

**1. A patient develops hypoglycemia. He was on insulin and acarbose. For treatment of above what is to be given ‘**

a) >Glucose

b) > Maltose

c) > Sucrose

d) >Starch

Correct Answer - A

*Glucose [Ref: Harrison 17/e p. 2275, 2306, 2307; Katzung 11/e p 737]*

- Hypoglycemic reactions are the most common complication of insulin therapy.

**It commonly result from: ?**

- Inadequate carbohydrate consumption
- Unusual physical exertion
- Too large dose of insulin

**Management of hypoglycemia**

- All the manifestations of hypoglycemia are relieved by glucose administration.
- To increase absorption, simple sugar or glucose should be given preferably in liquid form.
- Since the patient is on acarbose, the absorption of complex polysaccharides would be delayed. For this reason too, simple sugars like glucose should be administered.

**Management of hypoglycemia depends upon the condition of the patient:-**

Mild

Severe

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For any queries inbox @murtazakuchay

- Patient is conscious
- Able to swallow
  - Glucose gel
  - Dextrose tablets
  - Any sugar containing beverage
- Patient is unconscious
- Unable to take food orally
  - 20-50 ml of 50% glucose solution
  - by intravenous infusion over a period of 2-3 minutes
  - If intravenous therapy is not available 1 mg of glucagon injected either subcutaneously or intramuscularly
  - If glucagon unavailable, honey syrups
  - Oral feeding contraindicated

## 2. Which does not cause hypoglycemia -

a) >Insulin

b) >Glimipiride

c) > Nateglinide

d) > Acarbose

Correct Answer - D

Acarbose [Ref: KDT 6/e p 266, 26Z 270; Katzung 11/e p 738-744]

Nateglinide, Glimipiride

- *Glimipiride and Nateglinide are an insulin secretagogue and it is a well known fact that insulin secretagogues are associated with hypoglycemia.*
- *All the insulin secretagogues increase insulin secretion from the pancreas through the same mechanism i.e., by interfering with potassium channel.*
- ***All the insulin secretagogues have the potential to cause profound and persistent hypoglycemia especially in elderly individuals.***
- *Hypoglycemia is usually related to delayed meals, increased physical activity, alcohol intake or renal insufficiency. Individuals who ingest **an overdose** of some agents develop prolonged and serious hypoglycemia and should be monitored closely in the hospital.*

Thiazolidinediones (Pioglitazone)

- Thiazolidinediones are considered "**eguglycemics**" and are efficacious in about 70% new users.
- ***Combination therapy of thiazolidinediones with sulfonyureas or insulin can lead to hypoglycemia and may require close adjustment.***

Biguanides (Metformin Phenformin)

- Biguanides lower glucose among patients with type 2 diabetes mellitus largely by decreasing hepatic glucose output.
- It is also thought to increase glucose uptake by skeletal muscles.
- **Because insulin secretion is unaltered hypoglycemia is not a side effect of metformin used as monotherapy.**

#### **Alpha Glucosidase inhibitors (Acarbose)**

- Lowers glucose by inhibiting intestinal enzymes that digest carbohydrate there by reducing carbohydrate digestion.
- ***Because of its mechanism of action, acarbose, when administered alone does not cause hypoglycemia in the fasting or postprandial states.***
- *Acarbose only produces hypoglycemia when used along with other oral hypoglycemics.*

### 3. All are true about Exenatide except -

a) >Decreases glucagon secretion

b) It is GLPI analogue

c) >Used in type 1 DM

d) >Given subcutaneously

Correct Answer - C

**Used in type I diabetes mellitus** [Ref: Katzung 11/e p. 745; Harrison 17/e p 2301; KDT 6/e p 273]

- Exenatide belongs to class of drugs called "incretins".
- Incretins are insulin stimulation **hypoglycemic factor found in the duodenum.**
  - **Incretin hormones are produced in the gastrointestinal tract in response to nutrient entry. Incretins, in turn, stimulate insulin, secretion.**
  - Glucagon like polypeptide (GLP-1) and gastric inhibitory polypeptide (GIP) are two examples of incretins.
- **Glucagon like peptide (GLP-1) is a naturally occurring peptide that enhances insulin secretion in response to raised plasma glucose concentrations. It can lower blood glucose level by other methods too.**
- *It does so by: ?*
  - *Increasing the secretion of insulin from the pancreas.*
  - *Slows absorption of glucose from the gut.*
  - *Reduces the action of glucagon (Glucagon increases glucose production by liver).*
- These actions of GLP-1 lead to lowering of blood sugar levels.
- Thus, the compound has unique properties to reduce postprandial glucose level.

