Trench fever?

- A** Also known as five day fever
- B** Associated with body louse
- C** Cat is the animal reservoir CORRECT
- D** Causative organism is associated with culture negative endocarditis

RIGHT ANSWER

- OK** **C. Cat is the animal reservoir**

WHY THIS IS RIGHT

Trench fever is caused by *Bartonella quintana* and was historically seen among soldiers living in crowded, unhygienic conditions during World War I.

- Also called “five-day fever” because of recurrent febrile episodes every ~5 days.
- Transmitted by the human body louse (*Pediculus humanus corporis*).
- Common in homeless populations and people living in poor sanitary conditions.
- *Bartonella quintana* can cause culture-negative endocarditis.

Why option C is incorrect

- Cats are the reservoir for *Bartonella henselae*, which causes cat-scratch disease, not trench fever.

QUESTION

| Which of the following is a xenodiagnostic method?

- A** Rabbit ileal loop for enterotoxigenic *Escherichia coli*
- B** Injecting *Aedes thorax* with blood of a suspected dengue patient CORRECT
- C** Injecting a hamster with splenic biopsy for diagnosis of leishmaniasis
- D** Intradermal test on guinea pigs for toxigenicity of *Corynebacterium diphtheria*

RIGHT ANSWER

- OK** **B. Injecting *Aedes thorax* with blood of a suspected dengue patient**

WHY THIS IS RIGHT

Xenodiagnosis is a diagnostic method in which a live vector is infected with a patient's sample to detect the presence of a pathogen by allowing it to multiply in the vector.

In dengue diagnosis, blood from a suspected patient can be injected into the thorax of *Aedes* mosquitoes. If the virus is present, it multiplies in the mosquito and can later be detected.

QUESTION

A soldier presents with fever, rash not involving the palms and soles and myalgia. There is also history of louse infestation in the soldier barracks. The probable causative organism is:

A R. prowazekii

CORRECT

B R. conorii

C R. typhi

D R. akari

RIGHT ANSWER

OK

A. R. prowazekii

WHY THIS IS RIGHT

Epidemic typhus is caused by *Rickettsia prowazekii* and is transmitted by the human body louse. It commonly occurs in crowded conditions such as military barracks, prisons, or refugee camps. Clinical features include:

- High fever
- Severe headache and myalgia
- Maculopapular rash that begins on the trunk and spreads outward but typically spares the palms and soles

Why not other options:

- *R. conorii*: Causes Mediterranean spotted fever transmitted by ticks; rash usually involves palms and soles.
- *R. typhi*: Causes endemic (murine) typhus transmitted by fleas from rats, not lice.
- *R. akari*: Causes rickettsialpox transmitted by mites and typically produces an eschar at the bite site.

QUESTION

Anti-larval measures are being taken for a pond in a city. Which of the following synthetic insecticides are not recommended for such measures?

A Fenthion

B Paris green

C DDT

CORRECT

D Abate

RIGHT ANSWER

OK C. DDT

WHY THIS IS RIGHT

Anti-larval measures target the larval stages of mosquitoes in water bodies to prevent adult mosquito emergence.

Common larvicides used:

- Temephos (Abate) - widely used organophosphate larvicide.
- Fenthion - used as a larvicide in water bodies.
- Paris green - copper acetoarsenite historically used against mosquito larvae.

Not recommended for anti-larval control:

- DDT, which is primarily an adulticide used for indoor residual spraying (IRS) to kill adult mosquitoes resting on walls.

QUESTION

Identify the correct statements about malaria control:

1. Urban malaria scheme is based on anti-larval measures where SPR >5%
2. Anti-adult measures include ITBN and LLIN
3. Most efficient to control urban malaria is environmental control of diseases
4. Synthetic pyrethroids are agents of choice for Sandfly

A 1, 2, 4

B 1, 3, 4

CORRECT

C 1, 4

D 2, 3

RIGHT ANSWER

OK B. 1, 3, 4

WHY THIS IS RIGHT

Malaria control programs involve vector control measures and environmental management, especially in urban areas.

- Urban Malaria Scheme (UMS): Focuses mainly on anti-larval measures when Slide Positivity Rate (SPR) > 5%.
- Environmental control: The most effective method in urban malaria control is source reduction, such as eliminating stagnant water where mosquitoes breed.
- Insecticides: Synthetic pyrethroids are commonly used insecticides for sandfly control (important in vector control programs).

Note:

- ITBN/LLIN are personal protective measures against mosquito bites but are not classified as anti-adult mosquito control strategies in this context.

QUESTION

Identify A and B in the image given:



A A-Culex, B-Aedes

B A-Anopheles, B-Culex

CORRECT

C A-Culex, B-Anopheles

D A-Aedes, B-Culex

RIGHT ANSWER

OK

B. A-Anopheles, B-Culex

WHY THIS IS RIGHT

Mosquito larvae can be differentiated by their posture in water and respiratory structures.

Key differences:

- Anopheles larva
 - o No respiratory siphon
 - o Lies parallel to the water surface
 - o Breathes through spiracles directly at the surface
- Culex larva
 - o Has a long respiratory siphon
 - o Hangs obliquely from the water surface

QUESTION

A 12-year-old child in an endemic region is scheduled to receive the Dengvaxia vaccine. The pediatrician explains that this vaccine is a live recombinant chimeric vaccine in which the structural genes of dengue virus are inserted into the backbone of another attenuated virus strain. Which viral strain is used as the backbone for the Dengvaxia vaccine?

A Japanese encephalitis SA14-14-2 strain

B Yellow fever 17D strain

CORRECT

C Attenuated dengue serotype-2 strain

D Chimeric tick-borne encephalitis virus strain

RIGHT ANSWER

OK B. Yellow fever 17D strain

WHY THIS IS RIGHT

Dengvaxia (CYD-TDV) is a live attenuated recombinant chimeric dengue vaccine.

Vaccine design:

- The structural genes (prM and E proteins) of the four dengue virus serotypes (DENV 1-4) are inserted into the genetic backbone of the attenuated Yellow fever 17D virus.
- This creates a chimeric virus that stimulates immunity against dengue.

Key features:

- Provides immunity against all four dengue serotypes.

Recommended mainly for individuals with prior dengue infection in endemic areas

QUESTION

In a dengue-prone zone, 300 houses were inspected. 120 breeding containers were found, of which 90 were Aedes-positive. What is the Breteau Index?

A 20

B 30

CORRECT

C 40

D 120

RIGHT ANSWER

OK B. 30

WHY THIS IS RIGHT

The Breteau Index (BI) is an entomological indicator used in dengue surveillance to measure the density of Aedes mosquito breeding.

Calculation in this case:

· Houses inspected = 300

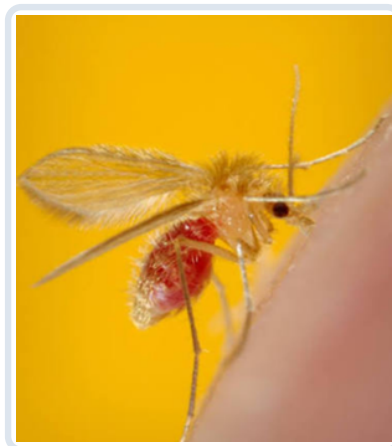
·

Aedes-positive containers = 90

A higher Breteau Index indicates a greater risk of dengue transmission in the community.

QUESTION

A vector shown in the image is highly prevalent in certain endemic regions and is responsible for transmission of an important parasitic disease. In recent years, resistance to commonly used insecticides has been reported against this vector. Which of the following insecticides is currently preferred for vector control in such settings?



A DDT

B Malathion

C Deltamethrin

CORRECT

D Benzene hexachloride (BHC)

RIGHT ANSWER

OK

C. Deltamethrin

WHY THIS IS RIGHT

The insect shown is a sandfly (*Phlebotomus*), the vector of leishmaniasis (e.g., visceral leishmaniasis/kala-azar). Due to resistance to older insecticides such as DDT, synthetic pyrethroids are now preferred for vector control.

Deltamethrin, a synthetic pyrethroid, is commonly used because it:

- Is highly effective against sandflies
- Has rapid knockdown action
- Has low toxicity to humans
- Is used in indoor residual spraying and insecticide-treated bed nets

Why not other options:

- DDT: Widespread resistance in sandflies and environmental toxicity; no longer preferred.
- Malathion: Organophosphate used in mosquito control, less effective for sandflies.
- BHC (Lindane): Resistance and toxicity issues; largely discontinued.

QUESTION

| Toxorhynchites mosquitoes are used in biological control because:

- A** Adult females suck large quantities of human blood
- B** Larvae prey upon larvae of container-breeding mosquitoes CORRECT
- C** Adults are strong fliers that transmit arboviruses efficiently
- D** They sterilize other mosquitoes through mating interference

RIGHT ANSWER

- OK** **B. Larvae prey upon larvae of container-breeding mosquitoes**

WHY THIS IS RIGHT

Toxorhynchites mosquitoes (also called “elephant mosquitoes”) are used in biological control of disease-transmitting mosquitoes because their larvae are predatory.

- Larvae feed on the larvae of other mosquitoes, especially Aedes and Culex species that breed in containers.
- Adult Toxorhynchites mosquitoes do not suck blood; they feed on nectar, so they do not transmit diseases.

Because of their larval predation, they help reduce populations of vector mosquitoes that transmit diseases such as dengue, chikungunya, and Zika.

QUESTION

An immunocompromised patient presents with a unilateral, painful, black necrotic lesion on the right side of the face. Which of the following is the most likely diagnosis?

A Aspergillosis

B Mucormycosis

CORRECT

C Histoplasmosis

D Candidiasis

RIGHT ANSWER

OK B. Mucormycosis

WHY THIS IS RIGHT

Mucormycosis is a rapidly progressive, angioinvasive fungal infection seen in immunocompromised patients (especially uncontrolled diabetes/DKA), characterized by black necrotic eschar due to vascular invasion and tissue infarction.

- Most common presentation: rhino-orbital-cerebral mucormycosis
- Hallmark feature: unilateral facial pain + black necrotic lesion (eschar)
- Pathogenesis: invasion of blood vessels -> thrombosis -> ischemic necrosis
- Microscopy: broad, aseptate hyphae with right-angle branching
- Management: Immediate IV amphotericin B + aggressive surgical debridement + correction of underlying immunosuppression

Why not others:

- Aspergillosis -> septate hyphae, acute-angle branching
- Histoplasmosis -> intracellular yeast in macrophages
- Candidiasis -> superficial mucocutaneous infection (no necrotic eschar)

QUESTION

A diabetic, chronic smoker presents with a white coating on the tongue. Microscopy of the lesion reveals budding yeast cells with pseudohyphae. Which of the following culture media is most appropriate for isolating the causative organism?



- A Blood agar
- B Thayer-Martin medium
- C CHROM agar**
- D Loeffler's serum slope

CORRECT

RIGHT ANSWER

- OK **C. CHROM agar**

WHY THIS IS RIGHT

Oral candidiasis (thrush) is caused by *Candida albicans*, characterized by white curd-like plaques on the tongue and microscopy showing budding yeast cells with pseudohyphae.

- Risk factors:
 - o Diabetes mellitus
 - o Immunocompromised state
 - o Smoking, antibiotics, steroids
- Diagnostic feature: Budding yeast + pseudohyphae on microscopy
- Culture: CHROM agar is used for isolation and differentiation of *Candida* species based on colony color

Why not others:

- Blood agar: general-purpose medium, not specific for *Candida* differentiation
- Thayer-Martin medium: for *Neisseria* species
- Loeffler's serum slope: for *Corynebacterium diphtheriae*

QUESTION

A patient's tissue biopsy reveals asteroid bodies on histopathological examination. Which of the following culture medium is most appropriate for isolating the causative organism?

A Blood agar

B Chocolate agar

C Sabouraud's dextrose agar

CORRECT

D Nutrient agar

RIGHT ANSWER

OK C. Sabouraud's dextrose agar

WHY THIS IS RIGHT

Asteroid bodies on histopathology are classically seen in sporotrichosis, caused by the dimorphic fungus *Sporothrix schenckii*.

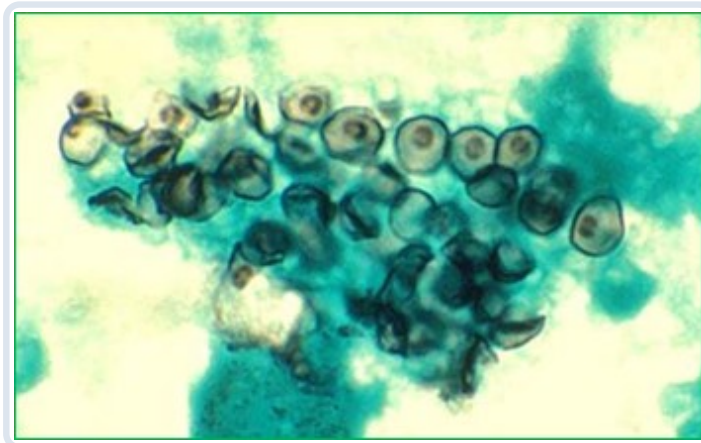
- Asteroid bodies: central yeast surrounded by eosinophilic radiating material (Splendore-Hoeppli phenomenon)
- Disease: Sporotrichosis ("rose gardener's disease")
- Transmission: traumatic inoculation via thorns, splinters
- Culture:
 - o Sabouraud's dextrose agar (SDA) is the medium of choice for fungal isolation
 - o Shows mold form at 25°C and yeast form at 37°C (dimorphic fungus)

Why not others:

- Blood agar / Chocolate agar / Nutrient agar: used for bacteria, not fungi

QUESTION

An HIV-positive patient presents with a history of pneumonia. Chest X-ray reveals bilateral interstitial infiltrates. A bronchoalveolar lavage (BAL) sample is obtained for diagnostic evaluation. Which of the following is the most likely causative organism?



A *Pneumocystis carinii*

CORRECT

B *Mucor* spp.

C *Aspergillus* spp.

D *Candida* spp.

RIGHT ANSWER

OK **A. *Pneumocystis carinii***

WHY THIS IS RIGHT

Pneumocystis jirovecii (formerly *P. carinii*) is an opportunistic fungal pathogen causing *Pneumocystis pneumonia* (PCP) in HIV patients, especially with CD4 < 200 cells/ μ L.

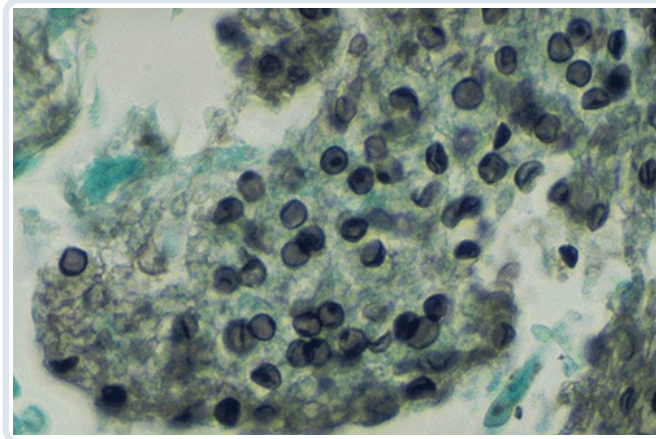
- Clinical setting: HIV + pneumonia + bilateral interstitial (ground-glass) infiltrates
- Diagnosis:
 - o Bronchoalveolar lavage (BAL) is the most sensitive test
 - o Gomori methenamine silver (GMS) stain shows cup-shaped cysts ("crushed ping-pong ball" appearance)

Why not others:

- *Mucor*: broad, aseptate hyphae with right-angle branching
- *Aspergillus*: septate hyphae with acute-angle branching
- *Candida*: budding yeast with pseudohyphae (not typical lung pathogen)

QUESTION

A patient presented with complaints of persistent cough and weight loss. He had a history of contact with multiple sexual partners. He was diagnosed as HIV positive 6 months back and is poorly adherent to his medications. The fungal culture of sputum was negative. On Gomori methamine silver staining, the following was seen. What is the most likely causative organism?



A Paracoccidioides brasiliensis

B Histoplasma capsulatum

C Coccidioides immitis

D **Pneumocystis jirovecii**

CORRECT

RIGHT ANSWER

OK **D. Pneumocystis jirovecii**

WHY THIS IS RIGHT

Pneumocystis jirovecii is an opportunistic fungal pathogen causing *Pneumocystis pneumonia* (PCP) in HIV patients with poor ART adherence, especially when CD4 < 200 cells/ μ L.

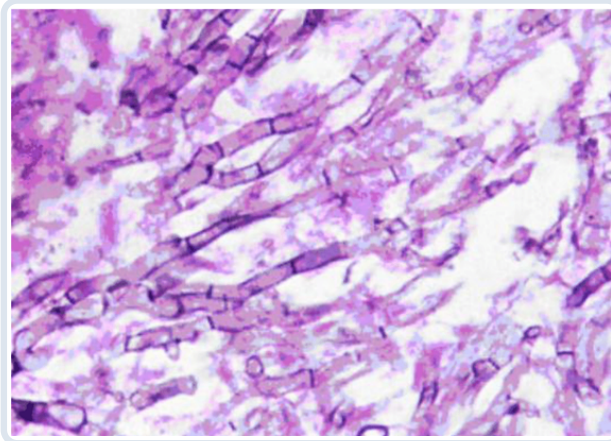
- Diagnosis: Gomori methenamine silver (GMS) stain shows darkly stained, crescent/cup-shaped cysts
- Clinical features:
 - o Persistent cough
 - o Progressive dyspnea
 - o Weight loss
 - o Hypoxia
- Radiology: diffuse bilateral interstitial (ground-glass) infiltrates
- Treatment: Trimethoprim-sulfamethoxazole (TMP-SMX)

Why not others:

- *Paracoccidioides brasiliensis*: "pilot wheel" yeast
- *Histoplasma capsulatum*: intracellular yeast in macrophages
- *Coccidioides immitis*: spherules with endospores

QUESTION

A diabetic truck driver presents to you with cough and breathlessness. A diagnosis of pneumonia was confirmed, and histopathological examination revealed dichotomous branching, as shown below. What is the likely causative agent?



A Rhizopus

B Mucor

C Candida

D Aspergillus

CORRECT

RIGHT ANSWER

OK

D. Aspergillus

WHY THIS IS RIGHT

Aspergillus causes opportunistic pulmonary infections, especially in diabetic or immunocompromised patients, and is identified histologically by septate hyphae with acute-angle ($\approx 45^\circ$) dichotomous branching.

- Morphology:
 - o Septate hyphae
 - o Acute-angle branching ($\sim 45^\circ$)
 - o Dichotomous branching pattern
- Clinical spectrum:
 - o Allergic bronchopulmonary aspergillosis (ABPA)
 - o Aspergilloma (fungal ball)
 - o Invasive aspergillosis (in immunocompromised)

Management (invasive disease): Voriconazole is drug of choice

Why not others:

- o Rhizopus/Mucor: broad, aseptate hyphae with right-angle (90°) branching
- o Candida: budding yeast with pseudohyphae

QUESTION

A female patient presents with complaints of thick white vaginal secretions. Which of the following can be used to identify the likely species of the causative agent?

- A Bird seed agar
- B Brain heart infusion agar
- C CHROME agar**
- D Sabouraud dextrose agar

CORRECT

RIGHT ANSWER

- OK
- C. CHROME agar**

WHY THIS IS RIGHT

Vulvovaginal candidiasis (thick, white “curdy” discharge) is most commonly caused by *Candida* species, especially *Candida albicans*, and CHROM agar is used to identify and differentiate *Candida* species.

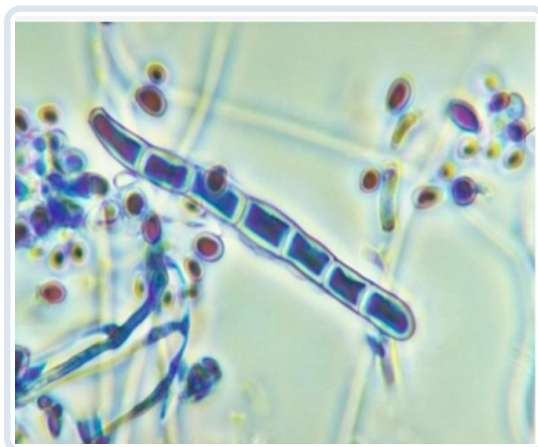
- Clinical clue: thick, white, non-foul-smelling discharge + itching
- Microscopy: budding yeast cells with pseudohyphae
- Role of CHROM agar:
 - o Differential medium for *Candida* speciation
 - o Produces species-specific colony colors (e.g., *C. albicans* -> green colonies)

Why not others:

- Bird seed agar: for *Cryptococcus neoformans* (melanin production)
- Brain heart infusion agar: general enriched medium
- Sabouraud dextrose agar (SDA): grows fungi but does not differentiate species

QUESTION

A patient presents with itching in the axilla. On microscopic examination of the skin scrapings, a red pigment-producing fungus with pencil-shaped macroconidia is seen. Which of the following is the most likely organism?



A Trichophyton violaceum

B Trichophyton rubrum

CORRECT

C Trichophyton tonsurans

D Trichophyton schoenleinii

RIGHT ANSWER

OK

B. Trichophyton rubrum

WHY THIS IS RIGHT

Trichophyton rubrum is the most common dermatophyte causing superficial fungal infections (tinea) and is identified by red pigment production and characteristic pencil-shaped macroconidia.

- Clinical presentation: itching in moist areas (e.g., axilla, groin -> tinea corporis/cruris)

- Microscopy:

- o Septate hyphae

- o Pencil-shaped (cigar-shaped) macroconidia

- Colony feature: Red pigment on reverse side of culture -> hallmark of T. rubrum

Why not others:

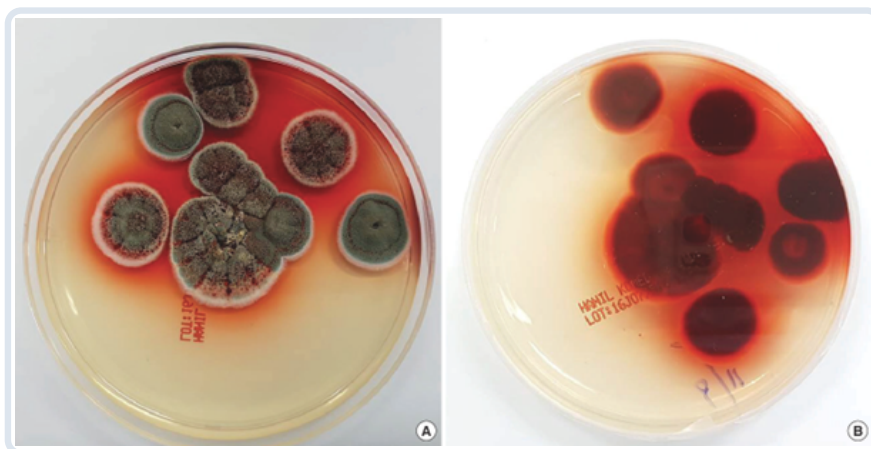
- Trichophyton violaceum: violet colonies, lacks typical macroconidia

- Trichophyton tonsurans: variable morphology, no red pigment

- Trichophyton schoenleinii: favus; antler-like hyphae

QUESTION

A patient presents with cervical lymphadenopathy and is found to be retropositive. A fungal culture depicts a velvety growth with red diffusible pigment on the underside, as shown below. Which is the most likely causative organism?



A *Talaromyces marneffei*

CORRECT

B *Blastomyces*

C *Aspergillus*

D *Pneumocystis jirovecii*

RIGHT ANSWER

OK

A. *Talaromyces marneffei*

WHY THIS IS RIGHT

Talaromyces (*Penicillium*) *marneffei* is a dimorphic opportunistic fungus seen in HIV-positive (retropositive) patients, characterized by velvety colonies producing a characteristic red diffusible pigment.

· Culture characteristics:

- o Mold form (25°C): velvety colonies with red pigment diffusing into agar
- o Yeast form (37°C): intracellular yeast

· Microscopy: Yeast cells with transverse septum (sausage-shaped) -> distinctive feature

· Clinical features:

- o Fever, weight loss
- o Generalized lymphadenopathy
- o Skin lesions resembling molluscum contagiosum

Why not others:

- *Blastomyces*: broad-based budding yeast, no red pigment
- *Aspergillus*: septate hyphae, no dimorphism or red pigment
- *Pneumocystis jirovecii*: cysts in lung, not cultured like this

QUESTION

In a patient in the ICU, an infection in the central venous catheter is noted. Staining showed a gram-positive oval-shaped organism that reproduces by budding. Identify the organism.

A Candida

CORRECT

B E. coli

C Staph aureus

D Staph epidermidis

RIGHT ANSWER

OK

A. Candida

WHY THIS IS RIGHT

A central venous catheter-associated infection with Gram-positive, oval organisms showing budding indicates Candida species.

- Candida is a yeast -> appears as oval, budding cells on microscopy
- Can form pseudohyphae in tissue
- Common cause of catheter-related bloodstream infections (CRBSI), especially in ICU patients

Risk factors:

- Indwelling catheters
- Immunocompromised state
- Broad-spectrum antibiotic use
- Total parenteral nutrition

Differentiation:

- E. coli -> Gram-negative rod
- Staphylococcus aureus / epidermidis -> Gram-positive cocci (not budding)

QUESTION

What type of budding is described by a broad base with a small bud coming off of it, often associated with a figure of 8 appearances?

A Blastomycosis

CORRECT

B Cryptococcus

C Candidiasis

D Histoplasmosis

RIGHT ANSWER

OK A. Blastomycosis

WHY THIS IS RIGHT

Blastomyces dermatitidis is identified by broad-based budding yeast, often giving a characteristic figure-of-8 appearance.

- Broad-based budding = hallmark of blastomycosis
- Thick-walled yeast seen in tissue

Clinical features:

- Pulmonary infection (pneumonia-like illness)
- Cutaneous and bone involvement in dissemination

Differentiation:

- Cryptococcus -> narrow-based budding + capsule (India ink)
- Candida -> budding yeast with pseudohyphae
- Histoplasma -> intracellular yeast in macrophages (narrow-based budding)

QUESTION

| Desert rheumatism is caused by:

A Coccidioides immitis

CORRECT

B Histoplasmosis

C Mucormycosis

D Paracoccidioidomycosis

RIGHT ANSWER

OK

A. Coccidioides immitis

WHY THIS IS RIGHT

Desert rheumatism refers to the arthralgia and erythema nodosum seen in primary infection with *Coccidioides immitis*

- Caused by *Coccidioides immitis* (dimorphic fungus)
- Endemic in desert regions (Southwestern USA)
- Infection acquired by inhalation of arthroconidia (spores)
- Tissue -> spherules filled with endospores
- Culture -> mold with arthroconidia

Clinical features:

- Primary pulmonary infection (flu-like illness)
- Desert rheumatism triad:

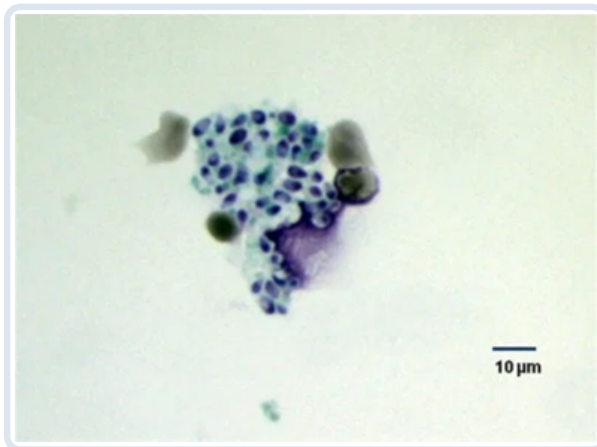
- o Fever
- o Arthralgia (joint pains)
- o Erythema nodosum

Differentiation:

- Histoplasma -> intracellular yeast in macrophages
- Mucor -> broad, aseptate hyphae
- Paracoccidioides -> "pilot wheel" budding

QUESTION

A man presents with low-grade fever, cough, and weight loss following a recent travel history. A bronchoalveolar lavage (BAL) sample cultured on Sabouraud Dextrose Agar (SDA) shows narrow-based budding yeast cells located within macrophages on direct mount. What is the most likely diagnosis?



A Blastomycosis

B Histoplasmosis

CORRECT

C Coccidioidomycosis

D Cryptococcosis

RIGHT ANSWER

OK B. Histoplasmosis

WHY THIS IS RIGHT

Histoplasma capsulatum is identified by narrow-based budding yeast seen intracellularly within macrophages.

- Small oval yeast (2-5 μm)
- Narrow-based budding
- Located inside macrophages (hallmark)
- Dimorphic fungus (mold in environment, yeast in tissue)

Clinical relevance:

- Causes pulmonary infection resembling tuberculosis (fever, cough, weight loss)
- Associated with exposure to bird or bat droppings

Differentiation:

- Blastomycosis -> broad-based budding
- Coccidioidomycosis -> spherules with endospores
- Cryptococcus -> encapsulated yeast (India ink positive)

QUESTION

A patient presents with fever, cough, and breathlessness. A KOH mount of the bronchoalveolar lavage (BAL) sample shows the following. What is the most likely causative organism?

- A Rhizopus species
- B Cryptococcus neoformans
- C Aspergillus fumigatus**
- D Candida albicans

CORRECT

RIGHT ANSWER

- OK
- C. Aspergillus fumigatus**

WHY THIS IS RIGHT

Aspergillus fumigatus is identified by slender, septate hyphae with acute angle ($\approx 45^\circ$) dichotomous branching on microscopy.

- Thin, septate hyphae
- Dichotomous branching at acute angles
- Seen on KOH mount, GMS, or PAS staining

Clinical relevance:

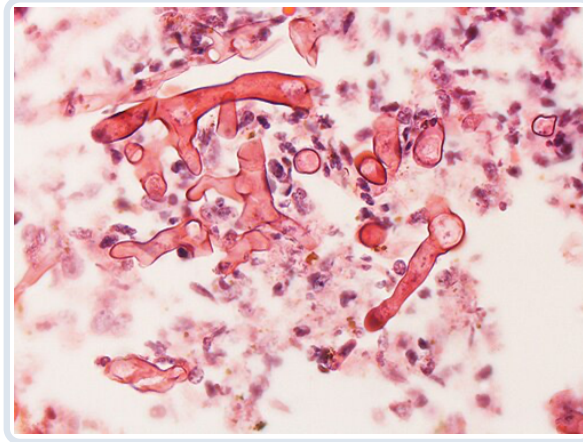
- Causes invasive pulmonary aspergillosis in immunocompromised patients
- Can also cause aspergilloma (fungal ball) in pre-existing lung cavities
- May present with cough, hemoptysis, and breathlessness

Differentiation:

- *Rhizopus* (*Mucor*) -> broad, aseptate hyphae with right-angle branching
- *Candida* -> yeast with pseudohyphae
- *Cryptococcus* -> encapsulated yeast (India ink)

QUESTION

A patient recovered from COVID-19, treated with steroids, now presents with nasal discharge for 3 weeks. What is the likely diagnosis?



A Mucor

CORRECT

B Aspergillus

C Candida

D Trichosporon

RIGHT ANSWER

OK A. Mucor

WHY THIS IS RIGHT

Post-COVID patient with steroid use presenting with nasal symptoms and histology showing broad, non-septate hyphae with right-angle branching is characteristic of mucormycosis.

- Caused by Mucor (Mucorales) species
- Shows broad, ribbon-like, aseptate hyphae with right-angle branching
- Strong association with diabetes, steroid use, and immunosuppression (post-COVID surge)
- Commonly presents as rhino-orbital-cerebral infection

Differentiation:

- Aspergillus -> thin, septate hyphae with acute angle branching
- Candida -> yeast with pseudohyphae
- Trichosporon -> yeast with arthroconidia

QUESTION

Match the following:

Column A	Column B
1. Leprosy	a. Biopsy
2. Tinea capitis	b. Patch test
3. Contact dermatitis	c. KOH wet mount
4. Lupus vulgaris	d. Split skin smear

- A. 1-c, 2-a, 3-b, 4-d
- B. 1-a, 2-c, 3-d, 4-b
- C. 1-b, 2-d, 3-c, 4-a
- D. 1-d, 2-c, 3-b, 4-a
- CORRECT

RIGHT ANSWER

OK D. 1-d, 2-c, 3-b, 4-a

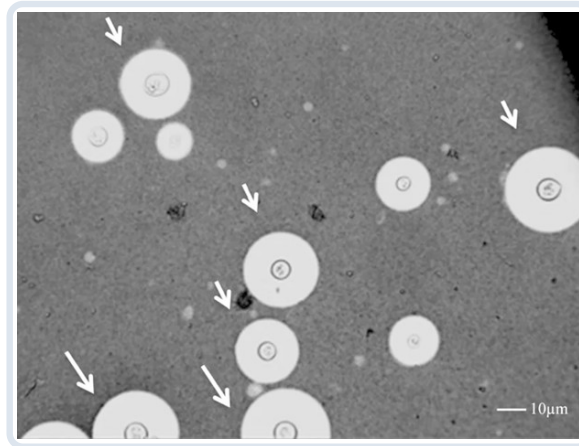
WHY THIS IS RIGHT

The correct matching of the diseases with their diagnostic techniques is as follows:

Condition	Investigation	Key Finding
1. Leprosy	d. Split-skin smear	Demonstrates acid-fast bacilli (Mycobacterium leprae)
2. Tinea capitis	c. KOH wet mount	Shows fungal hyphae/arthrospores
3. Contact dermatitis	b. Patch test	Identifies specific allergic sensitizers
4. Lupus vulgaris	a. Biopsy	Granulomatous TB; clinically apple-jelly nodules

QUESTION

Which of the following is true about the organism shown below, except?



- A Extrapulmonary cryptococcus is AIDS defining
- B Cryptococcus gattii is Associated with bird droppings
- C All pathogenic strains are urease positive

D CD4 count greater than 500

CORRECT

RIGHT ANSWER

OK

D. CD4 count greater than 500

WHY THIS IS RIGHT

Cryptococcus is an encapsulated yeast causing opportunistic infections, especially in immunocompromised patients.

Correct concepts:

- Extrapulmonary cryptococcosis (e.g., meningitis) is an AIDS-defining illness
- Cryptococcus species are urease positive
- Cryptococcus neoformans is classically associated with pigeon (bird) droppings

Incorrect statement:

- Infection typically occurs at low CD4 counts (<100), not when CD4 is greater than 500

Additional point:

Cryptococcus gattii is more often associated with environmental sources like eucalyptus trees and can infect immunocompetent individuals

QUESTION

An HIV-positive patient presents with dysphagia and odynophagia. Endoscopic examination of the esophagus reveals plaques. What is the most likely causative organism?

CORRECT

A Budding yeast cells with pseudohyphae

B Thin septate hyphae with acute angle branching

C Acid fast bacilli

D Squamous cell cancer

RIGHT ANSWER

OK

A. Budding yeast cells with pseudohyphae

WHY THIS IS RIGHT

In an HIV-positive patient, dysphagia and odynophagia with white esophageal plaques is characteristic of Candida esophagitis.

- Caused by *Candida albicans*
- Microscopy shows budding yeast cells with pseudohyphae
- Occurs in advanced immunosuppression (low CD4 count)
- Endoscopy shows white, adherent plaques in the esophagus

Differentiation:

- Thin septate hyphae with acute angle branching -> *Aspergillus* (lung disease, not esophagus)
- Acid-fast bacilli -> tuberculosis
- Squamous cell cancer -> irregular mass/ulcer, not fungal plaques

QUESTION

| Which of the following organisms is not classified as a dimorphic fungus?

A Histoplasma capsulatum

B Coccidioides

C **Cryptococcus neoformans**

CORRECT

D Talaromyces marneffii

RIGHT ANSWER

OK **C. Cryptococcus neoformans**

WHY THIS IS RIGHT

Dimorphic fungi exist in two forms depending on temperature: mold form at 25°C and yeast (or tissue) form at 37°C. "mold in the cold, yeast in the heat"

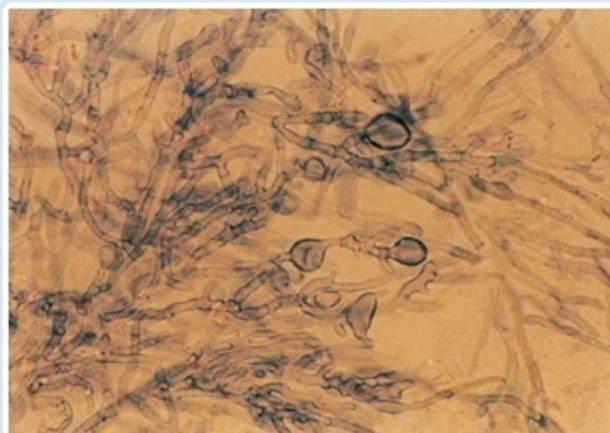
- Histoplasma capsulatum, Coccidioides, and Talaromyces marneffii are dimorphic fungi
- Cryptococcus neoformans is not dimorphic; it exists only as an encapsulated yeast with polysaccharide capsule seen in India ink preparation.

Key points:

- Histoplasma -> intracellular yeast in macrophages
- Coccidioides -> spherules with endospores in tissue
- Talaromyces marneffii -> yeast with transverse septum

QUESTION

A patient presents with exophytic valvular vegetations. Biopsy is stained with GMS. Which of the following is the most likely causative organism?



A Pigmented hyphae - Chromoblastomycosis

B Acute angle septate hyphae - Aspergillus

CORRECT

C Broad non-septate hyphae - Mucor

D Yeast-like budding cells - Candida

RIGHT ANSWER

OK

B. Acute angle septate hyphae - Aspergillus

WHY THIS IS RIGHT

In a patient with valvular vegetations and fungal elements on GMS stain, the presence of septate hyphae with acute angle (approximately 45°) branching is characteristic of Aspergillus species.

- Aspergillus shows thin, septate hyphae with acute angle branching
- Common cause of fungal endocarditis, especially in immunocompromised patients or prosthetic valves
- GMS stain highlights fungal hyphae in tissue

Differentiation:

- Mucor: broad, non-septate hyphae with right angle branching
- Candida: yeast forms with budding cells and pseudohyphae
- Chromoblastomycosis: pigmented (dematiaceous) fungi with sclerotic bodies

QUESTION

A 35 year old farmer presents with a painless swelling of the foot that has developed gradually over several months. On examination there are multiple discharging sinuses with black granules seen in the discharge. Which of the following is the most likely diagnosis?

- A Actinomyces israelii infection
- B Chromoblastomycosis
- C **Madurella mycetomatis**
- D Staphylococcus aureus abscess

CORRECT

RIGHT ANSWER

- OK
- C. **Madurella mycetomatis**

WHY THIS IS RIGHT

Madurella mycetomatis Causes eumycetoma (fungal mycetoma)

-> Presents with classic triad:

- Painless subcutaneous swelling
- Multiple discharging sinuses
- Black granules in discharge

Common in farmers due to traumatic implantation (thorn/splinter injury)

Granule color differentiation (high-yield):

- Black granules -> Madurella mycetomatis (fungal mycetoma)
- White/yellow granules -> Actinomyces, Nocardia (actinomycetoma)

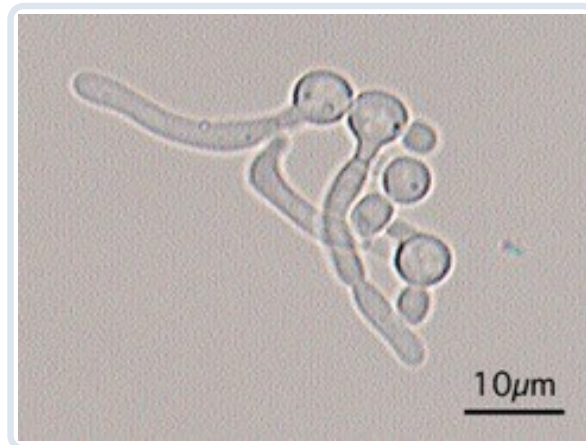
Why not others:

- Actinomyces israelii -> sulfur granules (yellow), not black
- Chromoblastomycosis -> verrucous lesions, not sinus + granules
- Staphylococcus aureus -> acute painful abscess, no granules



QUESTION

Identify the organism responsible for phenomenon in the given image?



CORRECT

A **Candida albicans**

B Candida krusei

C Candida tropicalis

D Cryptococcus neoformans

RIGHT ANSWER

OK **A. Candida albicans**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$19" here and does not include a written explanation for this item.

QUESTION

| Thorn prick injury is a common mode of infection in all except:

A Sporotrichosis

B Chromoblastomycosis

C Mycetoma

D Dermatophytosis

CORRECT

RIGHT ANSWER

OK

D. Dermatophytosis

WHY THIS IS RIGHT

Thorn prick / traumatic implantation infections (subcutaneous mycoses):

- Sporotrichosis -> caused by *Sporothrix schenckii*
-> Classic: "rose gardener's disease" (thorn injury)
- Chromoblastomycosis -> traumatic implantation of dematiaceous fungi
- Mycetoma -> entry via soil-contaminated thorn/splinter injuries

These infections:

- > Occur after minor trauma (thorn prick, splinter)
- > Involve skin + subcutaneous tissue

Dermatophytosis (EXCEPTION):

- Caused by dermatophytes (*Trichophyton*, *Microsporum*, *Epidermophyton*)
- Spread by direct contact (person, animal, fomites)
- Limited to keratinized tissues (skin, hair, nails)
- No trauma or thorn prick required

QUESTION

A bronchial asthma patient who is on inhalational steroids presented with white patchy lesions on the tongue and buccal mucosa. What is the drug that can be used to treat this condition?

A Clotrimazole

CORRECT

B Griseofulvin

C Terbinafine

D Flucytosine

RIGHT ANSWER

OK

A. Clotrimazole

WHY THIS IS RIGHT

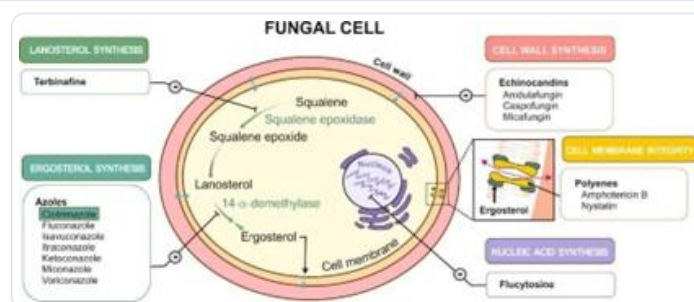
Inhaled corticosteroids predispose to oral candidiasis, presenting as white patchy plaques on tongue and buccal mucosa.

Clotrimazole (topical azole) is first-line treatment for uncomplicated oral thrush.

Griseofulvin and terbinafine are used for dermatophyte infections, not Candida.

Flucytosine is reserved for severe systemic fungal infections, not oral candidiasis.

Drug	Class	Use
Clotrimazole	Azole	Oral candidiasis
Griseofulvin	Microtubule inhibitor	Dermatophytes (skin, hair)
Terbinafine	Squalene epoxidase inhibitor	Dermatophytes
Flucytosine	DNA/RNA inhibitor	Systemic (with amphotericin)



QUESTION

A diabetic patient presented with rhinitis and swelling of the face. Intranasal biopsy revealed the presence of broad-based aseptate hyphae with right-angle branching. There was evidence of vascular invasion. What will be the preferred treatment for this condition?

A Fluconazole

B Amphotericin B

CORRECT

C Ketoconazole

D Griseofulvin

RIGHT ANSWER

OK

B. Amphotericin B

WHY THIS IS RIGHT

Broad, aseptate hyphae with right-angle branching indicate mucormycosis, an angioinvasive fungal infection seen in diabetics. Especially in DKA-
High glucose + acidic environment

-> Fungal growth ↑
-> Impaired immunity

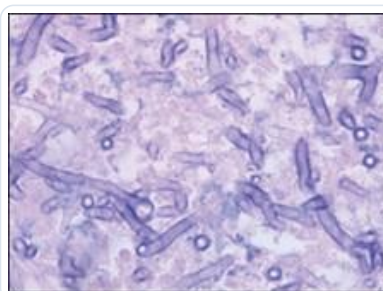
The treatment of choice is amphotericin B, which is rapidly fungicidal.

Amphotericin B

↓
Binds ergosterol
↓
Membrane pores form
↓
Cell contents leak
↓
Fungal death

Azoles like fluconazole and ketoconazole are ineffective against Mucor. Early aggressive amphotericin therapy is lifesaving.

Fungus	Morphology	Drug
Mucor	Broad, aseptate, 90°	Amphotericin B
Aspergillus	Septate, 45°	Voriconazole
Candida	Budding yeast	Fluconazole
Dermatophytes	Septate	Griseofulvin



QUESTION

| Which of the following organism is intrinsically resistant to the given drug?

A Aspergillus niger: Voriconazole

B Aspergillus fumigatus: Micafungin

C Candida glabrata: Amphotericin B

D Candida krusei: Fluconazole

CORRECT

RIGHT ANSWER

OK

D. Candida krusei: Fluconazole

WHY THIS IS RIGHT

Candida krusei is intrinsically resistant to fluconazole due to altered ergosterol pathway enzymes and reduced drug affinity. This resistance is predictable and clinically important. Other listed organisms are generally susceptible to their respective drugs. Fluconazole resistance is a classic hallmark of C. krusei.

Drug	Mechanism
Fluconazole	↓ Ergosterol synthesis
Amphotericin B	Pore formation
Micafungin	↓ β-glucan (cell wall)
Voriconazole	Ergosterol inhibition

Candida krusei = resistant to fluconazole
Candida glabrata = dose-dependent sensitivity
Voriconazole = DOC for Aspergillus
Amphotericin B = broad-spectrum

QUESTION

A 50-year-old male patient with a history of chronic pulmonary aspergillosis is being treated with voriconazole. He has been on the medication for two weeks and comes to the clinic for a follow-up. During the visit, he asks about the specific guidelines and considerations for taking voriconazole to ensure its effectiveness and safety. Which of the following statements is false about voriconazole?

A It should not be given with pyrazinamide

CORRECT

B It should be taken empty stomach

C It is given as a loading dose

D It requires therapeutic drug monitoring

RIGHT ANSWER

OK **A. It should not be given with pyrazinamide**

WHY THIS IS RIGHT

(A) "It should not be given with pyrazinamide." There is no specific contraindication against combining voriconazole with pyrazinamide; this is false. (The known contraindications involve rifampin and certain other CYP-inducing TB drugs.)

(B) "It should be taken on an empty stomach." This is true: voriconazole's absorption is reduced by food, so patients are instructed to dose it at least 1 hour before or 2 hours after meals.

(C) "It is given as a loading dose." This is true: clinical guidelines recommend an initial loading dose (e.g. 6 mg/kg IV or 400 mg PO twice on day 1) to rapidly achieve therapeutic levels.

(D) "It requires therapeutic drug monitoring." This is true: because of voriconazole's narrow therapeutic window and variable metabolism, TDM is recommended to ensure efficacy and avoid toxicity.

QUESTION

A patient presents with cough and hemoptysis and is diagnosed with pulmonary aspergillosis. He was treated with voriconazole. Which of the following is false about voriconazole?

A It should be taken on an empty stomach

B Therapeutic drug monitoring is required

C It can be combined with pyrazinamide

CORRECT

D A loading dose should be given

RIGHT ANSWER

OK

C. It can be combined with pyrazinamide

WHY THIS IS RIGHT

Voriconazole is a triazole antifungal and the drug of choice for invasive aspergillosis.

Important pharmacologic characteristics

- Should be taken on an empty stomach because food reduces its oral absorption.
- Therapeutic drug monitoring (TDM) is recommended due to variable metabolism and narrow therapeutic window, helping prevent toxicity and treatment failure.
- Loading dose is required to rapidly achieve therapeutic plasma concentrations because of its non-linear pharmacokinetics.

Why option C is false

- Voriconazole should not be combined with pyrazinamide, as both drugs can cause significant hepatotoxicity, increasing the risk of severe liver injury.

QUESTION

Which of the following statements regarding antifungal drug toxicity are true except?

A Long-term itraconazole use may cause cardiomyopathy

B Amphotericin B can cause renal tubular acidosis

C Voriconazole may cause skin cancer

D Echinocandins cause severe bone marrow suppression

CORRECT

RIGHT ANSWER

OK D. Echinocandins cause severe bone marrow suppression

WHY THIS IS RIGHT

Key toxicities of major antifungals

- Itraconazole

- o Can cause negative inotropic effects with long-term use, leading to cardiomyopathy or worsening heart failure.

- Amphotericin B

- o Causes nephrotoxicity due to renal tubular damage.

- o May lead to renal tubular acidosis, hypokalemia, and hypomagnesemia.

- Voriconazole

- o Associated with photosensitivity reactions.

- o Long-term use may increase the risk of cutaneous squamous cell carcinoma (skin cancer).

- Echinocandins (e.g., caspofungin, micafungin, anidulafungin)

- o Generally well tolerated.

- o They do NOT cause severe bone marrow suppression, making this statement false.

QUESTION

| Which among the following is not a sexual spore?

A Zygospor

B Sporangiphore

CORRECT

C Basidiospor

D Ascospore

RIGHT ANSWER

OK B. Sporangiphore

WHY THIS IS RIGHT

Fungi reproduce through sexual and asexual spores.

Sexual spores are formed after fusion of nuclei (karyogamy) and meiosis. Examples include:

- Zygospor - seen in Zygomycetes (e.g., Rhizopus).
- Ascospore - produced inside an ascus in Ascomycetes.
- Basidiospor - produced on a basidium in Basidiomycetes.

Sporangiphore is not a spore.

- It is a specialized hyphal stalk that bears the sporangium, which contains asexual spores (sporangiospores).

QUESTION

Galactomannan in serum is seen in:

- 1. Invasive aspergillosis**
- 2. Systemic candidiasis**
- 3. Mucormycosis**
- 4. Cryptococcosis**

A 1 & 2 only

B 1 & 3 only

C 1 only

CORRECT

D 1, 2 & 3 only

RIGHT ANSWER

OK

C. 1 only

WHY THIS IS RIGHT

Galactomannan is a polysaccharide component of the cell wall of *Aspergillus* that is released during fungal growth and tissue invasion. Detection of galactomannan antigen in serum or bronchoalveolar lavage (BAL) is used as a non-culture diagnostic marker for invasive aspergillosis, especially in immunocompromised patients (eg, neutropenia, hematologic malignancy, transplant recipients).

Why other options are incorrect:

- Systemic candidiasis: diagnosed by β -D-glucan assay, culture, or PCR, not galactomannan.
- Mucormycosis: organisms lack galactomannan in their cell wall, so the test is negative.
- Cryptococcosis: diagnosed using cryptococcal antigen (capsular polysaccharide) detection.

QUESTION

A 54-year-old man comes to the clinic with fever, exertional dyspnoea, and non productive cough for one week. He was diagnosed with HIV infection 3 years ago but has been asymptomatic since. He has not been taking his medications consistently. His temperature is 38.9 C (102 F), blood pressure is 120/80 mm Hg, pulse is 100/min, and respirations are 28/min. The patient's pulse oximetry shows 80% on room air. With use of a 100% nonrebreather mask, his oxygen saturation increases to 92%.

Laboratory results are as follows:

Hemoglobin-9.6 g/dL

Platelets-120,000/mm³

Leukocytes-8,000/mm³ (no bands)

Arterial blood gases on room air

pH-7.45

PaO₂-54 mm Hg

PaCO₂-44 mm Hg

Chest x-ray shows diffuse bilateral interstitial infiltrates. His CD4 count is 190/mm³ and lactate dehydrogenase level is 400 U/L. What is the most appropriate next step in management of this patient?

- A Initiation of antiretroviral treatment
- B Intravenous pentamidine and corticosteroids

C Trimethoprim-sulfamethoxazole and corticosteroids

CORRECT

D Trimethoprim-sulfamethoxazole

RIGHT ANSWER

OK C. Trimethoprim-sulfamethoxazole and corticosteroids

WHY THIS IS RIGHT

This patient with HIV (CD4 <200), fever, nonproductive cough, dyspnea, hypoxemia, and diffuse bilateral interstitial infiltrates is most consistent with *Pneumocystis jirovecii* pneumonia (PJP).

Treatment depends on severity:

- First-line therapy: Trimethoprim-sulfamethoxazole (TMP-SMX)
- Add corticosteroids when PaO₂ <70 mm Hg or A-a gradient ≥35 mm Hg because inflammation during treatment can worsen hypoxemia.

This patient has PaO₂ = 54 mm Hg, indicating moderate-severe PJP, so TMP-SMX + corticosteroids is indicated.

QUESTION

A 31-year-old man comes to the office due to a week of low-grade fever, dry cough, and right-sided chest pain. The pain is intermittent, sharp, and worse with deep inhalation or cough. The patient also notes mild "achiness" in his knees and ankles that started around the same time. He does not use tobacco, alcohol, or illicit drugs. The patient is an Army officer, and he returned after completing desert training exercises in Rajasthan. He does not know if other participants developed similar symptoms. Temperature is 37.8 C (100 F). Blood pressure is 120/80 mm Hg, pulse is 78/min, and respirations are 16/min. Lung auscultation shows right-sided crackles. No joint swelling or tenderness is present, but there are erythematous, tender nodules on the bilateral shins. Chest x-ray reveals a right lower lobe infiltrate with a prominent right hilum. Which of the following is most likely causing this patient's condition?

A Blastomyces dermatitidis

B **Coccidioides immitis**

CORRECT

C Histoplasma capsulatum

D Legionella pneumophila

RIGHT ANSWER

OK

B. Coccidioides immitis

WHY THIS IS RIGHT

Coccidioides immitis causes coccidioidomycosis (Valley fever), acquired by inhalation of arthroconidia from soil in desert regions.

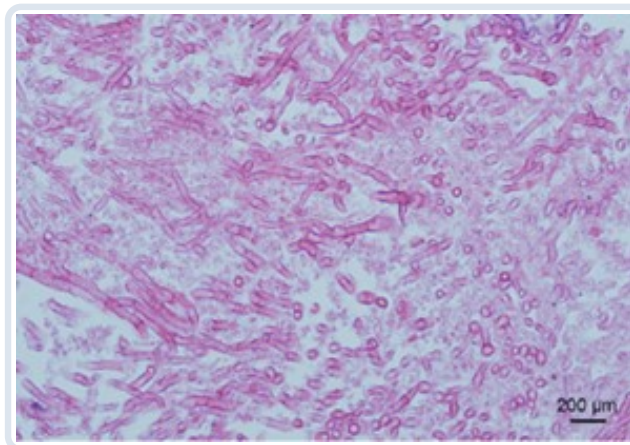
- Fever, dry cough, pleuritic chest pain
- Pulmonary infiltrates with hilar lymphadenopathy
- Erythema nodosum on the shins
- Arthralgia ("desert rheumatism")

Why not other options:

- *Blastomyces dermatitidis*: Seen in North America near rivers/lakes; often causes pulmonary infection with verrucous skin lesions, not erythema nodosum.
- *Histoplasma capsulatum*: Associated with bird/bat droppings (caves); may cause pulmonary disease with hilar lymphadenopathy but erythema nodosum and desert exposure are more typical of *Coccidioides*.
- *Legionella pneumophila*: Causes atypical pneumonia with GI symptoms (diarrhea), confusion, and hyponatremia, not erythema nodosum.

QUESTION

A patient presented with fever, dyspnea, palpitations, and tachycardia. The echocardiography revealed vegetation in the septal leaflets. Tissue sections from them reveal the following findings as shown in the image. What is the most likely implicated agent?



A Pigmented septate hyphae at 90 degrees, Mucormycosis

B Right angle branching septate hyphae, Fusarium

C Acute angle branching hyphae, Rhizopus

D Acute angle branching septate hyphae, Aspergillus

CORRECT

RIGHT ANSWER

OK

D. Acute angle branching septate hyphae, Aspergillus

WHY THIS IS RIGHT

Aspergillus species cause fungal endocarditis, especially in immunocompromised patients or those with prosthetic valves. On histopathology, the organism shows thin, septate hyphae with acute-angle ($\approx 45^\circ$) branching.

- Septate hyphae + acute angle ($\approx 45^\circ$) branching -> Aspergillus
- Broad, non-septate hyphae + right-angle ($\approx 90^\circ$) branching -> Mucor/Rhizopus.

Why not other options:

- Pigmented septate hyphae at 90° (Mucormycosis): Mucor shows broad, non-septate hyphae with right-angle (90°) branching, not septate hyphae.
- Right angle branching septate hyphae (Fusarium): Fusarium has septate hyphae but not the classic acute-angle branching pattern seen here.
- Acute angle branching hyphae (Rhizopus): Rhizopus shows broad non-septate hyphae with 90° branching, not acute-angle septate hyphae.

QUESTION

A 24-year-old woman comes to the OPD due to skin lesions on her trunk and proximal upper limbs. The patient noticed the lesions after returning from a summer vacation at a Goa beach a week ago. During the vacation, she had sun exposure on several occasions without prior application of sunscreen. The lesions are mildly itchy but not painful. Medical history is notable for hypothyroidism, for which she takes levothyroxine. Which of the following is the most likely cause of this patient's current condition?



A Autoimmune melanocyte injury

B Dermatophyte skin infection

C **Malassezia globosa infection**

CORRECT

D Ultraviolet skin damage

RIGHT ANSWER

OK **C. Malassezia globosa infection**

WHY THIS IS RIGHT

Pityriasis (tinea) versicolor is a superficial fungal infection caused by *Malassezia* species (commonly *Malassezia globosa* or *Malassezia furfur*) that produces hypopigmented or hyperpigmented macules on the trunk and proximal limbs, often more noticeable after sun exposure.

- Yeast interferes with melanin production by producing azelaic acid, which inhibits tyrosinase.
- Affected skin does not tan, making lesions appear lighter after sun exposure.

Diagnostic clue:

- KOH mount: "Spaghetti and meatballs" appearance (hyphae + spores).

QUESTION

I All of the following statements regarding *Cryptococcus gattii* are true, except:

A It is endemic in tropical and subtropical regions

B It corresponds to serotypes B and C

C It is commonly associated with eucalyptus trees

D It predominantly causes disease in immunocompromised hosts

CORRECT

RIGHT ANSWER

OK D. It predominantly causes disease in immunocompromised hosts

WHY THIS IS RIGHT

Cryptococcus gattii is an encapsulated yeast that differs from *Cryptococcus neoformans* in epidemiology and host susceptibility.

- Endemic in tropical and subtropical regions (e.g., Australia, Southeast Asia, parts of Africa and South America).
- Corresponds to serotypes B and C.
- Commonly associated with eucalyptus trees and environmental plant material.
- Often infects immunocompetent individuals, causing pulmonary disease and cryptococcal meningitis.

Contrast:

- *Cryptococcus neoformans* typically infects immunocompromised patients, especially those with HIV/AIDS.

QUESTION

A 25-year-old woman from a tropical region presents with a brown, macular lesion on the palm of her hand. There is no itching or scaling. Microscopic examination of skin scrapings reveals brownish, branched, septate hyphae along with budding cells. What is the most likely causative agent?

A Malassezia furfur

B **Exophiala werneckii**

CORRECT

C Trichophyton rubrum

D Candida albicans

RIGHT ANSWER

OK B. **Exophiala werneckii**

WHY THIS IS RIGHT

Tinea nigra is a superficial fungal infection characterized by brown to black macular patches, usually on the palms or soles, without itching or scaling.

Causative organism: *Exophiala* (*Hortaea*) *werneckii*, a dematiaceous (pigmented) fungus.

- Brown, septate, branched hyphae
- Budding yeast-like cells
- Pigmentation due to melanin in the fungal cell wall
- Infection is superficial and benign.
- Treated effectively with topical antifungals or keratolytic agents.

Why not other options:

- *Malassezia furfur*: Causes pityriasis versicolor -> hypopigmented/hyperpigmented scaly patches on trunk, not palm macules.
- *Trichophyton rubrum*: Dermatophyte causing tinea corporis/pedis, with itching and scaling, not pigmented macules.
- *Candida albicans*: Causes moist intertrigo or oral thrush with erythema and satellite lesions, not brown palm lesions.

QUESTION

A stool sample from a patient with chronic abdominal discomfort shows brown, spherical eggs with a thick, radially striated shell. When subjected to a modified Ziehl-Neelsen stain, the egg wall appears acid-fast. This finding is most consistent with:

A Taenia solium

B Taenia saginata

CORRECT

C Hymenolepis nana

D Dipylidium caninum

RIGHT ANSWER

OK

B. Taenia saginata

WHY THIS IS RIGHT

Taenia species eggs are brown, spherical with a thick radially striated shell (embryophore) and contain a hexacanth embryo with hooklets.

Special staining property:

- On modified Ziehl-Neelsen stain, the egg wall of Taenia saginata may show acid-fast staining.

Diagnostic points:

- Eggs indicate Taenia infection.
- Species differentiation usually requires proglottids or scolex examination:
 - o T. saginata: 15-30 uterine branches, unarmed scolex
 - o T. solium: 7-13 uterine branches, armed scolex

QUESTION

A 36-year-old HIV-positive man (CD4 count 110/ μ L) presents with recurrent oral thrush not responding to fluconazole. KOH mount shows budding yeast cells with pseudohyphae. Germ tube test is positive. On further testing, the isolate produces abundant clustered chlamydospores and fails to grow when incubated in hypertonic saline. The most likely organism is:

A Candida albicans

B Candida tropicalis

C Candida dubliniensis

CORRECT

D Candida glabrata

RIGHT ANSWER

OK C. Candida dubliniensis

WHY THIS IS RIGHT

Candida dubliniensis is an opportunistic yeast that commonly causes recurrent oral candidiasis in HIV-infected patients.

- Budding yeast with pseudohyphae
- Germ tube positive (similar to Candida albicans)
- Produces abundant clustered chlamydospores
- Fails to grow in hypertonic saline (6.5% NaCl) and grows poorly at higher temperatures, helping differentiate it from C. albicans.
- Often associated with fluconazole-resistant oral thrush in immunocompromised individuals.

Why not other options:

- A. Candida albicans: Germ tube positive and forms chlamydospores but grows in hypertonic saline and at higher temperatures (unlike C. dubliniensis).
- B. Candida tropicalis: Germ tube negative and usually does not form chlamydospores.
- D. Candida glabrata: Does not form pseudohyphae or germ tubes; appears as small budding yeast only.

QUESTION

| All of the following properties are true with regard to *Malassezia* species except:

CORRECT

- A** It easily grows on fungal isolation media
- B** It is the causative agent of pityriasis versicolor
- C** It is susceptible to Amphotericin B
- D** It may cause catheter-related sepsis

RIGHT ANSWER

OK

A. It easily grows on fungal isolation media

WHY THIS IS RIGHT

Malassezia species are lipophilic yeasts that require lipids for growth, which makes them difficult to culture on routine fungal media.

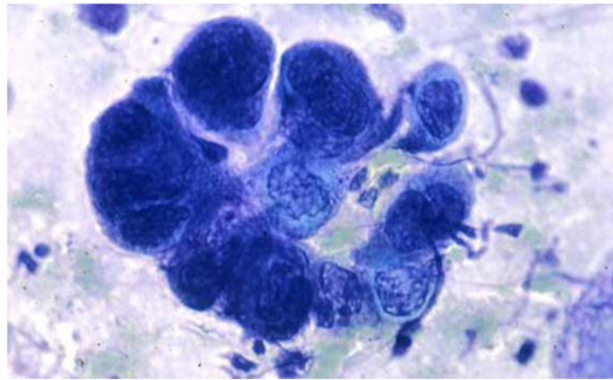
- Cause pityriasis (tinea) versicolor, a superficial fungal infection of the skin.
- Can cause catheter-related fungemia, especially in neonates receiving lipid-rich parenteral nutrition.
- Generally susceptible to antifungals such as amphotericin B and azoles.

Important laboratory point:

- They do not grow easily on standard fungal isolation media unless lipid supplementation (e.g., olive oil) is provided.

QUESTION

A Tzanck smear from a vesicular skin lesion reveals the following. Which of the following is the most likely causative agent?



CORRECT

A Herpes simplex virus

B Human papillomavirus

C Coxsackievirus

D Cytomegalovirus

RIGHT ANSWER

OK A. Herpes simplex virus

WHY THIS IS RIGHT

A Tzanck smear showing multinucleated giant cells with intranuclear inclusions is characteristic of infection by Herpes simplex virus (HSV).

- Diagnostic feature:
 - o Multinucleated giant cells
 - o Ballooning degeneration of keratinocytes
 - o Cowdry type A intranuclear inclusion bodies

- Diseases caused by HSV:
 - o Herpes labialis (cold sores)
 - o Genital herpes
 - o Keratitis, encephalitis

Why not others:

- HPV: koilocytes (perinuclear clearing), no giant cells
- Coxsackievirus: vesicular lesions (HFMD), no Tzanck findings
- CMV: "owl's eye" inclusions in enlarged cells, not multinucleated giant cells

QUESTION

| Which among the following is a ssRNA virus?

A Human papilloma virus

B Adenovirus

C Parvovirus

D Respiratory syncytial virus

CORRECT

RIGHT ANSWER

OK D. Respiratory syncytial virus

WHY THIS IS RIGHT

Respiratory syncytial virus (RSV) is a single-stranded RNA (ssRNA) virus belonging to the Paramyxoviridae family.

- Genome: Negative-sense ssRNA
- Family: Paramyxoviridae
- Transmission: respiratory droplets
- Common diseases:
 - o Bronchiolitis (most common cause in infants)
 - o Pneumonia in young children and elderly
- Characteristic feature: Formation of syncytia (multinucleated giant cells) in respiratory epithelium

Why not others:

- Human papillomavirus (HPV): double-stranded DNA virus
- Adenovirus: double-stranded DNA virus
- Parvovirus: single-stranded DNA virus (only ssDNA virus)

QUESTION

A patient presented with a high fever, altered sensorium, headache, neck rigidity, and seizures. He was diagnosed with HSV encephalitis. Which of the following tests can be used to confirm the diagnosis?

- A IgM antibodies in CSF
- B Tzanck smear of CSF
- C CSF PCR for viral DNA**
- D CSF culture on chick embryo lines

CORRECT

RIGHT ANSWER

OK **C. CSF PCR for viral DNA**

WHY THIS IS RIGHT

Herpes simplex encephalitis (HSE) is best confirmed by CSF PCR for HSV DNA, which is the gold standard diagnostic test.

- Etiology: HSV-1 most common cause of sporadic viral encephalitis
- Clinical features:
 - o Fever, headache
 - o Altered sensorium, seizures
 - o Focal neurological deficits (temporal lobe involvement)
- Diagnosis:
 - o CSF PCR for HSV DNA -> most sensitive & specific (gold standard)
 - o CSF findings: lymphocytic pleocytosis, ↑ protein, normal glucose, RBCs may be present

Why not others:

- o IgM in CSF: less sensitive, not definitive
- o Tzanck smear: used for skin lesions, not CSF
- o CSF culture: not practical; HSV is difficult to culture

QUESTION

A patient of sickle cell anemia developed aplastic crisis after a viral infection. The agent causing it is

A CMV

B EBV

C HBV

D Parvovirus B19

CORRECT

RIGHT ANSWER

OK

D. Parvovirus B19

WHY THIS IS RIGHT

Parvovirus B19 causes aplastic crisis in patients with hemolytic anemias (e.g., sickle cell disease) by selectively infecting and destroying erythroid precursor cells in the bone marrow.

- Virus type: single-stranded DNA virus (only ssDNA virus)
- Target cells: erythroid progenitors via P antigen (globoside receptor)
- Pathogenesis:

- o Temporary cessation of erythropoiesis
- o Leads to severe anemia (aplastic crisis) in patients with high RBC turnover
- Clinical features:

- o Sudden drop in hemoglobin
- o Reticulocytopenia
- o Fatigue, pallor
- Other manifestations:

- o Erythema infectiosum (slapped cheek rash) in children
- o Hydrops fetalis in pregnant women

Why not others:

- CMV, EBV, HBV: do not specifically target erythroid precursors to cause aplastic crisis

QUESTION

| Which of the following laboratory test is used to diagnose rotavirus diarrhea?

A Antigen detection in the stool sample

CORRECT

B Antigen detection in blood

C Antibody detection in serum

D Light microscopy of stool specimen

RIGHT ANSWER

OK

A. Antigen detection in the stool sample

WHY THIS IS RIGHT

Rotavirus diarrhea is best diagnosed by detection of viral antigen in stool, most commonly using ELISA-based assays.

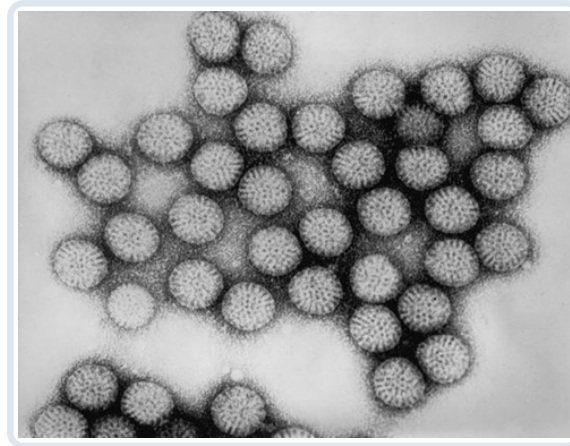
- Site of infection: small intestinal enterocytes -> causes watery diarrhea in children
- Diagnostic test of choice:
 - o Stool antigen detection (ELISA/rapid immunoassay) -> rapid, sensitive, and specific

Why not others:

- Antigen in blood: virus is localized to gut, not bloodstream
- Antibody detection: not useful for acute diagnosis
- Light microscopy: cannot visualize virus

QUESTION

A 2-year-old child presented with watery diarrhea and vomiting. Electron microscopy showed the following image. Identify the organism.



A Adenovirus

B Rotavirus

CORRECT

C Norwalk virus

D Astrovirus

RIGHT ANSWER

OK B. Rotavirus

WHY THIS IS RIGHT

Rotavirus is the most common cause of severe acute watery diarrhea in children, and on electron microscopy it shows a wheel-like (rota = wheel) appearance.

• Morphology:

- o Double-stranded RNA virus (Reoviridae family)
- o Wheel-shaped appearance on electron microscopy (central hub + spokes)

• Pathogenesis:

- o Infects enterocytes of small intestine
- o Leads to malabsorption + osmotic diarrhea

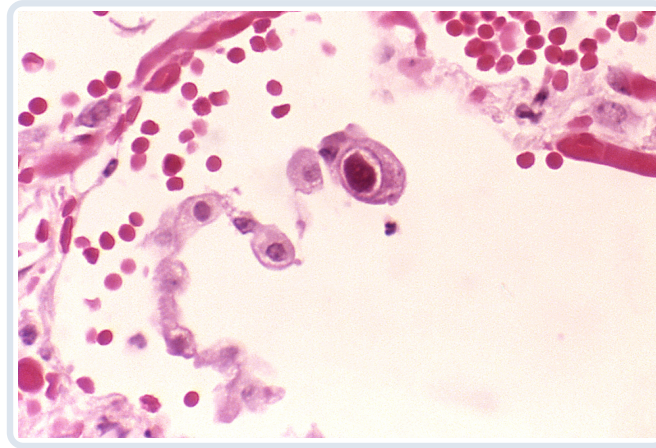
• Clinical features:

- o Watery diarrhea
- o Vomiting
- o Fever
- o Dehydration (especially in infants)
- Diagnosis: Stool antigen detection (ELISA)
- Why not others:

- o Adenovirus: non-enveloped DNA virus, no wheel appearance
- o Norwalk (Norovirus): small round virus, outbreaks in adults
- o Astrovirus: star-shaped morphology

QUESTION

A child presents with a fever and a rash. Histology showed cells with following appearance. What is the most likely diagnosis?



A Cytomegalovirus

CORRECT

B Epstein-Barr virus

C Herpes simplex virus

D Toxoplasma gondii

RIGHT ANSWER

OK A. Cytomegalovirus

WHY THIS IS RIGHT

Cytomegalovirus (CMV) infection is characterized by “owl’s eye” intranuclear inclusions, seen as large cells with basophilic nuclear inclusions surrounded by a clear halo.

- Histopathology:
 - o Enlarged cells (cytomegaly)
 - o Intranuclear inclusion with perinuclear halo -> “owl’s eye” appearance

- Clinical associations:
 - o Congenital infections (hearing loss, microcephaly)
 - o Immunocompromised patients (retinitis, colitis, pneumonitis)
 - o Can be detected in urine, saliva, or tissue samples

Why not others:

- o EBV: atypical lymphocytes, no owl’s eye inclusions
- o HSV: multinucleated giant cells, Cowdry type A inclusions
- o Toxoplasma: intracellular cysts, not nuclear inclusions

QUESTION

A patient addressing from Delhi presents with fever, arthralgia, and extensive petechial rash for 3 days. Lab investigations revealed a hemoglobin of 9 g/dL, a white blood cell count of 9000 cells/mm³, a platelet count of 20000 cells/mm³, and a prolonged bleeding time. The clotting time was normal. What is the most likely diagnosis?

A Dengue

CORRECT

B Malaria

C Scrub typhus

D Typhoid

RIGHT ANSWER

OK

A. Dengue

WHY THIS IS RIGHT

Dengue fever should be suspected in patients with acute fever + severe arthralgia + petechial rash + thrombocytopenia, especially with normal clotting time but prolonged bleeding time.

· Pathophysiology:

o Platelet destruction + capillary fragility -> bleeding manifestations

o Coagulation cascade usually intact -> normal clotting time

· Typical lab findings:

o Thrombocytopenia (↓ platelets)

o Hemoconcentration (↑ hematocrit in severe cases)

o Normal or mildly altered WBC count

o ↑ bleeding time, normal clotting time

· Clinical features:

o High fever

o Severe joint/muscle pain ("breakbone fever")

o Petechiae, bleeding manifestations

Why not others:

· Malaria: anemia, parasitemia, no petechial rash pattern

· Scrub typhus: eschar + lymphadenopathy

· Typhoid: step-ladder fever, relative bradycardia, no severe thrombocytopenia

QUESTION

A wildlife photographer returns from a trip to sub-Saharan Africa and presents with acute fever, jaundice, and hemorrhagic symptoms. Liver biopsy shows intranuclear Councilman/Torres bodies. Which vaccine could have prevented this infection?

A 17D

CORRECT

B Nakayama vaccine

C Weigl's vaccine

D Jeryl Lynn strain

RIGHT ANSWER

OK

A. 17D

WHY THIS IS RIGHT

Yellow fever, a viral hemorrhagic disease caused by a Flavivirus, presents with fever, jaundice, and hemorrhage, and is characterized histologically by Councilman bodies (apoptotic hepatocytes) in the liver.

- Transmission: Aedes mosquito (endemic in sub-Saharan Africa, South America)
- Clinical features:
 - o Fever, myalgia
 - o Jaundice + hemorrhage ("yellow" fever)
 - o Severe cases -> liver failure
- Prevention: 17D vaccine = live attenuated vaccine -> highly effective

Why not others:

- Nakayama vaccine: Japanese encephalitis
- Weigl's vaccine: epidemic typhus
- Jeryl Lynn strain: mumps vaccine

QUESTION

Identify the condition that presents with painful vesicles as shown below:



A Candidiasis

B Syphilis

C Chancroid

D Herpes simplex virus

CORRECT

RIGHT ANSWER

OK

D. Herpes simplex virus

WHY THIS IS RIGHT

Herpes simplex virus (HSV) infection presents with painful, grouped vesicles on an erythematous base, which may rupture to form shallow ulcers.

- Painful vesicles (hallmark)
- Lesions are clustered ("grouped vesicles")
- Common sites: oral (HSV-1), genital (HSV-2)
- May be associated with burning/tingling (prodrome)
- Establishes latency in sensory ganglia -> recurrent episodes

Differentiation:

- Syphilis -> painless chancre
- Chancroid -> painful ulcer (not vesicles), ragged edges
- Candidiasis -> white plaques, not vesicles

QUESTION

A South Asian fruit farmer presented with fever, breathlessness, and encephalitis. What can be the most likely diagnosis?

A Zika virus

B Nipah virus

CORRECT

C Malaria

D Ebola virus

RIGHT ANSWER

OK

B. Nipah virus

WHY THIS IS RIGHT

Nipah virus infection should be suspected in patients with fever, respiratory symptoms, and encephalitis, especially in individuals exposed to fruit bats or contaminated fruit in South Asia.

- Reservoir: fruit bats (Pteropus species)
- Transmission: bat -> human (via contaminated fruit/date palm sap), human-to-human possible
- Clinical features:

- o Fever, headache
- o Breathlessness (respiratory involvement)
- o Encephalitis (major cause of mortality)

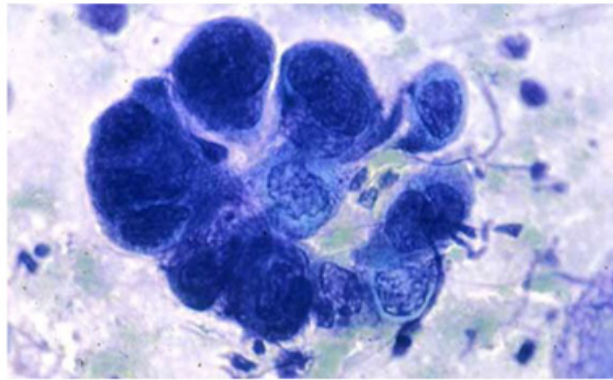
Farmers handling fruits -> exposure to bat-contaminated produce

Differentiation:

- Zika -> mild illness, congenital anomalies
- Malaria -> fever with chills, no encephalitis typically
- Ebola -> hemorrhagic fever, different geographic distribution

QUESTION

A patient presents with trigeminal neuralgia and perioral vesicular lesions. A Tzanck smear reveals the following. What is the most likely causative organism?



A HPV

B CMV

C EBV

D HSV

CORRECT

RIGHT ANSWER

OK

D. HSV

WHY THIS IS RIGHT

Herpes simplex virus (HSV) infection is identified on Tzanck smear by multinucleated giant cells with nuclear molding and ground-glass nuclei.

- Painful vesicular lesions (perioral/genital)
- Trigeminal neuralgia suggests HSV-1 reactivation
- Tzanck smear -> multinucleated giant cells

Pathogenesis:

- Virus infects epithelial cells -> cell fusion -> syncytia formation
- Establishes latency in sensory ganglia (e.g., trigeminal ganglion)

Differentiation:

- HPV -> koilocytes (no multinucleated giant cells)
- CMV -> "owl's eye" intranuclear inclusions
- EBV -> atypical lymphocytes, not vesicular lesions

QUESTION

| Which virus requires reverse transcriptase PCR for detection?

A RSV

CORRECT

B Herpes virus

C EBV

D CMV

RIGHT ANSWER

OK

A. RSV

WHY THIS IS RIGHT

Reverse transcriptase PCR (RT-PCR) is used for detection of RNA viruses.

RNA viruses require conversion of RNA to complementary DNA (cDNA) using reverse transcriptase before amplification

Correct answer: RSV (Respiratory syncytial virus) -> RNA virus -> requires RT-PCR

Why not others:

- Herpes virus -> DNA virus
- EBV -> DNA virus
- CMV -> DNA virus

Key points:

- RT-PCR is the diagnostic method of choice for many RNA viruses (e.g., RSV, influenza, SARS-CoV-2)
- DNA viruses can be detected directly by PCR without reverse transcription

QUESTION

A patient presents with pain in the genital area and a painful vesicle on examination, accompanied by painful lymphadenopathy. What is the diagnosis?

A HSV2

CORRECT

B Molluscum

C HPV

D HIV

RIGHT ANSWER

OK
A. HSV2

WHY THIS IS RIGHT

Bottom of Form Painful genital vesicles with tender lymphadenopathy are characteristic of genital herpes caused by HSV-2.

- HSV-2 causes painful vesicular lesions that may rupture to form ulcers
- Associated with painful inguinal lymphadenopathy
- Primary infection may have systemic symptoms (fever, malaise)
- Virus remains latent in sacral ganglia and can reactivate

Differentiation:

- Molluscum contagiosum -> painless, umbilicated papules
- HPV -> painless genital warts (condyloma acuminata)
- HIV -> does not present with localized vesicular genital lesions

QUESTION

| Which of the following is not caused by parvovirus B19?

A Pure red cell aplasia

B Hydrops fetalis

C Aplastic crisis

D **Petechial rash**

CORRECT

RIGHT ANSWER

OK

D. Petechial rash

WHY THIS IS RIGHT

Parvovirus B19 primarily infects erythroid precursor cells, leading to hematological manifestations.

Caused by Parvovirus B19:

- Pure red cell aplasia (especially in immunocompromised patients)
- Aplastic crisis (in patients with hemolytic anemias)
- Hydrops fetalis (due to severe fetal anemia in pregnancy)

Not caused: Petechial rash -> more typical of platelet disorders or other viral infections (e.g., dengue)

Key points:

- Causes erythema infectiosum ("slapped cheek" rash) in children
- Targets erythroid precursors via P antigen

QUESTION

| Which one is not a criterion for Kawasaki disease?

A Purulent conjunctivitis

CORRECT

B Rash

C Lymphadenopathy

D Strawberry tongue

RIGHT ANSWER

OK

A. Purulent conjunctivitis

WHY THIS IS RIGHT

Kawasaki disease is a pediatric vasculitis diagnosed clinically using specific criteria.

Diagnostic criteria (fever ≥ 5 days + ≥ 4 of the following):

- Bilateral non-purulent conjunctivitis
- Polymorphous rash
- Cervical lymphadenopathy
- Oral mucosal changes (strawberry tongue, cracked lips)
- Changes in extremities (edema, erythema, desquamation)

Incorrect option: Purulent conjunctivitis is not a feature; conjunctivitis in Kawasaki is non-purulent

Key points:

- Risk of coronary artery aneurysms if untreated
- Treated with IVIG and aspirin

QUESTION

A 3-year-old child presents with fever and a maculopapular rash that started on the face and spread downward. Examination reveals Koplik spots on the buccal mucosa. The causative organism responsible for this illness belongs to which of the following categories?

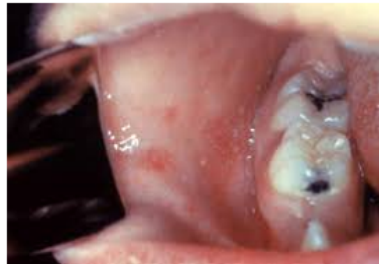
- A** DNA virus
- B** Enveloped, negative-sense single-stranded RNA virus CORRECT
- C** Non-enveloped, positive-sense RNA virus
- D** Double-stranded RNA virus

RIGHT ANSWER

- OK** **B. Enveloped, negative-sense single-stranded RNA virus**

WHY THIS IS RIGHT

- Diagnosis = Measles (Rubeola)
- Caused by Measles virus (Paramyxovirus family)
- Characteristics:
 - Enveloped
 - (-) ssRNA virus
 - Replicates in cytoplasm



QUESTION

Match the following:

Column (A)	Column (B)
a. Rotavirus	1. ssRNA
b. SARS-CoV-2	2. dsDNA
c. Parvovirus	3. dsRNA
d. HPV	4. ssDNA

A a-2, b-1, c-4, d-3

B a-3, b-1, c-4, d-2

CORRECT

C a-2, b-4, c-1, d-3

D a-1, b-2, c-3, d-4

RIGHT ANSWER

OK B. a-3, b-1, c-4, d-2

WHY THIS IS RIGHT

Virus	Genome Type	Key Feature
----	-----	-----
Rotavirus	dsRNA	Reoviridae family
SARS-CoV-2	ssRNA	Coronavirus, positive-sense RNA
Parvovirus	ssDNA	Smallest DNA virus
HPV	dsDNA	Papillomavirus causing warts & cancer

QUESTION

| Most common cause of diarrhoea in children:

A Escherichia coli

B Rotavirus

CORRECT

C Ascaris

D Shigella

RIGHT ANSWER

OK B. Rotavirus

WHY THIS IS RIGHT

The most common cause of acute diarrhoea in children worldwide is Rotavirus.

- Rotavirus is a double-stranded RNA virus (Reoviridae family)
- Primarily affects infants and young children
- Causes severe watery diarrhoea, vomiting, and dehydration
- Transmission is fecal-oral

Clinical relevance:

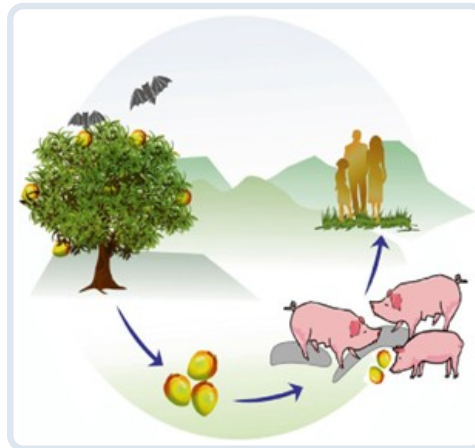
- Leading cause of severe dehydrating diarrhoea in children under 5 years
- Prevention is by oral rotavirus vaccination

Differentiation:

- Escherichia coli -> common bacterial cause, but less frequent than rotavirus in children
- Shigella -> causes dysentery (bloody diarrhoea)
- Ascaris -> helminth, not a typical cause of acute diarrhoea

QUESTION

Which of the following is true about the agent whose lifecycle is shown below?



- A** 100% case fatality in humans
- B** Humans act as natural reservoir
- C** Encephalitis is the cause of death in outbreak
- D** Its caused by a DNA virus

CORRECT

RIGHT ANSWER

- OK** **C. Encephalitis is the cause of death in outbreak**

WHY THIS IS RIGHT

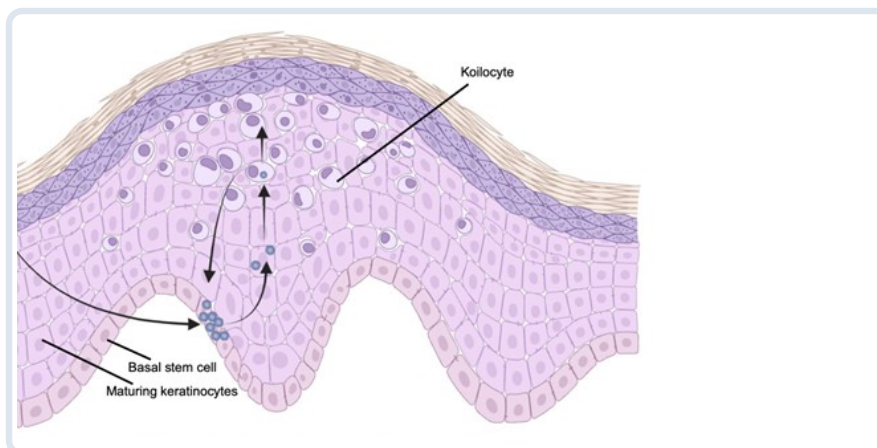
The image depicts transmission of Nipah virus, a zoonotic infection with fruit bats as the natural reservoir.

- Nipah virus is an RNA virus belonging to the Paramyxovirus family
- Natural reservoir: fruit bats (*Pteropus* species), not humans
- Transmission: bat → pig → human or directly via contaminated food (e.g., date palm sap), and human-to-human
- Causes severe encephalitis, which is the main cause of death during outbreaks
- Case fatality rate is high (around 40-75%), but not 100%

Thus, encephalitis is the major cause of mortality in Nipah virus infection.

QUESTION

Which of the following is true regarding the virus in the image?



A RNA virus

B Oncogenic virus

CORRECT

C Vaccine is not available

D Most common manifestation is painful genital ulcer

RIGHT ANSWER

OK

B. Oncogenic virus

WHY THIS IS RIGHT

The image depicts infection of stratified squamous epithelium by Human papillomavirus (HPV), showing viral replication in differentiating keratinocytes.

- HPV is a non-enveloped, double-stranded DNA virus
- It infects basal epithelial cells and replicates as cells differentiate
- High-risk types (16, 18) are oncogenic and associated with cervical cancer
- Low-risk types (6, 11) cause genital warts
- Vaccine is available (contrary to the incorrect option)
- It does not cause painful genital ulcers (that is seen in herpes)

Thus, HPV is an oncogenic DNA virus with available vaccination and epithelial tropism.

QUESTION

| Which among the following is the most common cause of diarrhea in adults?

- A Rotavirus
- B Adenovirus 40, 41
- C Norovirus**
- D Astrovirus

CORRECT

RIGHT ANSWER

OK **C. Norovirus**

WHY THIS IS RIGHT

Norovirus:

- Leading cause of outbreak-related diarrhea in adults
- Spread via fecal-oral route (contaminated food/water, person-to-person)
- Common in closed settings (cruise ships, hostels, hospitals)
- Causes acute onset vomiting + watery diarrhea

Why not others:

- Rotavirus -> most common in infants and young children
- Adenovirus 40/41 -> pediatric diarrhea
- Astrovirus -> mild diarrhea, mainly in children and elderly

QUESTION

A 45-year-old man undergoes an allogeneic hematopoietic stem cell transplant. He is CMV-seropositive and has no evidence of active CMV disease. To prevent post-transplant CMV reactivation, he is started on a newer antiviral agent that is not associated with myelosuppression or nephrotoxicity, unlike older anti-CMV drugs. Which of the following drugs was most likely prescribed?

A Glecaprevir

B Valganciclovir

C Baloxavir

D **Letermovir**

CORRECT

RIGHT ANSWER

OK **D. Letermovir**

WHY THIS IS RIGHT

Cytomegalovirus (CMV) reactivation is a common complication after allogeneic hematopoietic stem cell transplantation (HSCT), particularly in CMV-seropositive patients. Prophylactic antiviral therapy is often used to prevent CMV disease.

Letermovir is a newer antiviral drug used specifically for CMV prophylaxis in HSCT recipients. Mechanism of action:

- Inhibits the CMV terminase complex (UL56).
- Prevents cleavage and packaging of viral DNA into virions, blocking viral replication.

Not associated with myelosuppression or nephrotoxicity, unlike older anti-CMV drugs such as ganciclovir/valganciclovir.

QUESTION

| Choose the correct statement regarding CMV?

A Ganciclovir resistance is due to mutation in UL97 phosphotransferase gene

CORRECT

B CMV can be cultured in vitro in any mammalian cell

C Commonest manifestation of CMV associated disease is watery diarrhea

D UL54 mutated CMV strains do not show cross resistance to Foscarnet

RIGHT ANSWER

OK

A. Ganciclovir resistance is due to mutation in UL97 phosphotransferase gene

WHY THIS IS RIGHT

Cytomegalovirus (CMV) is a β -herpesvirus (Human herpesvirus-5) that causes opportunistic infections, especially in immunocompromised patients and transplant recipients.

First-line drug: Ganciclovir / Valganciclovir

Mechanism of resistance

- Mutation in the UL97 gene prevents phosphorylation of ganciclovir.
- As a result, the drug cannot be activated, leading to ganciclovir resistance.

Other important points

- UL54 gene mutations (viral DNA polymerase) can cause cross-resistance to ganciclovir, cidofovir, and sometimes foscarnet.
- CMV grows best in human fibroblast cell cultures, not in all mammalian cells.
- Common CMV disease manifestations include retinitis, colitis, esophagitis, and pneumonitis, not watery diarrhea as the most common symptom.

QUESTION

A petechial rash is associated with all the following except?

- A** Zika virus
- B** Exanthem subitum
- C** Kyasanur forest disease
- D** West Nile fever

CORRECT

RIGHT ANSWER

- OK** **B. Exanthem subitum**

WHY THIS IS RIGHT

Viruses associated with petechial rash:

- Zika virus - may produce a maculopapular rash that can include petechiae.
- Kyasanur Forest Disease (KFD) - a tick-borne viral hemorrhagic fever that can cause petechial or bleeding manifestations due to thrombocytopenia.
- West Nile fever - occasionally associated with maculopapular or petechial rash.

Why Exanthem subitum is the exception:

- Exanthem subitum (Roseola infantum) is caused by Human herpesvirus-6 (HHV-6).
- It produces a rose-pink maculopapular rash appearing after high fever subsides, not a petechial rash.

QUESTION

| Which of the following statements regarding monkey pox is false?

- A** Patient needs to wear a triple layer mask during isolation
- B** Contact monitoring must be done for a period of 21 days from day of contact
- C** Requires BSL-4 facilities for isolation CORRECT
- D** It is caused by an enveloped, double-stranded DNA virus

RIGHT ANSWER

- OK** C. Requires BSL-4 facilities for isolation

WHY THIS IS RIGHT

Monkeypox (mpox) is a zoonotic infection caused by an enveloped, double-stranded DNA virus of the Orthopoxvirus genus (family Poxviridae). It spreads through close contact with lesions, respiratory droplets, body fluids, or contaminated materials.

Key public health and infection control points:

- Isolation precautions: Patients should be isolated and wear a triple-layer mask to reduce respiratory droplet transmission.
- Contact monitoring: Individuals exposed to a confirmed case should be monitored for 21 days, which corresponds to the maximum incubation period of the virus.
- Laboratory biosafety: Routine diagnostic testing for monkeypox can be performed in BSL-2 or BSL-3 laboratories with appropriate precautions; BSL-4 is not required.

QUESTION

Solvent/Detergent (SD) plasma destroys lipid-enveloped viruses. So, on SD plasma transfusion, which of the following infection is likely to occur?

A Human Immunodeficiency Virus (HIV)

B Hepatitis A Virus (HAV) CORRECT

C Hepatitis B Virus (HBV)

D Hepatitis C Virus (HCV)

RIGHT ANSWER

OK **B. Hepatitis A Virus (HAV)**

WHY THIS IS RIGHT

Solvent/detergent (SD) treatment of plasma inactivates lipid-enveloped viruses by disrupting their lipid membrane. Therefore, it effectively eliminates viruses such as HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV). However, non-enveloped viruses lack a lipid membrane and are resistant to this process. Hepatitis A virus (HAV), a non-enveloped RNA virus, can therefore still be transmitted through SD-treated plasma.

QUESTION

A 27-year-old woman comes to the OPD due to joint pain. Her symptoms began 10 days ago and consist of bilateral pain in the metacarpophalangeal joints, proximal interphalangeal joints, wrists, knees, and ankles. She describes joint stiffness lasting 10-15 minutes on awakening in the morning. The patient has also had associated fatigue and a few episodes of loose bowel movements associated with mild skin itching and patchy redness. She has no fever, weight loss, or lymphadenopathy. She works as an elementary school teacher. On examination, there is tenderness of the involved joints without swelling or redness. Which of the following is most likely elevated in this patient?

A Anti-cyclic citrullinated peptide antibodies

B Anti-double-stranded DNA antibodies

C Antinuclear antibodies

D Anti-parvovirus B19 IgM antibodies

CORRECT

RIGHT ANSWER

OK D. Anti-parvovirus B19 IgM antibodies

WHY THIS IS RIGHT

Parvovirus B19 infection in adults commonly presents with acute symmetric polyarthralgia involving small joints (MCP, PIP, wrists), often mimicking rheumatoid arthritis. Symptoms are usually mild, transient, and associated with viral prodrome or rash.

The infection is common in school settings, and recent infection is indicated by elevated anti-Parvovirus B19 IgM antibodies.

Why not other options:

- Anti-CCP: Seen in rheumatoid arthritis (chronic, >1 hr morning stiffness).
- Anti-dsDNA: Seen in SLE.
- ANA: Nonspecific marker of autoimmune diseases.

QUESTION

| \$19

A Barrier contraceptive use

B Hepatitis A vaccination

CORRECT

C Hepatitis B immune globulin

D Hepatitis B vaccination

RIGHT ANSWER

OK

B. Hepatitis A vaccination

WHY THIS IS RIGHT

Acute hepatitis A infection is indicated by positive anti-HAV IgM and negative IgG. Hepatitis A is transmitted via the fecal-oral route, including close household or sexual contact.

Post-exposure prophylaxis for close contacts is Hepatitis A vaccination, which stimulates active immunity and reduces the risk of disease acquisition.

Why not other options:

- Barrier contraceptive use: Hepatitis A spreads mainly by the fecal-oral route, not primarily through sexual fluids; condoms alone do not adequately prevent transmission.
- Hepatitis B immune globulin: Used for post-exposure prophylaxis of Hepatitis B, not Hepatitis A.
- Hepatitis B vaccination: Prevents Hepatitis B infection, but this patient has acute Hepatitis A.

QUESTION

A 5-year-old child presented to emergency department with history of rhinorrhea and a mild non-productive cough and red eyes. He hasn't received his due vaccinations. On examination white lesions against red background seen on buccal mucosa as shown below. What is the likely cause?



A SS-RNA enveloped virus

CORRECT

B SS-RNA non- enveloped virus

C DS-RNA non-enveloped virus

D DS-DNA enveloped virus

RIGHT ANSWER

OK

A. SS-RNA enveloped virus

WHY THIS IS RIGHT

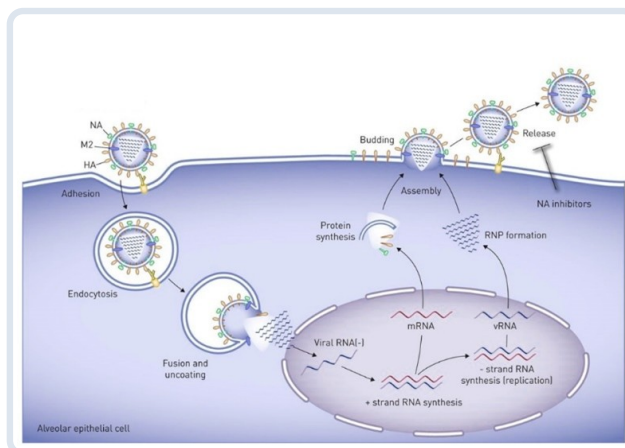
Koplik spots (white lesions on a red base on the buccal mucosa) are pathognomonic for measles infection. Measles virus belongs to the Paramyxoviridae family and is an enveloped, single-stranded negative-sense RNA virus.

Clinical features include:

- Cough, coryza (rhinorrhea), and conjunctivitis
- Koplik spots on buccal mucosa
- Followed by a maculopapular rash

QUESTION

Which of the following organisms is represented by the given form of replication?



A Hepatitis virus

B Influenza virus

CORRECT

C HIV

D Herpes virus

RIGHT ANSWER

OK B. Influenza virus

WHY THIS IS RIGHT

Influenza virus is an enveloped, negative-sense single-stranded RNA virus (Orthomyxovirus) that replicates in the host cell nucleus.

Key replication features shown in the diagram:

- Attachment via hemagglutinin (HA) to respiratory epithelial cells
- Endocytosis and uncoating mediated by the M2 ion channel
- RNA transcription and replication in the nucleus by viral RNA-dependent RNA polymerase
- Assembly and budding from the cell membrane
- Release of virions aided by neuraminidase (NA)

QUESTION

| Verruca vulgaris is associated with:



A HPV 6, 11

B HPV 1, 2

CORRECT

C HPV 3, 10

D HPV 13, 32

RIGHT ANSWER

OK B. HPV 1, 2

WHY THIS IS RIGHT

Verruca vulgaris (common wart) is a benign epidermal proliferation caused by Human papillomavirus (HPV) types 1 and 2.

It typically presents as rough, hyperkeratotic papules on fingers, hands, or periungual areas and spreads by direct skin contact or autoinoculation.

Why not other options:

- HPV 6, 11: Cause condyloma acuminata (genital warts) and laryngeal papillomas.
- HPV 3, 10: Cause flat warts (verruca plana).
- HPV 13, 32: Cause focal epithelial hyperplasia (Heck disease) in the oral mucosa.

QUESTION

A 22-year-old man with 2 days of fever, cough, sore throat, and runny nose comes to the OPD. Lung sounds are clear to auscultation. A nasopharyngeal swab is obtained. Naked viral particles are seen, and purified RNA molecules are extracted from these particles. Once introduced into human cells, the purified RNA molecules induce viral protein synthesis and viral genome replication. Which of the following is the most likely cause of this patient's symptoms?

- A HIV
- B Influenza virus type A
- C Respiratory syncytial virus

D Rhinovirus

CORRECT

RIGHT ANSWER

D. Rhinovirus

WHY THIS IS RIGHT

Rhinovirus is the most common cause of the common cold, presenting with fever, sore throat, cough, and rhinorrhea with usually normal lung examination.

Rhinovirus is a non-enveloped (naked), positive-sense single-stranded RNA virus. Its RNA acts directly as mRNA, so when introduced into host cells it can immediately initiate viral protein synthesis and genome replication.

Why not other options:

- HIV: Enveloped retrovirus with two copies of +ssRNA that requires reverse transcriptase to form DNA before protein synthesis.
- Influenza virus type A: Enveloped, negative-sense RNA virus; its RNA cannot directly act as mRNA and requires viral RNA polymerase.
- Respiratory syncytial virus: Enveloped, negative-sense RNA virus; RNA must first be transcribed to mRNA.

QUESTION

A 10-year-old boy is brought to the physician with ataxia, myoclonus, and visual problems. His parents say that he began acting strangely and having difficulty with school work several months ago. After the appropriate workup, a brain biopsy is obtained and an RNA virus containing hemagglutinin is cultured from the tissue sample. Which of the following is the most likely diagnosis?

- A** Guillain-Barre syndrome
- B** Multiple sclerosis
- C** Progressive multifocal leukoencephalopathy
- D** Subacute sclerosing panencephalitis

CORRECT

RIGHT ANSWER

- OK** **D. Subacute sclerosing panencephalitis**

WHY THIS IS RIGHT

Subacute sclerosing panencephalitis (SSPE) is a progressive neurodegenerative disease of childhood caused by persistent infection with a mutant measles virus (an RNA virus with hemagglutinin).

It typically presents years after measles infection with:

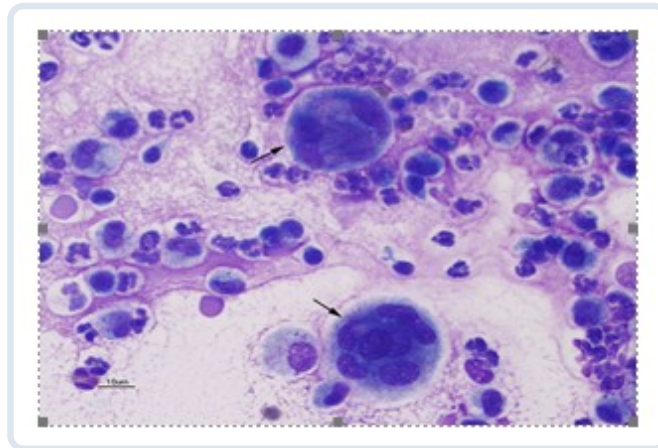
- Behavioral and cognitive decline
- Myoclonus
- Ataxia
- Visual disturbances
- Progressive neurological deterioration

Why not other options:

- Guillain-Barré syndrome: Acute peripheral neuropathy causing ascending weakness and areflexia; no chronic cognitive decline or myoclonus.
- Multiple sclerosis: Autoimmune demyelinating disease of CNS in young adults; not caused by an RNA virus.
- Progressive multifocal leukoencephalopathy: Caused by JC virus (DNA virus) in immunocompromised patients; no hemagglutinin-containing RNA virus.

QUESTION

The following appearance on a Tzanck smear may be seen in all except



- A Pemphigus vulgaris
- B Staphylococcal Scalded Skin Syndrome
- C Darier's disease
- D Pox virus

CORRECT

RIGHT ANSWER

OK

D. Pox virus

WHY THIS IS RIGHT

A Tzanck smear is obtained by scraping the base of a vesicle or blister and examining the cells cytologically.

- Multinucleated giant cells -> seen in HSV and VZV infections
- Acantholytic cells (Tzanck cells) -> seen in pemphigus vulgaris, SSSS, and Darier disease

Important limitation:

- Tzanck smear cannot identify poxvirus infections, as poxvirus produces intracytoplasmic inclusion bodies (Guarnieri bodies) rather than multinucleated giant cells.

QUESTION

A 32-year-old male presents to the clinic with fatigue, jaundice, and elevated liver enzymes. He reports recent unprotected sexual encounters and has a history of intravenous drug use. During further investigation of his blood sample, a specific particle associated with this viral infection is identified under the electron microscope. Which of the following structures, when transmitted, is capable of leading to infection in another person?

- A Spherical particles
- B Tubular structures
- C Filamentous structures
- D Dane particles** CORRECT

RIGHT ANSWER



D. Dane particles

WHY THIS IS RIGHT

No explanation was provided in the source quiz.

PARTICLE TYPE	SIZE (NM)	GENOME PRESENT	COMPOSITION
Dane Particle	42	Yes	Complete virions (Genome + HBsAg)
Spherical Particles	22	No	Surface proteins (Small HBsAg)
Tubular Particle	22	No	Surface proteins (Medium HBsAg)
Filamentous Particle	22	No	Surface proteins (HBsAg)
—	22	No	HBsAg

QUESTION

A 24-year-old male wrestler presents with a painful rash on his forehead and neck, initially small red bumps that developed into fluid-filled blisters (shown in the image). He reports fever and malaise for the past few days. What is the most likely diagnosis?



A Herpetic whitlow

B Herpes gladiatorum

CORRECT

C Herpes zoster

D Eczema herpeticum

RIGHT ANSWER

OK B. Herpes gladiatorum

WHY THIS IS RIGHT

Herpes gladiatorum is a cutaneous infection caused by Herpes simplex virus type-1 (HSV-1) that occurs in contact sports such as wrestling, rugby, and martial arts.

- Clusters of painful vesicles on an erythematous base
- Commonly affects face, neck, and trunk
- Associated with fever, malaise, and lymphadenopathy
- Spread occurs via skin-to-skin contact during sports
- Tzanck smear -> multinucleated giant cells
- PCR for HSV DNA (most sensitive)

Why not other options:

- Herpetic whitlow: HSV infection of the fingers/thumb, common in healthcare workers or thumb-sucking children.
- Herpes zoster: Dermatomal vesicular rash due to VZV reactivation, usually in older or immunocompromised patients.
- Eczema herpeticum: Disseminated HSV infection occurring in patients with pre-existing eczema/atopic dermatitis.

QUESTION

A 6-month-old infant is brought to the hospital with a 1-week history of high-grade fever, irritability, poor feeding, and progressive lethargy. Examination shows pallor, petechiae over the trunk and limbs, and moderate hepatomegaly. Complete blood counts reveal leukopenia and thrombocytopenia. A viral workup shows ELISA positivity for the pp65 antigen. Which viral agent is the most likely cause of this presentation?

A HHV-1

B HHV-2

C HHV-4

D HHV-5

CORRECT

RIGHT ANSWER

OK

D. HHV-5

WHY THIS IS RIGHT

Human Herpesvirus-5 (HHV-5), also called Cytomegalovirus (CMV), commonly causes systemic infection in infants, especially congenital or perinatal CMV infection.

- Fever, lethargy, poor feeding
- Hepatomegaly
- Petechiae ("blueberry muffin rash")
- Cytopenias such as leukopenia and thrombocytopenia

Laboratory diagnosis:

- Detection of CMV pp65 antigen by ELISA or antigenemia assay.
- PCR for CMV DNA can also be used.

QUESTION

A 34-year-old researcher accidentally exposes a viral sample to alcohol during a lab procedure. He recalls that alcohol can disrupt certain viral structures. Which of the following statements is true regarding the structure of viral envelopes and capsids?

A Hemagglutinin is a protein subunit found exclusively in non-enveloped viruses

B Non-enveloped viruses are more alcohol labile than enveloped viruses

C Viral envelope is composed of lipids derived from the host cell membrane

CORRECT

D Capsid in enveloped viruses gives the virus its pleomorphic shape

RIGHT ANSWER

OK

C. Viral envelope is composed of lipids derived from the host cell membrane

WHY THIS IS RIGHT

Viral envelopes are lipid bilayers derived from the host cell membrane (usually plasma membrane, ER, or Golgi) during viral budding.

- Envelope contains host-derived lipids with viral glycoproteins (spikes) embedded in it.
- The lipid envelope makes viruses susceptible to alcohol, detergents, and drying.
- These glycoproteins help in attachment and entry into host cells.

Capsid vs Envelope:

- Capsid: Protein coat that protects the viral genome.
- Envelope: Host-derived lipid layer surrounding the capsid in enveloped viruses.

QUESTION

The most common organism causing diarrhea associated with shellfish ingestion in adults is:

A Astrovirus

B Norovirus

CORRECT

C Echovirus

D Rotavirus

RIGHT ANSWER

OK

B. Norovirus

WHY THIS IS RIGHT

Norovirus is the most common cause of acute gastroenteritis associated with shellfish ingestion, particularly raw or undercooked oysters and other seafood contaminated with sewage.

- Causes acute onset vomiting, watery diarrhea, abdominal cramps, and nausea
- Highly contagious, often causing outbreaks in cruise ships, restaurants, and institutions
- Leading cause of foodborne viral gastroenteritis in adults

Why not other options:

- Astrovirus: Causes mild diarrhea mainly in children, not typically linked to shellfish outbreaks.
- Echovirus: An enterovirus causing meningitis or febrile illness, not common foodborne gastroenteritis.
- Rotavirus: Major cause of severe diarrhea in infants and young children, not shellfish-associated outbreaks.