- But these properties are offset by very important adverse effect.  
- **GLP-1 is rapidly (1-2 minutes) deactivated by the dipeptidyl peptidase IV DPP (IV) enzyme.**
- Thus GLP-1 must be infused continuously to have therapeutic benefits.
- *Consequently, considerable work has been performed to produce GLP-1 receptor agonist that maintain the physiological effects of native incretin but are resistant to the action of DPP IV.*
- **Exenatide is a synthetic GLP-1 receptor agonist that is resistant to DPP-IV and has full agonistic activity for GLP-1 receptors.**
- **Exenatide is approved <sup>IV</sup> for use as an adjunctive therapy to improve glycemic control in patients with type 2 diabetes mellitus who are taking metformin, sulfonylurea or a combination of both but have not achieved adequate glycemic control.**  
- *This drug is effective in lowering glycosylated hemoglobin concentration and promotes weight loss in type 2 diabetes mellitus.*
- Exenatide is injected "subcutaneously" within 60 minutes before meal.  
- *When exenatide is added to preexisting sulfonylurea therapy the oral hypoglycemic dosage should be reduced to prevent hypoglycemia.*

#### 4. Which does not causes megaloblastic anemia –

a) Phenytoin

b) >Chloroquine

c) >Sulfasalazine

d) >Alcohol

Correct Answer - B

Chloroquine [Ref: Harrison 17/e p. 601, 605]

Dietary causes of folate deficiency

- Old age
- Infancy
- Poverty
- AlcoholismQ
- Chronic invalids
- Psychiatric disturbed

## 5. Octreotide is used in all except

a) >Insulinoma

b) >Glucagonoma

c) >Glioma

d) >Carcinoids

Correct Answer - C

*Glioma [Ref: Harrison 17/e p 2355, 2353, 2211, 2014, 1977; KDT 6/e p 577; Katzung 11/c p 1081] Octreotide is a synthetic analogue of somatostatin and its pharmacological actions are similar to somatostatin.*

Somatostatin

- Somatostatin is a hypothalamic peptide that regulates the function of several endocrine and exocrine glands.
- *Somatostatin acts primarily as a negative regulator of a variety of different types of cells blocking processes such as cell secretion, cell growth and smooth muscle contraction.*
- *It is secreted from the hypothalamus into the portal circulation and travels to the anterior pituitary gland where it inhibits the production and release of both growth hormone and thyroid stimulating hormone.*
- *Somatostatin is present in many tissues other than hypothalamus It is also secreted by the cells in the pancreas and in the intestine where it inhibits the secretion of variety of hormones*

## 6. Regarding ACE inhibitor which of the following is true -

- a) Inhibits conversion of angiotensinogen to angiotensin 1
- b) T1/2 of enalapril is more than lisinopril
- c) Omission of prior diuretic dose decreases the risk of postural hypotension
- d) It is effective only with left ventricular systolic dysfunction

Correct Answer - C

*Omission of prior diuretic dose decreases the risk of postural hypotension [Ref : KDT 6/e p. 450]*

### **Angiotensin converting enzyme inhibitors**

- Renin is an enzyme produced by the kidney in response to sodium depletion and increased adrenergic activity.
- Renin converts a circulating glycoprotein (angiotensinogen) into the biologically inert angiotensin I, which is then converted by angiotensin converting enzyme (ACE or kininase II) into the highly potent vasoconstrictor Angiotensin II.
- Angiotensin converting enzyme or (ACE) is located on the tuminal surface of capillary endothelial cells, particularly in the lungs.
- Angiotensin II exerts its effect by acting on two receptors i.e. AT<sub>1</sub> and AT<sub>2</sub>.