QUESTION

| Which among the following is false regarding Mollaret's meningitis?

- A** Benign recurrent lymphocytic meningitis
- B** Diagnosed by demonstration of HSV abs in CSF
- C** Neurologic sequelae common
- D** Persistence of HSV DNA in CSF

CORRECT

RIGHT ANSWER

OK

C. Neurologic sequelae common

WHY THIS IS RIGHT

Mollaret's meningitis is a form of benign recurrent lymphocytic meningitis; most commonly associated with Herpes simplex virus type 2 (HSV-2).

- Recurrent episodes of aseptic meningitis
- Lymphocytic pleocytosis in CSF
- Episodes last 2-5 days and resolve spontaneously
- HSV DNA may be detected in CSF by PCR

Important characteristic:

The disease is self-limiting and

QUESTION

| All of the following statements about Tzanck smear are true except:

A It is performed by scraping the base of the lesion

B It can differentiate HSV from VZV

CORRECT

C Sensitivity of the test is only about 60%

D It can demonstrate multinucleated giant cells

RIGHT ANSWER

OK **B. It can differentiate HSV from VZV**

WHY THIS IS RIGHT

A Tzanck smear is a rapid cytological test used in the diagnosis of vesicular viral infections, especially Herpes simplex virus (HSV) and Varicella-zoster virus (VZV)

Procedure:

- The base of a vesicular lesion is scraped.
- The smear is stained (e.g., Giemsa or Wright stain) and examined microscopically.

Findings:

- Multinucleated giant cells
- Ballooning degeneration of epithelial cells

Limitation:

- Although it confirms a herpesvirus infection, it cannot differentiate HSV from VZV.

QUESTION

| The symmetric protein shell which encloses the viral genome is called:

- A Virion
- B Peplomers
- C Capsomere

D Capsid

CORRECT

RIGHT ANSWER

OK D. Capsid

WHY THIS IS RIGHT

The capsid is the protein coat that surrounds and protects the viral nucleic acid (genome).

- The capsid is composed of repeating protein subunits called capsomeres.
- Together, the capsid and viral genome form the nucleocapsid.

Functions of the capsid:

- Protects viral genetic material
- Helps in attachment and entry into host cells
- Determines the shape and symmetry of the virus (icosahedral, helical, complex)

Virion = complete virus particle (capsid ± envelope + genome)

Peplomers = glycoprotein spikes on enveloped viruses

QUESTION

A 28-year-old man presents with fever, agitation, hydrophobia, and a history of a stray dog bite 6 weeks earlier. Rabies is clinically suspected. The clinician wants to perform the most sensitive test for confirming the diagnosis of rabies in the ante-mortem period. Which of the following investigations should be performed?

- A** Direct fluorescent antibody test
- B** Negri body detection on histopathology
- C** RT-PCR for rabies viral RNA
- D** Viral culture in mice

CORRECT

RIGHT ANSWER

- OK** **C. RT-PCR for rabies viral RNA**

WHY THIS IS RIGHT

Rabies diagnosis in the ante-mortem period relies on detection of rabies viral RNA using RT-PCR, which is the most sensitive and specific test.

Specimens used for RT-PCR: Saliva, CSF and Nuchal skin biopsy (hair follicle nerves)

RT-PCR allows early detection of viral RNA before death, making it the preferred confirmatory test when rabies is clinically suspected.

Why not other options:

- A. Direct fluorescent antibody test: Gold standard for post-mortem brain tissue, not most sensitive ante-mortem test.
- B. Negri body detection: Seen on brain histopathology after death; low sensitivity.
- D. Viral culture in mice: Slow and rarely used for clinical diagnosis.

QUESTION

In a busy OPD at a District hospital, you are evaluating a 5-year-old boy who presents with fever, generalized malaise, and a distinctive rash. The child's clinical presentation strongly suggests a diagnosis of measles. The mother, anxious about the contagious nature of the disease and the risk it poses to her other kids and family members, inquires about the recommended period of isolation for her infected child. What would be your most appropriate recommendation for the duration of isolation?

A From onset of rash to 3 days after rash

B 2 weeks before rash to 1 week after rash

C From onset of rash to 5 days after rash

D From catarrhal stage to 4 days after rash

CORRECT

RIGHT ANSWER

OK

D. From catarrhal stage to 4 days after rash

WHY THIS IS RIGHT

Measles is highly contagious, with the maximum infectivity during the catarrhal (prodromal) stage, when symptoms such as fever, cough, coryza, and conjunctivitis appear.

Period of infectivity:

- Begins during the catarrhal stage (about 4 days before rash onset)
- Continues until 4 days after the appearance of the rash

QUESTION

A 29-year-old male presents to the emergency department with a 3-day history of high-grade fever, altered mental status, and severe respiratory distress. His family reports that he recently attended a wedding in a rural area of Kozhikode district of Kerala, where he consumed freshly tapped toddy (tapped from the sap of palm trees), a local drink. Over the next day, three more individuals from the same wedding presented with similar symptoms. On examination, the patient appears lethargic, disoriented, with reduced chest sounds on the right side. His CSF analysis reveals an elevated protein count with normal glucose and an increase in lymphocytes. Given the clinical presentation and his recent history, which of the following infectious agents is most likely responsible for this outbreak?

A Hantavirus

B Nipah virus

CORRECT

C Zika virus

D West Nile virus

RIGHT ANSWER

OK B. Nipah virus

WHY THIS IS RIGHT

Nipah virus is a zoonotic paramyxovirus transmitted from fruit bats (*Pteropus* species) to humans, often through contaminated food such as raw palm sap (toddy).

- Acute febrile illness
- Rapidly progressive encephalitis (altered mental status)
- Severe respiratory distress
- High case fatality rate

Epidemiological clues:

- Consumption of fresh palm sap contaminated by bat secretions
- Clusters of cases/outbreaks
- Reported outbreaks in Kerala (especially Kozhikode district)

CSF findings:

- Lymphocytic pleocytosis
- Elevated protein
- Normal glucose (suggestive of viral encephalitis)

QUESTION

A patient with HIV who is currently on antiretroviral therapy consisting of zidovudine, lamivudine, and nevirapine is diagnosed with tuberculosis. Considering potential drug interactions, which of the following TB drugs should be changed in this patient?

A Isoniazid

B Rifampicin

CORRECT

C Ethambutol

D Streptomycin

RIGHT ANSWER

OK B. Rifampicin

WHY THIS IS RIGHT

In HIV-TB coinfection, rifampicin must be modified/substituted in patients receiving NNRTI-based ART (e.g., nevirapine) due to significant drug interactions.

- Mechanism of interaction:

- o Rifampicin is a potent CYP450 inducer

- o ↓ plasma levels of nevirapine (NNRTI) -> risk of ART failure

- Clinical implication:

- o Avoid co-administration with nevirapine when possible

- o Substitute rifampicin with rifabutin or adjust ART regimen

- Why not others: Isoniazid, ethambutol, streptomycin: no major CYP450 induction -> safe with ART

QUESTION

An HIV-positive woman in her third trimester presents to the hospital with a viral load of 1,200 copies/mL and is started on antiretroviral therapy. She delivers a healthy infant at 38 weeks via normal vaginal delivery. The baby is exclusively breastfed. Which of the following is the most appropriate prophylactic therapy for the newborn?

- A** Nevirapine single dose and continue breast feeding
- B** Zidovudine plus Nevirapine for 6 weeks and continue breast feeding
- C** Nevirapine for 12 weeks and stop breast feeding
- D** Zidovudine plus Nevirapine for 12 weeks and continue breast feeding

CORRECT

RIGHT ANSWER

- OK** **D. Zidovudine plus Nevirapine for 12 weeks and continue breast feeding**

WHY THIS IS RIGHT

In HIV-exposed infants, the choice and duration of prophylaxis depend on maternal viral load and transmission risk. High-risk exposure (e.g., maternal viral load >1000 copies/mL, late ART initiation) -> dual prophylaxis is required.

Recommended management:

- Zidovudine + Nevirapine for 12 weeks
- Continue exclusive breastfeeding (with maternal ART)

Why not others:

- Single-dose nevirapine -> inadequate prophylaxis
- 6 weeks regimen -> for low-risk infants only
- Stopping breastfeeding -> not recommended in resource-limited settings (benefits outweigh risks with ART)

QUESTION

Which component of the HIV genome is necessary for the virus to enter the host cell membrane?

A GP120

CORRECT

B CCR5

C GP41

D CXCR4

RIGHT ANSWER

OK A. GP120

WHY THIS IS RIGHT

HIV entry into host cells is initiated by binding of viral gp120 to host receptors.

Key mechanism:

- gp120 (viral envelope glycoprotein) binds to CD4 receptor on host cells
- Then interacts with co-receptors (CCR5 or CXCR4)
- This triggers gp41-mediated membrane fusion

Roles:

- gp120 -> attachment to CD4 and co-receptors (essential for entry initiation)
- gp41 -> fusion of viral and host membranes
- CCR5/CXCR4 -> host co-receptors

QUESTION

Which of the following drug binds to CD4 receptors and is used for both CCR-5 as well as CXCR-4 tropic HIV?

A Maraviroc

B Ibalizumab

CORRECT

C Fostemsavir

D Tenofovir

RIGHT ANSWER

OK B. Ibalizumab

WHY THIS IS RIGHT

Ibalizumab is a monoclonal antibody that binds the CD4 receptor post-attachment and blocks HIV entry. Because it targets CD4 rather than the co-receptor, it is effective against both CCR5- and CXCR4-tropic HIV strains. Maraviroc blocks only CCR5, not CXCR4 virus. CD4-directed entry inhibition is the key distinguishing feature.

Entry Inhibitors

Attachment ⊖	Gp120 (Fostemsavir)
Post Attachment ⊖	CD4 Receptors (Ibalizumab)
Fusion ⊖	Gp41 (Enfuvirtide)
Co-Receptor ⊖	CCR-5 (Maraviroc)

QUESTION

| Which of the following is the best regimen for pre-exposure prophylaxis for HIV?

A Tenofovir with Emtricitabine

CORRECT

B Tenofovir Lamivudine

C Zidovudine, Emtricitabine

D Zidovudine alone

RIGHT ANSWER

OK

A. Tenofovir with Emtricitabine

WHY THIS IS RIGHT

The preferred regimen for HIV pre-exposure prophylaxis (PrEP) is Tenofovir combined with Emtricitabine.

- Daily oral Tenofovir disoproxil fumarate (TDF) + Emtricitabine (FTC) is the standard PrEP regimen
- Highly effective in preventing HIV acquisition when taken consistently
- Works by inhibiting reverse transcriptase, blocking viral replication early after exposure
- Indicated in high-risk individuals (multiple partners, serodiscordant couples, MSM, IV drug users)

Why not others:

- Tenofovir + Lamivudine is used in treatment regimens, not standard PrEP
- Zidovudine-based regimens are not used for PrEP due to toxicity and lower convenience
- Zidovudine alone is ineffective

QUESTION

A 40-year-old male with a known HIV infection presents with cough and fever lasting for 3 months. Patient is diagnosed with a case of miliary tuberculosis. What is the next best step?

CORRECT

A Start ATT now and start ART later and increase the dolutegravir dose

B Start ART now, start ATT two weeks later and increase the dolutegravir

C Start ATT and ART together

D Start ATT now along with corticosteroids, start and increase the dolutegravir

RIGHT ANSWER

OK

A. Start ATT now and start ART later and increase the dolutegravir dose

WHY THIS IS RIGHT

In HIV patients with active tuberculosis, anti-tubercular therapy (ATT) should be initiated first, followed by antiretroviral therapy (ART) after a short delay.

- Start ATT immediately in all cases of active TB
- ART is started after 2 weeks (early initiation reduces mortality but avoids severe immune reconstitution inflammatory syndrome, IRIS)
- Rifampicin induces hepatic enzymes -> reduces levels of dolutegravir
- Therefore, dolutegravir dose must be increased when co-administered with rifampicin

Additional notes:

- Simultaneous initiation of ATT and ART increases risk of IRIS
- Steroids are reserved for specific indications (e.g., TB meningitis, pericarditis), not routine miliary TB

Thus, ATT is started first, ART is added after 2 weeks, and dolutegravir dose is increased due to rifampicin interaction.

QUESTION

A 50-year-old female patient with HIV infection is started on antiretroviral therapy. After a year of treatment, the patient develops back pain. X-ray LS spine is shown below. Which of the following antiretroviral drugs could be the potential cause of these symptoms?



A Didanosine

B **Tenofovir**

CORRECT

C Zidovudine

D Ritonivir

RIGHT ANSWER

OK B. **Tenofovir**

WHY THIS IS RIGHT

Tenofovir, a nucleotide reverse transcriptase inhibitor (NRTI) used in HIV treatment, is associated with decreased bone mineral density and osteoporosis, which can lead to vertebral compression fractures and back pain. Causes renal proximal tubular dysfunction (Fanconi syndrome).

Why other options are less likely

- Didanosine - associated with pancreatitis and peripheral neuropathy.
- Zidovudine - causes bone marrow suppression (anemia, neutropenia) and myopathy.
- Ritonavir - causes metabolic syndrome, dyslipidemia, and insulin resistance.

QUESTION

A 4-year-old child weighing 18 kg is newly diagnosed with HIV and needs ART. The paediatric ART plan discussed includes 2 NRTIs plus a third agent appropriate for young children. Which regimen is most appropriate for a child under 6 years or under 20 kg?

A Tenofovir + Lamivudine + Dolutegravir

B Tenofovir + Efavirenz + Nevirapine

C Abacavir + Lamivudine + LPV/r combination

CORRECT

D Stavudine + Didanosine + Indinavir

RIGHT ANSWER

OK

C. Abacavir + Lamivudine + LPV/r combination

WHY THIS IS RIGHT

For children under 6 years of age or weighing <20 kg with HIV infection, the preferred first-line ART regimen includes:

- Two NRTIs: Abacavir (ABC) + Lamivudine (3TC)
- Third agent: Lopinavir/ritonavir (LPV/r) (a boosted protease inhibitor)

Reason:

- LPV/r-based regimens are preferred in young children because they have better efficacy and resistance profiles compared with NNRTI-based regimens in this age group.

Regimen: Abacavir + Lamivudine + Lopinavir/ritonavir

QUESTION

A newborn is delivered to an HIV-positive mother. The infant has received perinatal HIV prophylaxis and is scheduled for early infant diagnosis. According to guidelines, when should cotrimoxazole prophylaxis be initiated in this child?

- A** Immediately after birth
- B** At 2 weeks of age
- C** At 6 weeks of age, regardless of HIV status
- D** Only if the infant tests HIV positive at 6 months

CORRECT

RIGHT ANSWER

- OK** **C. At 6 weeks of age, regardless of HIV status**

WHY THIS IS RIGHT

Infants born to HIV-positive mothers are at increased risk of opportunistic infections, especially *Pneumocystis jirovecii* pneumonia (PCP).

Guideline recommendation:

- Cotrimoxazole prophylaxis should be started at 6 weeks of age in all HIV-exposed infants, regardless of their HIV test result, because infection status may not yet be definitively known.
- Continued until HIV infection is definitively ruled out or lifelong if the child is confirmed HIV-positive.

QUESTION

A 24-year-old male presents to the outpatient clinic with fever, sore throat, rash, and generalized lymphadenopathy 10 days after unprotected sexual exposure. Acute retroviral syndrome is suspected. The clinician wants to make an early diagnosis before seroconversion occurs. Which test should be ordered first to identify HIV infection at this stage?

A HIV ELISA (3rd generation)

B Western Blot

C p24 antigen assay

D HIV RNA PCR (NAT)

CORRECT

RIGHT ANSWER

OK

D. HIV RNA PCR (NAT)

WHY THIS IS RIGHT

During acute HIV infection (acute retroviral syndrome), symptoms such as fever, sore throat, rash, and lymphadenopathy occur before seroconversion, when HIV antibodies are not yet detectable.

Earliest detectable marker:

- HIV RNA by PCR (Nucleic Acid Test - NAT) detects viral RNA within ~7-10 days after infection, making it the most sensitive test during the window period.

Sequence of HIV markers after infection:

1. HIV RNA (PCR/NAT) - earliest detection
2. p24 antigen
3. HIV antibodies (ELISA/Western blot)

QUESTION

A 42-year-old man with HIV infection on a stable antiretroviral therapy (ART) regimen for the last 6 months presents with chronic, non-bloody watery diarrhea for 3 weeks. Stool examination is negative for ova, parasites, and bacterial pathogens. There is no history of fever or weight loss. His CD4 count is improving and viral load is suppressed. Despite dietary modification and loperamide, symptoms persist. Which of the following drugs is most appropriate for management of this patient's diarrhea?

A Octreotide

B Rifaximin

C Crofelemer

CORRECT

D Cholestyramine

RIGHT ANSWER

OK C. Crofelemer

WHY THIS IS RIGHT

Crofelemer is used for the treatment of noninfectious diarrhea in patients with HIV receiving antiretroviral therapy (ART). Indicated for chronic, noninfectious diarrhea associated with ART when stool studies are negative for infectious causes.

- Crofelemer inhibits CFTR chloride channels and calcium-activated chloride channels in the intestinal epithelium.
- This reduces chloride and water secretion into the intestinal lumen, thereby decreasing watery diarrhea.
- It does not affect intestinal motility, making it safer for long-term use compared with antimotility agents.

Why not other options:

- A. Octreotide: Used for secretory diarrhea due to tumors (VIPoma, carcinoid) or severe refractory diarrhea, not routine ART-associated diarrhea.
- B. Rifaximin: Antibiotic used for traveler's diarrhea, SIBO, hepatic encephalopathy, not noninfectious ART-related diarrhea.
- D. Cholestyramine: Used for bile acid malabsorption diarrhea (eg, post-ileal resection), not ART-induced diarrhea.

QUESTION

In a patient with HIV, which of following is correct statement for prophylaxis of opportunistic infections?

A Prophylaxis for *Pneumocystis carinii* Pneumonia (PCP) is indicated when CD4 count is $<500/\mu\text{L}$

B Stop prophylaxis for PCP if CD4 count is $>350/\mu\text{L}$ for consecutive 6 months

CORRECT

C Prophylaxis for MAC is indicated when CD4 count is $<50/\mu\text{L}$

D Prophylaxis for *Cryptococcus* is indicated when CD4 count is $<150/\mu\text{L}$

RIGHT ANSWER

OK B. Stop prophylaxis for PCP if CD4 count is $>350/\mu\text{L}$ for consecutive 6 months

WHY THIS IS RIGHT

Prophylaxis against opportunistic infections in HIV is guided by the CD4 cell count.

Pneumocystis jirovecii pneumonia (PCP):

- Start prophylaxis: when CD4 <200 cells/ μL .
- Stop prophylaxis: when CD4 count rises above ~ 200 - 350 cells/ μL for at least 3-6 months on effective ART.

Mycobacterium avium complex (MAC):

- Prophylaxis indicated when CD4 <50 cells/ μL (e.g., azithromycin or clarithromycin).

Cryptococcal infection:

- Routine primary prophylaxis is not generally recommended, even at low CD4 counts.

QUESTION

An investigator is studying an experimental treatment for HIV infection that inhibits the maturation of new HIV virions. Patients who are taking the drug are observed for several years and side effects are recorded. A correlation is established between the drug and the development of impaired glucose tolerance. In addition, a significant portion of the patients who take the drug for several years develop kidney stones and show increased fat accumulation in the neck with loss of subcutaneous fat in the face and extremities. Which of the following processes is most likely targeted by this drug?

- A** Viral entry into host cell
- B** Viral polypeptide cleavage
- C** Viral DNA integration into host DNA
- D** Reverse transcription of viral RNA

CORRECT

RIGHT ANSWER

- OK** **B. Viral polypeptide cleavage**

WHY THIS IS RIGHT

The drug described inhibits maturation of newly formed HIV virions, which is the mechanism of HIV protease inhibitors. Protease inhibitors block this polypeptide cleavage, resulting in immature, noninfectious viral particles.

Characteristic adverse effects of protease inhibitors:

- Insulin resistance / impaired glucose tolerance
- Lipodystrophy (buffalo hump, loss of peripheral fat)
- Nephrolithiasis (especially with indinavir)

Why not other options:

- A. Viral entry into host cell: Blocked by entry inhibitors (eg, maraviroc, enfuvirtide); they do not cause lipodystrophy or nephrolithiasis.
- C. Viral DNA integration: Targeted by integrase inhibitors (eg, raltegravir); not associated with lipodystrophy syndrome.
- D. Reverse transcription: Targeted by NRTIs/NNRTIs; side effects differ (eg, lactic acidosis, neuropathy).

QUESTION

Which of the following protease inhibitors is most associated with QT interval prolongation?

A Atazanavir

B Darunavir

C Indinavir

D Saquinavir

CORRECT

RIGHT ANSWER

OK

D. Saquinavir

WHY THIS IS RIGHT

Saquinavir, an HIV protease inhibitor, is most strongly associated with QT interval prolongation, which can predispose to serious ventricular arrhythmias such as torsades de pointes. Saquinavir can interfere with cardiac potassium channels (hERG channels), delaying ventricular repolarization and prolonging the QT interval on ECG.

Why not other options:

- Atazanavir: Mainly causes indirect hyperbilirubinemia (UGT1A1 inhibition), not significant QT prolongation.
- Darunavir: Generally well tolerated; main issues are rash and hepatotoxicity, not QT prolongation.
- Indinavir: Associated with nephrolithiasis and hyperbilirubinemia, not QT prolongation.

QUESTION

The most effective intervention to reduce mother-to-child HIV transmission is:

- A** Elective cesarean section
- B** Infant feeding modification
- C** **Maternal ART during pregnancy**
- D** Puerperal antibiotics

CORRECT

RIGHT ANSWER

- OK** **C. Maternal ART during pregnancy**

WHY THIS IS RIGHT

Maternal antiretroviral therapy (ART) during pregnancy is the most effective intervention to prevent mother-to-child transmission (MTCT) of HIV.

- ART suppresses maternal viral load, which is the most important determinant of transmission.
- Lower viral load significantly reduces intrauterine, intrapartum, and postpartum transmission.

Additional preventive measures include:

- Infant antiretroviral prophylaxis
- Safe infant feeding practices
- Elective cesarean section in selected cases with high viral load

QUESTION

A 22-year-old woman presents with fever, rash, lymphadenopathy 2 weeks after high-risk sexual exposure. HIV ELISA antibody test is non-reactive. Which test is most likely to detect infection at this stage?

A p24 antigen

CORRECT

B ELISA antibody

C Western blot

D CD4 count

RIGHT ANSWER

OK

A. p24 antigen

WHY THIS IS RIGHT

During acute HIV infection (2-4 weeks after exposure), patients may develop fever, rash, lymphadenopathy, and flu-like symptoms, but HIV antibodies may not yet be detectable due to the window period.

- p24 antigen appears earlier than antibodies in the blood and can detect infection during this early phase.
- ELISA antibody and Western blot become positive later (after seroconversion).
- CD4 count is not used for early diagnosis.

QUESTION

A 32-year-old male presents to the emergency department with high-grade fever and altered sensorium. He recently returned from a malaria-endemic region. Blood smear confirms *Plasmodium falciparum* infection resistant to chloroquine. The patient is diagnosed with complicated malaria. What is the most appropriate treatment of choice in this scenario?

A Quinine

B Artesunate

CORRECT

C Sulfadoxine-Pyrimethamine

D Primaquine

RIGHT ANSWER

OK B. Artesunate

WHY THIS IS RIGHT

Severe (complicated) malaria caused by *Plasmodium falciparum*, especially chloroquine-resistant strains, should be treated with intravenous artesunate, which is the drug of choice due to its rapid parasite clearance and superior survival benefit compared to quinine.

- Indications for IV artesunate: altered sensorium (cerebral malaria), severe anemia, acidosis, renal failure, shock, etc.
- Mechanism: Artemisinin derivatives generate free radicals -> rapid killing of parasitized RBCs.

· Why not others:

- o Quinine: second line; more side effects (cinchonism, hypoglycemia)
- o Sulfadoxine-pyrimethamine: resistance common; not for severe malaria
- o Primaquine: acts on hypnozoites (vivax/ovale), not used in acute severe falciparum malaria

QUESTION

A young woman presents with eye pain, photophobia, and blurred vision. She reports swimming at a beach while wearing contact lenses. Which of the following organisms is the most likely cause of her condition?

A Pseudomonas aeruginosa

B Aspergillus fumigatus

C Acanthamoeba spp.

CORRECT

D Herpes simplex virus

RIGHT ANSWER

OK C. Acanthamoeba spp.

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

An 18-year-old boy from Rajasthan weighing 50 kg is diagnosed with mixed *P. vivax* and *P. falciparum* malaria. What is the appropriate treatment regimen on day 2?

A Artesunate 50 mg (4 tablets) + Primaquine 2.5 mg (6 tablets)

CORRECT

B Artesunate 50 mg (4 tablets) + Primaquine 7.5 mg (6 tablets)

C Artesunate 50 mg (4 tablets) + Sulfadoxine/pyrimethamine (750/37.5 mg) (2 tablets) + Primaquine 2.5 mg (6 tablets)

D Artesunate 50 mg (4 tablets) + Sulfadoxine/pyrimethamine (750/37.5 mg) (2 tablets) + Primaquine 7.5 mg (6 tablets)

RIGHT ANSWER

OK A. Artesunate 50 mg (4 tablets) + Primaquine 2.5 mg (6 tablets)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1a" here and does not include a written explanation for this item.

QUESTION

An HIV-positive patient presents with a history of chronic diarrhea. Stool microscopy reveals cysts measuring 11-22 μm in size, each containing 2 sporocysts. Which of the following parasites is the most likely cause?

A) *Cryptosporidium parvum*

B) *Cyclospora cayetanensis*

C) *Cystoisospora belli*

CORRECT

D) *Toxoplasma gondii*

RIGHT ANSWER

OK

C. C) *Cystoisospora belli*

WHY THIS IS RIGHT

Cystoisospora belli is an opportunistic coccidian parasite causing chronic watery diarrhea in immunocompromised patients (especially HIV/AIDS).

- Diagnostic morphology:
 - o Oocysts (not cysts) measuring $\sim 20\text{--}30\ \mu\text{m}$ ($\approx 11\text{--}22\ \mu\text{m}$ in some descriptions)
 - o Contain 2 sporocysts, each with sporozoites $\rightarrow$ key identifying feature
- Site of infection: small intestine (enterocytes)
- Clinical features:
 - o Chronic, non-bloody diarrhea
 - o Malabsorption, weight loss
 - o Eosinophilia may be present

Why not others:

- *Cryptosporidium parvum*: smaller oocysts ($4\text{--}6\ \mu\text{m}$), no sporocysts seen
- *Cyclospora cayetanensis*: $8\text{--}10\ \mu\text{m}$ oocysts, variable acid-fast staining
- *Toxoplasma gondii*: systemic infection; not a cause of diarrheal illness



QUESTION

In a patient presented with a fever and a positive filarial antigen test, what is the next best step of management?

- A Bone marrow biopsy
- B DEC provocation test
- C Detection of microfilariae in the blood smear**
- D Ultrasound of the scrotum

CORRECT

RIGHT ANSWER

- OK C. Detection of microfilariae in the blood smear**

WHY THIS IS RIGHT

In a patient with suspected filariasis, a positive filarial antigen test should be followed by demonstration of microfilariae in peripheral blood smear for confirmation and species identification.

- Filarial antigen test:
 - o Sensitive screening tool (especially for *Wuchereria bancrofti*)
 - o Detects circulating filarial antigen
- Next step (confirmation):
 - o Peripheral blood smear (preferably night sample due to nocturnal periodicity)
 - o Helps identify species based on morphology

Why not others:

- o Bone marrow biopsy: not relevant
- o DEC provocation test: outdated, rarely used
- o Ultrasound (filarial dance sign): supportive, not confirmatory

QUESTION

A 32-year-old male from rural Bihar presents with a 3-month history of intermittent fever, progressive abdominal distension, and weight loss. On examination, he has marked splenomegaly, pallor, and hyperpigmentation of the skin. Laboratory evaluation reveals pancytopenia. Bone marrow aspiration shows intracellular amastigotes within macrophages.

Which of the following is the most likely vector responsible for transmission of this disease?

A Rat flea

B Sandfly (Phlebotomus)

CORRECT

C Deer fly (Chrysops)

D Black fly (Simulium)

RIGHT ANSWER

OK

B. Sandfly (Phlebotomus)

WHY THIS IS RIGHT

Visceral leishmaniasis (kala-azar), common in regions like Bihar, is caused by *Leishmania donovani* and is transmitted by the female sandfly (genus *Phlebotomus*).

- Vector: *Phlebotomus* (sandfly)
- Reservoir: humans (in Indian subcontinent)
- Clinical features:

- o Massive splenomegaly
- o Irregular (on-off) fever
- o Anemia, weight loss
- o Hyperpigmentation ("kala-azar")
- Parasite form:

- o Amastigotes (LD bodies) inside macrophages in spleen, liver, bone marrow
- Diagnosis: Demonstration of LD bodies in tissue aspirate
- Treatment: Liposomal amphotericin B

Why not others:

- Rat flea: plague (*Yersinia pestis*)
- Chrysops fly: *Loa loa* (loiasis)
- Black fly (*Simulium*): *Onchocerca volvulus* (river blindness)

QUESTION

A boy presented with a fever and chills. Rapid test was positive for specific antigen HRP-2. Which of the following species of *Plasmodium* is the most likely causative agent?

A *Plasmodium falciparum*

CORRECT

B *Plasmodium malariae*

C *Plasmodium vivax*

D *Plasmodium ovale*

RIGHT ANSWER

OK

A. *Plasmodium falciparum*

WHY THIS IS RIGHT

A positive HRP-2 (Histidine-Rich Protein-2) antigen test is specific for *Plasmodium falciparum* infection.

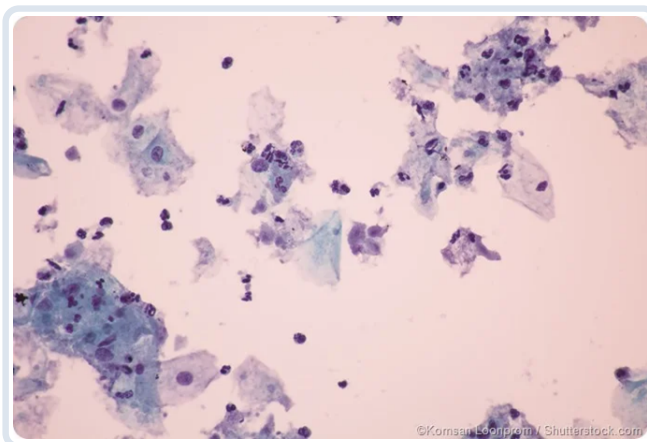
- HRP-2:
 - o Protein produced only by *P. falciparum*
 - o Detected by rapid diagnostic tests (RDTs)
- Clinical significance:
 - o Helps in rapid bedside diagnosis of *falciparum* malaria
 - o Useful in endemic settings where microscopy may not be immediately available
- Important limitation: HRP-2 may remain positive even after parasite clearance -> not useful for monitoring treatment response

Why not others:

- *Plasmodium vivax*, *ovale*, *malariae* -> do NOT produce HRP-2
- These are detected by other antigens (e.g., pLDH)

QUESTION

A woman in her reproductive age presented with a foul-smelling discharge, burning sensation, and lower abdominal pain. She also experiences dysuria. Pap smear is shown below. The organism responsible is:



A CMV

B HPV

C HSV

D Trichomonas

CORRECT

RIGHT ANSWER

OK

D. Trichomonas

WHY THIS IS RIGHT

Trichomonas vaginalis is a flagellated protozoan causing trichomoniasis, characterized by foul-smelling vaginal discharge, burning, dysuria, and inflammatory changes on Pap smear.

• Clinical features:

- o Frothy, foul-smelling discharge
- o Vaginal irritation, burning
- o Dysuria, lower abdominal discomfort
- o "Strawberry cervix" (punctate hemorrhages)

• Microscopy (Pap smear/wet mount):

- o Motile, flagellated trophozoites
- o No cyst form (exists only as trophozoite)

• Transmission: sexual contact

• Why not others:

- o CMV: owl's eye inclusions
- o HPV: koilocytes (perinuclear clearing)
- o HSV: multinucleated giant cells

• Diagnosis:

- o Wet mount (motile organisms)
- o NAAT (most sensitive)
- Treatment: Metronidazole (treat both partners)

QUESTION

A female presented with a long history of fever, discolored skin of lower limbs, and lower limb edema. Microscopic examination showed a sheathed organism with no nuclei at the tip of the tail. What can be the most likely diagnosis?



A **Wuchereria bancrofti**

CORRECT

B Mansonella

C Loa loa

D Brugia malayi

RIGHT ANSWER

OK

A. Wuchereria bancrofti

WHY THIS IS RIGHT

Wuchereria bancrofti is the most common cause of lymphatic filariasis, identified on microscopy by sheathed microfilariae with absence of nuclei at the tail tip.

• Clinical features:

- o Chronic fever
- o Lymphedema of lower limbs -> elephantiasis
- o Skin thickening and discoloration

• Morphology (diagnostic):

- o Sheathed microfilaria
- o No nuclei at the tip of the tail (key differentiating feature)

• Comparison:

- o Brugia malayi: sheathed, but 2 terminal nuclei at tail tip
- o Loa loa: sheathed, nuclei extend continuously to tail tip
- o Mansonella: unsheathed microfilariae

• Diagnosis:

- o Peripheral blood smear (night sample due to nocturnal periodicity)
- o Antigen detection tests
- Treatment: Diethylcarbamazine (DEC)

QUESTION

Infection with *Clonorchis sinensis* is associated with an increased risk of?

A Cervical cancer

B Cholangiocarcinoma

CORRECT

C Gastric carcinoma

D Bladder carcinoma

RIGHT ANSWER

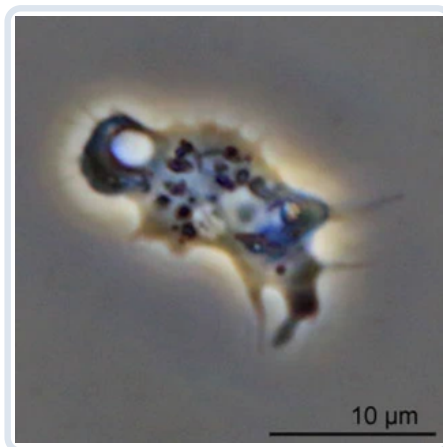
OK B. Cholangiocarcinoma

WHY THIS IS RIGHT

Cancer	Associated Organism
Cervical cancer	HPV (types 16, 18)
Gastric carcinoma	<i>Helicobacter pylori</i>
Bladder carcinoma	<i>Schistosoma haematobium</i>
Cholangiocarcinoma	<i>Clonorchis sinensis</i>

QUESTION

A young boy developed keratitis after careless use of contact lenses due to unhygienic lens fluid. Microscopy showed the following. Identify the organism.



A Acanthamoeba

CORRECT

B Balantidium

C Naegleria fowleri

D Staph aureus

RIGHT ANSWER

OK A. Acanthamoeba

WHY THIS IS RIGHT

Acanthamoeba is a free-living amoeba that causes keratitis in contact lens users, especially with poor lens hygiene.

Spike-like pseudopodia (acanthopodia) seen on microscopy

- Causes painful keratitis with redness, photophobia, and decreased vision
- Often associated with:

- o Improper lens cleaning
- o Use of contaminated lens solutions
- o Swimming with contact lenses

Morphology:

- Trophozoite -> irregular shape with acanthopodia
- Cyst -> double-walled (important for resistance)

Differentiation:

- Naegleria fowleri -> causes primary amoebic meningoencephalitis (brain infection)
- Balantidium coli -> ciliated protozoa causing dysentery
- Staph aureus -> bacterial keratitis, no pseudopodia

QUESTION

A lady from West Rajasthan presented with an ulcer surrounded by erythema on the right leg. Microscopy of the biopsy from the edge of the ulcer showed organisms with dark staining nuclei and kinetoplast. What is the most likely causative agent?

A Leishmania tropica

CORRECT

B Babesia

C Trypanosoma

D Histoplasma

RIGHT ANSWER

OK

A. Leishmania tropica

WHY THIS IS RIGHT

Cutaneous leishmaniasis (common in Rajasthan) is caused by *Leishmania tropica*, identified on microscopy by amastigotes (LD bodies) with a nucleus and kinetoplast inside macrophages.

- Clinical feature: Painless ulcer with erythematous border ("oriental sore")
- Morphology (diagnostic):
 - o Amastigotes (LD bodies)
 - o Each shows:
 - § Nucleus
 - § Kinetoplast (rod-shaped mitochondrial DNA) -> key identifying feature
- Site in tissue: Found inside macrophages in skin biopsy

Why not others:

- o Babesia: intraerythrocytic parasite (Maltese cross)
- o Trypanosoma: extracellular flagellated forms (trypomastigotes)
- o Histoplasma: intracellular yeast but no kinetoplast

QUESTION

| Which of the following statements is true about *Trichomonas vaginalis*?

- A** It cannot be cultured
- B** Twitching motility is seen on wet saline mount CORRECT
- C** Cysts are seen on wet saline mount of vaginal secretions
- D** It is not a sexually transmitted infection

RIGHT ANSWER

- OK** **B. Twitching motility is seen on wet saline mount**

WHY THIS IS RIGHT

Trichomonas vaginalis is a flagellated protozoan causing a sexually transmitted infection, and is diagnosed by characteristic twitching (jerky) motility on wet saline mount.

- Morphology:
 - o Exists only as trophozoite (no cyst form)
 - o Has flagella -> responsible for twitching motility
- Diagnosis:
 - o Wet mount: motile organisms with jerky movement (classic finding)
 - o Culture and NAAT can also be used
- Clinical features:
 - o Frothy, foul-smelling vaginal discharge
 - o Vaginal itching, dysuria
 - o Strawberry cervix

Why not others:

- o Can be cultured -> so A is false
- o No cyst form -> C is false
- Sexually transmitted infection -> D is false

QUESTION

A peripheral blood smear shows sheathed microfilariae with two distinct terminal nuclei at the tail tip. Which organism does this morphology most likely represent?



A *Wuchereria bancrofti*

B *Brugia malayi*

CORRECT

C *Loa*

D *Onchocerca volvulus*

RIGHT ANSWER

OK

B. *Brugia malayi*

WHY THIS IS RIGHT

Brugia malayi is identified on peripheral blood smear by sheathed microfilariae with two distinct terminal nuclei at the tail tip, a key differentiating feature from other filarial parasites.

- Morphology:
 - o Sheathed microfilariae
 - o Two separate terminal nuclei at tail tip (diagnostic feature)
- Clinical relevance:
 - o Causes lymphatic filariasis (similar to *Wuchereria*)
 - o Leads to lymphedema, elephantiasis (less severe than *Wuchereria*)
- Diagnosis: Peripheral blood smear (often nocturnal periodicity)
- Treatment: Diethylcarbamazine (DEC)

Comparison with others:

- o *Wuchereria bancrofti*: sheathed, but no nuclei at tail tip
- o *Loa loa*: sheathed, nuclei extend continuously to tail tip (no gap)
- o *Onchocerca volvulus*: unsheathed microfilariae

QUESTION

An HIV-positive patient presented with complaints of diarrhea and foul-smelling stool. His stool microscopy did not show any ova or eggs, but there was the presence of motile 200 μm larva. Identify the organism.

A Ancylostoma duodenale

B Ascaris lumbricoides

C Schistosoma mansoni

D Strongyloides stercoralis

CORRECT

RIGHT ANSWER

OK

D. Strongyloides stercoralis

WHY THIS IS RIGHT

Strongyloides stercoralis is identified in stool by the presence of motile larvae (not eggs), especially in immunocompromised patients like those with HIV.

Key diagnostic clue:

- Motile larvae ($\sim 200 \mu\text{m}$) seen in stool
- Eggs are usually not seen because they hatch within the intestine

Key features:

- Causes diarrhea, abdominal pain, and malabsorption
- Foul-smelling stool due to intestinal involvement
- Unique ability for autoinfection $\rightarrow$ persistent infection
- Can lead to hyperinfection syndrome in immunocompromised patients
- Dissemination may involve lungs and other organs

Differentiation:

- Ancylostoma/Ascaris $\rightarrow$ eggs seen in stool
- Schistosoma $\rightarrow$ eggs with spines

QUESTION

Following images show the sample collected from a patient complaining of perianal itching. The diagnosis is:



A Ancylostoma

B Enterobius vermicularis

CORRECT

C H. Nana

D Necator americanus

RIGHT ANSWER

OK

B. Enterobius vermicularis

WHY THIS IS RIGHT

Enterobius vermicularis (pinworm) is the most common cause of perianal itching, especially in children, and is diagnosed by identifying planoconvex (D-shaped) eggs using the Scotch tape test.

- Nocturnal perianal itching (female worm migrates at night to lay eggs)
- Eggs are oval, asymmetrical (one flat side)
- Adult worm: small, thread-like

Diagnosis:

- Cellophane tape (Scotch tape) test -> early morning sample from perianal region
- Stool examination is usually not helpful

Transmission: Feco-oral route, autoinfection common (hand-to-mouth)

Why not others:

- Ancylostoma / Necator -> hookworms (cause anemia, not perianal itching)
- Hymenolepis nana -> dwarf tapeworm, different egg morphology

QUESTION

A patient presents with edema of the lower limbs. On examination, inguinal lymph nodes are palpable. A peripheral blood smear is shown below. Based on these findings, what is the most likely cause of the edema in this patient?



A Obstruction of lymphatic vessels

CORRECT

B Hypoproteinemia

C Hypoalbuminemia

D Hyponatremia

RIGHT ANSWER

OK

A. Obstruction of lymphatic vessels

WHY THIS IS RIGHT

Lymphatic filariasis (caused by *Wuchereria bancrofti*) leads to edema due to obstruction of lymphatic vessels.

- Microfilariae seen in peripheral blood smear
- Adult worms reside in lymphatic vessels
- Causes lymphatic obstruction -> lymphedema (e.g., elephantiasis)

Clinical clues:

- Lower limb swelling
- Inguinal lymphadenopathy
- Chronic progression to thickened skin

Pathogenesis:

- Inflammation and fibrosis of lymphatics
- Impaired lymph drainage -> accumulation of fluid

QUESTION

A 4-year-old child presents with diarrhea and intense nocturnal perianal itching. Her mother reports noticing white thread-like worms in the child's undergarments. A stool sample collected using the scotch tape method reveals D-shaped (planoconvex) eggs under microscopy. What is the most likely causative organism?



A Strongyloides stercoralis

B Enterobius vermicularis

CORRECT

C Hymenolepis nana

D Trichuris trichiura

RIGHT ANSWER

OK

B. Enterobius vermicularis

WHY THIS IS RIGHT

Enterobius vermicularis (pinworm) is characterized by nocturnal perianal itching and D-shaped (planoconvex) eggs detected by the Scotch tape test.

- Intense perianal itching, especially at night
- Female worm migrates to perianal region to lay eggs
- Eggs are planoconvex (D-shaped)

Diagnosis:

- Scotch tape (cellophane tape) test -> gold standard
- Stool examination is usually not helpful

Transmission:

- Feco-oral route
- Autoinfection common (hand-to-mouth transfer)

Management:

- Albendazole or mebendazole
- Treat all household contacts

Emphasize hygiene (nail trimming, handwashing)

QUESTION

Cholangiocarcinoma is associated with all of the following except?

- A** Opisthorchis
- B** Primary sclerosing cholangitis
- C** Caroli's disease

D Hepatitis B

CORRECT

RIGHT ANSWER

OK
D. Hepatitis B

WHY THIS IS RIGHT

Cholangiocarcinoma (bile duct cancer) is associated with chronic inflammation and biliary tract diseases.

Associated conditions:

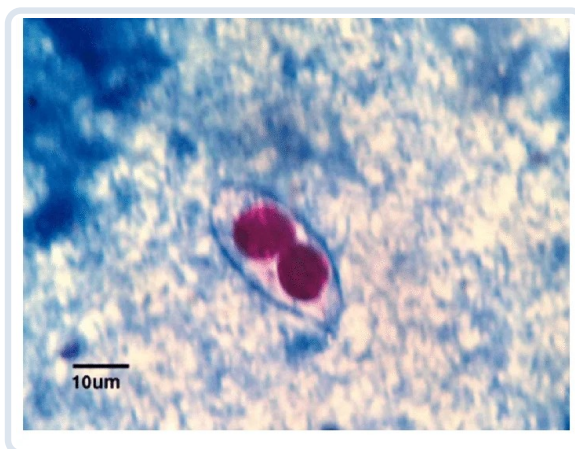
- Opisthorchis infection -> chronic biliary irritation -> strong risk factor
- Primary sclerosing cholangitis -> major predisposing condition
- Caroli's disease -> congenital bile duct dilatation -> increased risk

Not associated:

- Hepatitis B -> primarily associated with hepatocellular carcinoma, not cholangiocarcinoma

QUESTION

A 47-year-old renal transplant patient presented with watery diarrhea. Stool examination revealed oval cysts 30 x 15 microns as shown in the image below. Which among the following is the causative organism:



A Cryptosporidium

B Isospora

CORRECT

C Cyclospora

D Microsporidia

RIGHT ANSWER

OK

B. Isospora

WHY THIS IS RIGHT

An immunocompromised patient (renal transplant) with watery diarrhea and oval, acid-fast cysts measuring around 30 × 15 µm is characteristic of *Isospora belli* infection.

- *Isospora belli* produces large, oval, acid-fast oocysts in stool
- Commonly causes chronic watery diarrhea in immunocompromised patients (especially HIV/transplant)
- Transmitted via fecal-oral route
- Treatment: Cotrimoxazole

Differentiation:

- *Cryptosporidium* -> small, round oocysts (4-6 µm)
- *Cyclospora* -> spherical oocysts (8-10 µm)
- *Microsporidia* -> very small spores, require special stains

QUESTION

| Parthenogenesis is seen in which of the following worm?

A Trichuris trichura

B Strongyloides stercoralis

CORRECT

C Ancylostoma duodenale

D Enterobius vermicularis

RIGHT ANSWER

OK

B. Strongyloides stercoralis

WHY THIS IS RIGHT

Parthenogenesis refers to reproduction by females without fertilization.

Strongyloides stercoralis is the only intestinal helminth where parthenogenesis occurs in humans

Mechanism:

- Parasitic female worms in the intestinal mucosa produce eggs without male fertilization
- Eggs hatch into larvae within the intestine

Key points:

- Enables autoinfection and persistent infection
- Important cause of hyperinfection syndrome in immunocompromised patients
- Unique life cycle with both free-living and parasitic forms

Why not others: Trichuris, Ancylostoma, and Enterobius require male and female worms for reproduction

QUESTION

| Which of the following is best for the malaria species identification?

A Thin smear with Giemsa

CORRECT

B Thick smear with Giemsa

C Thin smear with acridine orange

D QBC (Quantitative Buffy Coat)

RIGHT ANSWER

OK

A. Thin smear with Giemsa

WHY THIS IS RIGHT

Peripheral smear examination remains the gold standard for malaria diagnosis and species identification.

- Thin smear with Giemsa stain is best for species identification
- Preserves morphology of RBCs and parasites
- Helps differentiate Plasmodium species (falciparum, vivax, ovale, malariae)
- Thick smear with Giemsa is more sensitive for detection of parasites
- Used for screening when parasitemia is low
- QBC and acridine orange are rapid methods but less reliable for species differentiation

QUESTION

| Which of the following drugs is not used for uncomplicated malaria?

A Sulfadoxine - pyrimethamine

B Chloroquine

C Primaquine

D **Artemether**

CORRECT

RIGHT ANSWER

OK

D. Artemether

WHY THIS IS RIGHT

Uncomplicated malaria is treated with oral antimalarial drugs targeting blood-stage parasites.

Drugs used in uncomplicated malaria:

- Chloroquine -> for chloroquine-sensitive malaria (e.g., *P. vivax*)
- Sulfadoxine-pyrimethamine -> used as partner drug in ACT
- Primaquine -> added for radical cure (*P. vivax/ovale*) and gametocyte clearance

Not used alone for uncomplicated malaria:

- Artemether -> used as part of injectable therapy (e.g., severe malaria) or in ACT combinations, not as monotherapy because it leads to resistance. Severe malaria requires parenteral therapy (artesunate/artemether)

QUESTION

| DOC for fasciola hepatica:

A Triclabendazole

CORRECT

B Albendazole**C** Mebendazole**D** Praziquantel

RIGHT ANSWER

OK

A. Triclabendazole

WHY THIS IS RIGHT

Triclabendazole is the drug of choice for treating *Fasciola hepatica* (liver fluke) infections.

| Drug | Primary Uses |

| --- | ----- |

| Albendazole | Broad-spectrum: *Neurocysticercosis*, hydatid disease, ascariasis, hookworm, trichuriasis, strongyloidiasis (with ivermectin). |

| Mebendazole | Intestinal nematodes: *Enterobius*, *Ascaris*, *Trichuris*, hookworm. Less systemic absorption than albendazole. |

| Praziquantel | Most trematodes except *Fasciola* (e.g., *Schistosoma*) and all cestodes (*Taenia*, *Diphyllobothrium*). Excellent for neurocysticercosis (with steroids). |

| Triclabendazole | *Fasciola hepatica* and **Fasciola gigantica** (adult + immature flukes). |

QUESTION

| Which of the following options is wrong about *ascaris lumbricoides*?

A Heavy infection is associated with Rectal prolapse

CORRECT

B Most infections are asymptomatic

C Fertilised unembryonated egg takes time to infect after it goes in soil

D Can spread to lungs and cause Asthma like symptoms

RIGHT ANSWER

OK

A. Heavy infection is associated with Rectal prolapse

WHY THIS IS RIGHT

Understanding the clinical features and life cycle of *Ascaris lumbricoides* helps identify incorrect statements.

Correct concepts:

- Most infections are asymptomatic
- Fertilized eggs passed in stool are unembryonated and require time in soil to become infective
- Larval migration through lungs can cause cough, wheeze, and eosinophilia (Loeffler syndrome)
- Heavy infection may cause intestinal obstruction, especially in children
- Pulmonary phase causes transient respiratory symptoms

Incorrect statement:

- Rectal prolapse is not associated with *Ascaris*; it is classically seen in *Trichuris trichiura* (whipworm) infection

QUESTION

Which of the following antimalarial drugs are commonly used for the clinical cure of malaria?

- a. Artemisinin
- b. Sulfadoxine-pyrimethamine
- c. Chloroquine
- d. Primaquine

A a, b, c

CORRECT

B a, b, d

C a, c, d

D b, c, d

RIGHT ANSWER

OK A. a, b, c

WHY THIS IS RIGHT

Clinical cure of malaria refers to clearance of asexual erythrocytic forms responsible for symptoms.

Drugs used for clinical cure:

- Artemisinin (and ACTs) -> rapidly clears parasitemia
- Sulfadoxine-pyrimethamine -> inhibits folate synthesis in parasites
- Chloroquine -> effective against sensitive strains

Not used for clinical cure:

- Primaquine -> acts on hepatic hypnozoites and gametocytes (used for radical cure and transmission blocking, not for treating acute blood-stage infection)

QUESTION

I All of the following statements regarding *Toxoplasma gondii* are true, except:

A Transmitted more in third trimester than first

B Releases cysts in stool that are immediately infective

CORRECT

C Can be grown in peritoneum of mice

D Infects most mammals and birds

RIGHT ANSWER

OK B. Releases cysts in stool that are immediately infective

WHY THIS IS RIGHT

Understanding transmission and life cycle of *Toxoplasma gondii* is essential.

Correct concepts:

- Transmission risk to fetus increases in the third trimester, but severity is higher when infection occurs in the first trimester
- It can be grown in the peritoneum of mice (used in laboratory diagnosis)
- It infects a wide range of mammals and birds (definitive host: cat)

Incorrect statement:

- Oocysts passed in cat feces are not immediately infective; they require 1-5 days in the environment to sporulate and become infective

QUESTION

Which of the following helminths is known to maintain its life cycle through autoinfection?

A Strongyloides stercoralis

CORRECT

B Ancylostoma duodenale

C Ascaris lumbricoides

D H. nana

RIGHT ANSWER

OK A. Strongyloides stercoralis

WHY THIS IS RIGHT

Strongyloides stercoralis maintains its life cycle through autoinfection where rhabditiform larvae mature to filariform larvae within the host and penetrate intestinal or perianal mucosa, causing persistent infection especially dangerous in immunocompromised patients.

Organisms causing autoinfection can be remembered as :-

C - Cryptosporidium

H - Hymenolepis nana

E - Enterobius vermicularis

S - Strongyloides stercoralis

T - Taenia solium (via self-ingestion of eggs -> cysticercosis)

Hymenolepis nana can also show autoinfection, but Strongyloides is the most characteristic and clinically significant example

QUESTION

Which protozoa have more than 2 morphological forms?

1. Naegleria
2. Acanthamoeba
3. Trichomonas
4. Giardia

A 1, 2 & 3

B 1, 2 & 4

CORRECT

C 3, 2 & 4

D 1 & 2 only

RIGHT ANSWER

OK

B. 1, 2 & 4

WHY THIS IS RIGHT

Protozoa can exist in different morphological forms such as trophozoite, cyst, and in some cases additional stages.

- Organisms with more than two forms include:
- Naegleria -> trophozoite, cyst, and flagellated form
- Acanthamoeba -> trophozoite and cyst (distinct double-walled cyst; functionally considered multiple adaptive forms)
- Giardia -> trophozoite and cyst
- Trichomonas has only a trophozoite form (no cyst stage)

Key points:

- Presence of multiple forms helps in survival and transmission
- Cyst form is usually the infective stage (except Naegleria, where trophozoite is infective)
- Trichomonas spreads via direct transmission as it lacks a cyst form

QUESTION

A child presented with intense perianal itching. Mother complains of seeing thread like worms in the perianal area. Scotch tape method was used to collect sample and showed these eggs in stool. Identify the organism?



A Ascaris lumbricoides

B Enterobius vermicularis

CORRECT

C Hymenolepis nana

D Hookworm

RIGHT ANSWER

OK

B. Enterobius vermicularis

WHY THIS IS RIGHT

Perianal itching in a child with thread-like worms and eggs detected by the Scotch tape test is characteristic of Enterobius vermicularis infection (pinworm).