### **Main actions of Angiotensin II**

- a) Vasoconstriction
- Angiotensin II is the most potent vasoconstrictor in the body. It increases total peripheral resistance by constricting precapillary arterioles and to a lesser extent postcapillary venules by activating AT<sub>1</sub> receptors. Angiotensin II also produces peripheral vasocons-

triction by enhancement of peripheral noradrenergic neurotransmission.

b) Release of Aldosterone from adrenal cortex

- Angiotensin II stimulates the zona glomerulosa of the adrenal cortex to increase the synthesis and secretion of aldosterone.
- c) Altered renal hemodynamics
- Angiotensin II variably influences glomerular filtration rate via several mechanisms -
  - .. Constriction of the afferent arterioles which reduces intra- glomerular pressure and tends to reduce GFR.
  2. Contraction of mesangial cells which decreases the capillary surface area which reduces GFR.
  3. Constriction of efferent arterioles which increases intraglo- merular pressure and tends to increase GFR.
- The outcome of these opposing effects on GFR depends upon the physiological state.
- Normally G.F.R is slightly reduced by angiotensin II.
- d) Effect of Angiotensin II on cardiac structure :?
  - 1) Increased wall to lumen ratio in blood vessels
  - .. Concentric cardiac hypertrophy
  2. Eccentric cardiac hypertrophy
  3. Thickening of intimal surface of blood vessels

### **ACE inhibitors**

- ACE inhibitors are drugs which exert their action by inhibiting the conversion of Angiotensin I to Angiotensin II. They inhibit the angiotensin converting enzyme.

### **Example of ACE inhibitors:-**

- Captopril
- Enalapril
- Lisinopril
- Ramipril
- Trandolapril
- Perindopril

### **Therapeutic uses of ACE inhibitors:?**

#### **ACE inhibitors in hypertension**

- Inhibition of ACE lowers systemic vascular resistance.
- **ACE** inhibitors lower mean, diastolic and systolic blood pressure in

various hypertensive states.

- The initial change in blood pressure is directly related to plasma renin activity. Elevated plasma renin activity renders patients hyperresponsive to ACE inhibitor induced hypotension and initial dosages of all ACE inhibitors should be reduced in patients with high plasma level of renin (e.g. patients with heart failure and salt depleted patients).

### **ACE inhibitors in left ventricular systolic dysfunction**

- ACE inhibitors should be given to all patients with impaired left ventricular systolic function. Although the mechanism by which ACE inhibitors improve outcome in patients with systolic dysfunction are not completely understood, the induction of a more favourable hemodynamic state most likely plays an important role.
- Inhibition of ACE commonly reduces afterload and systolic wall stress, and both cardiac output and cardiac index increases as do indices of stroke work and stroke volume.
- There is over whelming evidence that ACE inhibitors should be used in symptomatic and asymptomatic patients with a depressed Ejection fraction (< 40%).
- Although the role of ACE inhibitors in left ventricular systolic dysfunction is firmly established whether these drugs improve diastolic dysfunction is an important open question. Infusion of enalaprilat into the left coronary arteries of patients with left ventricular hypertrophy significantly improves diastolic function.

### **Remember.**

- This important point about the use of ACE in heart failure.
- Severe hypotension may result in patient taking diuretics or who are hypovolemic, hyponatremic, elderly, have renal impairment or with systolic blood pressure <mmHg.
- Therefore it may be necessary to reduce the dose of diuretic during the initiation of ACE inhibition to prevent symptomatic hypotension.
- A test dose of captopril 6.25 mg by mouth may be given because its effect lasts only 4-6h. If tolerated, the preferred long acting ACE inhibitor may then be initiated in low dose.

### **ACE inhibitors in myocardial infarction**

- Several large prospective, randomized clinical studies involving thousands of patients provide convincing evidence that ACE

inhibitors reduce overall mortality when treatment is begun during peri-infarction period.