- Female worms migrate at night to lay eggs in the perianal region -> intense nocturnal itching
- Diagnosis is best made by Scotch tape test (eggs rarely seen in stool)
- Eggs are oval, asymmetrical, and flattened on one side (planoconvex)
- Common in children and spreads via fecal-oral route (autoinfection)

Clinical relevance:

- Causes disturbed sleep and irritability
- May lead to secondary bacterial infection due to scratching

Treatment:

- Albendazole or mebendazole
- Treat all household contacts and maintain hygiene

QUESTION

Match the following types of larval migrations with their causative organisms:

Column A – Larval Migration Types	Column B – Organisms
A. Cutaneous larva migrans	1. <i>Strongyloides stercoralis</i>
B. Visceral larva migrans	2. <i>Toxocara canis</i>
C. Larva currens	3. <i>Ancylostoma braziliense</i>
D. Swimmer's itch	4. <i>Schistosoma cercariae</i>

A A-2, B-3, C-1, D-4

B A-1, B-4, C-3, D-2

C A-4, B-1, C-2, D-3

D A-3, B-2, C-1, D-4

CORRECT

RIGHT ANSWER

OK D. A-3, B-2, C-1, D-4

WHY THIS IS RIGHT

Larval migration syndromes are classified based on the site and pattern of larval movement in humans.

- Cutaneous larva migrans -> caused by *Ancylostoma braziliense*

Presents as serpiginous, itchy tracks in the skin due to larvae migrating within epidermis

- Visceral larva migrans -> caused by *Toxocara canis*

Larvae migrate through internal organs (liver, lungs), causing eosinophilia and organ damage

- Larva currens -> caused by *Strongyloides stercoralis*

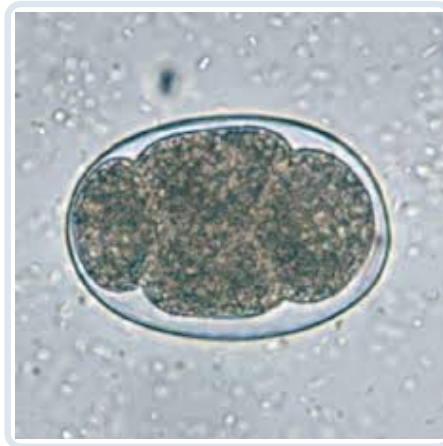
Rapidly moving, linear urticarial tracks due to autoinfection

- Swimmer's itch -> caused by *Schistosoma cercariae*

Cercariae penetrate skin causing pruritic papular rash without completing lifecycle in humans

QUESTION

Identify the egg.



A *Necator americanus*

CORRECT

B *Taenia solium*

C *Ascaris*

D *Hymenolepis nana*

RIGHT ANSWER

OK **A. *Necator americanus***

WHY THIS IS RIGHT

Hookworm eggs (*Necator americanus* / *Ancylostoma duodenale*) are identified by their characteristic morphology in stool microscopy.

- Oval or elliptical egg with a thin, transparent shell
- Contains segmented ovum (4-8 blastomeres, morula stage)
- Clear space between embryo and shell
- Eggs of *Necator* and *Ancylostoma* are morphologically indistinguishable

Clinical relevance:

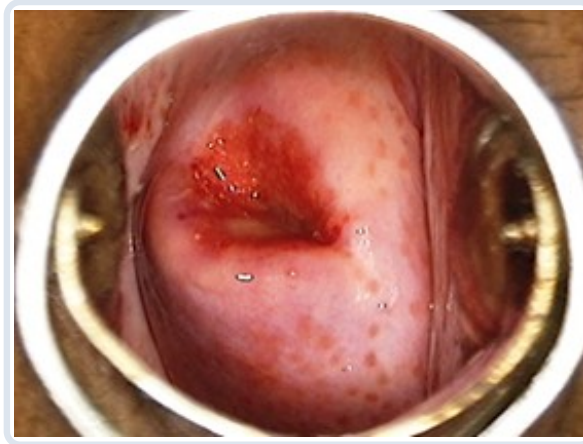
- Cause iron deficiency anemia due to chronic intestinal blood loss
- Infection occurs via skin penetration by filariform larvae

Differentiation:

- *Taenia* eggs: thick, radially striated shell
- *Ascaris* eggs: thick mammillated coat
- *Hymenolepis nana*: polar filaments present

QUESTION

| What is the most likely diagnosis on the colposcopic image?



A Candida albicans infection

B Trichomonas vaginalis infection

CORRECT

C Bacterial vaginosis

D Neisseria gonorrhoeae infection

RIGHT ANSWER

OK B. Trichomonas vaginalis infection

WHY THIS IS RIGHT

A colposcopic finding of multiple punctate hemorrhages on an erythematous cervix, described as "strawberry cervix," is characteristic of *Trichomonas vaginalis* infection.

- Strawberry cervix is due to subepithelial punctate hemorrhages
- Associated with frothy, yellow-green, foul-smelling vaginal discharge
- Diagnosis: motile trophozoites on wet mount microscopy
- Treatment: metronidazole with simultaneous partner treatment

Why not others:

- Candida causes curdy white discharge without cervical hemorrhages
- Bacterial vaginosis shows thin discharge with minimal inflammation
- Gonorrhea causes purulent cervicitis, not punctate hemorrhages

QUESTION

A patient presents with chronic cough and hemoptysis. Chest X-ray shows ring-shaped opacities in the lung field. CT scan reveals cystic lesions. Sputum examination shows operculated eggs. Which of the following is the drug of choice for this condition?

A Ivermectin

B Diethylcarbamazine

C Praziquantel

CORRECT

D Albendazole

RIGHT ANSWER

OK C. Praziquantel

WHY THIS IS RIGHT

Caused by *Paragonimus westermani*

-> Acquired by eating undercooked crab/crayfish

-> Adults lodge in lungs

Clinical features:

- Chronic cough + hemoptysis (mimics tuberculosis)
- Imaging: ring-shaped opacities / cystic lung lesions
- Sputum: operculated eggs (key diagnostic clue)

Drug of choice: Praziquantel -> treatment for most trematode (fluke) infections

Why not others:

- Ivermectin -> nematodes (e.g., *Strongyloides*)
- Diethylcarbamazine -> filariasis
- Albendazole -> many helminths but not DOC for *Paragonimus*

QUESTION

A patient from a filariasis-endemic region presents with features suggestive of lymphatic filariasis. Peripheral blood examination fails to demonstrate microfilariae. Which of the following is the most likely site where the organisms may be located?

A Liver

B Lung

CORRECT

C Spleen

D Skeletal muscle

RIGHT ANSWER

OK B. Lung

WHY THIS IS RIGHT

Lymphatic filariasis caused by *Wuchereria bancrofti* shows a distinct periodicity in the circulation of microfilariae.

Key concept: Nocturnal periodicity

- Microfilariae are not constantly present in peripheral blood
- They show nocturnal periodicity:
- Present in peripheral blood at night (10 pm - 4 am)
- Absent during daytime

Where do they go during the day?

During daytime, microfilariae sequester in deep vascular beds, especially: Pulmonary circulation (lungs) □

Why lungs?

- Thought to be due to:
- Oxygen tension differences
- Host circadian rhythm
- Adaptation to mosquito feeding habits (night-biting vectors)

Clinical implication

- If blood smear is negative during daytime:
- Repeat at night
- Or use DEC provocation test

QUESTION

A 22-year-old man comes with complaints of intermittent bloody diarrhea for 3 weeks after consuming street food during his travel. He is febrile and has RUQ tenderness. Which of the following is the infective form of the likely protozoan causing this disease?

A Trophozoite

B Mature quadrinucleate cyst

CORRECT

C Metacyclic trophozoite

D Precyst

RIGHT ANSWER

OK B. Mature quadrinucleate cyst

WHY THIS IS RIGHT

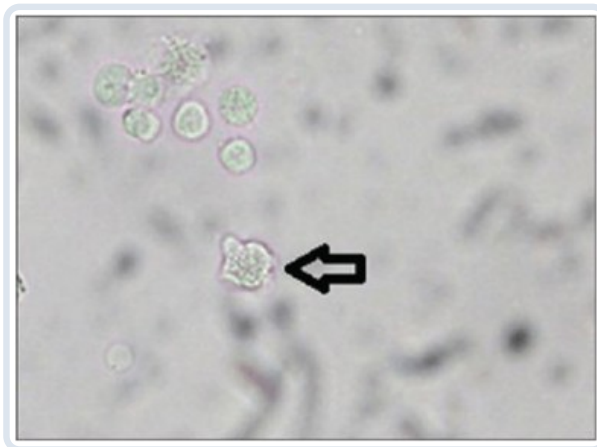
Entamoeba histolytica is transmitted through the fecal-oral route by ingestion of mature cysts in contaminated food or water, commonly from street food or poor sanitation.

Key life-cycle forms

- Mature quadrinucleate cyst
 - o Infective stage
 - o Resistant to gastric acid
 - o Transmitted via contaminated food or water
- Trophozoite
 - o Invasive and pathogenic form
 - o Causes amoebic dysentery and may spread via the portal circulation to produce liver abscess (explaining RUQ tenderness)
- Precyst
 - o Transitional stage during encystation

QUESTION

A 12-year-old boy develops a severe headache, fever, and stiff neck after swimming in a poorly maintained freshwater lake. He rapidly progresses to seizures and altered mental status. CSF examination is shown below. What is the infective form of the organism?



- A Cyst form
- B Sporozoite form
- C Amoeboid form
- D Flagellate form

CORRECT

RIGHT ANSWER

OK C. Amoeboid form

WHY THIS IS RIGHT

Primary amoebic meningoencephalitis (PAM) is a rapidly fatal CNS infection caused by *Naegleria fowleri*, a free-living amoeba found in warm freshwater (lakes, ponds, poorly chlorinated pools).

- Infection occurs when contaminated water enters the nose during swimming.
- The organism migrates through the olfactory nerve -> cribriform plate -> brain.
- Causes acute meningitis-like illness with severe headache, fever, neck stiffness, seizures, and rapid neurological deterioration.

Forms of *Naegleria*

1. Trophozoite (amoeboid form) - infective and tissue-invasive stage found in CSF and brain.
2. Flagellate form - temporary motile form in water.
3. Cyst form - environmental survival stage (not found in human tissue).

QUESTION

A young man presents with skin lesions as shown in the image below. All of the following organisms can spread through dermal and subcutaneous lymphatics, except?



- A Sporothrix schenckii
- B Staphylococcus aureus**
- C Nocardia asteroides
- D Mycobacterium marinum

CORRECT

RIGHT ANSWER

- OK
- B. Staphylococcus aureus**

WHY THIS IS RIGHT

The image shows nodular skin lesions arranged linearly along lymphatic channels, a pattern known as sporotrichoid spread (ascending lymphangitis).

Organisms that commonly spread through dermal and subcutaneous lymphatics (sporotrichoid pattern):

- *Sporothrix schenckii* - classic cause ("rose gardener's disease")
- *Nocardia asteroides* / *Nocardia brasiliensis* - cutaneous nocardiosis
- *Mycobacterium marinum* - "swimming pool or fish tank granuloma"

Why *Staphylococcus aureus* is the exception:

- *Staphylococcus aureus* usually causes localized skin infections such as abscesses, cellulitis, or furuncles. It does not typically produce a sporotrichoid lymphangitic spread pattern.

QUESTION

| What is the intermediate host for the organism shown in the image below?



A Vegetables

B Pig

C Cattle

D No intermediate host

CORRECT

RIGHT ANSWER

OK D. No intermediate host

WHY THIS IS RIGHT

Ascaris lumbricoides is a large intestinal roundworm (nematode) that infects humans through ingestion of embryonated eggs from contaminated food, water, or soil.

Key life-cycle points:

- Humans are the only definitive host.
- Infection occurs by fecal-oral transmission (contaminated vegetables or soil).
- Eggs hatch in the intestine -> larvae migrate intestine -> bloodstream -> lungs -> trachea -> swallowed back to intestine, where they mature into adult worms.
- No intermediate host is required for completion of the life cycle.

QUESTION

| \$1b

A Ascariasis**B** Dengue fever**C** Trichinellosis

CORRECT

D Infective endocarditis

RIGHT ANSWER

OK

C. Trichinellosis

WHY THIS IS RIGHT

Trichinellosis is a parasitic infection caused by ingestion of undercooked pork or wild game containing *Trichinella* larvae. The disease typically occurs in two phases:

1\ Intestinal phase (≈1 week after ingestion)

- Abdominal pain
- Nausea, vomiting
- Diarrhea

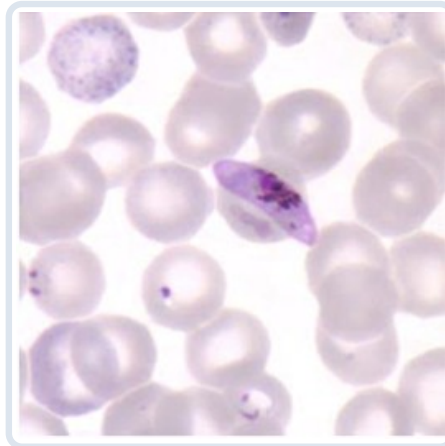
2\ Muscle invasion phase (1-3 weeks later)

Larvae migrate to skeletal muscle, producing:

- Fever
- Severe myalgia (especially jaw, neck, and extraocular muscles)
- Periorbital edema and chemosis (very characteristic finding)
- Eosinophilia
- Elevated creatine kinase (CK) due to muscle inflammation
- Possible splinter hemorrhages

QUESTION

Identify the organism?



A *P. falciparum*

CORRECT

B *P. vivax*

C *P. Knowlesi*

D *P. Malariae*

RIGHT ANSWER

OK A. *P. falciparum*

WHY THIS IS RIGHT

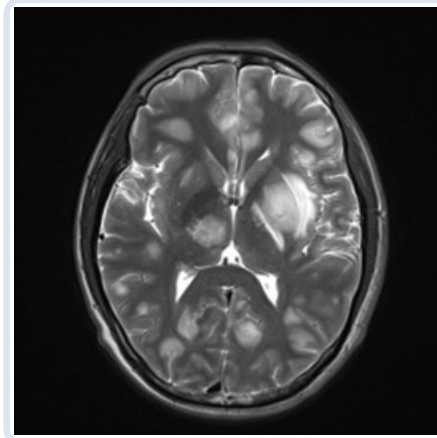
Plasmodium falciparum on peripheral blood smear characteristically shows crescent- or banana-shaped gametocytes. Infected red blood cells usually remain normal in size and may contain multiple delicate ring forms within a single RBC. These distinctive crescent gametocytes help differentiate *P. falciparum* from other *Plasmodium* species and are associated with the most severe form of malaria due to high parasitemia and microvascular sequestration.

Why not other options:

- B. *Plasmodium vivax* - RBCs enlarged, Schuffner dots, round gametocytes.
- C. *Plasmodium knowlesi* - Band forms similar to *P. malariae*, no crescent gametocytes.
- D. *Plasmodium malariae* - Band trophozoites and rosette schizonts, round gametocytes.

QUESTION

28-year-old man comes to the office due to abnormal movements of his arm and face over the last week. The patient has had 1- to 2-minute episodes of jerking and twitching of the left arm and left side of the face. The patient was recently diagnosed with HIV and started antiretroviral therapy 2 months ago. At that time, his CD4 count was 46./mm³. Temperature is 37.8 C (100 F), blood pressure is 124/82 mm Hg, and pulse is 76/min. Left arm motor strength is 4/5, and deep tendon reflexes are 3+. An MRI of the brain is shown below. Which of the following is the most appropriate treatment for this patient?



- A Albendazole
- B Amphotericin B and flucytosine
- C Ganciclovir
- D Sulfadiazine and pyrimethamine**

CORRECT

RIGHT ANSWER

- OK D. Sulfadiazine and pyrimethamine**

WHY THIS IS RIGHT

Cerebral toxoplasmosis is the most common cause of focal brain lesions in patients with advanced HIV (CD4 <100 cells/mm³). It typically presents with focal neurologic deficits, seizures, headache, and fever, and brain MRI shows multiple ring-enhancing lesions, often in the basal ganglia or corticomedullary junction.

The first-line therapy is pyrimethamine + sulfadiazine + leucovorin (folinic acid).

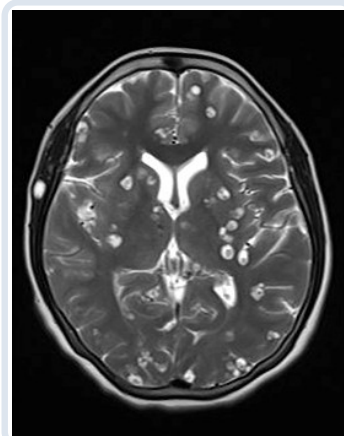
- Pyrimethamine -> inhibits protozoal dihydrofolate reductase
- Sulfadiazine -> inhibits dihydropteroate synthase
- Leucovorin -> prevents bone marrow suppression from pyrimethamine

Why not other options:

- Albendazole: Used for neurocysticercosis (*Taenia solium*).
- Amphotericin B + flucytosine: For cryptococcal meningitis.
- Ganciclovir: For CMV infections.

QUESTION

A 46-year-old man is brought to the emergency department due to a generalized tonic-clonic seizure. He is an agricultural scientist and recently spent 3 months with rural pig farmers. Temperature is 36.8 C (98.2 F), blood pressure is 120/70 mm Hg, and pulse is 86/min. Electroencephalogram shows epileptiform activity. MRI of the brain is shown. A rapid HIV test is negative. Which of the following is the most likely cause of this patient's current condition?



- A** Abnormal protein in an infected animal brain
- B** Infectious oocysts in feline feces
- C** Neurotropic virus acquired from an infected animal bite
- D** Parasite eggs in contaminated food or water

CORRECT

RIGHT ANSWER

OK

D. Parasite eggs in contaminated food or water

WHY THIS IS RIGHT

Multiple cystic lesions in the brain with seizures in a patient exposed to pigs suggests neurocysticercosis, caused by the larval stage of *Taenia solium*.

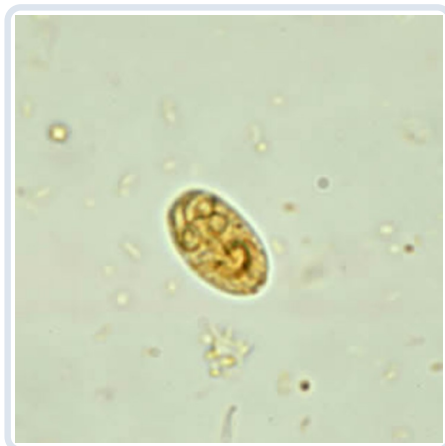
Humans acquire this infection by ingesting parasite eggs in contaminated food or water. The larvae migrate to tissues and form cysticerci in the brain, leading to seizures and multiple ring-enhancing lesions on imaging.

Why not other options:

- Abnormal protein in animal brain: Prion disease -> dementia, not cysts.
- Oocysts in feline feces: *Toxoplasma* -> mainly in immunocompromised.
- Neurotropic virus bite: Rabies -> encephalitis, not cysts.

QUESTION

A 19-year-old man comes to the physician due to diarrhea for the last 4 months. He visited a student health clinic at his university a month ago and was prescribed a course of antibiotics, but his diarrhea failed to improve. He also has persistent nausea, a bloating sensation, and a 6.8-kg weight loss. Microscopic examination of his stool is shown in the image. Impairment of which of the following immune functions would most likely predispose to this patient's infection?



- A** Bacterial killing by neutrophils
- B** CD8+ T lymphocyte-mediated cytotoxicity
- C** Eosinophil-mediated cytotoxicity

D Secretory IgA production

CORRECT

RIGHT ANSWER

OK

D. Secretory IgA production

WHY THIS IS RIGHT

The stool image and symptoms (chronic diarrhea, bloating, weight loss) are consistent with *Giardia lamblia* infection. *Giardia* attaches to the intestinal mucosa of the small intestine and causes malabsorption and chronic diarrhea.

Protection against *Giardia* primarily depends on mucosal immunity, especially secretory IgA, which prevents the parasite from attaching to intestinal epithelial cells. Therefore, IgA deficiency predisposes to recurrent or chronic giardiasis.

QUESTION

A 54-year-old male is evaluated for several months of intermittent dysuria and gross hematuria. The patient notes that he passes blood at the end of urination but has no associated pain. Cystoscopy reveals erythematous areas in the bladder mucosa. Multiple biopsies are taken from the affected sites; histopathological findings are shown in the image below.

Which of the following most likely predisposed this patient to his current condition?



A Chronic urinary tract obstruction

B Contaminated water exposure

CORRECT

C Cytotoxic immunosuppressant use

D Extensive cigarette smoking

RIGHT ANSWER

OK

B. Contaminated water exposure

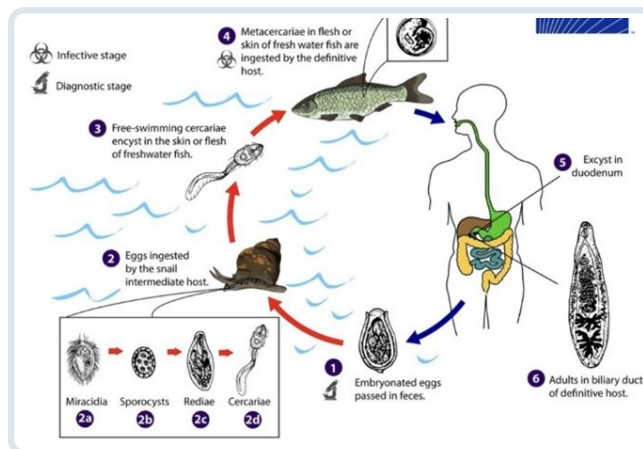
WHY THIS IS RIGHT

Schistosoma haematobium infection is associated with terminal hematuria and chronic granulomatous inflammation of the bladder wall due to deposition of parasite eggs. Long-standing infection leads to squamous cell carcinoma of the bladder.

Humans acquire infection through contact with freshwater contaminated with cercariae released from infected snails.

QUESTION

The organism whose life cycle is shown below is associated with which of the following malignancies?



A HCC

B Cholangiocarcinoma

CORRECT

C Gastric carcinoma

D Bladder carcinoma

RIGHT ANSWER

OK

B. Cholangiocarcinoma

WHY THIS IS RIGHT

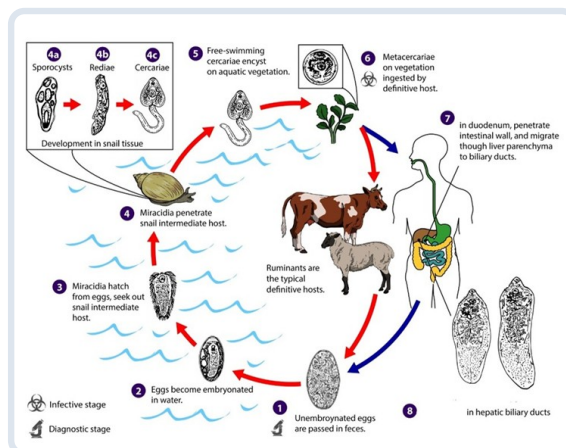
The life cycle shown (snail → freshwater fish → human ingestion → adults in biliary ducts) is characteristic of *Clonorchis sinensis* / *Opisthorchis* species, the Chinese liver flukes.

Humans acquire infection by eating raw or undercooked freshwater fish containing metacercariae. The adult worms inhabit the biliary tree, causing chronic inflammation and biliary epithelial hyperplasia.

Chronic infection with liver flukes (*Clonorchis sinensis* / *Opisthorchis*) is strongly associated with cholangiocarcinoma.

QUESTION

Identify the organism from the life cycle:



A *Fasciola hepatica*

CORRECT

B *Fasciolopsis buski*

C *Paragonimus westermani*

D *Clonorchis sinensis*

RIGHT ANSWER

OK

A. *Fasciola hepatica*

WHY THIS IS RIGHT

Fasciola hepatica (liver fluke) infects humans by ingestion of metacercariae encysted on aquatic vegetation (e.g., watercress).

- Snail acts as the intermediate host.
- Cercariae encyst on aquatic plants -> metacercariae (infective stage).
- Humans or ruminants (sheep/cattle) ingest contaminated vegetation.
- Larvae penetrate the intestinal wall, migrate through the liver parenchyma, and mature in the biliary ducts.
- Eggs are passed in feces (diagnostic stage).

Why not other options:

- *Fasciolopsis buski*: Intestinal fluke; adults live in the small intestine, not the biliary ducts.
- *Paragonimus westermani*: Lung fluke; infection from raw/undercooked crab or crayfish, adults reside in the lungs.
- *Clonorchis sinensis*: Liver fluke but infection occurs by eating raw freshwater fish, not aquatic vegetation.

QUESTION

Match the following:

PARASITE	ORGAN OF LOCOMOTION
A. BALAMUTHIA MANDRILLARIS	1. FLAGELLA
B. BALANTIDIUM COLI	2. CILIA
C. TRICHOMONAS VAGINALIS	3. PSUEDOPOD
D. TOXOPLASMA GONDII	4. NO PARTICULAR ORGAN

A A-2, B-1, C-3, D-4

B A-3, B-2, C-1, D-4

CORRECT

C A-4, B-1, C-2, D-3

D A-1, B-2, C-4, D-3

RIGHT ANSWER

OK B. A-3, B-2, C-1, D-4

WHY THIS IS RIGHT

Protozoa are classified based on their organ of locomotion:

- Balamuthia mandrillaris - moves by pseudopodia (amoeboid movement).
- Balantidium coli - the only pathogenic ciliate protozoa, moves by cilia.
- Trichomonas vaginalis - a flagellated protozoa, moves by flagella.
- Toxoplasma gondii - an apicomplexan protozoa with no specialized locomotory organ.

Key Point:

- Pseudopod -> Amoebae (e.g., Balamuthia)
- Cilia -> Balantidium coli
- Flagella -> Trichomonas vaginalis
- No locomotory organ -> Apicomplexa (e.g., Toxoplasma gondii).

QUESTION

| Identify the incorrect pair

A Calabar swellings: Chrysops

B River blindness: Deerfly

CORRECT

C Sleeping sickness: Tse tse fly

D Chagas disease: Reduvid bug

RIGHT ANSWER

OK

B. River blindness: Deerfly

WHY THIS IS RIGHT

River blindness (onchocerciasis) is caused by *Onchocerca volvulus* and is transmitted by the blackfly (*Simulium*), which breeds near fast-flowing rivers.

Therefore, the pair "River blindness: Deerfly" is incorrect because deerfly (*Chrysops*) transmits *Loa loa*, which causes loiasis and produces Calabar swellings.

Key Point:

- Blackfly (*Simulium*) -> Onchocerciasis (River blindness)
- Deerfly (*Chrysops*) -> *Loa loa* (Calabar swellings)
- Tsetse fly -> African sleeping sickness
- Reduviid bug -> Chagas disease.

QUESTION

A 21-year-old man, known case of HIV AIDS, comes to the OPD due to fever, malaise, myalgia, and nonproductive cough. Temperature is 38.3° C (100.9° F), blood pressure is 120/70 mm Hg, pulse is 96/min, and respirations are 16/min. Physical examination reveals lung crackles. Chest x-ray shows patchy parenchymal infiltrates with enlarged mediastinal and hilar lymph nodes. Which of the following is most likely to be present in this patient's pulmonary lesions?

- A Budding yeasts with a thick capsule
- B Macrophages with intracellular small yeasts**
- C Round spherules with multiple endospores
- D Septate hyphae with dichotomous branching

CORRECT

RIGHT ANSWER

- B. Macrophages with intracellular small yeasts**

WHY THIS IS RIGHT

Histoplasma capsulatum infection is common in immunocompromised patients (e.g., AIDS) and causes pulmonary infection with fever, cough, and mediastinal/hilar lymphadenopathy.

The organism is a dimorphic fungus that appears in tissue as small intracellular yeasts within macrophages.

Why not other options:

- A. Budding yeasts with a thick capsule: Seen in *Cryptococcus neoformans*, which causes meningitis in AIDS.
- C. Round spherules with multiple endospores: Seen in *Coccidioides immitis*.
- D. Septate hyphae with dichotomous branching: Seen in *Aspergillus* species.

QUESTION

A patient presents with itching of the skin of the leg. Examination is shown below. The causative organism is suspected to be linked to blackflies. What is the likely causative organism?



- A** Loa loa
- B** Leishmania donovani
- C** Wuchereria bancrofti

D *Onchocerca volvulus*

CORRECT

RIGHT ANSWER

OK

D. *Onchocerca volvulus*

WHY THIS IS RIGHT

Onchocerca volvulus causes onchocerciasis, a filarial infection transmitted by the blackfly (*Simulium*) that breeds near fast-flowing rivers. The infection leads to microfilariae migrating through the skin, which causes:

- Severe pruritus
- Papular dermatitis
- Subcutaneous nodules (onchocercomas)
- Depigmented “leopard skin” appearance of the legs

Chronic infection can also involve the eyes, leading to river blindness.

Why not other options:

- *Loa loa*: Causes Calabar swellings and migration of the worm across the eye; no leopard-skin depigmentation.
- *Leishmania donovani*: Causes visceral leishmaniasis (kala-azar) with fever and hepatosplenomegaly, not pruritic skin lesions.
- *Wuchereria bancrofti*: Causes lymphatic filariasis with elephantiasis, not depigmented pruritic skin lesions.

QUESTION

Which of the following is the most likely cause of this patient's condition?



- A Brown recluse spider bite
- B Hookworm infection
- C Mycobacterium marinum infection
- D Sporothrix schenckii infection

CORRECT

RIGHT ANSWER

- OK B. Hookworm infection

WHY THIS IS RIGHT

Cutaneous larva migrans is caused by skin penetration of dog or cat hookworm larvae (usually *Ancylostoma braziliense*), producing serpiginous, erythematous, intensely pruritic tracks ("creeping eruption") on the skin, commonly on the feet or buttocks after contact with contaminated sand or soil.

QUESTION

A 38-year-old patient presents with dry nocturnal cough, dyspnea, and wheezing. Blood tests show marked eosinophilia and elevated IgE, with no microfilaria in the blood. A chest X-ray reveals mottled shadows. The patient has a history of travel to endemic areas. What is the most likely diagnosis?

- A Loeffler's syndrome
- B Miliary tuberculosis
- C Weingarten's Syndrome**
- D Chronic eosinophilic pneumonia

CORRECT

RIGHT ANSWER

- OK C. Weingarten's Syndrome**

WHY THIS IS RIGHT

Tropical pulmonary eosinophilia (Weingarten's syndrome) is a hypersensitivity reaction to filarial parasites, mainly *Wuchereria bancrofti* and *Brugia malayi*.

- Paroxysmal nocturnal cough
- Dyspnea and wheezing
- Marked peripheral eosinophilia
- Elevated IgE levels
- Chest X-ray showing diffuse or mottled pulmonary infiltrates
- Microfilariae usually absent in peripheral blood
- Caused by immune hypersensitivity to trapped microfilariae in pulmonary tissues.

Why not other options:

- Loeffler's syndrome: Transient pulmonary eosinophilia due to helminth larval migration (e.g., *Ascaris*); mild, self-limiting, not marked IgE elevation with nocturnal cough.
- Miliary tuberculosis: Causes diffuse millet-seed nodules on X-ray, no eosinophilia or high IgE.
- Chronic eosinophilic pneumonia: Causes peripheral lung infiltrates ("photographic negative of pulmonary edema"), not linked to filarial exposure.

QUESTION

A 26-year-old pregnant woman in her second trimester presents with eye pain, photophobia, and headache. Fundoscopy reveals a fluffy white lesion and optic disc swelling. To rule out toxoplasmosis, her physician orders a serological test. Which of the following tests is the gold standard for diagnosis of toxoplasmosis?

- A Animal inoculation of amniotic fluid
- B Elisa using maternal serum to detect IgG and IgM
- C Sabin - Feldman dye test**
- D PCR of amniotic fluid for toxoplasma DNA

CORRECT

RIGHT ANSWER

- OK
- C. Sabin - Feldman dye test**

WHY THIS IS RIGHT

The Sabin-Feldman dye test is the gold standard serological test for toxoplasmosis.

- Detects *Toxoplasma gondii*-specific IgG antibodies.
- Patient serum is mixed with live tachyzoites, complement, and methylene blue dye.
- If antibodies are present, tachyzoites are lysed and do not take up the dye (dye exclusion).
- Extremely sensitive and specific for detecting *Toxoplasma* antibodies.
- Used as the reference test in many laboratories

Why not other options:

- Animal inoculation of amniotic fluid: Historical research method; not used routinely for diagnosis.
- ELISA (IgG, IgM): Common screening test, but not the gold standard.
- PCR of amniotic fluid: Useful for detecting fetal infection, especially in pregnancy, but not the reference serological test.

QUESTION

A 40-year-old male presents to the emergency department with a high fever, chills, and dark-coloured urine. He recently returned from a trip to a malaria-endemic region in West Africa and self-treated with antimalarial medication. On examination, he is febrile (39.5°C), tachycardic, and has jaundice. Laboratory investigations show:

- Hemoglobin: 8 g/dL
- LDH: Elevated
- Urinalysis: Dark brown urine, positive for haemoglobin.
- Total Bilirubin: 4 mg/dL.

Which of the following best explains the diagnosis?

A Benign malaria

B Septicemic malaria

C Algid malaria

D Blackwater fever

CORRECT

RIGHT ANSWER

OK D. Blackwater fever

WHY THIS IS RIGHT

Blackwater fever is a severe complication of *Plasmodium falciparum* malaria characterized by massive intravascular hemolysis.

- High fever and chills
- Severe hemolytic anemia (↓ hemoglobin)
- Hemoglobinuria -> dark "blackwater" urine
- Jaundice and elevated bilirubin
- Often associated with antimalarial drug exposure (historically quinine) and repeated malaria infections.

Why not other options:

- Benign malaria: Usually due to *Plasmodium vivax/ovale* -> milder disease, no massive hemolysis or hemoglobinuria.
- Septicemic malaria: Refers to secondary bacterial sepsis with malaria, not characterized by dark hemoglobinuria.
- Algid malaria: Severe *falciparum* malaria with shock, hypotension, and cold clammy skin, mimicking septic shock.

QUESTION

A 32-year-old sexually active woman presents with vaginal itching and frothy discharge for one week. On speculum examination, the cervix appears erythematous with punctate hemorrhagic spots. A motile, flagellated protozoan is suspected. Which of the following culture media cannot be used for identification of the causative organism?

- A Diamond medium
- B Trussell and Johnson medium
- C Novy-Nicolle-McNeal medium**
- D Feinberg-Whittington medium

CORRECT

RIGHT ANSWER

- OK C. Novy-Nicolle-McNeal medium**

WHY THIS IS RIGHT

Trichomonas vaginalis is a motile, flagellated protozoan causing trichomoniasis, a common sexually transmitted infection.

- Frothy, yellow-green vaginal discharge
- Vaginal itching
- “Strawberry cervix” (punctate hemorrhages)

Laboratory diagnosis:

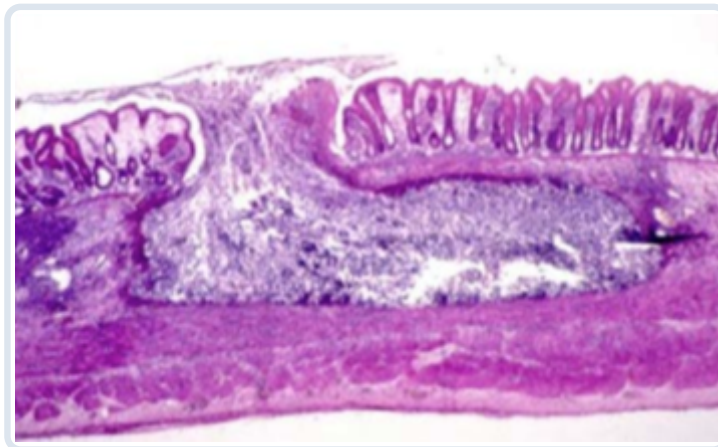
- Wet mount microscopy -> motile flagellated trophozoites
- Culture media used for *T. vaginalis*:

- o Diamond medium
- o Trussell & Johnson medium
- o Feinberg-Whittington medium

Not used: Novy-Nicolle-McNeal (NNN) medium, which is used for *Leishmania* culture, not *Trichomonas*.

QUESTION

A 40-year-old woman presents with severe abdominal pain and diarrhea after travelling to an area with poor sanitation. A histology of the intestinal mucosa obtained via colonoscopy revealed the following. What is the infective form of the organism that causes this condition?



A Trophozoite

B Tetrad

C Cyst

CORRECT

D Bradyzoite

RIGHT ANSWER

OK

C. Cyst

WHY THIS IS RIGHT

Entamoeba histolytica causes amoebic colitis, characterized by flask-shaped ulcers in the intestinal mucosa seen on histology.

Life cycle forms:

- Cyst: Infective form transmitted via fecal-oral route through contaminated food or water.
- Trophozoite: Invasive form that causes tissue destruction and ulcers in the colon.

Clinical features:

- Abdominal pain
- Diarrhea or dysentery
- Ulceration of intestinal mucosa

QUESTION

A 42-year-old male from central India presents with prolonged fever, weight loss, oral discomfort, and bleeding gums. Examination reveals painful palatal ulcers. Laboratory evaluation shows pancytopenia. On detailed history, he reports frequent spelunking with his friends. Which of the following is the most likely causative organism?

A Paracoccidioides brasiliensis

B Coccidioides immitis

C **Histoplasma capsulatum**

CORRECT

D Blastomyces dermatitidis

RIGHT ANSWER

OK

C. Histoplasma capsulatum

WHY THIS IS RIGHT

Histoplasma capsulatum is a dimorphic fungus that causes histoplasmosis, often acquired by inhalation of spores from soil contaminated with bird or bat droppings, especially in environments such as caves (spelunking).

- Causes disseminated infection in immunocompromised individuals.

- Clinical findings may include:

- o Prolonged fever and weight loss

- o Pancytopenia due to bone marrow involvement

- o Painful oral or palatal ulcers

- o Hepatosplenomegaly

Why not other options:

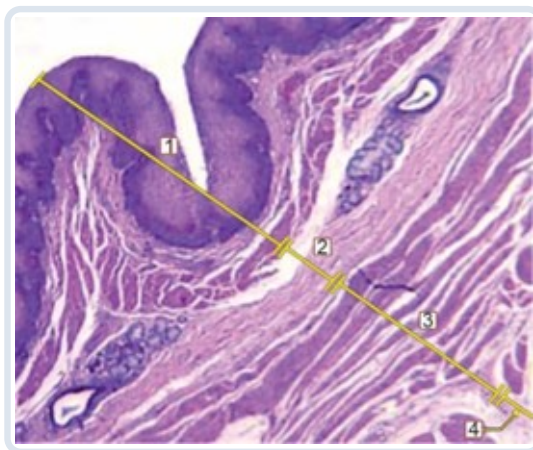
- Paracoccidioides brasiliensis: Causes paracoccidioidomycosis in Latin America, not typical in India; “pilot wheel” yeast.

- Coccidioides immitis: Causes Valley fever, endemic to Southwestern USA and desert regions, not linked to caves/bat guano.

- Blastomyces dermatitidis: Causes blastomycosis in North America, associated with soil/wood, not spelunking.

QUESTION

A 32-year-old farmer from a rural endemic area presents with abdominal distension, splenomegaly, and hematemesis. He has a history of recurrent exposure to freshwater canals while working in paddy fields. On examination, there is marked portal hypertension with preserved liver function tests. Histopathology appearance is shown below. Which pathogen is MOST likely responsible for this condition?



A Schistosoma mansoni

CORRECT

B Schistosoma haematobium

C Fasciola hepatica

D Hepatitis B virus

RIGHT ANSWER

OK A. Schistosoma mansoni

WHY THIS IS RIGHT

Schistosoma mansoni infection causes periportal (Symmers "pipestem") fibrosis leading to portal hypertension with relatively preserved hepatocellular function.

- Infection occurs through skin penetration by cercariae in freshwater.
- Adult worms reside in mesenteric veins.
- Eggs deposited in the liver induce granulomatous inflammation, leading to periportal fibrosis.

Clinical features:

- Splenomegaly
- Portal hypertension
- Esophageal varices -> hematemesis
- Liver function tests often preserved

QUESTION

Mazzoti test is the name given to:

- A** Complement fixation test for Loa loa
- B** Intradermal test for Loa loa
- C** Serological test for *Onchocerca volvulus*
- D** **Provocation test for *Onchocerca volvulus***

CORRECT

RIGHT ANSWER

- OK** **D. Provocation test for *Onchocerca volvulus***

WHY THIS IS RIGHT

The Mazzotti test is a provocation test used in the diagnosis of onchocerciasis, caused by *Onchocerca volvulus*.

Principle:

- The patient is given a small oral dose of diethylcarbamazine (DEC).
- In individuals infected with *Onchocerca volvulus*, the drug causes rapid killing of microfilariae, which triggers a localized allergic reaction.

QUESTION

A patient from a military background presented with rash, fever, and altered sensorium. There is also a deficiency of the membrane attacking complex. The likely cause can be:

A CMV

B Klebsiella pneumonia

C **Neisseria meningitides**

CORRECT

D Hemophilus influenzae

RIGHT ANSWER

OK

C. Neisseria meningitides

WHY THIS IS RIGHT

Neisseria meningitidis causes meningococemia ± meningitis, presenting with fever, rash, and altered sensorium.

| Defect / Deficiency | Organism Susceptibility | Mechanism |

| ----- | ----- | ----- |

| C5-C9 (MAC)

(terminal) | Neisseria spp. (especially *N. meningitidis*) | Failure of complement-mediated lysis |

| C3 deficiency | Pyogenic infections (*Strep*, *Staph*, *H. influenzae*) | Impaired opsonization |

| C1, C2, C4 (early) deficiency | SLE-like disease | Immune complex deposition |

QUESTION

A 19-year-old male presents with recurrent episodes of arthralgia, urethral discharge, and gonococcal infections. Culture of the synovial fluid from the knee grows *Neisseria gonorrhoeae*. Which of the following investigations is most appropriate to evaluate for an underlying immunodeficiency in this patient?

- A C1 esterase deficiency
- B Late complement deficiency (C5-C9)
- C IgA deficiency
- D Combined B & T Cell deficiency

CORRECT

RIGHT ANSWER

- OK
- B. Late complement deficiency (C5-C9)

WHY THIS IS RIGHT

Recurrent or disseminated *Neisseria* infections strongly suggest a defect in the membrane attack complex (C5-C9), which is essential for killing *Neisseria* due to their thin cell wall. Late complement deficiency classically presents with repeated gonococcal or meningococcal infections. Testing for C5-C9 levels or CH50 is therefore the most appropriate investigation.

Defect / Deficiency	Organism Susceptibility	Mechanism
C5-C9 (MAC)	<i>Neisseria</i> spp. (especially <i>N. meningitidis</i>)	Failure of complement-mediated lysis
C3 deficiency	Pyogenic infections (<i>Strep</i> *, <i>Staph</i> *, <i>H. influenzae</i> *)	Impaired opsonization
C1, C2, C4 (early) deficiency	SLE-like disease	Immune complex deposition

QUESTION

| Which of the following is classified under Biosafety level -3 infections?

A XDR-TB

CORRECT

B Salmonella

C Ebola

D Congo Crimean fever

RIGHT ANSWER

OK

A. XDR-TB

WHY THIS IS RIGHT

Biosafety Level 3 (BSL-3) is required for pathogens that cause serious or potentially lethal infections via airborne transmission.

- Transmitted by aerosols
- Can cause severe disease
- Require controlled laboratory access, negative pressure rooms, and respiratory protection

Correct example:

- Mycobacterium tuberculosis (including XDR-TB) -> airborne infection -> BSL-3

Differentiation:

- Salmonella -> BSL-2 (fecal-oral transmission)
- Ebola virus -> BSL-4 (highly lethal, no effective treatment, high risk)
- Crimean-Congo hemorrhagic fever -> BSL-4

QUESTION

Inoculation loops are commonly sterilized by which method?

- A** Autoclaving
- B** Microwave
- C** Passing over flame 3 times
- D** Heat till it become red hot

CORRECT

RIGHT ANSWER

- OK** **D. Heat till it become red hot**

WHY THIS IS RIGHT

Inoculating loops are sterilized by direct flaming until they become red hot.

- Red heat ensures complete destruction of all microorganisms, including spores
- This is a method of dry heat sterilization
- The loop must be allowed to cool before touching the culture to avoid killing organisms

Why not others:

- Autoclaving is used for bulk instruments, not for immediate sterilization during procedures
- Microwave is not a standard sterilization method in microbiology labs
- Passing over flame a few times without achieving red heat is inadequate

QUESTION

| All of the following methods of cold sterilization except:

A Plasma sterilization

B Gamma rays

C UV rays

D Autoclave

CORRECT

RIGHT ANSWER

OK

D. Autoclave

WHY THIS IS RIGHT

Cold sterilization refers to sterilization methods that do not use high temperatures and are suitable for heat-sensitive materials. Cold methods are used for heat-labile instruments (e.g., endoscopes, plastics).

Cold sterilization methods:

- Plasma sterilization -> uses hydrogen peroxide plasma
- Gamma rays -> ionizing radiation used for disposable medical equipment
- UV rays -> used for surface disinfection (limited penetration)

Not a cold sterilization method:

- Autoclave -> uses moist heat under pressure (121°C), hence a heat sterilization method

QUESTION

| Biosafety level for culture of *Mycobacterium tuberculosis* (MTB) is?

A BSL I

B BSL II

C BSL III

CORRECT

D BSL IV

RIGHT ANSWER

OK

C. BSL III

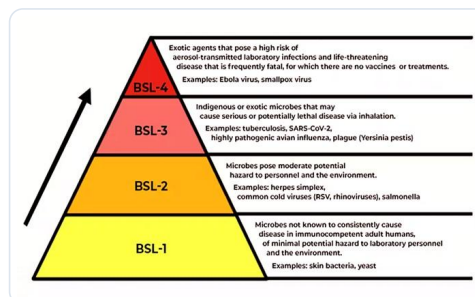
WHY THIS IS RIGHT

Mycobacterium tuberculosis is handled in Biosafety Level III (BSL-III) laboratories.

- MTB is transmitted via airborne droplet nuclei, requiring strict airborne precautions
- BSL-III is designed for pathogens that can cause serious or potentially lethal disease via inhalation
- Laboratory features include:
 - Negative pressure rooms
 - HEPA-filtered exhaust air
 - Controlled access
 - Work within biosafety cabinets

Comparison:

- BSL I: non-pathogenic organisms
- BSL II: moderate-risk pathogens (e.g., *Staphylococcus*, *Salmonella*)
- BSL III: airborne pathogens (e.g., *Mycobacterium tuberculosis*)
- BSL IV: highly dangerous agents with no treatment (e.g., Ebola virus)



QUESTION

A patient underwent cardiac surgery and was admitted to the ICU. He later developed ventilator-associated pneumonia and was started on empirical antibiotics. A few hours later, the patient developed acute kidney injury (AKI). Serum procalcitonin was sent. Which of the following statements regarding procalcitonin is correct?

A It helps in determining the duration of antibiotic therapy

CORRECT

B It helps in identifying which empirical antibiotics to be given

C It can be used to confirm source of infection

D It is used to differentiate bacterial from fungal cause

RIGHT ANSWER

OK

A. It helps in determining the duration of antibiotic therapy

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1a" here and does not include a written explanation for this item.

QUESTION

Which of the following refers to a host in which the larval stage of the parasite remains viable without further development?

- A Definitive host
- B Intermediate host
- C Paratenic host**
- D Reservoir host

CORRECT

RIGHT ANSWER

- OK **C. Paratenic host**

WHY THIS IS RIGHT

A paratenic host (transport host) is a host in which a parasite remains alive and infective but does not undergo further development. The parasite is simply carried until it reaches the definitive host, where normal development continues. Parasite remains viable and infective. Helps bridge the ecological gap between intermediate and definitive hosts.

Comparison with other hosts:

Host type	Definition
Definitive host	Host in which the parasite undergoes sexual reproduction
Intermediate host	Host in which larval or asexual development occurs
Paratenic host	Parasite survives without further development
Reservoir host	Host that maintains the parasite in nature and serves as a source of infection

QUESTION

| What is the primary function of the CRISPR system in bacteria?

A To facilitate horizontal gene transfer between bacterial cells

B To enable bacteria to resist viral infections through sequence-specific DNA cleavage

CORRECT

C To allow the incorporation of viral DNA into the bacterial genome

D To protect bacteria from the eukaryotic immune system

RIGHT ANSWER

OK

B. To enable bacteria to resist viral infections through sequence-specific DNA cleavage

WHY THIS IS RIGHT

CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a bacterial adaptive immune system that protects bacteria against bacteriophage (viral) infections and foreign genetic elements.

Mechanism

1. Adaptation (Spacer acquisition)
 - o When bacteria are infected by a virus, fragments of viral DNA are incorporated into the CRISPR locus as “spacers”.
2. Expression
 - o The CRISPR region is transcribed into CRISPR RNA (crRNA).
3. Interference
 - o CRISPR-associated (Cas) proteins use the crRNA as a guide to recognize complementary viral DNA.
 - o The Cas enzyme then cleaves the invading viral DNA, preventing infection.

QUESTION

Vaccination against which of the following is recommended in the elderly?

1. Varicella zoster virus
2. COVID-19
3. Measles
4. Pneumococcal meningitis
5. HPV
6. Td

A 1, 2, 3, 4

B 2, 4, 6

C 1, 5, 6

D 1, 2, 4, 6

CORRECT

RIGHT ANSWER

OK D. 1, 2, 4, 6

WHY THIS IS RIGHT

Vaccines recommended in the elderly include:

- Varicella zoster vaccine - prevents herpes zoster (shingles) and post-herpetic neuralgia.
- COVID-19 vaccine - reduces risk of severe disease, hospitalization, and mortality.
- Pneumococcal vaccine - protects against pneumococcal pneumonia, bacteremia, and meningitis.
- Td / Tdap booster - protects against tetanus and diphtheria, given every 10 years.

Vaccines generally not routinely recommended in the elderly:

- Measles vaccine - usually unnecessary because most elderly individuals have natural immunity from prior infection.
- HPV vaccine - recommended mainly for adolescents and young adults, not older adults.

QUESTION

A patient presented with a prolonged fever of unknown origin (PUO), raising suspicion of brucellosis. To confirm the diagnosis, various dilutions of the patient's serum sample are prepared for a standard agglutination test. The outcome is as follows: Agglutination is observed at serum dilutions of 1:20 and 1:40, while no agglutination occurs at dilutions of 1:80 and 1:160. What factor is accountable for the lack of agglutination in the last two dilutions?

A Incorrect antigen

B Incorrect antibody

C Antibody excess

D Antigen excess

CORRECT

RIGHT ANSWER

OK D. Antigen excess

WHY THIS IS RIGHT

Agglutination tests depend on the formation of an optimal antigen-antibody lattice, which occurs only when antigen and antibody are present in equivalent proportions (zone of equivalence).

In this case

- Agglutination occurs at 1:20 and 1:40 -> zone of equivalence
- No agglutination at higher dilutions (1:80, 1:160) because the antibody becomes diluted, resulting in relative antigen excess (postzone phenomenon).

QUESTION

A 25-year-old man presents with tingling of lips and mouth, nausea, and flushing. He gives a history of eating a Mahi-Mahi fish about an hour back and that it had an unusual taste. He responds well to treatment with intravenous antihistamines. Which of the following is true?

- A** Associated with gram negative organisms
- B** Due to sea food allergy
- C** Histamine-mediated
- D** Epinephrine may be used in refractory cases

CORRECT

RIGHT ANSWER

- OK** **B. Due to sea food allergy**

WHY THIS IS RIGHT

Scombroid fish poisoning occurs after ingestion of improperly stored fish such as tuna or mahi-mahi that contain high levels of histamine produced by bacterial decarboxylation of histidine. It presents with flushing, oral tingling, headache, nausea, and a peppery or unusual taste shortly after ingestion. Symptoms mimic an allergic reaction but are due to histamine toxicity rather than a true seafood allergy. Treatment is with antihistamines.

QUESTION

| Arrange the following in order of being most to least resistant?

A Spores>Prions>Mycobacterium>Naked virus>Enveloped virus

B Prions>Spores>Mycobacterium>Naked virus>Enveloped virus

CORRECT

C Spores>Mycobacterium>Enveloped virus> Prions

D Mycobacterium>Naked Virus> Spores>Enveloped virus

RIGHT ANSWER

OK B. Prions>Spores>Mycobacterium>Naked virus>Enveloped virus

WHY THIS IS RIGHT

Microorganisms vary in their resistance to sterilization and disinfectants. The order from most resistant to least resistant is:

Prions > Bacterial spores > Mycobacteria > Naked (non-enveloped) viruses > Enveloped viruses

- Prions are most resistant because they are misfolded proteins without nucleic acids, resistant to heat, radiation, and many disinfectants.
- Bacterial spores (e.g., Bacillus, Clostridium) resist heat and chemicals due to thick protective coats and low metabolic activity.
- Mycobacteria are moderately resistant because of their lipid-rich mycolic acid cell wall.
- Naked viruses are more resistant than enveloped viruses since they lack a fragile lipid envelope.
- Enveloped viruses are least resistant because their lipid envelope is easily destroyed by detergents, alcohol, and drying.

QUESTION

A technician wants to sterilize the material of the laboratory. Which of the following is a correct combination for him to use?

A Liquid paraffin- Hot air oven

CORRECT

B Heat sensitive vaccine: Pasteurisation

C LSS medium- Autoclave

D Catgut sutures- Autoclave

RIGHT ANSWER

OK A. Liquid paraffin- Hot air oven

WHY THIS IS RIGHT

Different laboratory materials require specific sterilization methods depending on their heat stability and composition.

- Hot air oven (dry heat sterilization) is used for oils, fats, waxes, and powders that cannot be sterilized by moist heat. Therefore, liquid paraffin is sterilized using a hot air oven.

Why not other options:

- Heat-sensitive vaccine - Pasteurization: Pasteurization reduces microbial load but does not sterilize; vaccines require cold storage or filtration, not pasteurization.
- LSS medium - Autoclave: Loeffler's serum slope (LSS) contains serum, which is damaged by autoclaving; it is sterilized by inspissation, not autoclave.
- Catgut sutures - Autoclave: Catgut is heat sensitive and is sterilized by chemical methods (e.g., iodine/alcohol) or irradiation, not autoclaving.

QUESTION

During the production of a viral vaccine using embryonated hen's eggs, which site is specifically utilised for the cultivation of yellow fever virus?

- A Yolk Sac
- B Amniotic Sac
- C Allantoic Sac**
- D Chorio-allantoic Membrane

CORRECT

RIGHT ANSWER

C. Allantoic Sac

WHY THIS IS RIGHT

Embryonated hen's eggs are commonly used for cultivation of viruses for vaccine production and laboratory isolation. Different viruses grow in specific compartments of the egg.

Yellow fever virus is cultivated in the allantoic sac, where it multiplies efficiently and can be harvested for vaccine preparation.

Common egg inoculation sites:

Site	Viruses commonly grown
Chorio-allantoic membrane (CAM)	Poxviruses, herpes viruses
Allantoic sac	Influenza virus, Yellow fever virus
Amniotic sac	Primary isolation of influenza
Yolk sac	Chlamydia, rickettsiae

QUESTION

A 32-year-old man working as a restaurant cook was diagnosed with typhoid fever 8 months ago. He recovered completely and has remained asymptomatic since. Over the past few weeks, multiple patrons who consumed food prepared by him developed culture-confirmed *Salmonella Typhi* infection. Stool cultures from the cook repeatedly test positive despite the absence of symptoms. This individual is best classified as which type of carrier?

A Convalescent carrier

B Temporary carrier

CORRECT

C Chronic carrier

D Acute carrier

RIGHT ANSWER

OK B. Temporary carrier

WHY THIS IS RIGHT

- Temporary carriers are individuals who carry and transmit the pathogen for a period of more than 3 months but less than a year.
- Convalescent carrier refers to a person who has recovered from a disease but continues to shed the infectious agent for a period of 3 weeks to 3 months after recovery.
- Chronic carriers are individuals who continue to carry and shed the pathogen for a period of more than a year.

QUESTION

A chronic smoker with persistent cough was found to have a lung mass on imaging. A bronchoscope was used to obtain a lung biopsy. Based on the Spaulding classification, what category does this medical device fall under, and what is the appropriate sterilisation or disinfection agent?

- A Critical device and Autoclave
- B Semi-critical device and Autoclave
- C Critical device and Glutaraldehyde

D Semi-critical device and Glutaraldehyde

CORRECT

RIGHT ANSWER

OK

D. Semi-critical device and Glutaraldehyde

WHY THIS IS RIGHT

No explanation was provided in the source quiz.

Risk Category	Recommended Method	Medical Device / Equipment
1. Critical device (high risk): Items that enter a normally sterile site	Sterilisation • If heat resistant: Hot air oven or autoclave • If heat sensitive: Ionising radiation or ethylene oxide or plasma sterilisation	Surgical instruments, implants/prosthesis, rigid endoscopes, syringes, needles, Cut, urinary catheter
2. Semi-critical device (intermediate risk): Items in contact with mucous membranes or body fluids	High-level disinfection (HLD): Glutaraldehyde, ortho-phthalaldehyde, formaldehyde, hydrogen peroxide	Respiratory equipment, non-invasive flexible endoscopes, bedpans, urine bottles
3. Non-critical (low-risk): Items in contact with intact skin	Intermediate or Low-level disinfection (ILD / LLD): Phenols, chlorhexidine, isopropyl alcohol, povidone iodine, etc.	Patient items: Blood pressure cuffs, ECG electrodes, thermometers, stethoscopes Environmental surfaces: Computers, bed rails, food utensils, bedside tables, patient furniture, floor

QUESTION

During conjugation experiments, a donor strain transfers antibiotic resistance and lactose fermentation genes to a recipient cell. However, the recipient rarely becomes F⁺ after mating. Which type of donor strain is most likely involved?

- A F⁺ strain
- B Hfr strain**
- C F plasmid-carrying bacteriophage
- D Competent cell undergoing transformation

CORRECT

RIGHT ANSWER

OK **B. Hfr strain**

WHY THIS IS RIGHT

Hfr (High-frequency recombination) strains are bacterial donor cells in which the F (fertility) plasmid is integrated into the bacterial chromosome.

Mechanism during conjugation:

- DNA transfer begins from the integrated F factor.
- Chromosomal genes adjacent to the F factor (e.g., antibiotic resistance, lactose fermentation genes) are transferred to the recipient.
- Because the entire F factor is rarely transferred, the recipient usually remains F⁺ even though it acquires some donor chromosomal genes.

QUESTION

Arrange the stages of spore formation (sporulation) in correct order:

- A** Axial filament formation ☐ Septum formation ☐ Asymmetric division ☐ Engulfment ☐ Cortex formation ☐ Maturation and lysis CORRECT
- B** Engulfment ☐ Cortex formation ☐ Septum formation ☐ Asymmetric division ☐ Axial filament formation ☐ Maturation and lysis
- C** Septum formation ☐ Asymmetric division ☐ Engulfment ☐ Cortex formation ☐ Maturation and lysis ☐ Axial filament formation
- D** Asymmetric division ☐ Engulfment ☐ Cortex formation ☐ Septum formation ☐ Axial filament formation ☐ Maturation and lysis
- RIGHT ANSWER**
- OK** **A. Axial filament formation** ☐ **Septum formation** ☐ **Asymmetric division** ☐ **Engulfment** ☐ **Cortex formation** ☐ **Maturation and lysis**

WHY THIS IS RIGHT

Sporulation (endospore formation) occurs in certain bacteria such as *Bacillus* and *Clostridium* when environmental conditions become unfavorable.

Correct sequence of sporulation:

1. Axial filament formation - Chromosomal DNA aligns along the cell axis.
2. Septum formation - A transverse septum begins to form.
3. Asymmetric division - Formation of a smaller forespore and larger mother cell.
4. Engulfment - The mother cell membrane engulfs the forespore.
5. Cortex formation - A thick peptidoglycan cortex develops around the forespore.
6. Maturation and lysis - The spore matures and the mother cell lyses, releasing the resistant endospore.

QUESTION

| The tissue of origin of HeLa cell line is:

- A** Epithelioma of larynx (HEp-2)
- B** Carcinoma of nasopharynx (KB)
- C** Carcinoma cervix
- D** Monkey kidney (Vero)

CORRECT

RIGHT ANSWER

OK

C. Carcinoma cervix

WHY THIS IS RIGHT

The HeLa cell line is derived from cervical carcinoma cells obtained from Henrietta Lacks in 1951. It was the first immortal human cell line successfully cultured in the laboratory.

Characteristics of HeLa cells:

- Derived from cervical cancer tissue
- Immortal cell line with rapid growth in culture
- Widely used in virology, cancer research, vaccine development, and molecular biology

Why not other options:

- a) HEp-2: Derived from epithelioma of larynx cell line.
- b) KB cells: Derived from carcinoma of nasopharynx.
- d) Vero cells: Derived from African green monkey kidney cells.

QUESTION

Which method is considered the gold standard for determining the Minimum Inhibitory Concentration (MIC) of an antibiotic?

A Kirby-Bauer disk diffusion

B Broth dilution method

CORRECT

C E-test strip

D Agar dilution method

RIGHT ANSWER

OK B. Broth dilution method

WHY THIS IS RIGHT

The Minimum Inhibitory Concentration (MIC) is the lowest concentration of an antibiotic that inhibits visible bacterial growth after incubation.

Broth dilution method (macro- or micro-dilution) is considered the gold standard for determining MIC.

- Helps determine antibiotic susceptibility
- Guides appropriate antimicrobial therapy

Why not other options:

A. Kirby-Bauer disk diffusion: Gives zone of inhibition and categorizes bacteria as sensitive/intermediate/resistant, but does not give exact MIC.

C. E-test strip: Provides an approximate MIC, but it is not the gold standard.

D. Agar dilution method: Can determine MIC but is labor-intensive and less commonly used compared to broth dilution.

QUESTION

A blood bank technician needs to sterilize serum without exposing it to heat, as heat may denature proteins. A method is used in which fluid is passed through a thick asbestos pad placed in a metal holder for bacterial removal. Which sterilization method is being used?

A Hot air oven

B Autoclave

C Seitz filtration

CORRECT

D Pasteurization

RIGHT ANSWER

OK C. Seitz filtration

WHY THIS IS RIGHT

Seitz filtration is a filtration sterilization method used for heat-sensitive liquids such as serum, vaccines, enzymes, and antibiotics.

- The liquid is passed through a Seitz filter, which consists of a thick asbestos pad mounted in a metal holder.
- The filter removes bacteria and particulate matter without exposing the fluid to heat, thereby preserving protein structure and biological activity.

Why not other options:

- A. Hot air oven: Dry heat sterilization (160-180 °C) used for glassware, powders, oils-would denature serum proteins.
- B. Autoclave: Moist heat (121 °C under pressure) used for culture media and instruments-not suitable for heat-sensitive fluids like serum.
- D. Pasteurization: Uses moderate heat to reduce pathogens in milk; does not achieve complete sterilization.

QUESTION

A scientist studying mobile genetic elements finds DNA segments capable of changing their chromosomal position. Such elements were first discovered in maize, and the discovery was later awarded the Nobel Prize in Physiology or Medicine. Which scientist received this award for demonstrating transposable elements?

A Watson and Crick

B Barbara McClintock

CORRECT

C Joshua Lederberg

D Paul Ehrlich

RIGHT ANSWER

OK

B. Barbara McClintock

WHY THIS IS RIGHT

Transposable elements ("jumping genes") are mobile DNA sequences that can move from one location to another within the genome, altering gene expression and causing mutations.

These elements were first discovered in maize (corn) by Barbara McClintock, who demonstrated that certain DNA segments could change their chromosomal position and influence neighboring genes. For this discovery, Barbara McClintock received the Nobel Prize in Physiology or Medicine in 1983.

QUESTION

What concentration of tetanus antitoxin in the blood is considered clinically protective against tetanus?

A >0.1 IU/ml

B >0.01 IU/ml

CORRECT

C >0.001 IU/ml

D >0.0001 IU/ml

RIGHT ANSWER

OK

B. >0.01 IU/ml

WHY THIS IS RIGHT

Protection against tetanus depends on the presence of neutralizing antibodies against tetanus toxin.

- A serum tetanus antitoxin level ≥ 0.01 IU/mL is considered the minimum protective level against tetanus.
- This level is achieved after complete immunization with tetanus toxoid-containing vaccines (e.g., DPT, Td).
- Individuals with antibody levels below 0.01 IU/mL are considered susceptible and may require tetanus prophylaxis (vaccine $\pm$ tetanus immunoglobulin) after injury.

QUESTION

| Which among the following organism is the cause of necrotizing fasciitis?

A Streptococcus pneumoniae

B Streptococcus pyogenes

CORRECT

C Clostridium perfringens

D Clostridium tetani

RIGHT ANSWER

OK

B. Streptococcus pyogenes

WHY THIS IS RIGHT

Necrotizing fasciitis is a rapidly progressive, life-threatening soft tissue infection most commonly caused by Group A β -hemolytic Streptococcus.

- Type II (monomicrobial) necrotizing fasciitis -> classically due to Streptococcus pyogenes
- Produces exotoxins (streptococcal pyrogenic exotoxins) -> tissue destruction, systemic toxicity, toxic shock
- Clinical features:
 - o Severe pain out of proportion to findings
 - o Rapid spread along fascial planes
 - o Skin necrosis, bullae, crepitus (late)
 - o Systemic toxicity (fever, shock)

Why not others:

- Streptococcus pneumoniae -> pneumonia, meningitis
- Clostridium perfringens -> gas gangrene (myonecrosis), not classic necrotizing fasciitis
- Clostridium tetani -> tetanus (neurotoxin-mediated disease)

QUESTION

A patient presents 2 days after a road traffic accident with severe muscle pain and palpable crepitus over the injured area. Which of the following organisms is the most likely cause of gas gangrene in this case?



A Clostridium haemolyticum

B Clostridium welchii

CORRECT

C Clostridium botulinum

D Clostridium tetani

RIGHT ANSWER

OK

B. Clostridium welchii

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$19" here and does not include a written explanation for this item.

QUESTION

A patient presented with complaints of diarrhea and vomiting for >3 hours after consuming salads and milk at a picnic. Which of the following organisms is the most likely cause?

A Bacillus cereus

B Staphylococcus aureus

CORRECT

C Salmonella enterica

D Clostridium perfringens

RIGHT ANSWER

OK

B. Staphylococcus aureus

WHY THIS IS RIGHT

Staphylococcus aureus food poisoning is caused by ingestion of preformed enterotoxin in contaminated food, leading to rapid-onset gastroenteritis.

- Incubation period: short (1-6 hours) -> symptoms within a few hours
- Food sources: salads (e.g., mayonnaise), milk, cream-based foods, pastries
- Mechanism: ingestion of heat-stable enterotoxin (toxin formed in food before consumption)

· Clinical features:

- o Prominent vomiting
- o Diarrhea
- o Usually no fever
- o Self-limiting (resolves within 24 hours)

Why not others:

- Bacillus cereus: can cause rapid vomiting type, but classically associated with reheated rice
- Salmonella enterica: longer incubation (12-48 hours), inflammatory diarrhea with fever
- Clostridium perfringens: incubation 8-16 hours, mainly diarrhea with minimal vomiting

QUESTION

A street food (pani puri) vendor presents with a black, necrotic eschar on his back. Which of the following organisms is the most likely causative agent?

A Rickettsia typhi

B Scrub typhus

C **Bacillus anthracis**

CORRECT

D Coxiella burnetii

RIGHT ANSWER

OK C. **Bacillus anthracis**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

A young male came to the hospital with a clean-cut wound without any bleeding. The patient received a full course of tetanus vaccination 10 years ago. What is the best management for this patient?

A Human tetanus immunoglobulin and full course of vaccine

B Human tetanus immunoglobulin only

C Single-dose tetanus toxoid

CORRECT

D Full course tetanus toxoid

RIGHT ANSWER

OK

C. Single-dose tetanus toxoid

WHY THIS IS RIGHT

A clean-cut wound is classified as a clean, minor wound with low risk of tetanus.

In an individual who has completed the full primary tetanus immunization, a booster dose of tetanus toxoid is recommended if more than 10 years have elapsed since the last dose.

Human tetanus immunoglobulin is not required for clean wounds in adequately immunized individuals, and restarting the full course is unnecessary.

Category	Clean Wound <6H	Other Wounds
A. CC/B<5 years	None	None
B. CC>10 years	1 Dose	1 Dose + TIG
C. Incomplete course/unknown	Complete course	Complete course + TIG

QUESTION

A woman presents with high-grade fever and signs of shock. She has a history of prolonged tampon use. What is the most likely diagnosis?

A Staphylococcal scalded skin syndrome

B Toxic shock syndrome toxin

CORRECT

C Septic shock

D Streptococcal pharyngitis

RIGHT ANSWER

OK

B. Toxic shock syndrome toxin

WHY THIS IS RIGHT

Toxic Shock Syndrome (TSS) is an acute, life-threatening illness caused by toxin-producing *Staphylococcus aureus*, classically associated with prolonged tampon use.

- Causative toxin: TSST-1 (toxic shock syndrome toxin-1)
- Mechanism: acts as a superantigen -> massive, non-specific T-cell activation -> cytokine storm -> shock
- Clinical features:
 - o Sudden high-grade fever
 - o Hypotension (shock)
 - o Diffuse erythematous rash -> later desquamation
 - o Multiorgan involvement (renal, hepatic, CNS)

Why not others:

- Staphylococcal scalded skin syndrome: exfoliative toxin, mainly in children, no shock
- Septic shock: may occur, but tampon use + toxin-mediated features point to TSS
- Streptococcal pharyngitis: localized throat infection

QUESTION

Chocolate agar is primarily used to culture which of the following organisms?

A Listeria monocytogenes

B Haemophilus influenzae

CORRECT

C Staphylococcus aureus

D Escherichia coli

RIGHT ANSWER

OK B. Haemophilus influenzae

WHY THIS IS RIGHT

Chocolate agar is an enriched medium used to culture fastidious organisms, especially Haemophilus influenzae.

- Prepared by heating blood agar, which lyses RBCs -> releases growth factors:

- o Factor X (hemin)

- o Factor V (NAD)

- Haemophilus influenzae requires both X and V factors, hence grows well on chocolate agar

- Also supports growth of Neisseria species (e.g., N. gonorrhoeae, N. meningitidis)

Why not others:

- Listeria monocytogenes: grows on standard media (e.g., blood agar)

- Staphylococcus aureus: grows on simple media (blood agar)

- Escherichia coli: grows on routine media (e.g., MacConkey agar)

QUESTION

A child was brought with complaints of high fever, multiple seizures, headache, and neck rigidity. CS analysis showed low glucose, high protein, and many polymorphs. The CSF culture showed pleomorphic gram-negative bacilli. What is true about the causative organism?

- A** It is bacitracin sensitive
- B** Produces non-lactose fermenting colonies on MacConkey agar
- C** Exhibits satellitism around *Staphylococcus aureus* colonies
- D** It exhibits alpha hemolysis on sheep blood agar

CORRECT

RIGHT ANSWER

- OK** **C. Exhibits satellitism around *Staphylococcus aureus* colonies**

WHY THIS IS RIGHT

The described organism is *Haemophilus influenzae*, a pleomorphic Gram-negative bacillus causing pyogenic meningitis in children, and it characteristically shows satellitism around *Staphylococcus aureus* on blood agar.

- CSF findings in bacterial meningitis:
 - o ↓ glucose, ↑ protein
 - o Neutrophilic (polymorph) predominance
- Organism characteristics: Requires Factor X (hemin) and Factor V (NAD) for growth
- Satellitism phenomenon: Grows around *Staphylococcus aureus* colonies because *S. aureus* releases NAD (Factor V)

Why not others:

- Bacitracin sensitivity: seen in Group A *Streptococcus*
- Non-lactose fermenter on MacConkey: applies to some Gram-negative bacilli, not *H. influenzae*
- Alpha hemolysis: seen in *Streptococcus pneumoniae*



QUESTION

A sewage worker presented with abdominal pain, jaundice, conjunctival suffusion, and blood in the urine for the past 5 days. Which of the following is the investigation of choice?

A Widal test

B Microscopic agglutination test

CORRECT

C Weil-Felix reaction

D Paul-Bunnell test

RIGHT ANSWER

OK

B. Microscopic agglutination test

WHY THIS IS RIGHT

Leptospirosis (e.g., in sewage workers exposed to contaminated water) is best confirmed by the Microscopic Agglutination Test (MAT), which is the gold standard serological test.

- Etiology: *Leptospira interrogans* (spirochete)
- Risk factors: exposure to water contaminated with animal urine (rats, sewage)
- Clinical features (Weil disease):
 - o Fever, abdominal pain
 - o Jaundice + renal involvement (hematuria)
 - o Conjunctival suffusion (red eyes without discharge)
- Diagnosis:
 - o MAT (Microscopic Agglutination Test) -> detects antibodies against leptospira (gold standard)
 - o Early phase: PCR may be used

Why not others:

- Widal test: typhoid fever
- Weil-Felix reaction: rickettsial infections
- Paul-Bunnell test: infectious mononucleosis (EBV)

QUESTION

A woman with recurrent diarrhea is prescribed a broad-spectrum antibiotic. Which of the following is not true regarding *Clostridium difficile* infection?

- A Oral fidaxomicin is used for treatment
- B It is toxin mediated
- C IgM assay is used to confirm the diagnosis**
- D Pseudomembrane consists of leukocytes, fibrin, and cellular debris

CORRECT

RIGHT ANSWER

- OK
- C. IgM assay is used to confirm the diagnosis**

WHY THIS IS RIGHT

Clostridioides difficile infection (CDI) is an antibiotic-associated, toxin-mediated colitis characterized by formation of pseudomembranes in the colon.

- Pathogenesis:
 - o Overgrowth after broad-spectrum antibiotics
 - o Produces toxin A (enterotoxin) and toxin B (cytotoxin) -> mucosal damage
- Clinical features:
 - o Watery diarrhea
 - o Abdominal pain
 - o Fever
 - o Severe cases -> toxic megacolon
- Diagnosis:
 - o Stool toxin detection (ELISA/PCR for toxin genes)
 - o IgM assay is NOT used -> hence incorrect statement
- Pseudomembrane composition: Leukocytes + fibrin + necrotic epithelial debris
- Treatment: Oral vancomycin or fidaxomicin (first line)

QUESTION

Which of the following is considered to be the best for the detection of *Clostridium difficile*?

- A Aerobic culture of stool
- B Glutamate dehydrogenase and toxin assay**
- C Glutamate dehydrogenase assay
- D None of the above

CORRECT

RIGHT ANSWER

- B. Glutamate dehydrogenase and toxin assay**

WHY THIS IS RIGHT

The best diagnostic approach for *Clostridioides difficile* infection is a combination test: Glutamate dehydrogenase (GDH) antigen + toxin assay.

- GDH antigen test:
 - o Highly sensitive
 - o Detects presence of *C. difficile* organism (both toxigenic & non-toxigenic strains)
- Toxin assay (A & B):
 - o Highly specific
 - o Confirms toxin production -> clinically relevant disease
- Why combination is best:
 - o GDH screens -> toxin assay confirms
 - o Improves diagnostic accuracy (high sensitivity + specificity)

Why not others:

- Aerobic culture: organism is anaerobic -> not suitable
- GDH alone: cannot differentiate toxigenic vs non-toxigenic strains

QUESTION

A newly joined teacher develops rice water stools. The causative agent acts on which of the following receptors?

A GM1 ganglioside receptor

CORRECT

B GM2 ganglioside receptor

C Sphingomyelin

D Cerebroganglioside

RIGHT ANSWER

OK A. GM1 ganglioside receptor

WHY THIS IS RIGHT

Vibrio cholerae causes rice-water diarrhea by producing cholera toxin, which binds to the GM1 ganglioside receptor on intestinal epithelial cells.

· Mechanism of action:

- o Cholera toxin (AB toxin) binds GM1 receptor
- o Activates adenylate cyclase -> ↑ cAMP
- o Leads to massive Cl^- and water secretion -> profuse watery diarrhea

· Clinical features:

- o "Rice-water stools" (watery, flecks of mucus)
- o Severe dehydration
- o No invasion -> no inflammation

Why not others: GM2, sphingomyelin, cerebroganglioside -> not involved in cholera toxin binding

QUESTION

A 12-year-old boy presents with right upper quadrant pain, calf pain, conjunctival suffusion, icterus, and fever. Examination shows tender hepatomegaly. What is the most likely diagnosis?

- A** Chikungunya
- B** Leptospirosis
- C** Dengue hemorrhagic fever
- D** Encephalopathy caused by hepatitis A

CORRECT

RIGHT ANSWER

B. Leptospirosis

WHY THIS IS RIGHT

Leptospirosis (caused by *Leptospira interrogans*) should be suspected in patients with fever + myalgia (especially calf pain) + conjunctival suffusion + jaundice (Weil disease).

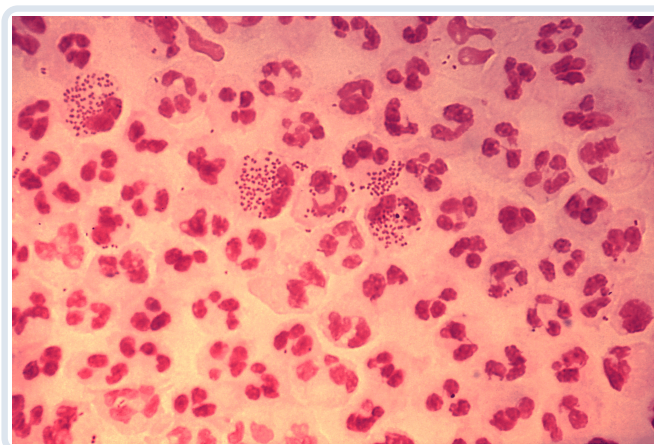
- Transmission: exposure to water/soil contaminated with animal urine (rats, livestock)
- Biphasic illness:
 - o Septicemic phase: fever, headache, severe calf muscle pain, conjunctival suffusion
 - o Immune phase: meningitis, hepatic and renal dysfunction (Weil disease)
- Characteristic triad (Weil disease): Jaundice + renal failure + hemorrhage
- Distinctive clue: Conjunctival suffusion (red eyes without discharge) -> highly suggestive

Why not others:

- Chikungunya: severe joint pain, no jaundice
- Dengue hemorrhagic fever: bleeding, thrombocytopenia, no calf pain or suffusion
- Hepatitis A: jaundice but no calf pain or conjunctival suffusion

QUESTION

A patient presented with pus discharge from the urethra and dysuria. He had a history of unprotected sexual intercourse. The best culture media for the following organism is:



A Blood agar

B MacConkey agar

C Thayer Martin agar

CORRECT

D Wilson Blair agar

RIGHT ANSWER

OK

C. Thayer Martin agar

WHY THIS IS RIGHT

Neisseria gonorrhoeae is cultured on Thayer-Martin agar, a selective chocolate agar used for isolating pathogenic *Neisseria*.

- Organism: Gram-negative intracellular diplococci
- Clinical: urethral discharge, dysuria after unprotected sexual exposure
- Fastidious organism -> requires enriched media
- Grows best on chocolate agar with CO₂ (5-10%)

Selective medium: Thayer-Martin agar contains antibiotics:

- o Vancomycin -> inhibits Gram-positive bacteria
- o Colistin -> inhibits Gram-negative rods
- o Nystatin -> inhibits fungi
- o Trimethoprim -> inhibits *Proteus*

Why not others:

- Blood agar -> not selective
- MacConkey agar -> for enteric Gram-negative bacilli
- Wilson-Blair agar -> for *Salmonella*

QUESTION

| What does 'H' indicate in a patient presenting with a history of EHEC O157:H7?

- A** Capsule
- B** Fimbriae
- C** Flagella
- D** Lipopolysaccharide

CORRECT

RIGHT ANSWER

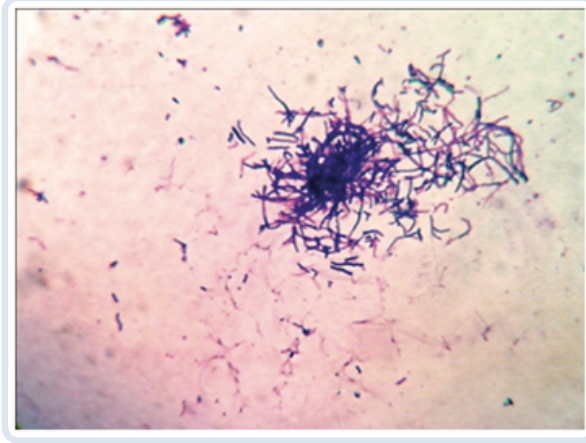
- OK** C. Flagella

WHY THIS IS RIGHT

Antigen	Represents	Location / Structure
O antigen	Somatic antigen	LPS (cell wall)
H antigen	Flagellar antigen	Flagella (motility)
A antigen	Fimbrial (pili) antigen	Surface pili or fimbriae

QUESTION

A farmer suffered from a subcutaneous wound on the dorsum of the foot which later involved the subcutaneous tissue and produced a discharging ulcer. Microscopic examination of the discharge showed gram-positive filamentous rods with branching. The organism responsible is:



A Candida

B Sporotrichosis

C Histoplasma

D Nocardia

CORRECT

RIGHT ANSWER

OK D. Nocardia

WHY THIS IS RIGHT

A chronic subcutaneous infection with discharging sinuses showing Gram-positive, branching filamentous rods is characteristic of Nocardia infection (often presenting as mycetoma).

- Gram-positive, branching filamentous bacteria
- Weakly acid-fast (important distinguishing feature)
- Aerobic organism found in soil -> common in farmers

Clinical features:

- Chronic subcutaneous swelling
- Discharging sinuses with granules
- May extend to deeper tissues (mycetoma)

Differentiation:

- Actinomyces -> branching but non-acid-fast, anaerobic
- Candida / Histoplasma -> fungi (yeast forms)
- Sporotrichosis -> nodular lesions along lymphatics ("rose gardener's disease")

QUESTION

A traveler consumed oysters. He later presented with bloody diarrhea, abdominal pain, and vomiting. The organism seen on microscopy exhibited Kanagawa phenomenon. The likely causative organism is:

- A Staphylococcus aureus
- B Salmonella typhi
- C Vibrio parahaemolyticus**
- D Vibrio cholera

CORRECT

RIGHT ANSWER

- OK
- C. Vibrio parahaemolyticus**

WHY THIS IS RIGHT

Vibrio parahaemolyticus is a marine, halophilic organism that causes acute gastroenteritis after ingestion of raw or undercooked seafood (especially oysters).

- Bloody diarrhea, abdominal pain, vomiting
- Exposure to seafood (oysters, shellfish)
- Gram-negative, curved rod

Diagnostic hallmark:

- Kanagawa phenomenon -> β -hemolysis on Wagatsuma agar
- Due to thermostable direct hemolysin (TDH) -> virulence factor

Differentiation:

- Vibrio cholerae -> profuse watery "rice water" diarrhea, not bloody
- Staphylococcus aureus -> toxin-mediated, rapid onset vomiting
- Salmonella typhi -> enteric fever, not seafood-associated diarrhea

QUESTION

A patient presented with abdominal pain since 4 days with a history of remitting fever and bradycardia after having meals outside frequently. Which test can be done in the patient to confirm the diagnosis?

A Widal test

B Blood culture

CORRECT

C Urine culture

D Stool culture

RIGHT ANSWER

OK B. Blood culture

WHY THIS IS RIGHT

Enteric (Typhoid) fever - *Salmonella typhi*/paratyphi: presents with step-ladder fever, abdominal pain, and relative bradycardia (Faget sign) after outside food intake.

Week of Illness	Test of Choice
1st week	Blood culture
2nd week	Agglutination (Widal test)
3rd week	Stool culture
4th week	Urine culture

QUESTION

A 40-year-old farmer presented with retro-orbital pain, conjunctival suffusion, night fever and chills, calf tenderness, cervical lymphadenopathy, hypokalemia, and joint pain. What can be the most likely diagnosis?

A Malaria

B Leptospirosis

CORRECT

C Filariasis

D Dengue

RIGHT ANSWER

OK

B. Leptospirosis

WHY THIS IS RIGHT

Leptospirosis should be suspected in patients with fever, conjunctival suffusion, and calf muscle tenderness, especially with occupational exposure (e.g., farmers).

- Conjunctival suffusion (redness without discharge)
- Severe calf muscle tenderness (characteristic)
- Fever with chills, myalgia, joint pain
- Retro-orbital pain may be present
- Electrolyte abnormalities (e.g., hypokalemia)

Transmission: Exposure to water/soil contaminated with urine of infected animals (especially rodents)

Severe form: Weil's disease -> jaundice, renal failure, hemorrhage

Differentiation:

- Dengue -> retro-orbital pain but no calf tenderness or conjunctival suffusion
- Malaria -> periodic fever, no conjunctival suffusion

Filariasis -> lymphatic involvement

QUESTION

A 30-year-old male travels frequently and has food during his travels. He presents to PHC OPD with abdominal pain, fever for 4 days. He has bradycardia too. Test for confirmation of diagnosis:

A Blood culture

CORRECT

B Widal test

C Stool culture

D Urine culture

RIGHT ANSWER

OK

A. Blood culture

WHY THIS IS RIGHT

Enteric fever (typhoid) should be suspected in a patient with prolonged fever, abdominal pain, and relative bradycardia (Faget sign) and is caused by *Salmonella typhi*.

Blood culture is the best confirmatory test in the first week of illness

Timeline of investigations:

- 1st week -> Blood culture (highest yield)
- 2nd week onward -> Widal test becomes positive
- Later stages -> Stool and urine cultures may become positive

Why not others:

- Widal test -> not reliable in early phase
- Stool/urine culture -> useful later

QUESTION

A child presents with pharyngitis, and Group A Streptococcus is isolated from the throat specimen. Which bacterial factor facilitates the binding of fibronectin on host cells, thereby aiding in bacterial attachment?

A Lipoprotein

B Lipoteichoic acid

CORRECT

C Capsule

D Flagella

RIGHT ANSWER

OK B. Lipoteichoic acid

WHY THIS IS RIGHT

Group A Streptococcus (*Streptococcus pyogenes*) adheres to host epithelial cells via lipoteichoic acid, which binds to fibronectin on host cells.

- Lipoteichoic acid (LTA) on bacterial surface binds fibronectin
- Fibronectin acts as a bridge to host epithelial cells
- Facilitates colonization of the pharynx

Other virulence factors:

- M protein -> anti-phagocytic, major virulence factor
- Capsule (hyaluronic acid) -> immune evasion
- Streptolysins -> tissue damage

Why not others:

- Lipoprotein -> not primary adhesion factor here
- Capsule -> prevents phagocytosis, not adhesion

Flagella -> GAS is non-motile

QUESTION

A patient is brought to the emergency department with pneumonia and hypotension and later succumbs to the illness. There is a history of meningitis. Postmortem examination of the brain reveals petechial hemorrhages and thrombosed vessels. What is the most likely causative organism?



A *Neisseria meningitidis*

CORRECT

B *Cryptococcus neoformans*

C *Haemophilus influenzae*

D *Streptococcus pneumoniae*

RIGHT ANSWER

OK

A. *Neisseria meningitidis*

WHY THIS IS RIGHT

Neisseria meningitidis causes fulminant meningococemia characterized by septic shock, petechial/purpuric rash, and disseminated intravascular coagulation (DIC).

- Gram-negative diplococcus
- Causes meningitis and rapidly progressive septicemia
- Petechial hemorrhages -> can progress to purpura fulminans
- Endotoxin (LOS) -> massive cytokine release
- Leads to DIC -> thrombosis + hemorrhage

Complication: Waterhouse-Friderichsen syndrome (adrenal hemorrhage)

Differentiation:

- *Streptococcus pneumoniae* -> meningitis without petechial rash
- *Haemophilus influenzae* -> meningitis, less severe septicemia
- *Cryptococcus* -> chronic meningitis in immunocompromised

QUESTION

A patient presents with a brain abscess involving the parieto-occipital region. Laboratory examination reveals Gram-positive, branched, filamentous bacteria that are positive on modified acid-fast staining and grow using the paraffin bait technique. What is the most likely causative organism?

A Mycobacterium species

B Nocardia

CORRECT

C Actinomyces israelii

D Neisseria meningitidis

RIGHT ANSWER

OK

B. Nocardia

WHY THIS IS RIGHT

Nocardia species are aerobic, branching, filamentous Gram-positive bacteria that are weakly acid-fast and characteristically identified by the paraffin bait technique.

- Gram-positive, branching filamentous organisms
- Partially acid-fast (modified Ziehl-Neelsen stain)
- Aerobic organism

Diagnostic clue: Paraffin bait technique -> Nocardia can utilize hydrocarbons (paraffin) for growth

Clinical relevance:

- Causes opportunistic infections
- Common presentations:

- o Pulmonary nocardiosis
- o Brain abscess (classically in immunocompromised patients)
- o Cutaneous infections

Differentiation:

- Actinomyces -> non-acid-fast, anaerobic
- Mycobacterium -> strongly acid-fast, non-branching rods
- Neisseria -> Gram-negative diplococci

QUESTION

An abattoir worker develops a cutaneous ulcer on the dorsum of the hand. Culture of the lesion yields a Gram-positive organism that shows a positive McFadyean's reaction. What is the most likely causative organism in this case?

A Leptospira interrogans

B Clostridium perfringens

C Bacillus anthracis

CORRECT

D Listeria monocytogenes

RIGHT ANSWER

OK C. Bacillus anthracis

WHY THIS IS RIGHT

Bacillus anthracis causes cutaneous anthrax, classically seen in individuals handling animal products (e.g., abattoir workers).

- McFadyean reaction -> demonstrates capsule (polypeptide capsule) using special staining
- Appears as blue bacilli with a pink capsule
- Painless ulcer -> progresses to black eschar with surrounding edema

Key microbiological features:

- Gram-positive, spore-forming rod
- Non-motile
- Forms characteristic "Medusa head" colonies

Differentiation:

- Leptospira -> spirochete (not Gram-positive rod)
- Clostridium perfringens -> gas gangrene, not eschar
- Listeria -> intracellular pathogen, no capsule demonstration by McFadyean

QUESTION

An elderly resident of an old-age home consumed raw milk along with other residents. Shortly after, several individuals developed abdominal pain, bloody diarrhea, and vomiting. Microscopic examination of the stool revealed Gram-negative curved rods. What is the most likely causative organism responsible for this outbreak?

A Clostridium perfringens

B Staphylococcus aureus

C Vibrio parahaemolyticus

D **Campylobacter jejuni**

CORRECT

RIGHT ANSWER

OK

D. Campylobacter jejuni

WHY THIS IS RIGHT

Campylobacter jejuni is a common cause of foodborne gastroenteritis associated with consumption of unpasteurized milk and presents with bloody diarrhea.

- Gram-negative, curved or “comma-shaped” rods
- Microaerophilic organism
- Transmitted via contaminated food (especially unpasteurized milk, poultry)

Important complications:

- Guillain-Barré syndrome
- Reactive arthritis

Differentiation:

- Clostridium perfringens -> toxin-mediated watery diarrhea, no blood
- Staphylococcus aureus -> rapid-onset vomiting due to preformed toxin

Vibrio parahaemolyticus -> seafood-associated diarrhea

QUESTION

A farmer presents with fever, jaundice, and conjunctival hemorrhage, and later succumbs to the illness. What is the most likely disease responsible for this clinical presentation?

- A** Brucellosis
- B** Hepatitis A
- C** **Weil's disease**
- D** Dengue hemorrhagic fever

CORRECT

RIGHT ANSWER

- OK** **C. Weil's disease**

WHY THIS IS RIGHT

Weil's disease is the severe form of leptospirosis caused by *Leptospira interrogans*, typically seen in individuals exposed to contaminated water (e.g., sewage workers). Key clinical triad:

- Fever
- Jaundice
- Hemorrhage (classically conjunctival suffusion/hemorrhage)

Important features:

- Exposure to contaminated water or animal urine (especially rodents)
- Biphasic illness -> septicemic phase followed by immune phase
- Severe disease -> hepatic dysfunction, renal failure, hemorrhage

Differentiation:

- Brucellosis -> undulant fever, no hemorrhage
- Hepatitis A -> jaundice without hemorrhagic features
- Dengue hemorrhagic fever -> thrombocytopenia, no prominent jaundice

QUESTION

A farmer presents with multiple draining sinuses on the foot, with black granules discharging from the lesions. Based on this presentation, what is the most likely microscopic finding expected in this case?



- A Arthrospores
- B Septate hyphae with 4-5-micron width
- C Yeast with pseudohyphae
- D Tender flower rosette

CORRECT

RIGHT ANSWER

- OK B. Septate hyphae with 4-5-micron width

WHY THIS IS RIGHT

No explanation was provided in the source quiz.

Type	Pathology
Madura mycetoma (Eumycetoma)	Caused by fungi; produces black or pale grains.
Actinomycetoma (Actinomycetes mycetoma)	Caused by filamentous bacteria (actinomycetes); produces white/yellow/red grains.
Bacterial mycetoma (non-actinomycetes)	Caused by true bacteria; grains usually absent or minimal, more acute inflammation.

QUESTION

| Which extracellular cell adhesion is disrupted by *Vibrio cholerae*?

- A** Integrin
- B** Cadherin
- C** Occludens CORRECT
- D** None of the above

RIGHT ANSWER

- OK** C. Occludens

WHY THIS IS RIGHT

Vibrio cholerae disrupts tight junctions between intestinal epithelial cells, specifically affecting zonula occludens.

- Cholera toxin -> ↑ cAMP via activation of adenylate cyclase
- Leads to massive chloride and water secretion
- Also disrupts tight junction proteins (occludens), increasing intestinal permeability

Key concept:

- Tight junctions (zonula occludens) maintain paracellular barrier integrity
- Their disruption contributes to profuse watery diarrhea

Differentiation:

- Integrins -> cell-matrix adhesion
- Cadherins -> adherens junctions (cell-cell adhesion)

QUESTION

| Which organism moves transcellularly by utilizing actin filaments?

A Listeria

CORRECT

B EIEC (Enteroinvasive E. coli)

C Salmonella

D Vibrio

RIGHT ANSWER

OK

A. Listeria

WHY THIS IS RIGHT

Listeria monocytogenes spreads from cell to cell by polymerizing host actin filaments.

- Uses ActA protein to induce actin polymerization
- Forms “actin comet tails” that propel the bacterium within and between cells
- Allows transcellular spread without exposure to extracellular immune defenses

Key points:

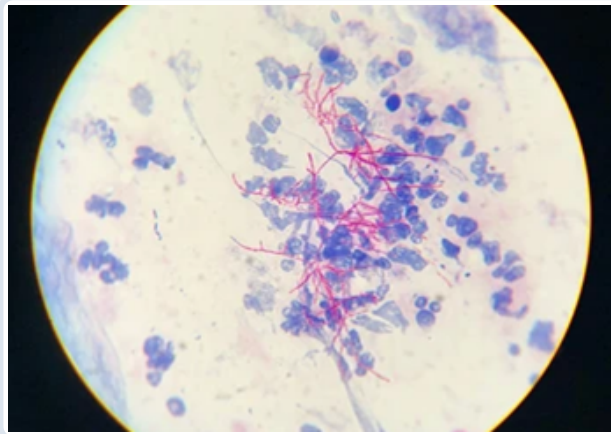
- Facultative intracellular organism
- Causes meningitis and sepsis in neonates, elderly, and immunocompromised
- Shows tumbling motility and grows at low temperatures

Differentiation:

- EIEC -> intracellular but does not use actin-based motility
- Salmonella -> resides in vacuoles (no actin comet tails)
- Vibrio -> extracellular organism

QUESTION

Identify the organism and the staining method used in the provided image.



A Nocardia acid fast stain

CORRECT

B Streptococcus gram stain

C Cryptococcus india ink

D Coccidioidomycosis PAS stain

RIGHT ANSWER

OK

A. Nocardia acid fast stain

WHY THIS IS RIGHT

Nocardia is a partially acid-fast, filamentous, branching Gram-positive bacterium identified using modified acid-fast staining.

- Shows thin, branching, filamentous structures
- Weakly acid-fast due to mycolic acids (demonstrated by modified Ziehl-Neelsen stain)
- Appears as red filaments against blue background

Clinical relevance:

- Causes opportunistic infections, especially in immunocompromised patients
- Common presentations: pulmonary infection, brain abscess, cutaneous disease

Differentiation:

- Actinomyces -> non-acid-fast, anaerobic
- Mycobacteria -> strongly acid-fast, non-branching rods
- Fungi -> seen with PAS/GMS stains, not acid-fast

QUESTION

| Which bacterial toxin acts by interfering with EF-2 function?

A Diphtheria

CORRECT

B Clostridium

C Bacillus

D Vibrio

RIGHT ANSWER

OK

A. Diphtheria

WHY THIS IS RIGHT

Diphtheria toxin inhibits protein synthesis by inactivating elongation factor-2 (EF-2).

- Catalyzes ADP-ribosylation of EF-2
- Blocks translocation step in protein synthesis -> cell death

Key points:

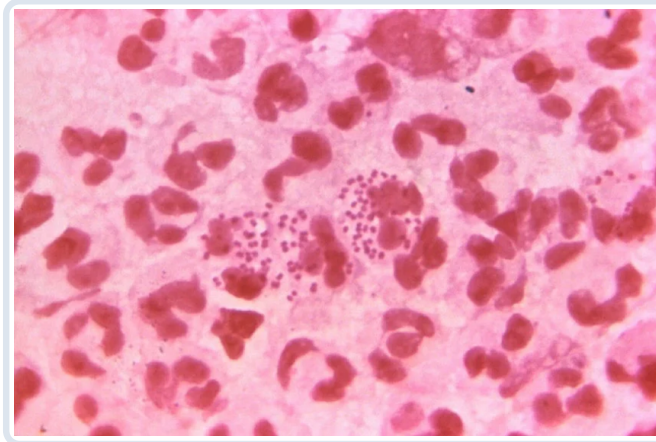
- Produced by *Corynebacterium diphtheriae*
- Responsible for systemic complications such as myocarditis and neuropathy
- Acts as an exotoxin (A-B toxin)

Differentiation:

- Clostridium toxins -> neurotoxins (tetanus, botulinum) affecting neurotransmitters
- Bacillus (e.g., anthrax) -> edema and lethal toxins
- Vibrio cholerae -> activates adenylate cyclase -> ↑ cAMP

QUESTION

A woman presents with dysuria and yellowish discharge. Gram staining is shown below. What is the diagnosis?



A Trichomoniasis

B **Neisseria**

CORRECT

C Chlamydia

D Bacterial vaginosis

RIGHT ANSWER

OK **B. Neisseria**

WHY THIS IS RIGHT

Gram-negative diplococci seen on Gram stain in a patient with dysuria and yellowish discharge is characteristic of *Neisseria gonorrhoeae* infection.

- Appears as kidney-shaped Gram-negative diplococci, often intracellular within neutrophils
- Causes gonorrhea, presenting with urethritis, cervicitis, and purulent discharge
- Transmitted sexually

Differentiation:

- Trichomoniasis -> motile protozoa, not seen on Gram stain
- Chlamydia -> intracellular organism not visible on Gram stain
- Bacterial vaginosis -> clue cells, mixed flora, not diplococci

QUESTION

| Drug resistance is seen in which of the following STDs:

- A** Syphilis
- B** Chancroid
- C** Donovanosis

D **Gonorrhea**

CORRECT

RIGHT ANSWER

OK **D. Gonorrhea**

WHY THIS IS RIGHT

Antimicrobial resistance is a major concern in sexually transmitted infections, especially with *Neisseria gonorrhoeae*.

- *Neisseria gonorrhoeae* shows high levels of drug resistance
- Resistance has been reported to penicillin, tetracycline, fluoroquinolones, and even emerging resistance to cephalosporins
- Mechanisms include β -lactamase production, altered penicillin-binding proteins, and efflux pumps

Clinical relevance:

- Requires updated treatment guidelines (currently ceftriaxone-based regimens)
- Regular surveillance of resistance patterns is essential

Differentiation:

- Syphilis (*Treponema pallidum*) -> remains sensitive to penicillin
- Chancroid -> some resistance reported but not as significant
- Donovanosis -> treated effectively with antibiotics like azithromycin

QUESTION

Which among the following is the most specific disease caused by *Streptococcus agalactiae*?

- A Neonatal sepsis**
- B Infective endocarditis
- C Dental caries
- D Pharyngitis with or without tonsillitis

CORRECT

RIGHT ANSWER

- OK**
A. Neonatal sepsis

WHY THIS IS RIGHT

Streptococcus agalactiae (Group B *Streptococcus*) is classically associated with neonatal infections.

- Most specific disease: neonatal sepsis (early- and late-onset)
- Also causes neonatal meningitis and pneumonia
- Transmitted from colonized maternal genital tract during delivery

Clinical relevance:

- Screening of pregnant women (35-37 weeks) is recommended
- Intrapartum antibiotic prophylaxis prevents neonatal infection

Differentiation:

- *Streptococcus pyogenes* -> pharyngitis, rheumatic fever
- *Streptococcus mutans* -> dental caries
- Infective endocarditis -> more commonly due to viridans streptococci or *Staphylococcus aureus*

QUESTION

A patient was injured with a rusted metal object. What is the mechanism of action of tetanus toxin in such cases?

A Inhibit the release of GABA and glycine

CORRECT

B Inhibit the release of Acetylcholine

C Inhibit the release of epinephrine

D Inhibit the release of norepinephrine

RIGHT ANSWER

OK

A. Inhibit the release of GABA and glycine

WHY THIS IS RIGHT

Tetanus toxin (tetanospasmin) causes spastic paralysis by blocking inhibitory neurotransmission. Inhibits release of inhibitory neurotransmitters GABA and glycine from interneurons in the spinal cord

Loss of inhibitory control -> continuous motor neuron excitation -> muscle rigidity and spasms

Clinical features:

- Trismus (lockjaw)
- Opisthotonus
- Generalized muscle spasms

Differentiation:

- Botulinum toxin inhibits acetylcholine release -> flaccid paralysis
- Tetanus causes spastic paralysis due to inhibition of inhibitory neurotransmitters

QUESTION

Assertion - Reason:**(A) Myocarditis is the common known complication of faucial diphtheria****(R) It is due to bacteremia by diphtheria**

- A** Assertion is true, reason is true; reason is the correct explanation for the assertion
- B** Assertion is true, reason is true; reason is not the correct explanation for the assertion
- C** Assertion is false and reason is true
- D** Assertion is true and reason is false **CORRECT**

RIGHT ANSWER

OK **D. Assertion is true and reason is false**

WHY THIS IS RIGHT

Myocarditis is a well-known and serious complication of faucial diphtheria, but it is not due to bacteremia.

- *Corynebacterium diphtheriae* produces a potent exotoxin
- The toxin spreads hematogenously and causes damage to distant organs, especially the heart and nerves
- Myocarditis occurs due to toxin-mediated inhibition of protein synthesis (via EF-2 inactivation), not due to direct bacterial invasion

Concept clarification:

- Diphtheria is primarily a toxemia, not a bacteremia
- Local infection remains in the throat, while systemic effects are toxin-mediated

QUESTION

A female patient presents with swollen Bartholin glands. Discharging pus showed Gram-negative intracellular diplococci. Which is the organism?

A *Neisseria gonorrhoeae*

CORRECT

B Chlamydia

C Chancroid

D Syphilis

RIGHT ANSWER

OK **A. *Neisseria gonorrhoeae***

WHY THIS IS RIGHT

Gram-negative intracellular diplococci seen in pus from an infected Bartholin gland are characteristic of *Neisseria gonorrhoeae*.

- Appears as kidney-shaped Gram-negative diplococci inside neutrophils
- Causes gonorrhea, a sexually transmitted infection
- Commonly presents with urethritis, cervicitis, and can involve Bartholin glands
- Culture on selective media (e.g., Thayer-Martin) confirms diagnosis

Differentiation:

- *Chlamydia trachomatis* -> intracellular but not visible on Gram stain
- Chancroid (*Haemophilus ducreyi*) -> Gram-negative coccobacilli ("school of fish")
- *Treponema pallidum* -> spirochete, not seen on Gram stain

QUESTION

A 10-year-old child has been diagnosed with diphtheria and is being treated in the ward. His 2.5-year-old brother, who lives in the same house, has received all due vaccinations according to NIS. What is the next best step for the management of the younger sibling?

- A DPT booster
- B Reassure as he is vaccinated
- C Erythromycin + diphtheria toxoid

D Erythromycin only

CORRECT

RIGHT ANSWER

OK D. Erythromycin only

WHY THIS IS RIGHT

For contacts of diphtheria:

1. Antibiotic prophylaxis -> eradicate carriage
2. ± Vaccine (toxoid) depending on immunization status

Why ONLY erythromycin here?

- Child is fully immunized -> already has protective antibodies
- So NO need for booster/toxoid immediately
- Only need to eliminate possible colonization

☐ Hence: Erythromycin only

QUESTION

Match each disease with the correct causative agent from the options provided:

Disease	Options
a. Donovanosis	1. <i>Treponema carateum</i>
b. Oroya fever	2. <i>Klebsiella granulomatis</i>
c. Rat bite fever	3. <i>Bartonella bacilliformis</i>
d. Pinta	4. <i>Streptobacillus moniliformis</i>

A a-1, b-2, c-3, d-4

B a-2, b-3, c-4, d-1

CORRECT

C a-2, b-4, c-3, d-1

D a-3, b-2, c-1, d-4

RIGHT ANSWER

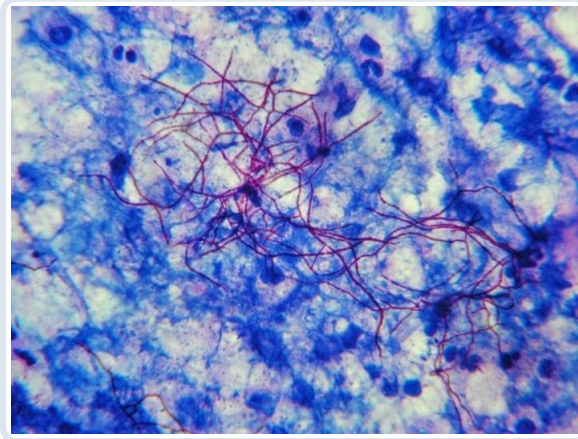
OK B. a-2, b-3, c-4, d-1

WHY THIS IS RIGHT

Condition	Organism
Donovanosis	*Klebsiella granulomatis*
Oroya fever	*Bartonella bacilliformis*
Rat bite fever	*Streptobacillus moniliformis*
Pinta	*Treponema carateum*

QUESTION

A farmer presents with history of blunt trauma to the chest. There is formation of pus from the wound. Microscopy showed mildly acid-fast bacteria with branching. What is the most likely organism?



A Mycobacterium tuberculosis

B Nocardia species

CORRECT

C Listeria

D Anthrax

RIGHT ANSWER

OK

B. Nocardia species

WHY THIS IS RIGHT

Mildly acid-fast, branching filamentous bacteria in a pus sample are characteristic of Nocardia species.

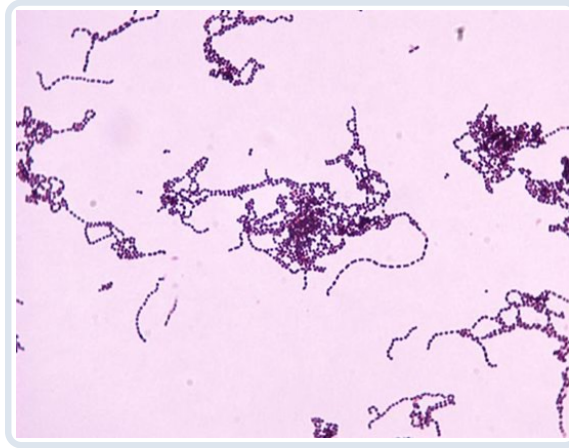
- Nocardia are Gram-positive, branching filamentous bacteria
- They are weakly acid-fast due to mycolic acids in the cell wall
- Found in soil and enter through traumatic implantation or inhalation
- Cause cutaneous infections, mycetoma, and pulmonary disease

Differentiation:

- Mycobacterium tuberculosis -> strongly acid-fast, non-branching rods
- Actinomyces -> branching but non-acid-fast
- Listeria -> short Gram-positive rods
- Bacillus anthracis -> large Gram-positive rods in chains

QUESTION

A 20-year male had a pustule which rapidly progressed to necrotizing fascitis. On microscopy findings were seen. What is the most likely organism involved in this case?



A Streptococcus pyogenes

CORRECT

B Staphylococcus aureus

C Enterococcus

D Micrococcus

RIGHT ANSWER

OK

A. Streptococcus pyogenes

WHY THIS IS RIGHT

Rapidly progressive necrotizing fasciitis with Gram-positive cocci arranged in chains on microscopy is characteristic of *Streptococcus pyogenes* (Group A *Streptococcus*).