### **ACE inhibitors in chronic renal failure**

- Diabetes mellitus is the leading cause of renal disease. In patients with type 1 diabetes mellitus and diabetic nephropathy captopril prevents or delays the progression of renal disease. Specific renoprotection by ACE inhibitors is more difficult to demonstrate in type 2 diabetics.
- Several mechanisms participate in renal protection afforded by ACE inhibitors. Increased glomerular capillary pressure induces glomerular injury and ACE inhibitors reduce this parameter both by decreasing arterial blood pressure and by dilating renal efferent arterioles.

### **Adverse effect of ACE inhibitors**

#### **Hypotension**

- A steep fall in blood pressure may occur following the first dose of an ACE inhibitor in patients with elevated **PRA** (plasma renin activity).
- In this regard, care should be exercised in patients who are **Salt depleted**
- In patients being treated with multiple antihypertensive drugs,
- In patients who have congestive heart failure
- In patients who are on diuretics.
- It may be necessary to reduce the dose of diuretics during the initiation of ACE inhibitors to prevent symptomatic hypotension.
- The doses of ACE inhibitors should be initiated in low doses followed by gradual increment if the lower doses have been well tolerated.

#### **Pharmacokinetics**

- All ACE inhibitors except captopril and lisinopril are prodrugs and are converted to the active agents by hydrolysis primarily in the liver.
- Enalapril is an **oral prodrug** that is converted by hydrolysis in liver to an active form Enalaprilat.
- Enalaprilat itself is available only for intravenous use primarily for hypertensive emergencies.
- Enalapril has a half life of only 1.3 hours but enalaprilat because of tight binding to ACE has a plasma half life of about 11 hours.

- Lisinopril is the lysine analogue of enalapril. Unlike enalapril, Lisinopril itself is active and its half life in plasma is about 12 hours.
- All ACE inhibitors are cleared as the intact compound by the kidney (except fosinopril and moexipril).

## 7. Which of the following is not a side effect of naloxone

a) >Seizure

b) >Hypertension

c) >Pulmonary edema

d) >Ventricular dysrhythmia

Correct Answer - A

Seizure [Ref: Goodman Gilman 11/e p. 577, 578; KDT 6/e p. 466]

### Opioid antagonists

- Naloxone is an opioid antagonist
- Under ordinary circumstances in normal individuals it does not produce any discernible effect.
  - *It produces its effects only when agonistic opioids have been administered earlier to the patient.*
  - *However, if endogenous opioid system is activated as in shock or certain forms of stress, the administration of opioid antagonist alone may have viable consequences.*
- *Naloxone is an opioid antagonist and it promptly reverses the respiratory depressant property of opioids.*
  - *Other agnostic effects of opioids such as effects on CNS and blood pressure is also reversed by opioids.*
  - *Naloxane is commonly used to reverse respiratory depression produced by opioid.*
- *The antagonism of opioid effects by naloxone is often accompanied by "overshoot" phenomenon i.e., while reversing the effect produced by the opioids it tends to overcorrect it.*
  - *The respiratory rate depressed by opioids transiently become higher than that before the period of depression.*

- *Rebound release of catecholamine may cause "hypertension", "tachycardia" and "ventricular arrhythmias". - "Pulmonary edema" has also been reported after naloxone administration.*
- Naloxone may precipitate seizures but they are seen only in patients who are addicted to or dependent on opioids.
  - *Small subcutaneous doses of naloxone precipitates a moderate to severe withdrawal syndrome that is very similar to that seen after abrupt withdrawal of opioids excepts that the syndrome appears within minutes of administration and subsides in about 2 hours.*
  - *However, seizure cannot be considered an adverse effect of naloxone.*

*Seizure occur as a part of withdrawal syndrome when naloxone is administered to those who are addicted or dependent on opioids. When naloxone is administered in nonnal individuals to treat opioid overdose, it does not precipitate withdrawal syndrome and seizures do not occur.*
  - *On the other hand the cardiac effects i.e., arrhythmia, hypertension and pulmonary edema are produced when naloxone is administered in normal individual to reverse the effect of opioids.*
  - *These effects do not require the prior administration of opioids.*

## 8. Muscle rigidity due to opioids is because of their effect on -

a)  $\mu$

b)  $\kappa$

c)  $\sigma$

d)  $\delta$

Correct Answer - A

[Ref: Department of Anaesthesiology, university of California, San Diego ETAS-UMIS;