- Gram-positive cocci in chains -> *Streptococcus* species
- *Streptococcus pyogenes* is the most common cause of necrotizing fasciitis ("flesh-eating disease")
- Produces exotoxins (streptolysins, pyrogenic exotoxins) causing rapid tissue destruction
- Can lead to streptococcal toxic shock syndrome

Differentiation:

- *Staphylococcus aureus* -> Gram-positive cocci in clusters
- *Enterococcus* -> pairs/short chains, less aggressive soft tissue infection
- *Micrococcus* -> tetrads, usually non-pathogenic

QUESTION

| Which of the following test is used for antibiotic sensitivity?

A Elek's test

B E-test (Epsilometer test)

CORRECT

C Latex agglutination test

D CAMP test

RIGHT ANSWER

OK

B. E-test (Epsilometer test)

WHY THIS IS RIGHT

The E-test (Epsilometer test) is used to determine antibiotic sensitivity by providing a quantitative measure of the minimum inhibitory concentration (MIC).

- A plastic strip impregnated with a gradient of antibiotic is placed on an inoculated agar plate
- An elliptical zone of inhibition forms after incubation
- The MIC is read where the ellipse intersects the strip

Why not others:

- Elek's test detects diphtheria toxin production
- Latex agglutination is used for antigen detection
- CAMP test identifies Group B Streptococcus

QUESTION

Choose the correct statements from the following options:

- a. Widal test done in first week of illness
- b. Microscopic agglutination test in *Leptospira*
- c. Weil Felix test in typhus fever
- d. Standard agglutination test in Brucellosis
- e. VDRL used for *Treponema pallidum*

A a, b, c, d

B b, c, d, e

CORRECT

C a, c, d

D c & d only

RIGHT ANSWER

OK B. b, c, d, e

WHY THIS IS RIGHT

Understanding the appropriate serological tests for different infections is essential for diagnosis and exam questions.
Correct associations:

- *Leptospira* -> Microscopic agglutination test (MAT)
- Typhus (rickettsial infections) -> Weil-Felix test
- Brucellosis -> Standard agglutination test (SAT)
- *Treponema pallidum* -> VDRL (non-treponemal screening test)

Incorrect statement:

- Widal test is not useful in the first week of illness; it becomes positive only after 7-10 days

QUESTION

Match the following pairs between column 1 and column 2 correctly.

Column 1	Column 2
1. Elek's gel precipitation	a. Streptococcus pneumoniae
2. Quellung reaction	b. Corynebacterium diphtheriae
3. String test	c. Staphylococcus
4. Coagulase	d. Vibrio cholerae

A 1-a, 2-d, 3-c, 4-b

B 1-d, 2-c, 3-a, 4-b

C 1-a, 2-b, 3-c, 4-d

D 1-b, 2-a, 3-d, 4-c

CORRECT

RIGHT ANSWER

OK D. 1-b, 2-a, 3-d, 4-c

WHY THIS IS RIGHT

Organism	Test	Purpose
Corynebacterium diphtheriae	Elek's gel precipitation test	Detects diphtheria toxin via immunodiffusion.
Streptococcus pneumoniae	Quellung reaction	Demonstrates capsular swelling with specific antisera.
Vibrio cholerae	String test	Shows mucoid "string" formation confirming Vibrio colony.
Staphylococcus aureus	Coagulase test	Differentiates S. aureus by fibrin clot formation.

QUESTION

The Kanagawa phenomenon, demonstrated using Wagatsuma agar, is characteristic of which bacterial organism?

- A Vibrio cholerae
- B Vibrio parahaemolyticus**
- C Shigella sonnei
- D Burkholderia pseudomallei

CORRECT

RIGHT ANSWER

- OK
- B. Vibrio parahaemolyticus**

WHY THIS IS RIGHT

The Kanagawa phenomenon is a hemolysis reaction seen on Wagatsuma agar and is characteristic of *Vibrio parahaemolyticus*.

- Demonstrates beta-hemolysis due to thermostable direct hemolysin (TDH)
- TDH is a major virulence factor responsible for enterotoxic effects
- Associated with seafood-related gastroenteritis (especially raw/undercooked seafood)

Differentiation:

- *Vibrio cholerae* -> causes rice-water diarrhea via cholera toxin (no Kanagawa phenomenon)
- *Shigella* -> invasive dysentery, no hemolysis on Wagatsuma agar
- *Burkholderia pseudomallei* -> causes melioidosis, unrelated

QUESTION

Identify the organism by this Test?



- A** Group B streptococcus
- B** **Haemophilus influenzae**
- C** Corynebacterium diphtheriae
- D** Clostridium tetani

CORRECT

RIGHT ANSWER

OK

B. Haemophilus influenzae

WHY THIS IS RIGHT

The image represents the satellitism test, used to identify *Haemophilus influenzae*.

- *Haemophilus influenzae* requires both X factor (hemin) and V factor (NAD) for growth
- On blood agar, it shows satellitism around *Staphylococcus aureus* colonies, which provide V factor
- Appears as small colonies growing around a streak of *S. aureus*

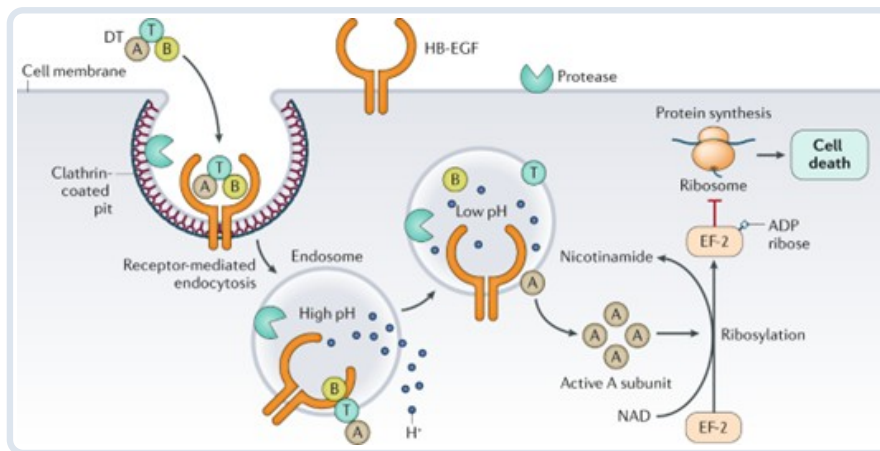
Clinical relevance:

- Causes meningitis, pneumonia, epiglottitis, and otitis media
- Encapsulated type b (Hib) is most virulent

Thus, satellitism on blood agar is a key diagnostic feature of *Haemophilus influenzae*.

QUESTION

Which of the following statements about the toxin shown (Diphtheria toxin mechanism) is incorrect?



A Most toxic known to man

CORRECT

B Causes myocarditis

C It is an exotoxin

D Vaccine is available

RIGHT ANSWER

OK

A. Most toxic known to man

WHY THIS IS RIGHT

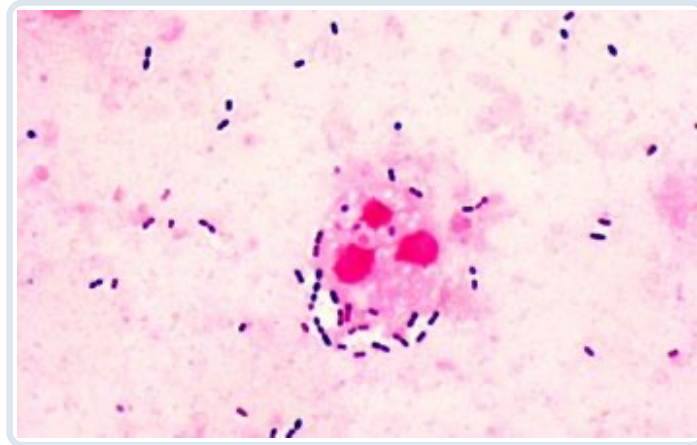
Diphtheria toxin is an AB exotoxin that inhibits protein synthesis by ADP-ribosylation of elongation factor-2 (EF-2), leading to cell death.

- It is an exotoxin produced by *Corynebacterium diphtheriae*
- Mechanism: inactivates EF-2 → blocks protein synthesis
- Causes systemic complications, especially myocarditis and neuropathy
- Vaccine is available (toxoid vaccine) and provides effective protection
- It is highly potent but not the most toxic substance known (botulinum toxin is more potent)

Thus, diphtheria toxin is an exotoxin causing inhibition of protein synthesis, with vaccine availability, and the incorrect statement is that it is the most toxic known to man.

QUESTION

A 65-year-old man presents with fever, productive cough with rusty-colored sputum, and shortness of breath for 3 days. Gram staining is shown. Which test confirms the organism?



A Catalase test

B Coagulase test

C Bile solubility test

CORRECT

D Novobiocin sensitivity

RIGHT ANSWER

OK

C. Bile solubility test

WHY THIS IS RIGHT

A patient with fever, productive cough with rusty sputum, and lobar pneumonia is suggestive of *Streptococcus pneumoniae*.

The confirmatory test is the bile solubility test.

- *Streptococcus pneumoniae* is a Gram-positive, lancet-shaped diplococcus
- It is alpha-hemolytic and optochin sensitive
- Bile solubility test differentiates it from viridans streptococci
- *Pneumococcus* is bile soluble due to autolytic enzyme activation

Why not others:

- Catalase test differentiates Staphylococci (positive) from Streptococci (negative)
- Coagulase test identifies *Staphylococcus aureus*
- Novobiocin sensitivity differentiates *Staphylococcus saprophyticus* (resistant) from *Staphylococcus epidermidis*

QUESTION

| Which of the following is an obligate intracellular organism?

A Campylobacter jejuni

B Tropheryma whipplei

C Ehrlichia chaffeensis

CORRECT

D Serratia marcescens

RIGHT ANSWER

OK

C. Ehrlichia chaffeensis

WHY THIS IS RIGHT

Obligate intracellular organisms are bacteria that must live and multiply inside host cells because they lack the ability to generate sufficient energy independently.

- Ehrlichia chaffeensis is an obligate intracellular bacterium
 - > Infects monocytes
 - > Forms morulae (intracytoplasmic inclusions)
 - > Transmitted by tick bite

Other obligate intracellular organisms:

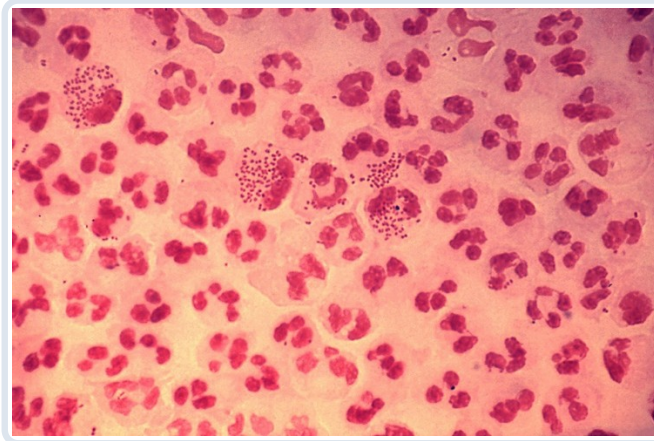
- Chlamydia
- Rickettsia
- Coxiella
- Ehrlichia
- Anaplasma

Why not others:

- Campylobacter jejuni -> extracellular
- Tropheryma whipplei -> intracellular but not obligate
- Serratia marcescens -> extracellular

QUESTION

A man presents with a history of dysuria and urethral discharge after having unprotected sexual intercourse. Gram-staining of the purulent discharge is seen in the following image. What is the treatment of choice for this infection?



A Erythromycin

B Azithromycin

C Ceftriaxone

CORRECT

D Penicillin G

RIGHT ANSWER

OK

C. Ceftriaxone

WHY THIS IS RIGHT

Treatment Component	Details
DOC for uncomplicated gonorrhoea	Third-generation cephalosporins; treat both partners
Ceftriaxone	250 mg IM, single dose
Cefixime	400 mg orally, single dose
If coexisting Chlamydia	Add azithromycin or doxycycline

QUESTION

An adult male patient presented with the following condition on his private parts. A gram-negative diplococcus was found in the gram stain. The drug of choice for treatment is:



A Tab Azithromycin

B Tab Cefixime 400 mg

CORRECT

C Tab Doxycycline 200 mg

D Inj. Benzathine Penicillin

RIGHT ANSWER

OK

B. Tab Cefixime 400 mg

WHY THIS IS RIGHT

A genital lesion with Gram-negative diplococci on smear indicates *Neisseria gonorrhoeae* infection (gonorrhea).

- Gram-negative intracellular diplococci (inside neutrophils) -> diagnostic clue
- Common presentation: urethritis, discharge, dysuria; may also present with genital lesions

Treatment:

- Cefixime (oral) or Ceftriaxone (preferred IM)
- Often combined with azithromycin/doxycycline to cover possible *Chlamydia* co-infection

Why not others:

- Azithromycin alone -> insufficient for gonorrhea
- Doxycycline -> used for *Chlamydia*, not gonorrhea
- Benzathine penicillin -> for syphilis

QUESTION

A 3-week-old infant is brought to OPD with complaints of cough and sore throat. The mother reports that the infant develops a paroxysm of cough followed by apnea. Blood investigations reveal total leucocyte count to be $>50,000$ cells/L. Which of the following drugs is appropriate for this patient?

A Azithromycin

CORRECT

B Amoxicillin

C Cotrimoxazole

D Ciprofloxacin

RIGHT ANSWER

OK A. Azithromycin

WHY THIS IS RIGHT

Pertussis (whooping cough) in infants presents with paroxysmal coughing, apnea, and marked lymphocytosis, and requires prompt macrolide therapy.

- Caused by *Bordetella pertussis*
- Features: paroxysmal cough, inspiratory “whoop” (may be absent in infants), apnea, post-tussive vomiting
- Marked leukocytosis with lymphocyte predominance is characteristic

Treatment:

- Azithromycin is the drug of choice in infants (preferred over erythromycin due to better safety profile)
- Early treatment reduces transmission and severity

Clinical importance:

- Infants are at high risk of complications such as apnea and pneumonia
- Close contacts should also receive prophylaxis

QUESTION

A 50-year-old male presents with complaints of leg swelling and pain in the heel, which started a few days after he began an antibiotic course for a lower respiratory tract infection. Examination reveals signs suggestive of Achilles tendinitis. Which of the following best describes the mechanism of action of the drug most likely responsible for his condition?

A Inhibition of bacterial protein synthesis

B Inhibition of bacterial cell wall synthesis

C Inhibition of bacterial DNA gyrase

CORRECT

D Inhibition of bacterial folic acid synthesis

RIGHT ANSWER

OK

C. Inhibition of bacterial DNA gyrase

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

A woman presenting with symptoms of urinary tract infection was prescribed a drug that causes tendon rupture and arthropathy. What is the mechanism of action of the drug?

- A** DNA gyrase inhibition
- B** Ribosomal inhibition
- C** Cell wall synthesis inhibition
- D** Inhibition of folic acid synthesis

CORRECT

RIGHT ANSWER

OK **A. DNA gyrase inhibition**

WHY THIS IS RIGHT

“Tendon rupture + arthropathy”

This is a signature adverse effect of Fluoroquinolones. Targets -

- DNA gyrase (Topoisomerase II) -> Gram-negative bacteria
- Topoisomerase IV -> Gram-positive bacteria

Tendon rupture and arthropathy are classic adverse effects of fluoroquinolones. These drugs act by inhibiting bacterial DNA gyrase (topoisomerase II) and topoisomerase IV. This blocks DNA replication and transcription. The toxicity clue points to the fluoroquinolone mechanism.

Mechanism	Drug Class	Example
-----	-----	-----
DNA gyrase inhibition	Fluoroquinolones	Ciprofloxacin
Protein synthesis inhibition	Aminoglycosides	Gentamicin
Cell wall inhibition	β -lactams	Penicillin
Folate inhibition	Sulfonamides	TMP-SMX

QUESTION

A 25-year-old male presents to the clinic with complaints of burning sensation during urination and a purulent discharge from the penis for the past 5 days. He has had unprotected sexual intercourse with a new partner two weeks ago. On examination, the urethral meatus is erythematous, and there is a noticeable purulent discharge. A Gram stain of the discharge reveals intracellular gram-negative diplococci. The patient is otherwise healthy and has no known drug allergies. What is the most appropriate treatment for this patient?

A Benzathine penicillin G 2.4 million Units intramuscularly

B Cefixime 400 mg orally

CORRECT

C Metronidazole 500 mg thrice a day

D Doxycycline 100 mg twice a day

RIGHT ANSWER

OK B. Cefixime 400 mg orally

WHY THIS IS RIGHT

Urethritis + purulent discharge

↓

Gram stain -> GN diplococci

↓

Gonorrhea

↓

Use cephalosporin

↓

Cefixime

Intracellular gram-negative diplococci indicate *Neisseria gonorrhoeae*. Third-generation cephalosporins are first-line therapy for uncomplicated gonorrhea. Oral cefixime is an accepted alternative when parenteral therapy is not used. Penicillin resistance is common, and doxycycline/metronidazole do not treat gonorrhea.

| Infection | Drug |

| ----- | --- |

| Gonorrhea | Ceftriaxone / Cefixime |

| Chlamydia | Doxycycline / Azithromycin |

| Syphilis | Penicillin |

| Trichomonas | Metronidazole |

QUESTION

A 63-year-old diabetic woman presents with fever, flank pain, dysuria, and elevated WBC count. Imaging reveals mild hydronephrosis. Urinalysis shows pyuria and bacteriuria. She is diagnosed with a complicated urinary tract infection (UTI). Which of the following is the parenteral drug of choice for empirical treatment of a complicated UTI?

A Ceftriaxone

B Meropenem

CORRECT

C Amoxicillin-clavulanate

D Nitrofurantoin

RIGHT ANSWER

OK B. Meropenem

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

A 24-year-old sexually active male presents to the outpatient department with complaints of painful urination and a thick yellow urethral discharge for the past 3 days. He denies any fever, chills, or flank pain. He reports multiple unprotected sexual encounters in the past month. A urethral swab is sent for Gram stain, which shows intracellular gram-negative diplococci within polymorphonuclear leukocytes. The organism is resistant to penicillins. Which of the following is the most appropriate treatment?

A Ceftriaxone

CORRECT

B Vancomycin

C Amoxicillin

D Tetracycline

RIGHT ANSWER

OK A. Ceftriaxone

WHY THIS IS RIGHT

Disseminated Gonococcal Infection (DGI): Triad:

- Dermatitis
- Tenosynovitis
- Migratory polyarthritis

Resistance Mechanisms for penicillin

1. β -lactamase production (penicillinase)
2. Altered PBPs ($\downarrow$ binding affinity)
3. Efflux pumps

Penicillins (amoxicillin) become ineffective

Intracellular gram-negative diplococci in urethral discharge indicate *Neisseria gonorrhoeae*. Penicillin resistance is common due to β -lactamase production. A third-generation cephalosporin like ceftriaxone is the drug of choice for resistant gonorrhea. It provides reliable activity and high cure rates for uncomplicated infection.

| Condition | Treatment |

| ----- | ----- |

| Uncomplicated gonorrhea | Ceftriaxone IM single dose |

| With possible Chlamydia | Ceftriaxone + Azithromycin/Doxycycline |

QUESTION

Which of the following is an indication for short-course bedaquiline-containing regimen in the treatment of tuberculosis?

A Rifampicin resistance with katG and inhA mutations

B Extrapulmonary TB with hydrocephalus

C Rifampicin resistant but FQ sensitive TB

CORRECT

D Rifampicin sensitive TB

RIGHT ANSWER

OK C. Rifampicin resistant but FQ sensitive TB

WHY THIS IS RIGHT

The short-course bedaquiline-containing regimen (shorter MDR/RR-TB regimen) is indicated in rifampicin-resistant TB (RR-TB) that is sensitive to fluoroquinolones.

• Eligibility criteria:

- o Rifampicin-resistant / MDR-TB
- o Confirmed fluoroquinolone sensitivity
- o No prior significant exposure to second-line drugs
- o No extensive or severe extrapulmonary disease

• Rationale:

- o Fluoroquinolones are the backbone drugs -> resistance reduces efficacy
- o Bedaquiline improves outcomes in eligible RR-TB patients

• Why not others:

- o katG/inhA mutations: indicate isoniazid resistance, not criteria for shorter regimen
- o Extrapulmonary TB (e.g., hydrocephalus): excluded due to poor drug penetration
- o Rifampicin-sensitive TB: treated with standard first-line regimen

QUESTION

A 35-year-old homeless man presented with a 1-month history of fever, cough, and weight loss. Both sputum smears turned out to be negative, but the chest x-ray ordered was suggestive of tuberculosis. According to the recent NTEP guidelines, which is the next best line of management?

- A Repeat sputum smears
- B CBNAAT**
- C Line probe assay
- D Wait until TB culture results to start ATT

CORRECT

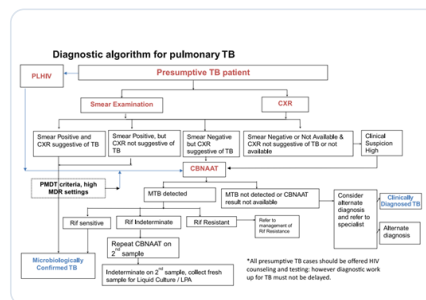
RIGHT ANSWER

OK

B. CBNAAT

WHY THIS IS RIGHT

In a patient with clinical and radiological features suggestive of tuberculosis but negative sputum smear microscopy, the next recommended diagnostic step under NTEP is CBNAAT (Cartridge-Based Nucleic Acid Amplification Test). CBNAAT has higher sensitivity, detects *Mycobacterium tuberculosis* DNA, and simultaneously identifies rifampicin resistance, enabling early initiation of appropriate therapy. Waiting for culture delays treatment, while repeating smear or performing LPA is not the preferred next step in smear-negative presumptive TB.



QUESTION

Which of the following is an inclusion criterion for the shorter bedaquiline regimen in the treatment of tuberculosis?

- A Extrapulmonary TB like Tubercular meningitis
- B Rifampicin resistance with both KatG and inhA mutation
- C Rifampicin-sensitive TB
- D Rifampicin-resistant but fluoroquinolone-sensitive TB**

CORRECT

RIGHT ANSWER

- D. Rifampicin-resistant but fluoroquinolone-sensitive TB**

WHY THIS IS RIGHT

The shorter bedaquiline-containing regimen (all-oral shorter regimen) is indicated in rifampicin-resistant TB (RR-TB) that is sensitive to fluoroquinolones.

• Eligibility criteria:

- o Rifampicin-resistant TB (RR-TB) or MDR-TB
- o No resistance to fluoroquinolones
- o No prior exposure to second-line drugs that could cause resistance

• Rationale:

- o Fluoroquinolones are the core drugs of the shorter regimen
- o Resistance to them -> poor outcomes -> regimen not suitable

• Why not others:

- o Extrapulmonary TB (e.g., TB meningitis): excluded due to poor drug penetration
- o Rifampicin-sensitive TB: treated with standard first-line regimen
- o KatG/inhA mutations: relate to isoniazid resistance, not criteria for shorter regimen

QUESTION

| Multidrug-resistant (MDR) TB shows resistance to which of the following drugs?

A Isoniazid, rifampicin, and fluoroquinolone

B Fluoroquinolones

C Isoniazid and rifampicin

CORRECT

D Isoniazid, rifampicin, and kanamycin

RIGHT ANSWER

OK

C. Isoniazid and rifampicin

WHY THIS IS RIGHT

Multidrug-resistant tuberculosis (MDR-TB) is defined as resistance to at least both isoniazid (INH) and rifampicin, the two most potent first-line anti-TB drugs. These are the backbone of standard TB therapy -> resistance makes treatment difficult

· Related terms:

o XDR-TB (Extensively drug-resistant TB):

• MDR-TB + resistance to any fluoroquinolone + at least one second-line injectable drug (e.g., amikacin, kanamycin, capreomycin)

· Causes of resistance:

o Incomplete/irregular treatment

o Poor compliance

o Inadequate drug regimens

Why not others:

· Fluoroquinolone resistance alone ≠ MDR

· Resistance to INH + rifampicin + others -> goes beyond MDR (e.g., XDR)

QUESTION

A patient with HIV with a CD4 count of 250 cells/mm³ is newly diagnosed to have rifampicin resistance TB. Which of the following is the appropriate regimen, and what should be monitored?

- A** Isoniazid, Ethambutol, Streptomycin, Pyrazinamide for 9 months and optic neuritis
- B** Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin for 6 months and immune reconstitution syndrome CORRECT
- C** Isoniazid, Ethambutol, Levofloxacin, Pyrazinamide for 6 months and hepatotoxicity
- D** Isoniazid, Ethambutol, Clarithromycin, Pyrazinamide for 12 months and pyridoxine deficiency

RIGHT ANSWER

- OK** **B. Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin for 6 months and immune reconstitution syndrome**

WHY THIS IS RIGHT

In HIV patients with rifampicin-resistant TB (RR/MDR-TB), the preferred treatment is a short, all-oral regimen-BPaLM (Bedaquiline + Pretomanid + Linezolid + Moxifloxacin) for 6 months.

- Rifampicin resistance = treat as MDR-TB
- Avoid standard first-line regimens (HRZE) -> ineffective
- Prefer shorter, oral regimens over older injectable-based therapies

HIV-specific considerations:

- Start ATT first, then initiate ART early (within 2-8 weeks)
- CD4 = 250 -> ART should still be started early
- Monitor for immune reconstitution inflammatory syndrome (IRIS) after ART initiation

Drug monitoring:

- Bedaquiline -> QT prolongation
- Linezolid -> myelosuppression, neuropathy
- Pretomanid -> hepatotoxicity
- Moxifloxacin -> QT prolongation

QUESTION

A 40-year-old man, newly diagnosed with HIV infection, presents with low-grade fever, productive cough, and weight loss. A chest X-ray reveals miliary nodules throughout both lung fields. Sputum GeneXpert reveals *Mycobacterium tuberculosis* with rifampicin resistance. He is not yet started on ART. His CD4 count is 110 cells/mm³. What is the most appropriate management?

- A** Start BPaLM regimen for 6 months and follow up for immune reconstitution inflammatory syndrome (IRIS) CORRECT
- B** Start HEZ plus levofloxacin for 9 months and monitor for optic neuritis
- C** Start HEZ plus linezolid for 9 months and monitor for hepatotoxicity
- D** Start kanamycin-based MDR regimen for 20 months and continue ART without interruption

RIGHT ANSWER

- OK** **A. Start BPaLM regimen for 6 months and follow up for immune reconstitution inflammatory syndrome (IRIS)**

WHY THIS IS RIGHT

In HIV patients with rifampicin-resistant (RR/MDR) tuberculosis, the recommended management is an all-oral, shorter regimen such as BPaLM (Bedaquiline + Pretomanid + Linezolid + Moxifloxacin) for ~6 months.

- GeneXpert showing rifampicin resistance = treat as MDR-TB
- BPaLM regimen is now preferred:

- o Shorter duration (≈6 months)
- o Fully oral (no injectables)
- o Higher success rates

HIV considerations:

- Start ATT immediately
- Initiate ART early (within 2 weeks for CD4 <200)
- Monitor for IRIS after ART initiation

Why not other options:

- HEZ regimens -> ineffective in rifampicin-resistant TB
- Kanamycin-based regimens -> outdated, toxic (ototoxicity), longer duration
- Injectable regimens are no longer preferred

QUESTION

A 38-year-old man presents with chronic cough, fever, and significant weight loss. Chest X-ray shows right upper lobe infiltrates, and sputum is positive for acid-fast bacilli (AFB). During evaluation, he is found to be HIV positive. What is the most appropriate management plan?

A Start anti-tubercular therapy (ATT) and ART simultaneously

B Start ATT first, and initiate ART after 2 weeks

CORRECT

C Start ART first, and add ATT after 2 weeks

D Complete ATT first, then start ART

RIGHT ANSWER

OK

B. Start ATT first, and initiate ART after 2 weeks

WHY THIS IS RIGHT

In patients with HIV-tuberculosis coinfection, the priority is to start anti-tubercular therapy (ATT first), followed by early initiation of ART (within 2 weeks)-especially in those with advanced immunosuppression.

- ATT is started immediately to control active TB (reduces mortality and transmission)
- ART is delayed briefly (≈2 weeks) to:

- o Reduce risk of immune reconstitution inflammatory syndrome (IRIS)
- o Improve drug tolerance and adherence

Timing of ART:

- CD4 < 50 cells/mm³ -> start ART within 2 weeks
- CD4 > 50 -> start ART within 2-8 weeks

Why not other options:

- Simultaneous start -> ↑ risk of severe IRIS
- ART first -> worsens untreated TB
- Delay ART till ATT completion -> ↑ HIV progression and mortality

QUESTION

A 40-year-old woman presents with a slowly progressive lesion on her cheek showing central atrophy for the past 2 years. A chest X-ray reveals apical calcification of the right lung. Which diagnostic test should be performed to confirm the underlying cause of this condition?



- A Mantoux test
- B Split skin smear
- C PCR**
- D Skin biopsy with AFB

CORRECT

RIGHT ANSWER

C. PCR

WHY THIS IS RIGHT

Chronic, slowly progressive facial skin lesions with central atrophy and evidence of past pulmonary tuberculosis (apical calcification) suggest lupus vulgaris (cutaneous tuberculosis).

- Lupus vulgaris is a paucibacillary form of cutaneous TB (hence no role of AFB and skin biopsy)
- Presents as slowly enlarging plaques with central atrophy ("apple jelly nodules")
- Often associated with prior TB focus (e.g., lung calcification)

Diagnosis:

- PCR is the most sensitive test for detecting *Mycobacterium tuberculosis* DNA in paucibacillary lesions
- Smear/culture often negative due to low bacillary load

Why not others:

- Mantoux test -> indicates exposure, not confirmatory
- Split skin smear -> used for leprosy
- Probe test -> not relevant here

QUESTION

A patient undergoing antitubercular therapy reports joint pain 10 days after initiation of treatment. Laboratory tests reveal normal AST and ALT levels, a serum creatinine of 0.9 mg/dL, and an elevated serum uric acid level of 10 mg/dL. What is the most appropriate next step in managing this patient's treatment?

- A** Stop pyrazinamide and continue the rest of the drugs with kidney function test (KFT) monitoring. **CORRECT**
- B** Add uric acid-lowering drugs and continue antitubercular therapy (ATT) as such with liver function test (LFT) and KFT monitoring.
- C** Continue all drugs and monitor serum uric acid level as well as LFT and KFT.
- D** Stop all ATT drugs until laboratory values return to normal.

RIGHT ANSWER

- OK** **A. Stop pyrazinamide and continue the rest of the drugs with kidney function test (KFT) monitoring.**

WHY THIS IS RIGHT

Pyrazinamide commonly causes hyperuricemia by decreasing renal excretion of uric acid, leading to acute gouty arthritis early in ATT.

- Onset within days to weeks of starting therapy
- Joint pain with elevated serum uric acid
- Normal LFT and KFT (isolated hyperuricemia)

Management principle:

- Symptomatic hyperuricemia (with joint pain) -> stop pyrazinamide
- Continue remaining ATT drugs
- Monitor renal function
- Asymptomatic hyperuricemia -> no need to stop drug

Why not others:

- Adding uric acid-lowering drugs is not first-line
- Continuing drug despite symptoms worsens gout
- Stopping all ATT is unnecessary

QUESTION

| Which of the following statements is true regarding pretomanid?

- A** Its use is contraindicated along with CYP2C9 inducers
- B** It can be used for resistant malaria
- C** It is approved for treatment of XDR tuberculosis in combination with Bedaquiline and Linezolid CORRECT
- D** It acts by formation of reactive oxygen species

RIGHT ANSWER

OK

C. It is approved for treatment of XDR tuberculosis in combination with Bedaquiline and Linezolid

WHY THIS IS RIGHT

Pretomanid is a newer antitubercular drug used in drug-resistant tuberculosis.

- Approved for use in XDR-TB and MDR-TB as part of the BPaL regimen (Bedaquiline + Pretomanid + Linezolid)
- It is a nitroimidazole prodrug that acts against Mycobacterium tuberculosis under both aerobic and anaerobic conditions
- Mechanism: releases reactive nitrogen species (not primarily reactive oxygen species), leading to inhibition of mycolic acid synthesis and bacterial killing

Why not others:

- Not used for malaria
- Drug interactions are mainly with CYP3A4 inducers (not specifically CYP2C9)
- Mechanism is via reactive nitrogen species, so ROS statement is incorrect

QUESTION

| Mycobacterium tuberculosis is typically cultured in which medium?

A Lowenstein-jensen medium

CORRECT

B Macconkey agar

C Sabouraud dextrose agar

D Muller hinton

RIGHT ANSWER

OK

A. Lowenstein-jensen medium

WHY THIS IS RIGHT

Mycobacterium tuberculosis is cultured on Lowenstein-Jensen (LJ) medium, a specialized medium designed for mycobacterial growth.

- LJ medium is an egg-based medium containing malachite green, which inhibits contaminating bacteria
- MTB grows slowly, producing rough, buff-colored colonies in 2-8 weeks
- Culture is the gold standard for diagnosis and drug susceptibility testing

Why not others:

- MacConkey agar -> for Gram-negative enteric bacteria
- Sabouraud dextrose agar -> for fungi
- Mueller-Hinton agar -> for antibiotic sensitivity testing

QUESTION

Which of the following methods are appropriate for identifying different strains of the same species of *Mycobacterium tuberculosis*?

- a. RFLP (Restriction Fragment Length Polymorphism)
- b. Chromosomal mutation detection
- c. Spoligotyping
- d. Multiple interspaced repetitive unit typing (MIRU-VNTR)

A a, b, c & d

B a, c & d

CORRECT

C a, b & c

D b Only

RIGHT ANSWER

OK

B. a, c & d

WHY THIS IS RIGHT

Strain typing methods are used to differentiate between strains of the same species of *Mycobacterium tuberculosis* for epidemiological tracking and outbreak analysis.

Correct methods:

- RFLP (Restriction Fragment Length Polymorphism) -> analyzes DNA fragment patterns
- Spoligotyping -> detects spacer sequences in the DR (direct repeat) region
- MIRU-VNTR -> evaluates variable number tandem repeats at multiple loci

Incorrect option:

- Chromosomal mutation detection is mainly used for identifying drug resistance, not for strain typing

QUESTION

Which of the following statements regarding Rifampicin are true?

1. It should be taken with fatty meals
2. Resistance is associated with the *rpoB* gene mutation
3. It undergoes enterohepatic circulation
4. It is pumped out of the CNS mainly by P-glycoprotein pumps

A 1, 2, and 3

B 2 and 3

CORRECT

C 2, 3, and 4

D 1, 3, and 4

RIGHT ANSWER

OK B. 2 and 3

WHY THIS IS RIGHT

Rifampicin pharmacology and resistance patterns are important for exam-based elimination.

Correct concepts:

- Resistance is due to mutation in the *rpoB* gene encoding DNA-dependent RNA polymerase
- Rifampicin undergoes enterohepatic circulation, prolonging its half-life

Incorrect concepts:

- It should not be taken with fatty meals; food decreases its absorption, so it is taken on an empty stomach
- CNS penetration is good in inflamed meninges, and it is not primarily limited by P-glycoprotein pumps

QUESTION

A patient being treated for multidrug-resistant tuberculosis (MDR-TB) presents with bilateral tingling and numbness in both lower limbs below the knees. Which of the following drugs is the most likely cause?

A Bedaquiline

B Levofloxacin

C Linezolid

CORRECT

D Clofazimine

RIGHT ANSWER

OK C. Linezolid

WHY THIS IS RIGHT

Peripheral neuropathy (bilateral tingling and numbness) in a patient receiving MDR-TB therapy is classically associated with Linezolid toxicity.

- Linezolid causes dose- and duration-dependent peripheral neuropathy
- It may also cause optic neuropathy with prolonged use
- Mechanism: mitochondrial protein synthesis inhibition (affects neuronal function)
- Neuropathy may be irreversible if not detected early

Differentiation:

- Bedaquiline -> QT prolongation
- Levofloxacin -> tendinopathy, QT prolongation
- Clofazimine -> skin discoloration (reddish-brown pigmentation)

Thus, peripheral neuropathy in MDR-TB treatment strongly suggests linezolid toxicity.

QUESTION

A young patient undergoing treatment for multidrug-resistant tuberculosis (MDR-TB) presents with symptoms of weight gain, cold intolerance, and lethargy. Laboratory investigations reveal high levels of thyroid-stimulating hormone (TSH) and low levels of T3 (triiodothyronine) and T4 (thyroxine). Which of the following drugs is likely responsible for these symptoms?

A Cycloserine

B Ethionamide

CORRECT

C Streptomycin

D Pyrazinamide

RIGHT ANSWER

OK B. Ethionamide

WHY THIS IS RIGHT

Symptoms point to hypothyroidism:

Feature	Meaning
Weight gain	↓ metabolism
Cold intolerance	↓ heat production
Lethargy	↓ energy
↑ TSH + ↓ T3/T4	Primary hypothyroidism

Ethionamide commonly causes drug-induced hypothyroidism, especially in MDR-TB regimens. It interferes with thyroid hormone synthesis, leading to ↑TSH and low T3/T4. Symptoms include weight gain, cold intolerance, and lethargy. Thyroid dysfunction is a classic adverse effect of ethionamide.

Anti-TB Side Effects Table-

Drug	Side Effect
Ethionamide	Hypothyroidism
PAS	Hypothyroidism
Isoniazid	Neuropathy
Rifampicin	Hepatotoxicity
Pyrazinamide	Hyperuricemia
Streptomycin	Ototoxicity

QUESTION

Rickettsia typhi is the causative agent of which of the following diseases?

A Epidemic typhus

B Endemic typhus

CORRECT

C Scrub typhus

D Indian tick typhus

RIGHT ANSWER

OK B. Endemic typhus

WHY THIS IS RIGHT

Rickettsia typhi causes endemic (murine) typhus, a flea-borne rickettsial infection associated with rodents.

- Vector: rat flea (*Xenopsylla cheopis*)
- Reservoir: rodents (especially rats)
- Transmission: inoculation of infected flea feces into skin via scratching
- Clinical features:
 - o Fever, headache, myalgia
 - o Rash (less prominent, starts on trunk)
 - o Milder disease compared to epidemic typhus

Differentiate from others:

- Epidemic typhus: caused by *Rickettsia prowazekii* (louse-borne, severe)
- Scrub typhus: caused by *Orientia tsutsugamushi* (mite/chigger-borne, eschar present)
- Indian tick typhus: caused by *Rickettsia conorii* (tick-borne)

QUESTION

A farmer presents with fever, malaise, and diarrhea. There is a history of direct exposure to livestock. Which of the following organisms is the most likely causative agent?

A Rickettsia typhi

B Coxiella burnetii

CORRECT

C Orientia tsutsugamushi

D Rickettsia prowazekii

RIGHT ANSWER

OK B. Coxiella burnetii

WHY THIS IS RIGHT

Coxiella burnetii causes Q fever, a zoonotic infection transmitted from livestock (cattle, sheep, goats), typically via inhalation of contaminated aerosols from animal products (placenta, urine, feces).

- Risk factor: farmers, veterinarians, slaughterhouse workers
- Transmission: inhalation (NOT via arthropod bite -> important distinction from rickettsiae)
- Clinical features:
 - o Acute: fever, malaise, headache, atypical pneumonia, hepatitis ± diarrhea
 - o Chronic: endocarditis (especially in patients with valvular disease)
 - o Obligate intracellular organism
 - o Survives in harsh conditions (spore-like form)
 - o No rash (helps differentiate from rickettsial infections)

Why not others:

- Rickettsia typhi: flea-borne (endemic typhus)
- Orientia tsutsugamushi: mite-borne (scrub typhus, eschar present)
- Rickettsia prowazekii: louse-borne (epidemic typhus)

QUESTION

A militant living in overcrowded conditions presents with high fever and a centrifugal rash that spares the palms and soles, along with evidence of body louse infestation. What is the most likely causative organism?

A Rickettsia typhi

B Rickettsia prowazekii

CORRECT

C Rickettsia akari

D Rickettsia conorii

RIGHT ANSWER

OK

B. Rickettsia prowazekii

WHY THIS IS RIGHT

Rickettsia prowazekii causes epidemic typhus, a severe rickettsial infection associated with overcrowding and poor hygiene, transmitted by the human body louse.

- Transmission: inoculation of infected louse feces into skin (scratching)

- Clinical features:

- o High-grade fever, severe headache
- o Centrifugal rash (starts on trunk -> spreads outward)
- o Spares palms and soles
- o May progress to delirium, shock

- Risk factors:

- o Overcrowding (e.g., war zones, refugee camps, prisons)

Why not others:

- Rickettsia typhi: endemic (murine) typhus, flea-borne, milder
- Rickettsia akari: rickettsialpox (mite-borne, eschar present)
- Rickettsia conorii: Indian tick typhus (tick-borne, involves palms/soles)

QUESTION

During a field visit, an epidemiologist observes mosquito larvae resting parallel to the water surface, without a siphon tube, and having palmate hairs on their abdominal segments. Based on these characteristics, which mosquito species do these larvae most likely belong to?

A Anopheles

CORRECT

B Aedes

C Culex

D Mansonia

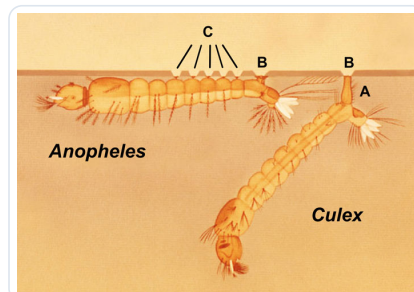
RIGHT ANSWER

OK

A. Anopheles

WHY THIS IS RIGHT

Anopheles mosquito larvae characteristically rest parallel to the water surface due to the absence of a siphon tube. They possess palmate hairs on abdominal segments, which help maintain this horizontal position. In contrast, Aedes and Culex larvae have siphon tubes and hang at an angle, while Mansonia larvae attach to aquatic plants for respiration.



QUESTION

A 28-year-old man presents with a rash after a trip. You observe a vector on his skin. Considering common vector-borne diseases, what is the disease transmitted by the vector shown in the image.



- A Babesiosis
- B Anaplasmosis
- C Scrub typhus**
- D Ehrlichiosis

CORRECT

RIGHT ANSWER

OK **C. Scrub typhus**

WHY THIS IS RIGHT

Scrub typhus is transmitted by chiggers (larval mites), not ticks, and should be suspected in patients with fever and rash after exposure in endemic areas.

- Causative organism: *Orientia tsutsugamushi*
- Vector: chigger (larval stage of mite)
- Classic feature: eschar at bite site
- Symptoms: fever, rash, lymphadenopathy
- Treated with doxycycline

Important distinction:

- Tick-borne diseases -> Babesiosis, Anaplasmosis, Ehrlichiosis
- Mite-borne disease -> Scrub typhus

QUESTION

A 30-year-old woman with no significant past medical history presents to the emergency department with symptoms that have persisted for five days, including high-grade fever, severe headache, generalized body aches, and a new cough accompanied by mild shortness of breath. She also reports noticing a blackish lesion at the site of an insect bite on her thigh after returning from a camping trip in a region known for chigger infestation. On physical examination, she is found to have a fever of 39°C, regional lymphadenopathy, and a well-defined eschar at the site of the lesion. Lung auscultation reveals mild diffuse rales. Laboratory tests show a normal white blood cell count and elevated liver enzymes. A chest X-ray indicates interstitial infiltrates, suggestive of atypical pneumonia that may be related to her primary infection. What is the most appropriate treatment for this patient?



- A** Intravenous doxycycline only
- B** Intravenous doxycycline and ceftriaxone
- C** Intravenous ceftriaxone and azithromycin
- D** Intravenous doxycycline and azithromycin

CORRECT

RIGHT ANSWER

- OK** A. Intravenous doxycycline only

WHY THIS IS RIGHT

Scrub typhus (caused by *Orientia tsutsugamushi*) should be suspected in a patient with fever, eschar, lymphadenopathy, and history of chigger exposure.

- Eschar at bite site (pathognomonic)
- Fever, headache, myalgia
- Lymphadenopathy
- Elevated liver enzymes
- Interstitial pneumonia (atypical pneumonia picture)

Management:

- Drug of choice: doxycycline
- Rapid clinical response is typical ("doxycycline test")
- Monotherapy is sufficient even with pulmonary involvement

Why not others:

- Ceftriaxone -> for bacterial pneumonia/sepsis, not rickettsial infections
- Azithromycin -> alternative in pregnancy or doxycycline intolerance
- Combination therapy -> not required

QUESTION

| Which of the following diseases is not transmitted by the vector shown below?



A Orientia

CORRECT

B Babesia

C Ehrlichia

D Crimean congo hemorrhagic fever

RIGHT ANSWER

OK

A. Orientia

WHY THIS IS RIGHT

Ticks are important vectors transmitting multiple infections, but not all rickettsial diseases are tick-borne.

Tick-borne diseases include:

- Babesia -> causes babesiosis
- Ehrlichia -> causes ehrlichiosis
- Crimean-Congo hemorrhagic fever -> transmitted by Hyalomma ticks

Not transmitted by ticks:

- Orientia tsutsugamushi (scrub typhus) -> transmitted by chigger (larval mites), not ticks

QUESTION

A 24-year-old male presented with fever and myalgia. On examination, he had a diffuse maculopapular rash. Labs revealed a Hb of 14 g/dL, Hematocrit of 55%, Total WBC count of 4000, and platelet count of 25,000. Which of the following is the best prognostic indicator?

A Platelets

B Hematocrit

CORRECT

C Total Leukocyte Count

D Albumin

RIGHT ANSWER

OK

B. Hematocrit

WHY THIS IS RIGHT

Correct answer is B because rising hematocrit in the setting of thrombocytopenia and leukopenia suggests hemoconcentration due to plasma leakage, which is a key marker of severity and poor prognosis in dengue.

Dengue infection

↓

Endothelial dysfunction

↓

Plasma leakage

↓

Hemoconcentration

↓

↑ Hematocrit

Platelet count helps assess bleeding risk but is not the best prognostic indicator. Leukopenia is common but not predictive of severity. Albumin may fall in plasma leakage but hematocrit rise is the primary monitoring parameter.

Parameter	Finding
Platelets	↓↓↓
WBC	↓
Hematocrit	↑
Hb	Normal/↑

Dengue severity depends on:

- Capillary permeability, not just platelet count

Marker	Significance
Hematocrit ↑	Plasma leakage (most important)
Platelets ↓	Bleeding risk
AST/ALT ↑	Liver involvement

QUESTION

A patient presented with retro-orbital pain and rash since the 5 days. Most appropriate test to be done now is:

A NS1 Ag ELISA

B Dengue RNA by PCR

C Antibody detection by ELISA

CORRECT

D Viral culture

RIGHT ANSWER

OK

C. Antibody detection by ELISA

WHY THIS IS RIGHT

Selection of dengue diagnostic tests depends on the day of illness.

Key timeline:

- Early phase (Day 1-5):

- o NS1 antigen detection

- o RT-PCR (viral RNA detection)

- Late phase (after Day 5):

- o Antibody detection (IgM ELISA) becomes the test of choice

Clinical application:

- This patient is on Day 5 with retro-orbital pain and rash -> entering antibody phase

- IgM antibodies start appearing around Day 5

Key points:

- NS1 and PCR are useful early when viremia is present

- IgM ELISA is preferred after Day 5

- IgG indicates past infection or secondary infection

QUESTION

Match the following vectors with their most commonly associated Rickettsial diseases:

1-Tick	A-Epidemic typhus
2-Mite	B-Endemic typhus
3-Louse	C-RMSF
4-Flea	D-Rickettsial pox

A 1-D, 2-C, 3-B, 4-A

B 1-D, 2-C, 3-A, 4-B

C 1-C, 2-D, 3-A, 4-B

CORRECT

D 1-A, 2-C, 3-D, 4-B

RIGHT ANSWER

OK

C. 1-C, 2-D, 3-A, 4-B

WHY THIS IS RIGHT

Rickettsial diseases are classically associated with specific arthropod vectors, which helps in diagnosis.

Correct matching:

- Tick -> Rocky Mountain spotted fever (RMSF)
- Mite -> Rickettsial pox (and scrub typhus in general context)
- Louse -> Epidemic typhus
- Flea -> Endemic (murine) typhus

Key points:

- Vector identification is crucial for clinical suspicion
- Rickettsial diseases often present with fever, rash, and eschar (in some cases)
- All are obligate intracellular organisms

QUESTION

A 20-30-year-old man presents with NS1 positivity and has with fever for 5 days. There are no bleeding manifestations. The Hb is 9 gm/dL, platelet count is 20,000, and ALT is 112 U/L. Which of the following should be used in the management of this patient?

1. Paracetamol
2. Platelet transfusion
3. PRBC transfusion
4. Steroids

A 1 only

CORRECT

B 1 and 2

C 1, 2, and 3

D 1, 2, 3, 4

RIGHT ANSWER

OK A. 1 only

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1b" here and does not include a written explanation for this item.

QUESTION

Which of the following drugs are used for clinical cure of malaria?

1. Artemether
2. Sulfadoxine-pyrimethamine
3. Chloroquine
4. Primaquine

A 1 and 2

B 1, 2 and 3

CORRECT

C 3 and 4

D 1, 2 and 4

RIGHT ANSWER

OK B. 1, 2 and 3

WHY THIS IS RIGHT

Term	Meaning	Target stage
--- ----- -----		
Clinical cure	Relief of symptoms (fever ↓)	Blood schizonts
Radical cure	Prevent relapse	Liver hypnozoites
Suppressive cure	Prevent symptoms	Blood stage
Gametocidal	Prevent transmission	Gametocytes

Clinical cure requires drugs that clear erythrocytic schizonts, which produce symptoms. Artemether, chloroquine, and sulfadoxine-pyrimethamine act on blood stages and achieve symptomatic cure. Primaquine mainly eradicates hepatic hypnozoites and gametocytes for radical cure. Hence only 1, 2, and 3 are used for clinical cure.

Students think: "antimalarial = include primaquine"

BUT: It is for radical cure, NOT clinical cure

QUESTION

An immunocompromised patient presents with a unilateral, painful, black necrotic lesion on the right side of the face. Which of the following is the most likely diagnosis?

A Aspergillosis

B Mucormycosis

CORRECT

C Histoplasmosis

D Candidiasis

RIGHT ANSWER

OK B. Mucormycosis

WHY THIS IS RIGHT

Mucormycosis is a rapidly progressive, angioinvasive fungal infection seen in immunocompromised patients (especially uncontrolled diabetes/DKA), characterized by black necrotic eschar due to vascular invasion and tissue infarction.

- Most common presentation: rhino-orbital-cerebral mucormycosis
- Hallmark feature: unilateral facial pain + black necrotic lesion (eschar)
- Pathogenesis: invasion of blood vessels -> thrombosis -> ischemic necrosis
- Microscopy: broad, aseptate hyphae with right-angle branching
- Management: Immediate IV amphotericin B + aggressive surgical debridement + correction of underlying immunosuppression

Why not others:

- Aspergillosis -> septate hyphae, acute-angle branching
- Histoplasmosis -> intracellular yeast in macrophages
- Candidiasis -> superficial mucocutaneous infection (no necrotic eschar)

QUESTION

A diabetic, chronic smoker presents with a white coating on the tongue. Microscopy of the lesion reveals budding yeast cells with pseudohyphae. Which of the following culture media is most appropriate for isolating the causative organism?



- A Blood agar
- B Thayer-Martin medium
- C CHROM agar**
- D Loeffler's serum slope

CORRECT

RIGHT ANSWER

OK

C. CHROM agar

WHY THIS IS RIGHT

Oral candidiasis (thrush) is caused by *Candida albicans*, characterized by white curd-like plaques on the tongue and microscopy showing budding yeast cells with pseudohyphae.

- Risk factors:
 - o Diabetes mellitus
 - o Immunocompromised state
 - o Smoking, antibiotics, steroids
- Diagnostic feature: Budding yeast + pseudohyphae on microscopy
- Culture: CHROM agar is used for isolation and differentiation of *Candida* species based on colony color

Why not others:

- Blood agar: general-purpose medium, not specific for *Candida* differentiation
- Thayer-Martin medium: for *Neisseria* species
- Loeffler's serum slope: for *Corynebacterium diphtheriae*

QUESTION

A patient's tissue biopsy reveals asteroid bodies on histopathological examination. Which of the following culture medium is most appropriate for isolating the causative organism?

A Blood agar

B Chocolate agar

C Sabouraud's dextrose agar

CORRECT

D Nutrient agar

RIGHT ANSWER

OK

C. Sabouraud's dextrose agar

WHY THIS IS RIGHT

Asteroid bodies on histopathology are classically seen in sporotrichosis, caused by the dimorphic fungus *Sporothrix schenckii*.

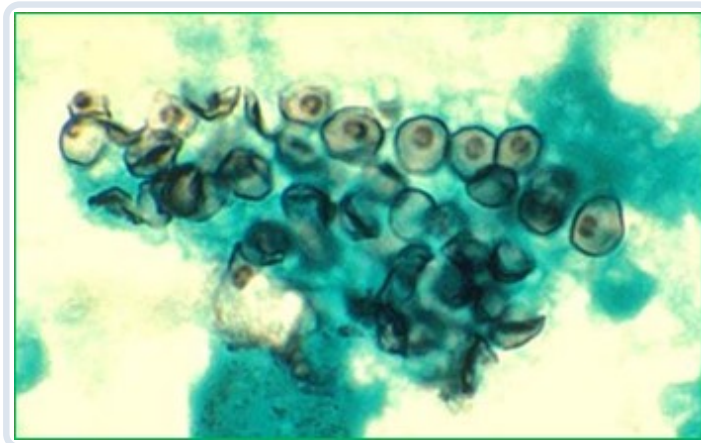
- Asteroid bodies: central yeast surrounded by eosinophilic radiating material (Splendore-Hoeppli phenomenon)
- Disease: Sporotrichosis ("rose gardener's disease")
- Transmission: traumatic inoculation via thorns, splinters
- Culture:
 - o Sabouraud's dextrose agar (SDA) is the medium of choice for fungal isolation
 - o Shows mold form at 25°C and yeast form at 37°C (dimorphic fungus)

Why not others:

- Blood agar / Chocolate agar / Nutrient agar: used for bacteria, not fungi

QUESTION

An HIV-positive patient presents with a history of pneumonia. Chest X-ray reveals bilateral interstitial infiltrates. A bronchoalveolar lavage (BAL) sample is obtained for diagnostic evaluation. Which of the following is the most likely causative organism?



A *Pneumocystis carinii*

CORRECT

B *Mucor* spp.

C *Aspergillus* spp.