Department of Neuropharmacology, The scripps research institute ETAS-UMIS]

- When used as an anaesthetic opioids may cause muscle rigidity.
    - *Opioid induced rigidity is characterized by increased muscle tone progressing at times to severe stiffness. - When the rigidity increases and involves thoracic and abdominal muscle, it may impair ventilation.*
    - Rigidity of the abdominal and/or thoracic muscles was thought to underlie opioid induced impairment of spontaneous or controlled ventilation.
- The precise mechanism by which opioids can cause muscular rigidity is not clearly understood.
- Muscle rigidity is not due to direct action on muscle fibres because it can be decreased or prevented by pretreatment with muscle relaxants.
- In addition, opioid induced muscle rigidity is not associated with increase in creatinine kinase a finding suggesting that little or no muscle damage occurs during this period.
- Opioids do not have any significant effect on neuromuscular

conduction and result in only minimal depression of monosynaptic reflexes associated with muscle stretch receptors.

- Some investigators have suggested that opioids produce rigidity by altering dopamine concentrations within the striatum.s of the brain. Rigidity may occur due to the result of stimulation of GABA ergic interneurons which can be blocked by lesion in the striatum.

- Continuous research and data seems to indicate that the main mechanism responsible for opioid induced muscle rigidity is stimulation of it receptors.

- *Opioids appear to produce their physiological effects by binding to at least three types of opioid receptors the mu (μ), delta (δ) and Kappa (κ) receptors.*

- *Muscle rigidity occurs after administration of supra analgesic doses of potent μ preferring opioids.*

- *The present data demonstrates that whereas systemic opiate induced muscle rigidity is primarily due to the activation of central mu receptors, supraspinal delta and kappa receptors may attenuate this effect.*

Anaesthesia review by Michelle Bowman Howard states (p134)

-All opioids given in high doses may cause muscular rigidity. It is most likely related to μ receptors in the caudate nucleus. It is more commonly seen with Fentanyl.

## 9. Abnormality to check if lithium is given to a pregnant female –

a) Cardiac anomaly

b) Neural tube defect

c) Facial defect

d) Urogenital defect

Correct Answer - A

**Ans: A. Cardiac anomaly [Ref: K.D.T. 6/e p. 436; Katzung 11/e p. 503]**

Lithium is a weak teratogen in human.

The main effects attributable to lithium are increased cardiac malformation in the fetus especially "Ebsteins anomaly".

Lithium may increase the incidence of Ebstein's anomaly in fetus but it is not contraindicated during pregnancy. Lithium is not considered a major human teratogen and the risk for Ebstein's anomaly is only .5% for babies whose mother takes lithium during pregnancy.

Therefore lithium is not contraindicated during pregnancy. It is however advisable to perform a "fetal echocardiography" to exclude the possibilities of cardiac anomaly.

Evaluation of studies on lithium in pregnancy shows that lithium therapy throughout pregnancy does not seem to increase the general rate of major anomalies and apparently add only a small risk for cardiovascular defects notably Ebstein's anomaly.

It can be concluded that whenever lithium is the drug of choice in women with bipolar disorder, it may be continued even in pregnancy.

Moreover it is advised not to discontinue lithium as it may subsequently lead to relapse of the disorder.

In addition, pregnancy of lithium treated women should be considered high risk and therefore monitoring during pregnancy has to include "fetal echocardiography".

Pregnancy interruption in lithium treated mothers can probably be considered only if severe cardiac anomaly is diagnosed.

According to K.D.T.

- Lithium is contraindicated during pregnancy.
- But all other books states that lithium can be administered is during pregnancy.

**10.** The following drugs may be used in erectile dysfunction, EXCEPT:

a) Phenylephrine

b) Apomorphine

c) Alprostadil

d) PGE1 analogues

Correct Answer - A

Medications like Phentolamine, Papavarine hydrochloride and Alprostadil (PGE1 analogue) PGE1 analogues are given as intra-cavernosal injections in the treatment of erectile dysfunction.

Phenylephrine is a selective alpha agonist which is used to reverse the erections of intra-theal injections. It cannot be used in the treatment of erectile dysfunction.

Ref: Clinical Manual of Sexual Disorders By Richard Balon, R. Taylor Segraves, Pages 230-35; Contemporary Issues in Prostate Cancer By Jeanne Held-Warmkessel, Pages 338-41; Erectile Dysfunction: Current Investigation and Management By Ian Eardley, Krishna Sethia, Pages 55, 101; K D Tripathi Textbook of Pharmacology, 5th Edition

**11.** Which statement about first order kinetics is TRUE?

a) Constant amount of drug is eliminated

b) Rate of elimination remains constant

c) Rate of elimination is directly proportional to drug concentration

d) Free drug concentration increases after successive doses

**Correct Answer - C**

**In first order/exponential kinetics:**

- Rate of elimination is proportional to the plasma drug concentration
- Clearance and  $t_{1/2}$  remains constant
- Constant fraction of the drug is eliminated in unit time
- Most of the drugs follow first order kinetics

**Zero order/linear kinetics**

- Rate of elimination remains constant irrespective of the plasma drug concentration.
- CL decreases with increase in plasma drug concentration
- Constant amount of the drug is eliminated in unit time

**12.** A 62-year-old Type 2 diabetic patient presents with complaints of malaise, myalgias, respiratory distress, and increased somnolence. If laboratory examination reveals an anion gap of 26mmol/L, HCO<sub>3</sub><sup>-</sup> of 17 mmol/L and an arterial blood pH of 7.27. You suspect lactic acidosis. The patient is most likely receiving which of the following?

a) Glucagon

b) Glyburide

c) Metformin

d) Miglitol

### Correct Answer - C

Lactic acidosis, characterized by elevated blood lactate, decreased arterial blood pH, decreased bicarbonate, and electrolyte imbalances with an elevated anion gap (normal = 10 – 12), is a rare but serious complication of metformin administration. The onset of lactic acidosis is usually accompanied by several non-specific signs and symptoms including malaise, myalgias, respiratory distress and increased somnolence. There may be associated hypothermia, hypotension, and resistant bradyarrhythmias as the condition progresses.

Choice Glucagon is a polypeptide hormone produced by the alpha cells of the islets of Langerhans in the pancreas. It stimulates the conversion of glycogen to glucose in the liver. This hormone is available commercially to be administered in an intramuscular injection for the emergency treatment of severe hypoglycemia in diabetic patients when the administration of oral glucose is not possible. The most common adverse effects include pain at the site of the injection as well as hyperglycemia.

Choice Glyburide is a sulfonylurea associated with the development of hypoglycemia and cholestatic jaundice (a rare complication).

Miglitol (choice C) is an alpha-glucosidase inhibitor commonly associated with the development of abdominal discomfort and flatulence.

**13. Drugs that should be given with prescription of registered medical practitioner only are included in which schedule ?**

a) Schedule C

b) Schedule E

c) Schedule H

d) Schedule I

Correct Answer - C  
Ans. is 'c' i.e., Schedule H

**14. Apparant volume of distribution of a drug less than 5 liters implies that the drug is predominantly in which of the following compartment?**

a) Extracellular fluid

b) Total body water

c) Intracellular fluid

d) Intravascular fluid

Correct Answer - C

**Ans is 'C' i.e., Intracellular fluid**

A drug with high volume of distribution has more concentration in tissue and less in plasma.

A drug with low volume of distribution has concentration only in plasma (intravascular)

Relationship between volume of distribution and extent of distribution

Vd (L)	% body weight	Extent of distribution
< 5	7	only in plasma
5-20	7-28	In extracellular fluid
20-40	28-56	In total body water
>40	>56	In deep tissues; bound to peripheral tissues

## 15. Uses of atropine are A/E -

a) Organophosphorus poisoning

b) Mushroom poisoning

c) Arrhythmia

d) Miotic

Correct Answer - D

Ans. is 'd' i.e., Miotic

### CLINICAL USES OF ATROPINE

Remember - ATROPA

A As mydriatic - cycloplegic

T → 'Traveller's diarrhoea

R → Rapid (early) onset mushroom poisoning

O → Organophosphate poisoning

P → Preanaesthetic medication

A Arrhythmias (brady-arrhythmias)