D *Candida* spp.

RIGHT ANSWER

OK **A. *Pneumocystis carinii***

WHY THIS IS RIGHT

Pneumocystis jirovecii (formerly *P. carinii*) is an opportunistic fungal pathogen causing *Pneumocystis pneumonia* (PCP) in HIV patients, especially with CD4 < 200 cells/ μ L.

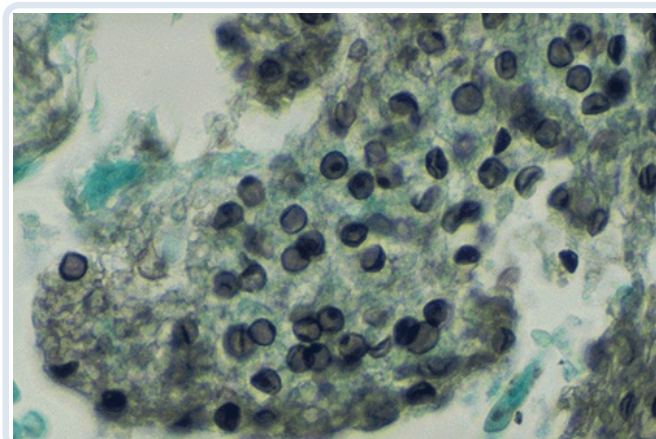
- Clinical setting: HIV + pneumonia + bilateral interstitial (ground-glass) infiltrates
- Diagnosis:
 - o Bronchoalveolar lavage (BAL) is the most sensitive test
 - o Gomori methenamine silver (GMS) stain shows cup-shaped cysts ("crushed ping-pong ball" appearance)

Why not others:

- *Mucor*: broad, aseptate hyphae with right-angle branching
- *Aspergillus*: septate hyphae with acute-angle branching
- *Candida*: budding yeast with pseudohyphae (not typical lung pathogen)

QUESTION

A patient presented with complaints of persistent cough and weight loss. He had a history of contact with multiple sexual partners. He was diagnosed as HIV positive 6 months back and is poorly adherent to his medications. The fungal culture of sputum was negative. On Gomori methamine silver staining, the following was seen. What is the most likely causative organism?



A Paracoccidioides brasiliensis

B Histoplasma capsulatum

C Coccidioides immitis

D **Pneumocystis jirovecii**

CORRECT

RIGHT ANSWER

OK

D. Pneumocystis jirovecii

WHY THIS IS RIGHT

Pneumocystis jirovecii is an opportunistic fungal pathogen causing *Pneumocystis pneumonia* (PCP) in HIV patients with poor ART adherence, especially when CD4 < 200 cells/ μ L.

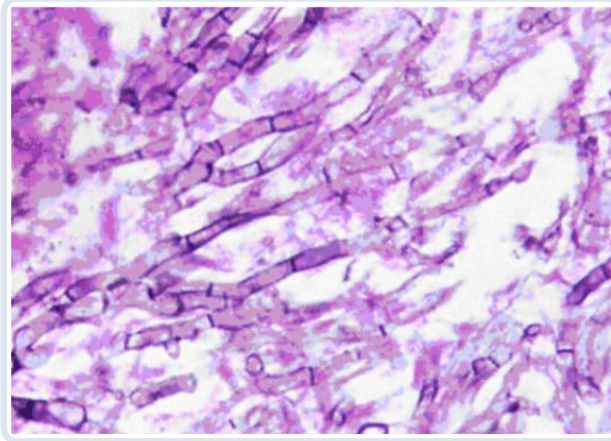
- Diagnosis: Gomori methenamine silver (GMS) stain shows darkly stained, crescent/cup-shaped cysts
- Clinical features:
 - o Persistent cough
 - o Progressive dyspnea
 - o Weight loss
 - o Hypoxia
- Radiology: diffuse bilateral interstitial (ground-glass) infiltrates
- Treatment: Trimethoprim-sulfamethoxazole (TMP-SMX)

Why not others:

- *Paracoccidioides brasiliensis*: "pilot wheel" yeast
- *Histoplasma capsulatum*: intracellular yeast in macrophages
- *Coccidioides immitis*: spherules with endospores

QUESTION

A diabetic truck driver presents to you with cough and breathlessness. A diagnosis of pneumonia was confirmed, and histopathological examination revealed dichotomous branching, as shown below. What is the likely causative agent?



A Rhizopus

B Mucor

C Candida

D Aspergillus

CORRECT

RIGHT ANSWER

OK

D. Aspergillus

WHY THIS IS RIGHT

Aspergillus causes opportunistic pulmonary infections, especially in diabetic or immunocompromised patients, and is identified histologically by septate hyphae with acute-angle ($\approx 45^\circ$) dichotomous branching.

- Morphology:
 - o Septate hyphae
 - o Acute-angle branching ($\sim 45^\circ$)
 - o Dichotomous branching pattern
- Clinical spectrum:
 - o Allergic bronchopulmonary aspergillosis (ABPA)
 - o Aspergilloma (fungal ball)
 - o Invasive aspergillosis (in immunocompromised)

Management (invasive disease): Voriconazole is drug of choice

Why not others:

- o Rhizopus/Mucor: broad, aseptate hyphae with right-angle (90°) branching
- o Candida: budding yeast with pseudohyphae

QUESTION

A female patient presents with complaints of thick white vaginal secretions. Which of the following can be used to identify the likely species of the causative agent?

- A Bird seed agar
- B Brain heart infusion agar
- C CHROME agar**
- D Sabouraud dextrose agar

CORRECT

RIGHT ANSWER

- OK
- C. CHROME agar**

WHY THIS IS RIGHT

Vulvovaginal candidiasis (thick, white “curdy” discharge) is most commonly caused by *Candida* species, especially *Candida albicans*, and CHROM agar is used to identify and differentiate *Candida* species.

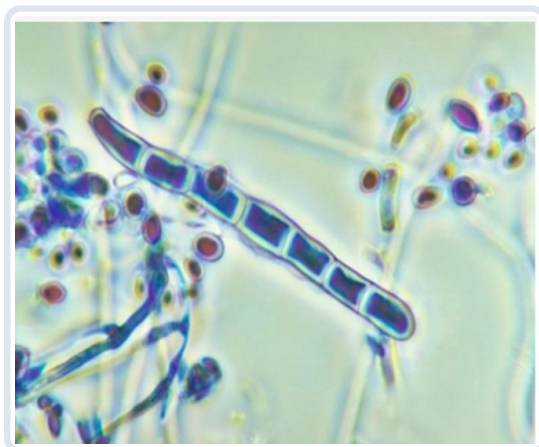
- Clinical clue: thick, white, non-foul-smelling discharge + itching
- Microscopy: budding yeast cells with pseudohyphae
- Role of CHROM agar:
 - o Differential medium for *Candida* speciation
 - o Produces species-specific colony colors (e.g., *C. albicans* -> green colonies)

Why not others:

- Bird seed agar: for *Cryptococcus neoformans* (melanin production)
- Brain heart infusion agar: general enriched medium
- Sabouraud dextrose agar (SDA): grows fungi but does not differentiate species

QUESTION

A patient presents with itching in the axilla. On microscopic examination of the skin scrapings, a red pigment-producing fungus with pencil-shaped macroconidia is seen. Which of the following is the most likely organism?



A Trichophyton violaceum

B Trichophyton rubrum

CORRECT

C Trichophyton tonsurans

D Trichophyton schoenleinii

RIGHT ANSWER

OK

B. Trichophyton rubrum

WHY THIS IS RIGHT

Trichophyton rubrum is the most common dermatophyte causing superficial fungal infections (tinea) and is identified by red pigment production and characteristic pencil-shaped macroconidia.

- Clinical presentation: itching in moist areas (e.g., axilla, groin -> tinea corporis/cruris)

- Microscopy:

- o Septate hyphae

- o Pencil-shaped (cigar-shaped) macroconidia

- Colony feature: Red pigment on reverse side of culture -> hallmark of T. rubrum

Why not others:

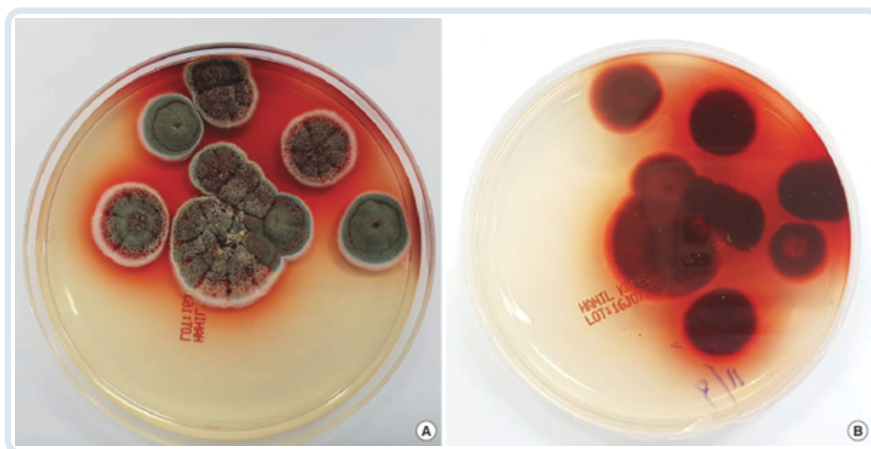
- Trichophyton violaceum: violet colonies, lacks typical macroconidia

- Trichophyton tonsurans: variable morphology, no red pigment

- Trichophyton schoenleinii: favus; antler-like hyphae

QUESTION

A patient presents with cervical lymphadenopathy and is found to be retropositive. A fungal culture depicts a velvety growth with red diffusible pigment on the underside, as shown below. Which is the most likely causative organism?



A *Talaromyces marneffei*

CORRECT

B *Blastomyces*

C *Aspergillus*

D *Pneumocystis jirovecii*

RIGHT ANSWER

OK

A. *Talaromyces marneffei*

WHY THIS IS RIGHT

Talaromyces (*Penicillium*) *marneffei* is a dimorphic opportunistic fungus seen in HIV-positive (retropositive) patients, characterized by velvety colonies producing a characteristic red diffusible pigment.

· Culture characteristics:

- o Mold form (25°C): velvety colonies with red pigment diffusing into agar
- o Yeast form (37°C): intracellular yeast

· Microscopy: Yeast cells with transverse septum (sausage-shaped) -> distinctive feature

· Clinical features:

- o Fever, weight loss
- o Generalized lymphadenopathy
- o Skin lesions resembling molluscum contagiosum

Why not others:

- *Blastomyces*: broad-based budding yeast, no red pigment
- *Aspergillus*: septate hyphae, no dimorphism or red pigment
- *Pneumocystis jirovecii*: cysts in lung, not cultured like this

QUESTION

In a patient in the ICU, an infection in the central venous catheter is noted. Staining showed a gram-positive oval-shaped organism that reproduces by budding. Identify the organism.

A Candida

CORRECT

B E. coli

C Staph aureus

D Staph epidermidis

RIGHT ANSWER

OK

A. Candida

WHY THIS IS RIGHT

A central venous catheter-associated infection with Gram-positive, oval organisms showing budding indicates Candida species.

- Candida is a yeast -> appears as oval, budding cells on microscopy
- Can form pseudohyphae in tissue
- Common cause of catheter-related bloodstream infections (CRBSI), especially in ICU patients

Risk factors:

- Indwelling catheters
- Immunocompromised state
- Broad-spectrum antibiotic use
- Total parenteral nutrition

Differentiation:

- E. coli -> Gram-negative rod
- Staphylococcus aureus / epidermidis -> Gram-positive cocci (not budding)

QUESTION

What type of budding is described by a broad base with a small bud coming off of it, often associated with a figure of 8 appearances?

A Blastomycosis

CORRECT

B Cryptococcus

C Candidiasis

D Histoplasmosis

RIGHT ANSWER

OK A. Blastomycosis

WHY THIS IS RIGHT

Blastomyces dermatitidis is identified by broad-based budding yeast, often giving a characteristic figure-of-8 appearance.

- Broad-based budding = hallmark of blastomycosis
- Thick-walled yeast seen in tissue

Clinical features:

- Pulmonary infection (pneumonia-like illness)
- Cutaneous and bone involvement in dissemination

Differentiation:

- Cryptococcus -> narrow-based budding + capsule (India ink)
- Candida -> budding yeast with pseudohyphae
- Histoplasma -> intracellular yeast in macrophages (narrow-based budding)

QUESTION

| Desert rheumatism is caused by:

A Coccidioides immitis

CORRECT

B Histoplasmosis

C Mucormycosis

D Paracoccidioidomycosis

RIGHT ANSWER

OK

A. Coccidioides immitis

WHY THIS IS RIGHT

Desert rheumatism refers to the arthralgia and erythema nodosum seen in primary infection with *Coccidioides immitis*

- Caused by *Coccidioides immitis* (dimorphic fungus)
- Endemic in desert regions (Southwestern USA)
- Infection acquired by inhalation of arthroconidia (spores)
- Tissue -> spherules filled with endospores
- Culture -> mold with arthroconidia

Clinical features:

- Primary pulmonary infection (flu-like illness)
- Desert rheumatism triad:

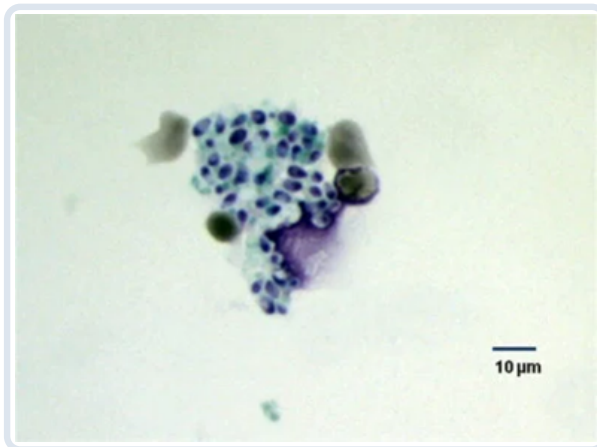
- o Fever
- o Arthralgia (joint pains)
- o Erythema nodosum

Differentiation:

- Histoplasma -> intracellular yeast in macrophages
- Mucor -> broad, aseptate hyphae
- Paracoccidioides -> "pilot wheel" budding

QUESTION

A man presents with low-grade fever, cough, and weight loss following a recent travel history. A bronchoalveolar lavage (BAL) sample cultured on Sabouraud Dextrose Agar (SDA) shows narrow-based budding yeast cells located within macrophages on direct mount. What is the most likely diagnosis?



- A Blastomycosis
- B Histoplasmosis**
- C Coccidioidomycosis
- D Cryptococcosis

CORRECT

RIGHT ANSWER

B. Histoplasmosis

WHY THIS IS RIGHT

Histoplasma capsulatum is identified by narrow-based budding yeast seen intracellularly within macrophages.

- Small oval yeast (2-5 μm)
- Narrow-based budding
- Located inside macrophages (hallmark)
- Dimorphic fungus (mold in environment, yeast in tissue)

Clinical relevance:

- Causes pulmonary infection resembling tuberculosis (fever, cough, weight loss)
- Associated with exposure to bird or bat droppings

Differentiation:

- Blastomycosis -> broad-based budding
- Coccidioidomycosis -> spherules with endospores
- Cryptococcus -> encapsulated yeast (India ink positive)

QUESTION

A patient presents with fever, cough, and breathlessness. A KOH mount of the bronchoalveolar lavage (BAL) sample shows the following. What is the most likely causative organism?

- A Rhizopus species
- B Cryptococcus neoformans
- C Aspergillus fumigatus**
- D Candida albicans

CORRECT

RIGHT ANSWER

- OK
- C. Aspergillus fumigatus**

WHY THIS IS RIGHT

Aspergillus fumigatus is identified by slender, septate hyphae with acute angle ($\approx 45^\circ$) dichotomous branching on microscopy.

- Thin, septate hyphae
- Dichotomous branching at acute angles
- Seen on KOH mount, GMS, or PAS staining

Clinical relevance:

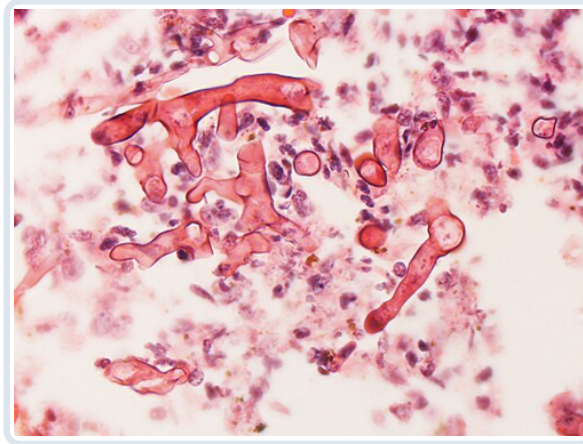
- Causes invasive pulmonary aspergillosis in immunocompromised patients
- Can also cause aspergilloma (fungal ball) in pre-existing lung cavities
- May present with cough, hemoptysis, and breathlessness

Differentiation:

- *Rhizopus* (*Mucor*) -> broad, aseptate hyphae with right-angle branching
- *Candida* -> yeast with pseudohyphae
- *Cryptococcus* -> encapsulated yeast (India ink)

QUESTION

A patient recovered from COVID-19, treated with steroids, now presents with nasal discharge for 3 weeks. What is the likely diagnosis?



A Mucor

CORRECT

B Aspergillus

C Candida

D Trichosporon

RIGHT ANSWER

OK

A. Mucor

WHY THIS IS RIGHT

Post-COVID patient with steroid use presenting with nasal symptoms and histology showing broad, non-septate hyphae with right-angle branching is characteristic of mucormycosis.

- Caused by Mucor (Mucorales) species
- Shows broad, ribbon-like, aseptate hyphae with right-angle branching
- Strong association with diabetes, steroid use, and immunosuppression (post-COVID surge)
- Commonly presents as rhino-orbital-cerebral infection

Differentiation:

- Aspergillus -> thin, septate hyphae with acute angle branching
- Candida -> yeast with pseudohyphae
- Trichosporon -> yeast with arthroconidia

QUESTION

Match the following:

Column A	Column B
1. Leprosy	a. Biopsy
2. Tinea capitis	b. Patch test
3. Contact dermatitis	c. KOH wet mount
4. Lupus vulgaris	d. Split skin smear

- A. 1-c, 2-a, 3-b, 4-d
- B. 1-a, 2-c, 3-d, 4-b
- C. 1-b, 2-d, 3-c, 4-a
- D. 1-d, 2-c, 3-b, 4-a
- CORRECT

RIGHT ANSWER

OK D. 1-d, 2-c, 3-b, 4-a

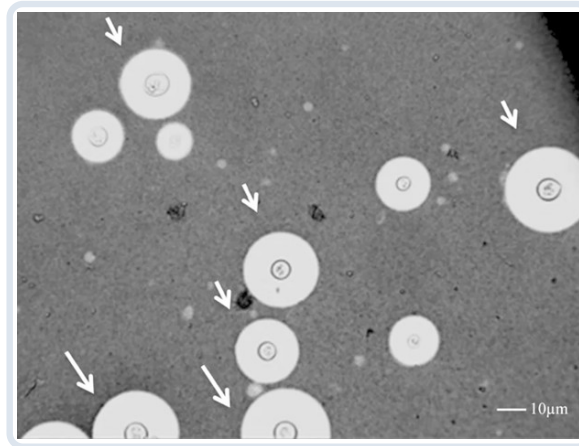
WHY THIS IS RIGHT

The correct matching of the diseases with their diagnostic techniques is as follows:

Condition	Investigation	Key Finding
1. Leprosy	d. Split-skin smear	Demonstrates acid-fast bacilli (Mycobacterium leprae)
2. Tinea capitis	c. KOH wet mount	Shows fungal hyphae/arthrospores
3. Contact dermatitis	b. Patch test	Identifies specific allergic sensitizers
4. Lupus vulgaris	a. Biopsy	Granulomatous TB; clinically apple-jelly nodules

QUESTION

Which of the following is true about the organism shown below, except?



- A Extrapulmonary cryptococcus is AIDS defining
- B Cryptococcus gattii is Associated with bird droppings
- C All pathogenic strains are urease positive

D CD4 count greater than 500

CORRECT

RIGHT ANSWER

OK

D. CD4 count greater than 500

WHY THIS IS RIGHT

Cryptococcus is an encapsulated yeast causing opportunistic infections, especially in immunocompromised patients.

Correct concepts:

- Extrapulmonary cryptococcosis (e.g., meningitis) is an AIDS-defining illness
- Cryptococcus species are urease positive
- Cryptococcus neoformans is classically associated with pigeon (bird) droppings

Incorrect statement:

- Infection typically occurs at low CD4 counts (<100), not when CD4 is greater than 500

Additional point:

Cryptococcus gattii is more often associated with environmental sources like eucalyptus trees and can infect immunocompetent individuals

QUESTION

An HIV-positive patient presents with dysphagia and odynophagia. Endoscopic examination of the esophagus reveals plaques. What is the most likely causative organism?

A Budding yeast cells with pseudohyphae

CORRECT

B Thin septate hyphae with acute angle branching

C Acid fast bacilli

D Squamous cell cancer

RIGHT ANSWER

OK

A. Budding yeast cells with pseudohyphae

WHY THIS IS RIGHT

In an HIV-positive patient, dysphagia and odynophagia with white esophageal plaques is characteristic of Candida esophagitis.

- Caused by *Candida albicans*
- Microscopy shows budding yeast cells with pseudohyphae
- Occurs in advanced immunosuppression (low CD4 count)
- Endoscopy shows white, adherent plaques in the esophagus

Differentiation:

- Thin septate hyphae with acute angle branching -> *Aspergillus* (lung disease, not esophagus)
- Acid-fast bacilli -> tuberculosis
- Squamous cell cancer -> irregular mass/ulcer, not fungal plaques

QUESTION

| Which of the following organisms is not classified as a dimorphic fungus?

- A Histoplasma capsulatum
- B Coccidioides
- C Cryptococcus neoformans**
- D Talaromyces marneffii

CORRECT

RIGHT ANSWER

- OK C. Cryptococcus neoformans**

WHY THIS IS RIGHT

Dimorphic fungi exist in two forms depending on temperature: mold form at 25°C and yeast (or tissue) form at 37°C. "mold in the cold, yeast in the heat"

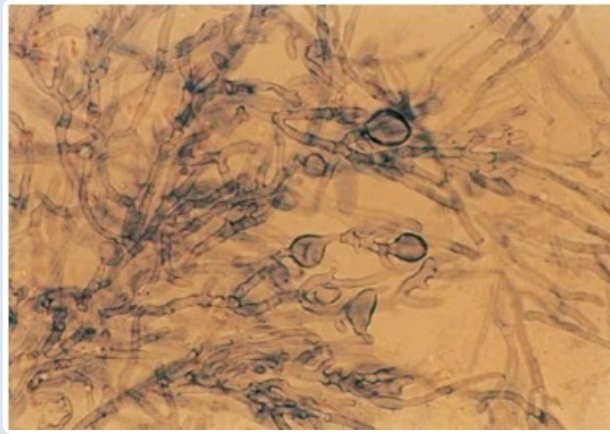
- Histoplasma capsulatum, Coccidioides, and Talaromyces marneffii are dimorphic fungi
- Cryptococcus neoformans is not dimorphic; it exists only as an encapsulated yeast with polysaccharide capsule seen in India ink preparation.

Key points:

- Histoplasma -> intracellular yeast in macrophages
- Coccidioides -> spherules with endospores in tissue
- Talaromyces marneffii -> yeast with transverse septum

QUESTION

A patient presents with exophytic valvular vegetations. Biopsy is stained with GMS. Which of the following is the most likely causative organism?



A Pigmented hyphae - Chromoblastomycosis

B Acute angle septate hyphae - Aspergillus

CORRECT

C Broad non-septate hyphae - Mucor

D Yeast-like budding cells - Candida

RIGHT ANSWER

OK

B. Acute angle septate hyphae - Aspergillus

WHY THIS IS RIGHT

In a patient with valvular vegetations and fungal elements on GMS stain, the presence of septate hyphae with acute angle (approximately 45°) branching is characteristic of Aspergillus species.

- Aspergillus shows thin, septate hyphae with acute angle branching
- Common cause of fungal endocarditis, especially in immunocompromised patients or prosthetic valves
- GMS stain highlights fungal hyphae in tissue

Differentiation:

- Mucor: broad, non-septate hyphae with right angle branching
- Candida: yeast forms with budding cells and pseudohyphae
- Chromoblastomycosis: pigmented (dematiaceous) fungi with sclerotic bodies

QUESTION

A 35 year old farmer presents with a painless swelling of the foot that has developed gradually over several months. On examination there are multiple discharging sinuses with black granules seen in the discharge. Which of the following is the most likely diagnosis?

- A Actinomyces israelii infection
- B Chromoblastomycosis
- C **Madurella mycetomatis**
- D Staphylococcus aureus abscess

CORRECT

RIGHT ANSWER

- OK
- C. **Madurella mycetomatis**

WHY THIS IS RIGHT

Madurella mycetomatis Causes eumycetoma (fungal mycetoma)

-> Presents with classic triad:

- Painless subcutaneous swelling
- Multiple discharging sinuses
- Black granules in discharge

Common in farmers due to traumatic implantation (thorn/splinter injury)

Granule color differentiation (high-yield):

- Black granules -> Madurella mycetomatis (fungal mycetoma)
- White/yellow granules -> Actinomyces, Nocardia (actinomycetoma)

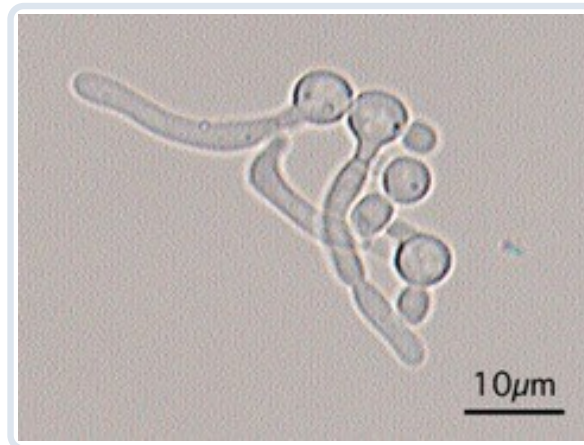
Why not others:

- Actinomyces israelii -> sulfur granules (yellow), not black
- Chromoblastomycosis -> verrucous lesions, not sinus + granules
- Staphylococcus aureus -> acute painful abscess, no granules



QUESTION

Identify the organism responsible for phenomenon in the given image?



A **Candida albicans**

CORRECT

B Candida krusei

C Candida tropicalis

D Cryptococcus neoformans

RIGHT ANSWER

OK **A. Candida albicans**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$19" here and does not include a written explanation for this item.

QUESTION

| Thorn prick injury is a common mode of infection in all except:

A Sporotrichosis

B Chromoblastomycosis

C Mycetoma

D Dermatophytosis

CORRECT

RIGHT ANSWER

OK

D. Dermatophytosis

WHY THIS IS RIGHT

Thorn prick / traumatic implantation infections (subcutaneous mycoses):

- Sporotrichosis -> caused by *Sporothrix schenckii*
-> Classic: "rose gardener's disease" (thorn injury)
- Chromoblastomycosis -> traumatic implantation of dematiaceous fungi
- Mycetoma -> entry via soil-contaminated thorn/splinter injuries

These infections:

- > Occur after minor trauma (thorn prick, splinter)
- > Involve skin + subcutaneous tissue

Dermatophytosis (EXCEPTION):

- Caused by dermatophytes (*Trichophyton*, *Microsporum*, *Epidermophyton*)
- Spread by direct contact (person, animal, fomites)
- Limited to keratinized tissues (skin, hair, nails)
- No trauma or thorn prick required

QUESTION

A bronchial asthma patient who is on inhalational steroids presented with white patchy lesions on the tongue and buccal mucosa. What is the drug that can be used to treat this condition?

A Clotrimazole

CORRECT

B Griseofulvin

C Terbinafine

D Flucytosine

RIGHT ANSWER

OK

A. Clotrimazole

WHY THIS IS RIGHT

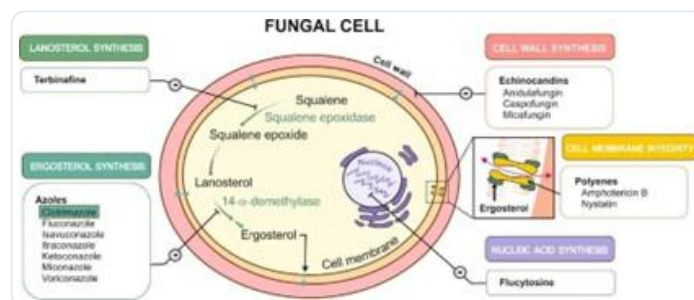
Inhaled corticosteroids predispose to oral candidiasis, presenting as white patchy plaques on tongue and buccal mucosa.

Clotrimazole (topical azole) is first-line treatment for uncomplicated oral thrush.

Griseofulvin and terbinafine are used for dermatophyte infections, not Candida.

Flucytosine is reserved for severe systemic fungal infections, not oral candidiasis.

Drug	Class	Use
Clotrimazole	Azole	Oral candidiasis
Griseofulvin	Microtubule inhibitor	Dermatophytes (skin, hair)
Terbinafine	Squalene epoxidase inhibitor	Dermatophytes
Flucytosine	DNA/RNA inhibitor	Systemic (with amphotericin)



QUESTION

A diabetic patient presented with rhinitis and swelling of the face. Intranasal biopsy revealed the presence of broad-based aseptate hyphae with right-angle branching. There was evidence of vascular invasion. What will be the preferred treatment for this condition?

A Fluconazole

B Amphotericin B

CORRECT

C Ketoconazole

D Griseofulvin

RIGHT ANSWER

OK

B. Amphotericin B

WHY THIS IS RIGHT

Broad, aseptate hyphae with right-angle branching indicate mucormycosis, an angioinvasive fungal infection seen in diabetics. Especially in DKA-
High glucose + acidic environment

-> Fungal growth ↑
-> Impaired immunity

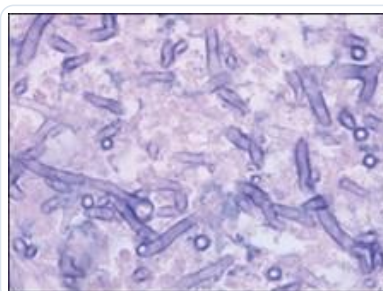
The treatment of choice is amphotericin B, which is rapidly fungicidal.

Amphotericin B

↓
Binds ergosterol
↓
Membrane pores form
↓
Cell contents leak
↓
Fungal death

Azoles like fluconazole and ketoconazole are ineffective against Mucor. Early aggressive amphotericin therapy is lifesaving.

Fungus	Morphology	Drug
Mucor	Broad, aseptate, 90°	Amphotericin B
Aspergillus	Septate, 45°	Voriconazole
Candida	Budding yeast	Fluconazole
Dermatophytes	Septate	Griseofulvin



QUESTION

| Which of the following organism is intrinsically resistant to the given drug?

A Aspergillus niger: Voriconazole

B Aspergillus fumigatus: Micafungin

C Candida glabrata: Amphotericin B

D Candida krusei: Fluconazole

CORRECT

RIGHT ANSWER

OK

D. Candida krusei: Fluconazole

WHY THIS IS RIGHT

Candida krusei is intrinsically resistant to fluconazole due to altered ergosterol pathway enzymes and reduced drug affinity. This resistance is predictable and clinically important. Other listed organisms are generally susceptible to their respective drugs. Fluconazole resistance is a classic hallmark of C. krusei.

Drug	Mechanism
Fluconazole	↓ Ergosterol synthesis
Amphotericin B	Pore formation
Micafungin	↓ β-glucan (cell wall)
Voriconazole	Ergosterol inhibition

Candida krusei = resistant to fluconazole
Candida glabrata = dose-dependent sensitivity
Voriconazole = DOC for Aspergillus
Amphotericin B = broad-spectrum

QUESTION

A 50-year-old male patient with a history of chronic pulmonary aspergillosis is being treated with voriconazole. He has been on the medication for two weeks and comes to the clinic for a follow-up. During the visit, he asks about the specific guidelines and considerations for taking voriconazole to ensure its effectiveness and safety. Which of the following statements is false about voriconazole?

A It should not be given with pyrazinamide

CORRECT

B It should be taken empty stomach

C It is given as a loading dose

D It requires therapeutic drug monitoring

RIGHT ANSWER

OK **A. It should not be given with pyrazinamide**

WHY THIS IS RIGHT

(A) "It should not be given with pyrazinamide." There is no specific contraindication against combining voriconazole with pyrazinamide; this is false. (The known contraindications involve rifampin and certain other CYP-inducing TB drugs.)

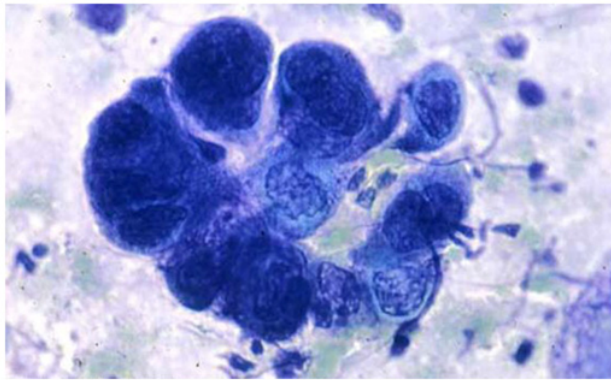
(B) "It should be taken on an empty stomach." This is true: voriconazole's absorption is reduced by food, so patients are instructed to dose it at least 1 hour before or 2 hours after meals.

(C) "It is given as a loading dose." This is true: clinical guidelines recommend an initial loading dose (e.g. 6 mg/kg IV or 400 mg PO twice on day 1) to rapidly achieve therapeutic levels.

(D) "It requires therapeutic drug monitoring." This is true: because of voriconazole's narrow therapeutic window and variable metabolism, TDM is recommended to ensure efficacy and avoid toxicity.

QUESTION

A Tzanck smear from a vesicular skin lesion reveals the following. Which of the following is the most likely causative agent?



CORRECT

A Herpes simplex virus

B Human papillomavirus

C Coxsackievirus

D Cytomegalovirus

RIGHT ANSWER

OK

A. Herpes simplex virus

WHY THIS IS RIGHT

A Tzanck smear showing multinucleated giant cells with intranuclear inclusions is characteristic of infection by Herpes simplex virus (HSV).

- Diagnostic feature:
 - o Multinucleated giant cells
 - o Ballooning degeneration of keratinocytes
 - o Cowdry type A intranuclear inclusion bodies

- Diseases caused by HSV:
 - o Herpes labialis (cold sores)
 - o Genital herpes
 - o Keratitis, encephalitis

Why not others:

- HPV: koilocytes (perinuclear clearing), no giant cells
- Coxsackievirus: vesicular lesions (HFMD), no Tzanck findings
- CMV: "owl's eye" inclusions in enlarged cells, not multinucleated giant cells

QUESTION

| Which among the following is a ssRNA virus?

A Human papilloma virus

B Adenovirus

C Parvovirus

D Respiratory syncytial virus

CORRECT

RIGHT ANSWER

OK

D. Respiratory syncytial virus

WHY THIS IS RIGHT

Respiratory syncytial virus (RSV) is a single-stranded RNA (ssRNA) virus belonging to the Paramyxoviridae family.

- Genome: Negative-sense ssRNA
- Family: Paramyxoviridae
- Transmission: respiratory droplets
- Common diseases:
 - o Bronchiolitis (most common cause in infants)
 - o Pneumonia in young children and elderly
- Characteristic feature: Formation of syncytia (multinucleated giant cells) in respiratory epithelium

Why not others:

- Human papillomavirus (HPV): double-stranded DNA virus
- Adenovirus: double-stranded DNA virus
- Parvovirus: single-stranded DNA virus (only ssDNA virus)

QUESTION

A patient presented with a high fever, altered sensorium, headache, neck rigidity, and seizures. He was diagnosed with HSV encephalitis. Which of the following tests can be used to confirm the diagnosis?

- A IgM antibodies in CSF
- B Tzanck smear of CSF
- C CSF PCR for viral DNA**
- D CSF culture on chick embryo lines

CORRECT

RIGHT ANSWER

OK **C. CSF PCR for viral DNA**

WHY THIS IS RIGHT

Herpes simplex encephalitis (HSE) is best confirmed by CSF PCR for HSV DNA, which is the gold standard diagnostic test.

- Etiology: HSV-1 most common cause of sporadic viral encephalitis
- Clinical features:
 - o Fever, headache
 - o Altered sensorium, seizures
 - o Focal neurological deficits (temporal lobe involvement)
- Diagnosis:
 - o CSF PCR for HSV DNA -> most sensitive & specific (gold standard)
 - o CSF findings: lymphocytic pleocytosis, ↑ protein, normal glucose, RBCs may be present

Why not others:

- o IgM in CSF: less sensitive, not definitive
- o Tzanck smear: used for skin lesions, not CSF
- o CSF culture: not practical; HSV is difficult to culture

QUESTION

A patient of sickle cell anemia developed aplastic crisis after a viral infection. The agent causing it is

A CMV

B EBV

C HBV

D Parvovirus B19

CORRECT

RIGHT ANSWER

OK

D. Parvovirus B19

WHY THIS IS RIGHT

Parvovirus B19 causes aplastic crisis in patients with hemolytic anemias (e.g., sickle cell disease) by selectively infecting and destroying erythroid precursor cells in the bone marrow.

- Virus type: single-stranded DNA virus (only ssDNA virus)
- Target cells: erythroid progenitors via P antigen (globoside receptor)
- Pathogenesis:

- o Temporary cessation of erythropoiesis
- o Leads to severe anemia (aplastic crisis) in patients with high RBC turnover
- Clinical features:

- o Sudden drop in hemoglobin
- o Reticulocytopenia
- o Fatigue, pallor
- Other manifestations:

- o Erythema infectiosum (slapped cheek rash) in children
- o Hydrops fetalis in pregnant women

Why not others:

- CMV, EBV, HBV: do not specifically target erythroid precursors to cause aplastic crisis

QUESTION

| Which of the following laboratory test is used to diagnose rotavirus diarrhea?

A Antigen detection in the stool sample

CORRECT

B Antigen detection in blood

C Antibody detection in serum

D Light microscopy of stool specimen

RIGHT ANSWER

OK

A. Antigen detection in the stool sample

WHY THIS IS RIGHT

Rotavirus diarrhea is best diagnosed by detection of viral antigen in stool, most commonly using ELISA-based assays.

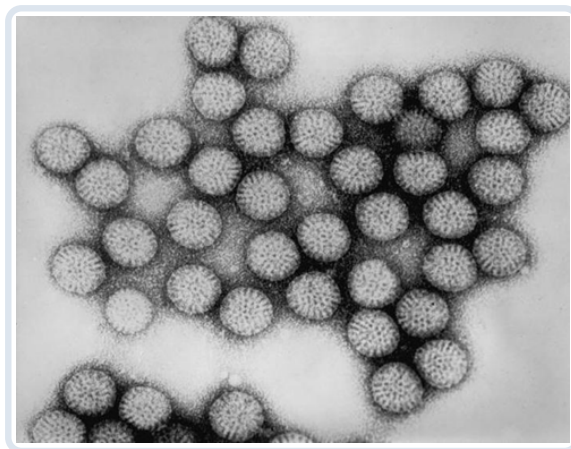
- Site of infection: small intestinal enterocytes -> causes watery diarrhea in children
- Diagnostic test of choice:
 - o Stool antigen detection (ELISA/rapid immunoassay) -> rapid, sensitive, and specific

Why not others:

- Antigen in blood: virus is localized to gut, not bloodstream
- Antibody detection: not useful for acute diagnosis
- Light microscopy: cannot visualize virus

QUESTION

A 2-year-old child presented with watery diarrhea and vomiting. Electron microscopy showed the following image. Identify the organism.



A Adenovirus

B Rotavirus

CORRECT

C Norwalk virus

D Astrovirus

RIGHT ANSWER

OK

B. Rotavirus

WHY THIS IS RIGHT

Rotavirus is the most common cause of severe acute watery diarrhea in children, and on electron microscopy it shows a wheel-like (rota = wheel) appearance.

• Morphology:

- o Double-stranded RNA virus (Reoviridae family)
- o Wheel-shaped appearance on electron microscopy (central hub + spokes)

• Pathogenesis:

- o Infects enterocytes of small intestine
- o Leads to malabsorption + osmotic diarrhea

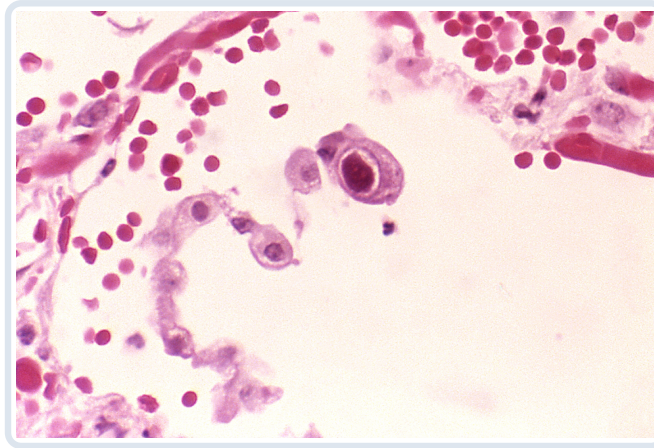
• Clinical features:

- o Watery diarrhea
- o Vomiting
- o Fever
- o Dehydration (especially in infants)
- Diagnosis: Stool antigen detection (ELISA)
- Why not others:

- o Adenovirus: non-enveloped DNA virus, no wheel appearance
- o Norwalk (Norovirus): small round virus, outbreaks in adults
- o Astrovirus: star-shaped morphology

QUESTION

A child presents with a fever and a rash. Histology showed cells with following appearance. What is the most likely diagnosis?



A Cytomegalovirus

CORRECT

B Epstein-Barr virus

C Herpes simplex virus

D Toxoplasma gondii

RIGHT ANSWER

OK A. Cytomegalovirus

WHY THIS IS RIGHT

Cytomegalovirus (CMV) infection is characterized by “owl’s eye” intranuclear inclusions, seen as large cells with basophilic nuclear inclusions surrounded by a clear halo.

- Histopathology:
 - o Enlarged cells (cytomegaly)
 - o Intranuclear inclusion with perinuclear halo -> “owl’s eye” appearance

- Clinical associations:
 - o Congenital infections (hearing loss, microcephaly)
 - o Immunocompromised patients (retinitis, colitis, pneumonitis)
 - o Can be detected in urine, saliva, or tissue samples

Why not others:

- o EBV: atypical lymphocytes, no owl’s eye inclusions
- o HSV: multinucleated giant cells, Cowdry type A inclusions
- o Toxoplasma: intracellular cysts, not nuclear inclusions

QUESTION

A patient addressing from Delhi presents with fever, arthralgia, and extensive petechial rash for 3 days. Lab investigations revealed a hemoglobin of 9 g/dL, a white blood cell count of 9000 cells/mm³, a platelet count of 20000 cells/mm³, and a prolonged bleeding time. The clotting time was normal. What is the most likely diagnosis?

A Dengue

CORRECT

B Malaria

C Scrub typhus

D Typhoid

RIGHT ANSWER

OK A. Dengue

WHY THIS IS RIGHT

Dengue fever should be suspected in patients with acute fever + severe arthralgia + petechial rash + thrombocytopenia, especially with normal clotting time but prolonged bleeding time.

· Pathophysiology:

o Platelet destruction + capillary fragility -> bleeding manifestations

o Coagulation cascade usually intact -> normal clotting time

· Typical lab findings:

o Thrombocytopenia (↓ platelets)

o Hemoconcentration (↑ hematocrit in severe cases)

o Normal or mildly altered WBC count

o ↑ bleeding time, normal clotting time

· Clinical features:

o High fever

o Severe joint/muscle pain ("breakbone fever")

o Petechiae, bleeding manifestations

Why not others:

· Malaria: anemia, parasitemia, no petechial rash pattern

· Scrub typhus: eschar + lymphadenopathy

· Typhoid: step-ladder fever, relative bradycardia, no severe thrombocytopenia

QUESTION

A wildlife photographer returns from a trip to sub-Saharan Africa and presents with acute fever, jaundice, and hemorrhagic symptoms. Liver biopsy shows intranuclear Councilman/Torres bodies. Which vaccine could have prevented this infection?

A 17D

CORRECT

B Nakayama vaccine

C Weigl's vaccine

D Jeryl Lynn strain

RIGHT ANSWER

OK

A. 17D

WHY THIS IS RIGHT

Yellow fever, a viral hemorrhagic disease caused by a Flavivirus, presents with fever, jaundice, and hemorrhage, and is characterized histologically by Councilman bodies (apoptotic hepatocytes) in the liver.

- Transmission: Aedes mosquito (endemic in sub-Saharan Africa, South America)
- Clinical features:
 - o Fever, myalgia
 - o Jaundice + hemorrhage ("yellow" fever)
 - o Severe cases -> liver failure
- Prevention: 17D vaccine = live attenuated vaccine -> highly effective

Why not others:

- Nakayama vaccine: Japanese encephalitis
- Weigl's vaccine: epidemic typhus
- Jeryl Lynn strain: mumps vaccine

QUESTION

Identify the condition that presents with painful vesicles as shown below:



A Candidiasis

B Syphilis

C Chancroid

D Herpes simplex virus

CORRECT

RIGHT ANSWER

OK

D. Herpes simplex virus

WHY THIS IS RIGHT

Herpes simplex virus (HSV) infection presents with painful, grouped vesicles on an erythematous base, which may rupture to form shallow ulcers.

- Painful vesicles (hallmark)
- Lesions are clustered ("grouped vesicles")
- Common sites: oral (HSV-1), genital (HSV-2)
- May be associated with burning/tingling (prodrome)
- Establishes latency in sensory ganglia -> recurrent episodes

Differentiation:

- Syphilis -> painless chancre
- Chancroid -> painful ulcer (not vesicles), ragged edges
- Candidiasis -> white plaques, not vesicles

QUESTION

A South Asian fruit farmer presented with fever, breathlessness, and encephalitis. What can be the most likely diagnosis?

A Zika virus

B Nipah virus

CORRECT

C Malaria

D Ebola virus

RIGHT ANSWER

OK

B. Nipah virus

WHY THIS IS RIGHT

Nipah virus infection should be suspected in patients with fever, respiratory symptoms, and encephalitis, especially in individuals exposed to fruit bats or contaminated fruit in South Asia.

- Reservoir: fruit bats (Pteropus species)
- Transmission: bat -> human (via contaminated fruit/date palm sap), human-to-human possible
- Clinical features:

- o Fever, headache
- o Breathlessness (respiratory involvement)
- o Encephalitis (major cause of mortality)

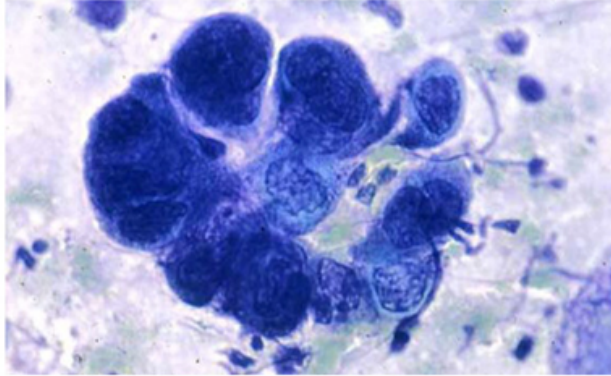
Farmers handling fruits -> exposure to bat-contaminated produce

Differentiation:

- Zika -> mild illness, congenital anomalies
- Malaria -> fever with chills, no encephalitis typically
- Ebola -> hemorrhagic fever, different geographic distribution

QUESTION

A patient presents with trigeminal neuralgia and perioral vesicular lesions. A Tzanck smear reveals the following. What is the most likely causative organism?



A HPV

B CMV

C EBV

D HSV

CORRECT

RIGHT ANSWER

OK

D. HSV

WHY THIS IS RIGHT

Herpes simplex virus (HSV) infection is identified on Tzanck smear by multinucleated giant cells with nuclear molding and ground-glass nuclei.

- Painful vesicular lesions (perioral/genital)
- Trigeminal neuralgia suggests HSV-1 reactivation
- Tzanck smear -> multinucleated giant cells

Pathogenesis:

- Virus infects epithelial cells -> cell fusion -> syncytia formation
- Establishes latency in sensory ganglia (e.g., trigeminal ganglion)

Differentiation:

- HPV -> koilocytes (no multinucleated giant cells)
- CMV -> "owl's eye" intranuclear inclusions
- EBV -> atypical lymphocytes, not vesicular lesions

QUESTION

| Which virus requires reverse transcriptase PCR for detection?

A RSV

CORRECT

B Herpes virus

C EBV

D CMV

RIGHT ANSWER

OK

A. RSV

WHY THIS IS RIGHT

Reverse transcriptase PCR (RT-PCR) is used for detection of RNA viruses.

RNA viruses require conversion of RNA to complementary DNA (cDNA) using reverse transcriptase before amplification

Correct answer: RSV (Respiratory syncytial virus) -> RNA virus -> requires RT-PCR

Why not others:

- Herpes virus -> DNA virus
- EBV -> DNA virus
- CMV -> DNA virus

Key points:

- RT-PCR is the diagnostic method of choice for many RNA viruses (e.g., RSV, influenza, SARS-CoV-2)
- DNA viruses can be detected directly by PCR without reverse transcription

QUESTION

A patient presents with pain in the genital area and a painful vesicle on examination, accompanied by painful lymphadenopathy. What is the diagnosis?

A HSV2

CORRECT

B Molluscum

C HPV

D HIV

RIGHT ANSWER

OK A. HSV2

WHY THIS IS RIGHT

Bottom of Form Painful genital vesicles with tender lymphadenopathy are characteristic of genital herpes caused by HSV-2.

- HSV-2 causes painful vesicular lesions that may rupture to form ulcers
- Associated with painful inguinal lymphadenopathy
- Primary infection may have systemic symptoms (fever, malaise)
- Virus remains latent in sacral ganglia and can reactivate

Differentiation:

- Molluscum contagiosum -> painless, umbilicated papules
- HPV -> painless genital warts (condyloma acuminata)
- HIV -> does not present with localized vesicular genital lesions

QUESTION

| Which of the following is not caused by parvovirus B19?

A Pure red cell aplasia

B Hydrops fetalis

C Aplastic crisis

D Petechial rash

CORRECT

RIGHT ANSWER

OK D. Petechial rash

WHY THIS IS RIGHT

Parvovirus B19 primarily infects erythroid precursor cells, leading to hematological manifestations.

Caused by Parvovirus B19:

- Pure red cell aplasia (especially in immunocompromised patients)
- Aplastic crisis (in patients with hemolytic anemias)
- Hydrops fetalis (due to severe fetal anemia in pregnancy)

Not caused: Petechial rash -> more typical of platelet disorders or other viral infections (e.g., dengue)

Key points:

- Causes erythema infectiosum ("slapped cheek" rash) in children
- Targets erythroid precursors via P antigen

QUESTION

| Which one is not a criterion for Kawasaki disease?

A Purulent conjunctivitis

CORRECT

B Rash

C Lymphadenopathy

D Strawberry tongue

RIGHT ANSWER

OK

A. Purulent conjunctivitis

WHY THIS IS RIGHT

Kawasaki disease is a pediatric vasculitis diagnosed clinically using specific criteria.

Diagnostic criteria (fever ≥ 5 days + ≥ 4 of the following):

- Bilateral non-purulent conjunctivitis
- Polymorphous rash
- Cervical lymphadenopathy
- Oral mucosal changes (strawberry tongue, cracked lips)
- Changes in extremities (edema, erythema, desquamation)

Incorrect option: Purulent conjunctivitis is not a feature; conjunctivitis in Kawasaki is non-purulent

Key points:

- Risk of coronary artery aneurysms if untreated
- Treated with IVIG and aspirin

QUESTION

A 3-year-old child presents with fever and a maculopapular rash that started on the face and spread downward. Examination reveals Koplik spots on the buccal mucosa. The causative organism responsible for this illness belongs to which of the following categories?

- A** DNA virus
- B** Enveloped, negative-sense single-stranded RNA virus CORRECT
- C** Non-enveloped, positive-sense RNA virus
- D** Double-stranded RNA virus

RIGHT ANSWER

- OK** **B. Enveloped, negative-sense single-stranded RNA virus**

WHY THIS IS RIGHT

- Diagnosis = Measles (Rubeola)
- Caused by Measles virus (Paramyxovirus family)
- Characteristics:
 - Enveloped
 - (-) ssRNA virus
 - Replicates in cytoplasm



QUESTION

Match the following:

Column (A)	Column (B)
a. Rotavirus	1. ssRNA
b. SARS-CoV-2	2. dsDNA
c. Parvovirus	3. dsRNA
d. HPV	4. ssDNA

A a-2, b-1, c-4, d-3

B a-3, b-1, c-4, d-2

CORRECT

C a-2, b-4, c-1, d-3

D a-1, b-2, c-3, d-4

RIGHT ANSWER

OK

B. a-3, b-1, c-4, d-2

WHY THIS IS RIGHT

Virus	Genome Type	Key Feature
----	-----	-----
Rotavirus	dsRNA	Reoviridae family
SARS-CoV-2	ssRNA	Coronavirus, positive-sense RNA
Parvovirus	ssDNA	Smallest DNA virus
HPV	dsDNA	Papillomavirus causing warts & cancer

QUESTION

| Most common cause of diarrhoea in children:

A Escherichia coli

B Rotavirus

CORRECT

C Ascaris

D Shigella

RIGHT ANSWER

OK

B. Rotavirus

WHY THIS IS RIGHT

The most common cause of acute diarrhoea in children worldwide is Rotavirus.

- Rotavirus is a double-stranded RNA virus (Reoviridae family)
- Primarily affects infants and young children
- Causes severe watery diarrhoea, vomiting, and dehydration
- Transmission is fecal-oral

Clinical relevance:

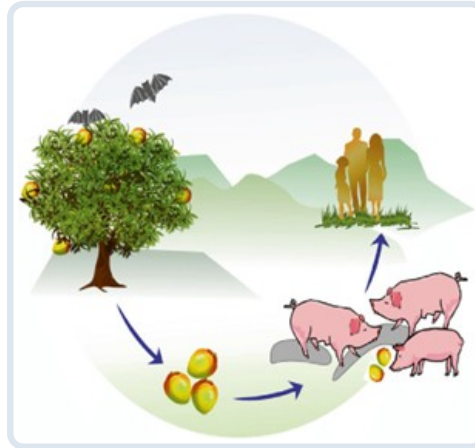
- Leading cause of severe dehydrating diarrhoea in children under 5 years
- Prevention is by oral rotavirus vaccination

Differentiation:

- Escherichia coli -> common bacterial cause, but less frequent than rotavirus in children
- Shigella -> causes dysentery (bloody diarrhoea)
- Ascaris -> helminth, not a typical cause of acute diarrhoea

QUESTION

Which of the following is true about the agent whose lifecycle is shown below?



- A 100% case fatality in humans
- B Humans act as natural reservoir
- C Encephalitis is the cause of death in outbreak**
- D Its caused by a DNA virus

CORRECT

RIGHT ANSWER

- OK C. Encephalitis is the cause of death in outbreak**

WHY THIS IS RIGHT

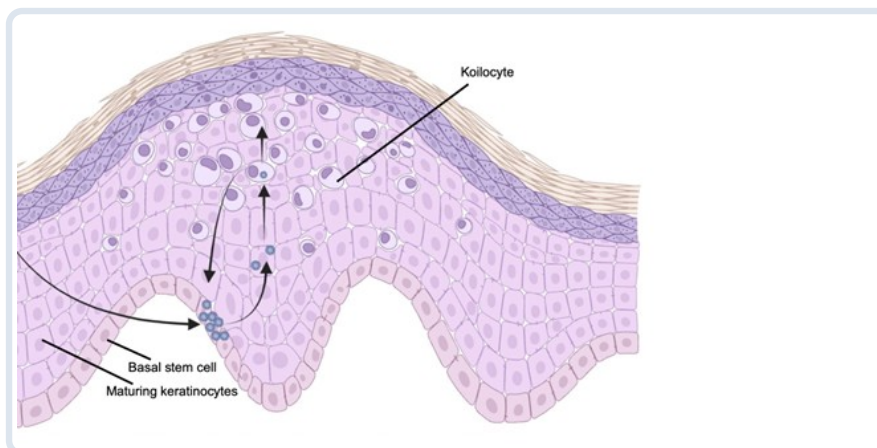
The image depicts transmission of Nipah virus, a zoonotic infection with fruit bats as the natural reservoir.

- Nipah virus is an RNA virus belonging to the Paramyxovirus family
- Natural reservoir: fruit bats (Pteropus species), not humans
- Transmission: bat -> pig -> human or directly via contaminated food (e.g., date palm sap), and human-to-human
- Causes severe encephalitis, which is the main cause of death during outbreaks
- Case fatality rate is high (around 40-75%), but not 100%

Thus, encephalitis is the major cause of mortality in Nipah virus infection.

QUESTION

Which of the following is true regarding the virus in the image?



A RNA virus

B Oncogenic virus

CORRECT

C Vaccine is not available

D Most common manifestation is painful genital ulcer

RIGHT ANSWER

OK

B. Oncogenic virus

WHY THIS IS RIGHT

The image depicts infection of stratified squamous epithelium by Human papillomavirus (HPV), showing viral replication in differentiating keratinocytes.

- HPV is a non-enveloped, double-stranded DNA virus
- It infects basal epithelial cells and replicates as cells differentiate
- High-risk types (16, 18) are oncogenic and associated with cervical cancer
- Low-risk types (6, 11) cause genital warts
- Vaccine is available (contrary to the incorrect option)
- It does not cause painful genital ulcers (that is seen in herpes)

Thus, HPV is an oncogenic DNA virus with available vaccination and epithelial tropism.

QUESTION

| Which among the following is the most common cause of diarrhea in adults?

- A** Rotavirus
- B** Adenovirus 40, 41
- C** **Norovirus**
- D** Astrovirus

CORRECT

RIGHT ANSWER

- OK** **C. Norovirus**

WHY THIS IS RIGHT

Norovirus:

- Leading cause of outbreak-related diarrhea in adults
- Spread via fecal-oral route (contaminated food/water, person-to-person)
- Common in closed settings (cruise ships, hostels, hospitals)
- Causes acute onset vomiting + watery diarrhea

Why not others:

- Rotavirus -> most common in infants and young children
- Adenovirus 40/41 -> pediatric diarrhea
- Astrovirus -> mild diarrhea, mainly in children and elderly

QUESTION

A patient with HIV who is currently on antiretroviral therapy consisting of zidovudine, lamivudine, and nevirapine is diagnosed with tuberculosis. Considering potential drug interactions, which of the following TB drugs should be changed in this patient?

A Isoniazid

B Rifampicin

CORRECT

C Ethambutol

D Streptomycin

RIGHT ANSWER

OK

B. Rifampicin

WHY THIS IS RIGHT

In HIV-TB coinfection, rifampicin must be modified/substituted in patients receiving NNRTI-based ART (e.g., nevirapine) due to significant drug interactions.

- Mechanism of interaction:

- o Rifampicin is a potent CYP450 inducer

- o ↓ plasma levels of nevirapine (NNRTI) -> risk of ART failure

- Clinical implication:

- o Avoid co-administration with nevirapine when possible

- o Substitute rifampicin with rifabutin or adjust ART regimen

- Why not others: Isoniazid, ethambutol, streptomycin: no major CYP450 induction -> safe with ART

QUESTION

An HIV-positive woman in her third trimester presents to the hospital with a viral load of 1,200 copies/mL and is started on antiretroviral therapy. She delivers a healthy infant at 38 weeks via normal vaginal delivery. The baby is exclusively breastfed. Which of the following is the most appropriate prophylactic therapy for the newborn?

- A** Nevirapine single dose and continue breast feeding
- B** Zidovudine plus Nevirapine for 6 weeks and continue breast feeding
- C** Nevirapine for 12 weeks and stop breast feeding
- D** Zidovudine plus Nevirapine for 12 weeks and continue breast feeding

CORRECT

RIGHT ANSWER

OK

D. Zidovudine plus Nevirapine for 12 weeks and continue breast feeding

WHY THIS IS RIGHT

In HIV-exposed infants, the choice and duration of prophylaxis depend on maternal viral load and transmission risk. High-risk exposure (e.g., maternal viral load >1000 copies/mL, late ART initiation) -> dual prophylaxis is required.

Recommended management:

- Zidovudine + Nevirapine for 12 weeks
- Continue exclusive breastfeeding (with maternal ART)

Why not others:

- Single-dose nevirapine -> inadequate prophylaxis
- 6 weeks regimen -> for low-risk infants only
- Stopping breastfeeding -> not recommended in resource-limited settings (benefits outweigh risks with ART)

QUESTION

Which component of the HIV genome is necessary for the virus to enter the host cell membrane?

A GP120

CORRECT

B CCR5

C GP41

D CXCR4

RIGHT ANSWER

OK A. GP120

WHY THIS IS RIGHT

HIV entry into host cells is initiated by binding of viral gp120 to host receptors.

Key mechanism:

- gp120 (viral envelope glycoprotein) binds to CD4 receptor on host cells
- Then interacts with co-receptors (CCR5 or CXCR4)
- This triggers gp41-mediated membrane fusion

Roles:

- gp120 -> attachment to CD4 and co-receptors (essential for entry initiation)
- gp41 -> fusion of viral and host membranes
- CCR5/CXCR4 -> host co-receptors

QUESTION

Which of the following drug binds to CD4 receptors and is used for both CCR-5 as well as CXCR-4 tropic HIV?

A Maraviroc

B Ibalizumab

CORRECT

C Fostemsavir

D Tenofovir

RIGHT ANSWER

OK B. Ibalizumab

WHY THIS IS RIGHT

Ibalizumab is a monoclonal antibody that binds the CD4 receptor post-attachment and blocks HIV entry. Because it targets CD4 rather than the co-receptor, it is effective against both CCR5- and CXCR4-tropic HIV strains. Maraviroc blocks only CCR5, not CXCR4 virus. CD4-directed entry inhibition is the key distinguishing feature.

Entry Inhibitors

Attachment ⊖	Gp120 (Fostemsavir)
Post Attachment ⊖	CD4 Receptors (Ibalizumab)
Fusion ⊖	Gp41 (Enfuvirtide)
Co-Receptor ⊖	CCR-5 (Maraviroc)

QUESTION

| Which of the following is the best regimen for pre-exposure prophylaxis for HIV?

A Tenofovir with Emtricitabine

CORRECT

B Tenofovir Lamivudine

C Zidovudine, Emtricitabine

D Zidovudine alone

RIGHT ANSWER

OK

A. Tenofovir with Emtricitabine

WHY THIS IS RIGHT

The preferred regimen for HIV pre-exposure prophylaxis (PrEP) is Tenofovir combined with Emtricitabine.

- Daily oral Tenofovir disoproxil fumarate (TDF) + Emtricitabine (FTC) is the standard PrEP regimen
- Highly effective in preventing HIV acquisition when taken consistently
- Works by inhibiting reverse transcriptase, blocking viral replication early after exposure
- Indicated in high-risk individuals (multiple partners, serodiscordant couples, MSM, IV drug users)

Why not others:

- Tenofovir + Lamivudine is used in treatment regimens, not standard PrEP
- Zidovudine-based regimens are not used for PrEP due to toxicity and lower convenience
- Zidovudine alone is ineffective

QUESTION

A 40-year-old male with a known HIV infection presents with cough and fever lasting for 3 months. Patient is diagnosed with a case of miliary tuberculosis. What is the next best step?

CORRECT

A Start ATT now and start ART later and increase the dolutegravir dose

B Start ART now, start ATT two weeks later and increase the dolutegravir

C Start ATT and ART together

D Start ATT now along with corticosteroids, start and increase the dolutegravir

RIGHT ANSWER

OK

A. Start ATT now and start ART later and increase the dolutegravir dose

WHY THIS IS RIGHT

In HIV patients with active tuberculosis, anti-tubercular therapy (ATT) should be initiated first, followed by antiretroviral therapy (ART) after a short delay.

- Start ATT immediately in all cases of active TB
- ART is started after 2 weeks (early initiation reduces mortality but avoids severe immune reconstitution inflammatory syndrome, IRIS)
- Rifampicin induces hepatic enzymes -> reduces levels of dolutegravir
- Therefore, dolutegravir dose must be increased when co-administered with rifampicin

Additional notes:

- Simultaneous initiation of ATT and ART increases risk of IRIS
- Steroids are reserved for specific indications (e.g., TB meningitis, pericarditis), not routine miliary TB

Thus, ATT is started first, ART is added after 2 weeks, and dolutegravir dose is increased due to rifampicin interaction.

QUESTION

A 32-year-old male presents to the emergency department with high-grade fever and altered sensorium. He recently returned from a malaria-endemic region. Blood smear confirms *Plasmodium falciparum* infection resistant to chloroquine. The patient is diagnosed with complicated malaria. What is the most appropriate treatment of choice in this scenario?

A Quinine

B Artesunate

CORRECT

C Sulfadoxine-Pyrimethamine

D Primaquine

RIGHT ANSWER

OK

B. Artesunate

WHY THIS IS RIGHT

Severe (complicated) malaria caused by *Plasmodium falciparum*, especially chloroquine-resistant strains, should be treated with intravenous artesunate, which is the drug of choice due to its rapid parasite clearance and superior survival benefit compared to quinine.

- Indications for IV artesunate: altered sensorium (cerebral malaria), severe anemia, acidosis, renal failure, shock, etc.
- Mechanism: Artemisinin derivatives generate free radicals -> rapid killing of parasitized RBCs.

· Why not others:

- o Quinine: second line; more side effects (cinchonism, hypoglycemia)
- o Sulfadoxine-pyrimethamine: resistance common; not for severe malaria
- o Primaquine: acts on hypnozoites (vivax/ovale), not used in acute severe falciparum malaria

QUESTION

A young woman presents with eye pain, photophobia, and blurred vision. She reports swimming at a beach while wearing contact lenses. Which of the following organisms is the most likely cause of her condition?

A Pseudomonas aeruginosa

B Aspergillus fumigatus

C Acanthamoeba spp.

CORRECT

D Herpes simplex virus

RIGHT ANSWER

OK C. Acanthamoeba spp.

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

An 18-year-old boy from Rajasthan weighing 50 kg is diagnosed with mixed *P. vivax* and *P. falciparum* malaria. What is the appropriate treatment regimen on day 2?

A Artesunate 50 mg (4 tablets) + Primaquine 2.5 mg (6 tablets)

CORRECT

B Artesunate 50 mg (4 tablets) + Primaquine 7.5 mg (6 tablets)

C Artesunate 50 mg (4 tablets) + Sulfadoxine/pyrimethamine (750/37.5 mg) (2 tablets) + Primaquine 2.5 mg (6 tablets)

D Artesunate 50 mg (4 tablets) + Sulfadoxine/pyrimethamine (750/37.5 mg) (2 tablets) + Primaquine 7.5 mg (6 tablets)

RIGHT ANSWER

OK A. Artesunate 50 mg (4 tablets) + Primaquine 2.5 mg (6 tablets)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1b” here and does not include a written explanation for this item.

QUESTION

An HIV-positive patient presents with a history of chronic diarrhea. Stool microscopy reveals cysts measuring 11-22 μm in size, each containing 2 sporocysts. Which of the following parasites is the most likely cause?

A) *Cryptosporidium parvum*

B) *Cyclospora cayetanensis*

C) *Cystoisospora belli*

CORRECT

D) *Toxoplasma gondii*

RIGHT ANSWER

OK C. C) *Cystoisospora belli*

WHY THIS IS RIGHT

Cystoisospora belli is an opportunistic coccidian parasite causing chronic watery diarrhea in immunocompromised patients (especially HIV/AIDS).

- Diagnostic morphology:
 - o Oocysts (not cysts) measuring ~20-30 μm ($\approx$ 11-22 μm in some descriptions)
 - o Contain 2 sporocysts, each with sporozoites -> key identifying feature
- Site of infection: small intestine (enterocytes)

- Clinical features:
 - o Chronic, non-bloody diarrhea
 - o Malabsorption, weight loss
 - o Eosinophilia may be present

Why not others:

- *Cryptosporidium parvum*: smaller oocysts (4-6 μm), no sporocysts seen
- *Cyclospora cayetanensis*: 8-10 μm oocysts, variable acid-fast staining
- *Toxoplasma gondii*: systemic infection; not a cause of diarrheal illness



QUESTION

In a patient presented with a fever and a positive filarial antigen test, what is the next best step of management?

- A Bone marrow biopsy
- B DEC provocation test
- C Detection of microfilariae in the blood smear**
- D Ultrasound of the scrotum

CORRECT

RIGHT ANSWER

- OK C. Detection of microfilariae in the blood smear**

WHY THIS IS RIGHT

In a patient with suspected filariasis, a positive filarial antigen test should be followed by demonstration of microfilariae in peripheral blood smear for confirmation and species identification.

- Filarial antigen test:
 - o Sensitive screening tool (especially for *Wuchereria bancrofti*)
 - o Detects circulating filarial antigen
- Next step (confirmation):
 - o Peripheral blood smear (preferably night sample due to nocturnal periodicity)
 - o Helps identify species based on morphology

Why not others:

- o Bone marrow biopsy: not relevant
- o DEC provocation test: outdated, rarely used
- o Ultrasound (filarial dance sign): supportive, not confirmatory

QUESTION

A 32-year-old male from rural Bihar presents with a 3-month history of intermittent fever, progressive abdominal distension, and weight loss. On examination, he has marked splenomegaly, pallor, and hyperpigmentation of the skin. Laboratory evaluation reveals pancytopenia. Bone marrow aspiration shows intracellular amastigotes within macrophages.

Which of the following is the most likely vector responsible for transmission of this disease?

A Rat flea

B Sandfly (Phlebotomus)

CORRECT

C Deer fly (Chrysops)

D Black fly (Simulium)

RIGHT ANSWER

OK

B. Sandfly (Phlebotomus)

WHY THIS IS RIGHT

Visceral leishmaniasis (kala-azar), common in regions like Bihar, is caused by *Leishmania donovani* and is transmitted by the female sandfly (genus *Phlebotomus*).

- Vector: *Phlebotomus* (sandfly)
- Reservoir: humans (in Indian subcontinent)
- Clinical features:

- o Massive splenomegaly
- o Irregular (on-off) fever
- o Anemia, weight loss
- o Hyperpigmentation ("kala-azar")
- Parasite form:

- o Amastigotes (LD bodies) inside macrophages in spleen, liver, bone marrow

- Diagnosis: Demonstration of LD bodies in tissue aspirate
- Treatment: Liposomal amphotericin B

Why not others:

- Rat flea: plague (*Yersinia pestis*)
- Chrysops fly: *Loa loa* (loiasis)
- Black fly (*Simulium*): *Onchocerca volvulus* (river blindness)

QUESTION

A boy presented with a fever and chills. Rapid test was positive for specific antigen HRP-2. Which of the following species of *Plasmodium* is the most likely causative agent?

A *Plasmodium falciparum*

CORRECT

B *Plasmodium malariae*

C *Plasmodium vivax*

D *Plasmodium ovale*

RIGHT ANSWER

OK

A. *Plasmodium falciparum*

WHY THIS IS RIGHT

A positive HRP-2 (Histidine-Rich Protein-2) antigen test is specific for *Plasmodium falciparum* infection.

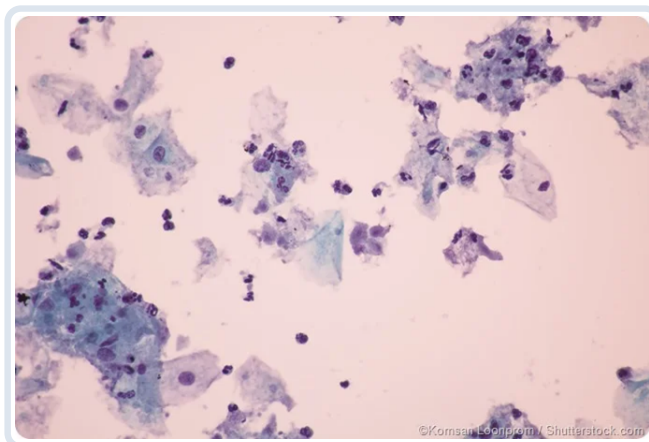
- HRP-2:
 - o Protein produced only by *P. falciparum*
 - o Detected by rapid diagnostic tests (RDTs)
- Clinical significance:
 - o Helps in rapid bedside diagnosis of *falciparum* malaria
 - o Useful in endemic settings where microscopy may not be immediately available
- Important limitation: HRP-2 may remain positive even after parasite clearance -> not useful for monitoring treatment response

Why not others:

- *Plasmodium vivax*, *ovale*, *malariae* -> do NOT produce HRP-2
- These are detected by other antigens (e.g., pLDH)

QUESTION

A woman in her reproductive age presented with a foul-smelling discharge, burning sensation, and lower abdominal pain. She also experiences dysuria. Pap smear is shown below. The organism responsible is:



A CMV

B HPV

C HSV

D Trichomonas

CORRECT

RIGHT ANSWER

OK

D. Trichomonas

WHY THIS IS RIGHT

Trichomonas vaginalis is a flagellated protozoan causing trichomoniasis, characterized by foul-smelling vaginal discharge, burning, dysuria, and inflammatory changes on Pap smear.

• Clinical features:

- o Frothy, foul-smelling discharge
- o Vaginal irritation, burning
- o Dysuria, lower abdominal discomfort
- o "Strawberry cervix" (punctate hemorrhages)

• Microscopy (Pap smear/wet mount):

- o Motile, flagellated trophozoites
- o No cyst form (exists only as trophozoite)

• Transmission: sexual contact

• Why not others:

- o CMV: owl's eye inclusions
- o HPV: koilocytes (perinuclear clearing)
- o HSV: multinucleated giant cells

• Diagnosis:

- o Wet mount (motile organisms)
- o NAAT (most sensitive)
- Treatment: Metronidazole (treat both partners)

QUESTION

A female presented with a long history of fever, discolored skin of lower limbs, and lower limb edema. Microscopic examination showed a sheathed organism with no nuclei at the tip of the tail. What can be the most likely diagnosis?



A **Wuchereria bancrofti**

CORRECT

B Mansonella

C Loa loa

D Brugia malayi

RIGHT ANSWER

OK

A. Wuchereria bancrofti

WHY THIS IS RIGHT

Wuchereria bancrofti is the most common cause of lymphatic filariasis, identified on microscopy by sheathed microfilariae with absence of nuclei at the tail tip.

• Clinical features:

- o Chronic fever
- o Lymphedema of lower limbs -> elephantiasis
- o Skin thickening and discoloration

• Morphology (diagnostic):

- o Sheathed microfilaria
- o No nuclei at the tip of the tail (key differentiating feature)

• Comparison:

- o Brugia malayi: sheathed, but 2 terminal nuclei at tail tip
- o Loa loa: sheathed, nuclei extend continuously to tail tip
- o Mansonella: unsheathed microfilariae

• Diagnosis:

- o Peripheral blood smear (night sample due to nocturnal periodicity)
- o Antigen detection tests
- Treatment: Diethylcarbamazine (DEC)

QUESTION

| Infection with *Clonorchis sinensis* is associated with an increased risk of?

A Cervical cancer

B Cholangiocarcinoma

CORRECT

C Gastric carcinoma

D Bladder carcinoma

RIGHT ANSWER

OK **B. Cholangiocarcinoma**

WHY THIS IS RIGHT

Cancer	Associated Organism
-----	-----
Cervical cancer	HPV (types 16, 18)
Gastric carcinoma	* <i>Helicobacter pylori</i> *
Bladder carcinoma	* <i>Schistosoma haematobium</i> *
Cholangiocarcinoma	* <i>Clonorchis sinensis</i> *

QUESTION

A young boy developed keratitis after careless use of contact lenses due to unhygienic lens fluid. Microscopy showed the following. Identify the organism.



A Acanthamoeba

CORRECT

B Balantidium

C Naegleria fowleri

D Staph aureus

RIGHT ANSWER

OK A. Acanthamoeba

WHY THIS IS RIGHT

Acanthamoeba is a free-living amoeba that causes keratitis in contact lens users, especially with poor lens hygiene.

Spike-like pseudopodia (acanthopodia) seen on microscopy

- Causes painful keratitis with redness, photophobia, and decreased vision
- Often associated with:

- o Improper lens cleaning
- o Use of contaminated lens solutions
- o Swimming with contact lenses

Morphology:

- Trophozoite -> irregular shape with acanthopodia
- Cyst -> double-walled (important for resistance)

Differentiation:

- Naegleria fowleri -> causes primary amoebic meningoencephalitis (brain infection)
- Balantidium coli -> ciliated protozoa causing dysentery
- Staph aureus -> bacterial keratitis, no pseudopodia

QUESTION

A lady from West Rajasthan presented with an ulcer surrounded by erythema on the right leg. Microscopy of the biopsy from the edge of the ulcer showed organisms with dark staining nuclei and kinetoplast. What is the most likely causative agent?

A Leishmania tropica

CORRECT

B Babesia

C Trypanosoma

D Histoplasma

RIGHT ANSWER

OK

A. Leishmania tropica

WHY THIS IS RIGHT

Cutaneous leishmaniasis (common in Rajasthan) is caused by *Leishmania tropica*, identified on microscopy by amastigotes (LD bodies) with a nucleus and kinetoplast inside macrophages.

- Clinical feature: Painless ulcer with erythematous border ("oriental sore")
- Morphology (diagnostic):
 - o Amastigotes (LD bodies)
 - o Each shows:
 - § Nucleus
 - § Kinetoplast (rod-shaped mitochondrial DNA) -> key identifying feature
- Site in tissue: Found inside macrophages in skin biopsy

Why not others:

- o Babesia: intraerythrocytic parasite (Maltese cross)
- o Trypanosoma: extracellular flagellated forms (trypomastigotes)
- o Histoplasma: intracellular yeast but no kinetoplast

QUESTION

| Which of the following statements is true about *Trichomonas vaginalis*?

- A** It cannot be cultured
- B** Twitching motility is seen on wet saline mount CORRECT
- C** Cysts are seen on wet saline mount of vaginal secretions
- D** It is not a sexually transmitted infection

RIGHT ANSWER

- OK** **B. Twitching motility is seen on wet saline mount**

WHY THIS IS RIGHT

Trichomonas vaginalis is a flagellated protozoan causing a sexually transmitted infection, and is diagnosed by characteristic twitching (jerky) motility on wet saline mount.

- Morphology:
 - o Exists only as trophozoite (no cyst form)
 - o Has flagella -> responsible for twitching motility
- Diagnosis:
 - o Wet mount: motile organisms with jerky movement (classic finding)
 - o Culture and NAAT can also be used
- Clinical features:
 - o Frothy, foul-smelling vaginal discharge
 - o Vaginal itching, dysuria
 - o Strawberry cervix

Why not others:

- o Can be cultured -> so A is false
- o No cyst form -> C is false
- Sexually transmitted infection -> D is false

QUESTION

A peripheral blood smear shows sheathed microfilariae with two distinct terminal nuclei at the tail tip. Which organism does this morphology most likely represent?



A *Wuchereria bancrofti*

B *Brugia malayi*

CORRECT

C *Loa*

D *Onchocerca volvulus*

RIGHT ANSWER

OK B. *Brugia malayi*

WHY THIS IS RIGHT

Brugia malayi is identified on peripheral blood smear by sheathed microfilariae with two distinct terminal nuclei at the tail tip, a key differentiating feature from other filarial parasites.

- Morphology:
 - o Sheathed microfilariae
 - o Two separate terminal nuclei at tail tip (diagnostic feature)
- Clinical relevance:
 - o Causes lymphatic filariasis (similar to *Wuchereria*)
 - o Leads to lymphedema, elephantiasis (less severe than *Wuchereria*)
- Diagnosis: Peripheral blood smear (often nocturnal periodicity)
- Treatment: Diethylcarbamazine (DEC)

Comparison with others:

- o *Wuchereria bancrofti*: sheathed, but no nuclei at tail tip
- o *Loa loa*: sheathed, nuclei extend continuously to tail tip (no gap)
- o *Onchocerca volvulus*: unsheathed microfilariae

QUESTION

An HIV-positive patient presented with complaints of diarrhea and foul-smelling stool. His stool microscopy did not show any ova or eggs, but there was the presence of motile 200 μm larva. Identify the organism.

A Ancylostoma duodenale

B Ascaris lumbricoides

C Schistosoma mansoni

D Strongyloides stercoralis

CORRECT

RIGHT ANSWER

OK

D. Strongyloides stercoralis

WHY THIS IS RIGHT

Strongyloides stercoralis is identified in stool by the presence of motile larvae (not eggs), especially in immunocompromised patients like those with HIV.

Key diagnostic clue:

- Motile larvae ($\sim 200 \mu\text{m}$) seen in stool
- Eggs are usually not seen because they hatch within the intestine

Key features:

- Causes diarrhea, abdominal pain, and malabsorption
- Foul-smelling stool due to intestinal involvement
- Unique ability for autoinfection $\rightarrow$ persistent infection
- Can lead to hyperinfection syndrome in immunocompromised patients
- Dissemination may involve lungs and other organs

Differentiation:

- Ancylostoma/Ascaris $\rightarrow$ eggs seen in stool
- Schistosoma $\rightarrow$ eggs with spines

QUESTION

Following images show the sample collected from a patient complaining of perianal itching. The diagnosis is:



A Ancylostoma

B Enterobius vermicularis

CORRECT

C H. Nana

D Necator americanus

RIGHT ANSWER

OK

B. Enterobius vermicularis

WHY THIS IS RIGHT

Enterobius vermicularis (pinworm) is the most common cause of perianal itching, especially in children, and is diagnosed by identifying planoconvex (D-shaped) eggs using the Scotch tape test.

- Nocturnal perianal itching (female worm migrates at night to lay eggs)
- Eggs are oval, asymmetrical (one flat side)
- Adult worm: small, thread-like

Diagnosis:

- Cellophane tape (Scotch tape) test -> early morning sample from perianal region
- Stool examination is usually not helpful

Transmission: Feco-oral route, autoinfection common (hand-to-mouth)

Why not others:

- Ancylostoma / Necator -> hookworms (cause anemia, not perianal itching)
- Hymenolepis nana -> dwarf tapeworm, different egg morphology

QUESTION

A patient presents with edema of the lower limbs. On examination, inguinal lymph nodes are palpable. A peripheral blood smear is shown below. Based on these findings, what is the most likely cause of the edema in this patient?



A Obstruction of lymphatic vessels

CORRECT

B Hypoproteinemia

C Hypoalbuminemia

D Hyponatremia

RIGHT ANSWER

OK

A. Obstruction of lymphatic vessels

WHY THIS IS RIGHT

Lymphatic filariasis (caused by *Wuchereria bancrofti*) leads to edema due to obstruction of lymphatic vessels.

- Microfilariae seen in peripheral blood smear
- Adult worms reside in lymphatic vessels
- Causes lymphatic obstruction -> lymphedema (e.g., elephantiasis)

Clinical clues:

- Lower limb swelling
- Inguinal lymphadenopathy
- Chronic progression to thickened skin

Pathogenesis:

- Inflammation and fibrosis of lymphatics
- Impaired lymph drainage -> accumulation of fluid

QUESTION

A 4-year-old child presents with diarrhea and intense nocturnal perianal itching. Her mother reports noticing white thread-like worms in the child's undergarments. A stool sample collected using the scotch tape method reveals D-shaped (planoconvex) eggs under microscopy. What is the most likely causative organism?



A Strongyloides stercoralis

B Enterobius vermicularis

CORRECT

C Hymenolepis nana

D Trichuris trichiura

RIGHT ANSWER

OK

B. Enterobius vermicularis

WHY THIS IS RIGHT

Enterobius vermicularis (pinworm) is characterized by nocturnal perianal itching and D-shaped (planoconvex) eggs detected by the Scotch tape test.

- Intense perianal itching, especially at night
- Female worm migrates to perianal region to lay eggs
- Eggs are planoconvex (D-shaped)

Diagnosis:

- Scotch tape (cellophane tape) test -> gold standard
- Stool examination is usually not helpful

Transmission:

- Feco-oral route
- Autoinfection common (hand-to-mouth transfer)

Management:

- Albendazole or mebendazole
- Treat all household contacts

Emphasize hygiene (nail trimming, handwashing)

QUESTION

Cholangiocarcinoma is associated with all of the following except?

- A** Opisthorchis
- B** Primary sclerosing cholangitis
- C** Caroli's disease
- D** Hepatitis B

CORRECT

RIGHT ANSWER

OK

D. Hepatitis B

WHY THIS IS RIGHT

Cholangiocarcinoma (bile duct cancer) is associated with chronic inflammation and biliary tract diseases.

Associated conditions:

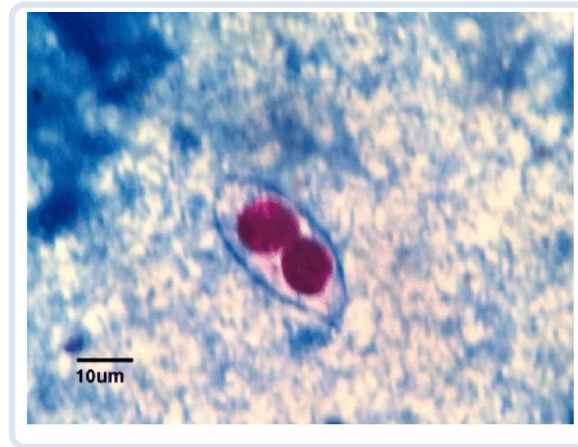
- Opisthorchis infection -> chronic biliary irritation -> strong risk factor
- Primary sclerosing cholangitis -> major predisposing condition
- Caroli's disease -> congenital bile duct dilatation -> increased risk

Not associated:

- Hepatitis B -> primarily associated with hepatocellular carcinoma, not cholangiocarcinoma

QUESTION

A 47-year-old renal transplant patient presented with watery diarrhea. Stool examination revealed oval cysts 30 x 15 microns as shown in the image below. Which among the following is the causative organism:



A Cryptosporidium

B Isospora

CORRECT

C Cyclospora

D Microsporidia

RIGHT ANSWER

OK

B. Isospora

WHY THIS IS RIGHT

An immunocompromised patient (renal transplant) with watery diarrhea and oval, acid-fast cysts measuring around 30 × 15 µm is characteristic of *Isospora belli* infection.

- *Isospora belli* produces large, oval, acid-fast oocysts in stool
- Commonly causes chronic watery diarrhea in immunocompromised patients (especially HIV/transplant)
- Transmitted via fecal-oral route
- Treatment: Cotrimoxazole

Differentiation:

- *Cryptosporidium* -> small, round oocysts (4-6 µm)
- *Cyclospora* -> spherical oocysts (8-10 µm)
- *Microsporidia* -> very small spores, require special stains

QUESTION

| Parthenogenesis is seen in which of the following worm?

A Trichuris trichura

B Strongyloides stercoralis

CORRECT

C Ancylostoma duodenale

D Enterobius vermicularis

RIGHT ANSWER

OK

B. Strongyloides stercoralis

WHY THIS IS RIGHT

Parthenogenesis refers to reproduction by females without fertilization.

Strongyloides stercoralis is the only intestinal helminth where parthenogenesis occurs in humans

Mechanism:

- Parasitic female worms in the intestinal mucosa produce eggs without male fertilization
- Eggs hatch into larvae within the intestine

Key points:

- Enables autoinfection and persistent infection
- Important cause of hyperinfection syndrome in immunocompromised patients
- Unique life cycle with both free-living and parasitic forms

Why not others: Trichuris, Ancylostoma, and Enterobius require male and female worms for reproduction

QUESTION

| Which of the following is best for the malaria species identification?

A Thin smear with Giemsa

CORRECT

B Thick smear with Giemsa

C Thin smear with acridine orange

D QBC (Quantitative Buffy Coat)

RIGHT ANSWER

OK

A. Thin smear with Giemsa

WHY THIS IS RIGHT

Peripheral smear examination remains the gold standard for malaria diagnosis and species identification.

- Thin smear with Giemsa stain is best for species identification
- Preserves morphology of RBCs and parasites
- Helps differentiate Plasmodium species (falciparum, vivax, ovale, malariae)
- Thick smear with Giemsa is more sensitive for detection of parasites
- Used for screening when parasitemia is low
- QBC and acridine orange are rapid methods but less reliable for species differentiation

QUESTION

| Which of the following drugs is not used for uncomplicated malaria?

A Sulfadoxine - pyrimethamine

B Chloroquine

C Primaquine

D **Artemether**

CORRECT

RIGHT ANSWER

OK

D. Artemether

WHY THIS IS RIGHT

Uncomplicated malaria is treated with oral antimalarial drugs targeting blood-stage parasites.

Drugs used in uncomplicated malaria:

- Chloroquine -> for chloroquine-sensitive malaria (e.g., *P. vivax*)
- Sulfadoxine-pyrimethamine -> used as partner drug in ACT
- Primaquine -> added for radical cure (*P. vivax/ovale*) and gametocyte clearance

Not used alone for uncomplicated malaria:

- Artemether -> used as part of injectable therapy (e.g., severe malaria) or in ACT combinations, not as monotherapy because it leads to resistance. Severe malaria requires parenteral therapy (artesunate/artemether)

QUESTION

| DOC for fasciola hepatica:

A Triclabendazole

CORRECT

B Albendazole

C Mebendazole

D Praziquantel

RIGHT ANSWER

OK

A. Triclabendazole

WHY THIS IS RIGHT

Triclabendazole is the drug of choice for treating Fasciola hepatica (liver fluke) infections.

| Drug | Primary Uses |

| --- | ----- |

| Albendazole | Broad-spectrum: *Neurocysticercosis*, hydatid disease, ascariasis, hookworm, trichuriasis, strongyloidiasis (with ivermectin). |

| Mebendazole | Intestinal nematodes: *Enterobius*, *Ascaris*, *Trichuris*, hookworm. Less systemic absorption than albendazole. |

| Praziquantel | Most trematodes except Fasciola (e.g., *Schistosoma*) and all cestodes (*Taenia*, *Diphyllobothrium*). Excellent for neurocysticercosis (with steroids). |

| Triclabendazole | Fasciola hepatica and *Fasciola gigantica* (adult + immature flukes). |

QUESTION

| Which of the following options is wrong about ascaris lumbricoides?

A Heavy infection is associated with Rectal prolapse

CORRECT

B Most infections are asymptomatic

C Fertilised unembryonated egg takes time to infect after it goes in soil

D Can spread to lungs and cause Asthma like symptoms

RIGHT ANSWER

OK

A. Heavy infection is associated with Rectal prolapse

WHY THIS IS RIGHT

Understanding the clinical features and life cycle of *Ascaris lumbricoides* helps identify incorrect statements.

Correct concepts:

- Most infections are asymptomatic
- Fertilized eggs passed in stool are unembryonated and require time in soil to become infective
- Larval migration through lungs can cause cough, wheeze, and eosinophilia (Loeffler syndrome)
- Heavy infection may cause intestinal obstruction, especially in children
- Pulmonary phase causes transient respiratory symptoms

Incorrect statement:

- Rectal prolapse is not associated with *Ascaris*; it is classically seen in *Trichuris trichiura* (whipworm) infection

QUESTION

Which of the following antimalarial drugs are commonly used for the clinical cure of malaria?

- a. Artemisinin
- b. Sulfadoxine-pyrimethamine
- c. Chloroquine
- d. Primaquine

A a, b, c

CORRECT

B a, b, d

C a, c, d

D b, c, d

RIGHT ANSWER

OK A. a, b, c

WHY THIS IS RIGHT

Clinical cure of malaria refers to clearance of asexual erythrocytic forms responsible for symptoms.

Drugs used for clinical cure:

- Artemisinin (and ACTs) -> rapidly clears parasitemia
- Sulfadoxine-pyrimethamine -> inhibits folate synthesis in parasites
- Chloroquine -> effective against sensitive strains

Not used for clinical cure:

- Primaquine -> acts on hepatic hypnozoites and gametocytes (used for radical cure and transmission blocking, not for treating acute blood-stage infection)

QUESTION

I All of the following statements regarding *Toxoplasma gondii* are true, except:

A Transmitted more in third trimester than first

B Releases cysts in stool that are immediately infective

CORRECT

C Can be grown in peritoneum of mice

D Infects most mammals and birds

RIGHT ANSWER

OK B. Releases cysts in stool that are immediately infective

WHY THIS IS RIGHT

Understanding transmission and life cycle of *Toxoplasma gondii* is essential.

Correct concepts:

- Transmission risk to fetus increases in the third trimester, but severity is higher when infection occurs in the first trimester
- It can be grown in the peritoneum of mice (used in laboratory diagnosis)
- It infects a wide range of mammals and birds (definitive host: cat)

Incorrect statement:

- Oocysts passed in cat feces are not immediately infective; they require 1-5 days in the environment to sporulate and become infective

QUESTION

Which of the following helminths is known to maintain its life cycle through autoinfection?

A Strongyloides stercoralis

CORRECT

B Ancylostoma duodenale

C Ascaris lumbricoides

D H. nana

RIGHT ANSWER

OK A. Strongyloides stercoralis

WHY THIS IS RIGHT

Strongyloides stercoralis maintains its life cycle through autoinfection where rhabditiform larvae mature to filariform larvae within the host and penetrate intestinal or perianal mucosa, causing persistent infection especially dangerous in immunocompromised patients.

Organisms causing autoinfection can be remembered as :-

C - Cryptosporidium

H - Hymenolepis nana

E - Enterobius vermicularis

S - Strongyloides stercoralis

T - Taenia solium (via self-ingestion of eggs -> cysticercosis)

Hymenolepis nana can also show autoinfection, but Strongyloides is the most characteristic and clinically significant example

QUESTION

Which protozoa have more than 2 morphological forms?

1. Naegleria
2. Acanthamoeba
3. Trichomonas
4. Giardia

A 1, 2 & 3

B 1, 2 & 4

CORRECT

C 3, 2 & 4

D 1 & 2 only

RIGHT ANSWER

OK

B. 1, 2 & 4

WHY THIS IS RIGHT

Protozoa can exist in different morphological forms such as trophozoite, cyst, and in some cases additional stages.

- Organisms with more than two forms include:
- Naegleria -> trophozoite, cyst, and flagellated form
- Acanthamoeba -> trophozoite and cyst (distinct double-walled cyst; functionally considered multiple adaptive forms)
- Giardia -> trophozoite and cyst
- Trichomonas has only a trophozoite form (no cyst stage)

Key points:

- Presence of multiple forms helps in survival and transmission
- Cyst form is usually the infective stage (except Naegleria, where trophozoite is infective)
- Trichomonas spreads via direct transmission as it lacks a cyst form

QUESTION

A child presented with intense perianal itching. Mother complains of seeing thread like worms in the perianal area. Scotch tape method was used to collect sample and showed these eggs in stool. Identify the organism?



A Ascaris lumbricoides

B Enterobius vermicularis

CORRECT

C Hymenolepis nana

D Hookworm

RIGHT ANSWER

OK

B. Enterobius vermicularis

WHY THIS IS RIGHT

Perianal itching in a child with thread-like worms and eggs detected by the Scotch tape test is characteristic of Enterobius vermicularis infection (pinworm).

- Female worms migrate at night to lay eggs in the perianal region -> intense nocturnal itching
- Diagnosis is best made by Scotch tape test (eggs rarely seen in stool)
- Eggs are oval, asymmetrical, and flattened on one side (planoconvex)
- Common in children and spreads via fecal-oral route (autoinfection)

Clinical relevance:

- Causes disturbed sleep and irritability
- May lead to secondary bacterial infection due to scratching

Treatment:

- Albendazole or mebendazole
- Treat all household contacts and maintain hygiene

QUESTION

Match the following types of larval migrations with their causative organisms:

Column A – Larval Migration Types	Column B – Organisms
A. Cutaneous larva migrans	1. <i>Strongyloides stercoralis</i>
B. Visceral larva migrans	2. <i>Toxocara canis</i>
C. Larva currens	3. <i>Ancylostoma braziliense</i>
D. Swimmer's itch	4. <i>Schistosoma cercariae</i>

A A-2, B-3, C-1, D-4

B A-1, B-4, C-3, D-2

C A-4, B-1, C-2, D-3

D A-3, B-2, C-1, D-4

CORRECT

RIGHT ANSWER

OK D. A-3, B-2, C-1, D-4

WHY THIS IS RIGHT

Larval migration syndromes are classified based on the site and pattern of larval movement in humans.

- Cutaneous larva migrans -> caused by *Ancylostoma braziliense*

Presents as serpiginous, itchy tracks in the skin due to larvae migrating within epidermis

- Visceral larva migrans -> caused by *Toxocara canis*

Larvae migrate through internal organs (liver, lungs), causing eosinophilia and organ damage

- Larva currens -> caused by *Strongyloides stercoralis*

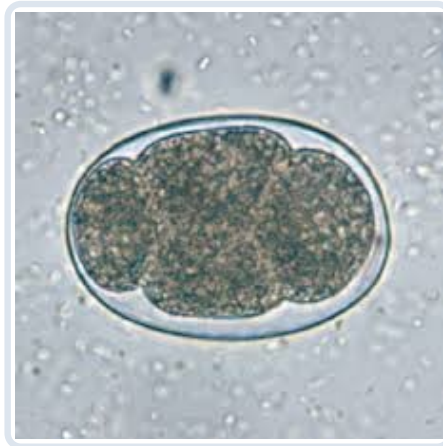
Rapidly moving, linear urticarial tracks due to autoinfection

- Swimmer's itch -> caused by *Schistosoma cercariae*

Cercariae penetrate skin causing pruritic papular rash without completing lifecycle in humans

QUESTION

Identify the egg.



A *Necator americanus*

CORRECT

B *Taenia solium*

C *Ascaris*

D *Hymenolepis nana*

RIGHT ANSWER

OK **A. *Necator americanus***

WHY THIS IS RIGHT

Hookworm eggs (*Necator americanus* / *Ancylostoma duodenale*) are identified by their characteristic morphology in stool microscopy.

- Oval or elliptical egg with a thin, transparent shell
- Contains segmented ovum (4-8 blastomeres, morula stage)
- Clear space between embryo and shell
- Eggs of *Necator* and *Ancylostoma* are morphologically indistinguishable

Clinical relevance:

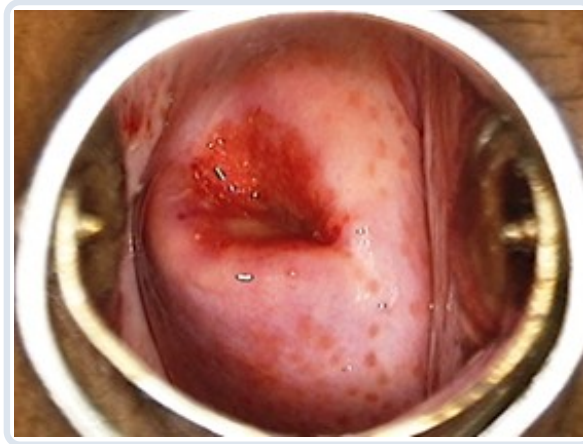
- Cause iron deficiency anemia due to chronic intestinal blood loss
- Infection occurs via skin penetration by filariform larvae

Differentiation:

- *Taenia* eggs: thick, radially striated shell
- *Ascaris* eggs: thick mammillated coat
- *Hymenolepis nana*: polar filaments present

QUESTION

| What is the most likely diagnosis on the colposcopic image?



A Candida albicans infection

B Trichomonas vaginalis infection

CORRECT

C Bacterial vaginosis

D Neisseria gonorrhoeae infection

RIGHT ANSWER

OK B. Trichomonas vaginalis infection

WHY THIS IS RIGHT

A colposcopic finding of multiple punctate hemorrhages on an erythematous cervix, described as "strawberry cervix," is characteristic of *Trichomonas vaginalis* infection.

- Strawberry cervix is due to subepithelial punctate hemorrhages
- Associated with frothy, yellow-green, foul-smelling vaginal discharge
- Diagnosis: motile trophozoites on wet mount microscopy
- Treatment: metronidazole with simultaneous partner treatment

Why not others:

- Candida causes curdy white discharge without cervical hemorrhages
- Bacterial vaginosis shows thin discharge with minimal inflammation
- Gonorrhea causes purulent cervicitis, not punctate hemorrhages

QUESTION

A patient presents with chronic cough and hemoptysis. Chest X-ray shows ring-shaped opacities in the lung field. CT scan reveals cystic lesions. Sputum examination shows operculated eggs. Which of the following is the drug of choice for this condition?

- A Ivermectin
- B Diethylcarbamazine
- C Praziquantel**
- D Albendazole

CORRECT

RIGHT ANSWER

OK **C. Praziquantel**

WHY THIS IS RIGHT

Caused by *Paragonimus westermani*

- > Acquired by eating undercooked crab/crayfish
- > Adults lodge in lungs

Clinical features:

- Chronic cough + hemoptysis (mimics tuberculosis)
- Imaging: ring-shaped opacities / cystic lung lesions
- Sputum: operculated eggs (key diagnostic clue)

Drug of choice: Praziquantel -> treatment for most trematode (fluke) infections

Why not others:

- Ivermectin -> nematodes (e.g., *Strongyloides*)
- Diethylcarbamazine -> filariasis
- Albendazole -> many helminths but not DOC for *Paragonimus*

QUESTION

A patient from a filariasis-endemic region presents with features suggestive of lymphatic filariasis. Peripheral blood examination fails to demonstrate microfilariae. Which of the following is the most likely site where the organisms may be located?

A Liver

B Lung

CORRECT

C Spleen

D Skeletal muscle

RIGHT ANSWER

OK B. Lung

WHY THIS IS RIGHT

Lymphatic filariasis caused by *Wuchereria bancrofti* shows a distinct periodicity in the circulation of microfilariae.

Key concept: Nocturnal periodicity

- Microfilariae are not constantly present in peripheral blood
- They show nocturnal periodicity:
- Present in peripheral blood at night (10 pm - 4 am)
- Absent during daytime

Where do they go during the day?

During daytime, microfilariae sequester in deep vascular beds, especially: Pulmonary circulation (lungs) □

Why lungs?

- Thought to be due to:
- Oxygen tension differences
- Host circadian rhythm
- Adaptation to mosquito feeding habits (night-biting vectors)

Clinical implication

- If blood smear is negative during daytime:
- Repeat at night
- Or use DEC provocation test

QUESTION

A patient from a military background presented with rash, fever, and altered sensorium. There is also a deficiency of the membrane attacking complex. The likely cause can be:

A CMV

B Klebsiella pneumonia

C **Neisseria meningitides**

CORRECT

D Hemophilus influenzae

RIGHT ANSWER

OK

C. Neisseria meningitides

WHY THIS IS RIGHT

Neisseria meningitidis causes meningococemia ± meningitis, presenting with fever, rash, and altered sensorium.

| Defect / Deficiency | Organism Susceptibility | Mechanism |

| ----- | ----- | ----- |

| C5-C9 (MAC)

(terminal) | Neisseria spp. (especially *N. meningitidis*) | Failure of complement-mediated lysis |

| C3 deficiency | Pyogenic infections (*Strep*, *Staph*, *H. influenzae*) | Impaired opsonization |

| C1, C2, C4 (early) deficiency | SLE-like disease | Immune complex deposition |

QUESTION

A 19-year-old male presents with recurrent episodes of arthralgia, urethral discharge, and gonococcal infections. Culture of the synovial fluid from the knee grows *Neisseria gonorrhoeae*. Which of the following investigations is most appropriate to evaluate for an underlying immunodeficiency in this patient?

- A C1 esterase deficiency
- B Late complement deficiency (C5-C9)**
- C IgA deficiency
- D Combined B & T Cell deficiency

CORRECT

RIGHT ANSWER

- OK
- B. Late complement deficiency (C5-C9)**

WHY THIS IS RIGHT

Recurrent or disseminated *Neisseria* infections strongly suggest a defect in the membrane attack complex (C5-C9), which is essential for killing *Neisseria* due to their thin cell wall. Late complement deficiency classically presents with repeated gonococcal or meningococcal infections. Testing for C5-C9 levels or CH50 is therefore the most appropriate investigation.

Defect / Deficiency	Organism Susceptibility	Mechanism
C5-C9 (MAC)	<i>Neisseria</i> spp. (especially <i>N. meningitidis</i>)	Failure of complement-mediated lysis
C3 deficiency	Pyogenic infections (<i>Strep</i> *, <i>Staph</i> *, <i>H. influenzae</i> *)	Impaired opsonization
C1, C2, C4 (early) deficiency	SLE-like disease	Immune complex deposition

QUESTION

| Which of the following is classified under Biosafety level -3 infections?

A XDR-TB

CORRECT

B Salmonella

C Ebola

D Congo Crimean fever

RIGHT ANSWER

OK

A. XDR-TB

WHY THIS IS RIGHT

Biosafety Level 3 (BSL-3) is required for pathogens that cause serious or potentially lethal infections via airborne transmission.

- Transmitted by aerosols
- Can cause severe disease
- Require controlled laboratory access, negative pressure rooms, and respiratory protection

Correct example:

- Mycobacterium tuberculosis (including XDR-TB) -> airborne infection -> BSL-3

Differentiation:

- Salmonella -> BSL-2 (fecal-oral transmission)
- Ebola virus -> BSL-4 (highly lethal, no effective treatment, high risk)
- Crimean-Congo hemorrhagic fever -> BSL-4

QUESTION

Inoculation loops are commonly sterilized by which method?

- A** Autoclaving
- B** Microwave
- C** Passing over flame 3 times
- D** Heat till it become red hot

CORRECT

RIGHT ANSWER

- OK** **D. Heat till it become red hot**

WHY THIS IS RIGHT

Inoculating loops are sterilized by direct flaming until they become red hot.

- Red heat ensures complete destruction of all microorganisms, including spores
- This is a method of dry heat sterilization
- The loop must be allowed to cool before touching the culture to avoid killing organisms

Why not others:

- Autoclaving is used for bulk instruments, not for immediate sterilization during procedures
- Microwave is not a standard sterilization method in microbiology labs
- Passing over flame a few times without achieving red heat is inadequate

QUESTION

| All of the following methods of cold sterilization except:

A Plasma sterilization

B Gamma rays

C UV rays

D Autoclave

CORRECT

RIGHT ANSWER

OK

D. Autoclave

WHY THIS IS RIGHT

Cold sterilization refers to sterilization methods that do not use high temperatures and are suitable for heat-sensitive materials. Cold methods are used for heat-labile instruments (e.g., endoscopes, plastics).

Cold sterilization methods:

- Plasma sterilization -> uses hydrogen peroxide plasma
- Gamma rays -> ionizing radiation used for disposable medical equipment
- UV rays -> used for surface disinfection (limited penetration)

Not a cold sterilization method:

- Autoclave -> uses moist heat under pressure (121°C), hence a heat sterilization method

QUESTION

Biosafety level for culture of *Mycobacterium tuberculosis* (MTB) is?

A BSL I

B BSL II

C BSL III

CORRECT

D BSL IV

RIGHT ANSWER

OK

C. BSL III

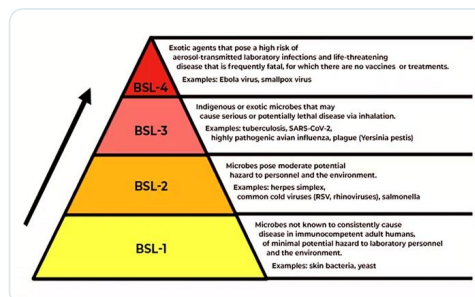
WHY THIS IS RIGHT

Mycobacterium tuberculosis is handled in Biosafety Level III (BSL-III) laboratories.

- MTB is transmitted via airborne droplet nuclei, requiring strict airborne precautions
- BSL-III is designed for pathogens that can cause serious or potentially lethal disease via inhalation
- Laboratory features include:
 - Negative pressure rooms
 - HEPA-filtered exhaust air
 - Controlled access
 - Work within biosafety cabinets

Comparison:

- BSL I: non-pathogenic organisms
- BSL II: moderate-risk pathogens (e.g., *Staphylococcus*, *Salmonella*)
- BSL III: airborne pathogens (e.g., *Mycobacterium tuberculosis*)
- BSL IV: highly dangerous agents with no treatment (e.g., Ebola virus)



QUESTION

A patient underwent cardiac surgery and was admitted to the ICU. He later developed ventilator-associated pneumonia and was started on empirical antibiotics. A few hours later, the patient developed acute kidney injury (AKI). Serum procalcitonin was sent. Which of the following statements regarding procalcitonin is correct?

A It helps in determining the duration of antibiotic therapy

CORRECT

B It helps in identifying which empirical antibiotics to be given

C It can be used to confirm source of infection

D It is used to differentiate bacterial from fungal cause

RIGHT ANSWER

OK

A. It helps in determining the duration of antibiotic therapy

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.