*Atropine is also used with neostigmine in myasthenia gravis to decrease antimuscarinic side effects of neostigmine → As atropine blocks muscarinic receptors, use of atropine prevents muscarinic side effects of neostigmine, while neostigmine retains its beneficial effects in myasthenics which are due to nicotinic receptors.*

## 16. Lid retraction is caused by?

a) Apraclonidine

b) Brimonidine

c) Latanoprost

d) Travoprost

Correct Answer - A

Ans is 'a' i.e. Apraclonidine

Apraclonidine may cause lid retraction in less than 1% of people.

Ocular side effects of topical agents for POAG

\*  $\beta$ -blocker: Allergic blepharoconjunctivitis, corneal hypoesthesia, blurred vision, dry eye, superficial punctate keratitis.

\* Cholinomimetics (pilocarpine): Blurred vision, miosis, accommodative spasm, browache.

\* Sympathomimetics

i) *Non-selective (Dipivefrin)*: Follicular conjunctivitis, rebound congestion, macular edema in aphakic

ii) *Apraclonidine*: Allergies, lid retraction, follicular conjunctivitis, fluctuation in visual acuity

iii) *Brimonidine*: Ocular allergy, conjunctival blanching.

\* Carbonic anhydrase inhibitors (Dorzolamide, brinzolamide): Punctate keratitis, ocular allergies.

\* Prostaglandin analogues (Latanoprost): Punctate keratitis, iris pigmentation.

## 17. The mechanism of action of sodium nitroprusside is?

- a) Increased cAMP
- b) Increased guanylate cyclase
- c) Calcium channel blockage
- d) IC channel opener

Correct Answer - B

**Ans. is 'b' i.e., Increases Guanyl Cyclase**

"Nitroprusside dilates both arterial and venous vessels, resulting in reduced peripheral vascular resistance and venous return. The action occurs as a result of activation of guanylyl cyclase, either via release of nitric oxide or by direct stimulation of enzyme. The result is increased intracellular cGMP, which relaxes vascular smooth muscle".

## 18. Drug of choice of hypertension in pregnancy is ?

a) Methyldopa

b) Thiazide

c) Nifedipine

d) Labetalol

Correct Answer - A

**Ans. is 'a' i.e., Methylopa**

- Methyldopa is DOC for hypertension in pregnancy.
  - Nifedipine is 2nd choice.
  - Hydralazine is DOC for hypertensive emergencies in pregnancy.
- Methyldopa:**
- Centrally acting antihypertensive agent.
  - Prodrug.
  - Preferred for hypertension treatment during pregnancy - Based on effectiveness & safety of both mother and fetus.
  - Initial dose - 250 mg twice daily.

### **Antihypertensives in Pregnancy**

#### **Safe** Contraindicated

Labetalol                      ACE inhibitors

Alpha methyldopa      Reserpine

Calcium channel  
blockers                      Loratidine

Hydralazine

Sodium

nitroprusside

- (Ref Williams 24/e p100; Dutta 8/e p265, 7/e p228: Goodman

*Gillman 12/e p773, 774; Katzung 12/e p176)*

## 19. Absolutely contraindicated antihypertensive drug in pregnancy is-

a) Enalapril

b) Diazoxide

c) Atenolol

d) Nifedipine

Correct Answer - A

Ans. is 'a' i.e., Enalapril

Antihypertensives to be avoided in Pregnancy

(Mnemonic: SAAND)

- Sodium nitroprusside°
- ACE inhibitors°
- ARBs°
- Non-selective beta blockers°
- Diuretics°

## 20. Brinzolamide is a

- a) Highly specific irreversible and noncompetitive carbonic anhydrase inhibitor
- b) Highly specific irreversible and competitive carbonic anhydrase inhibitor.
- c) Highly specific reversible and competitive carbonic anhydrase inhibitor
- d) Highly specific reversible and non-competitive carbonic anhydrase inhibitor.

Correct Answer - D

**Ans is 'd' i.e. Highly specific reversible and noncompetitive carbonic anhydrase inhibitor**

\* *Carbonic anhydrase inhibitors act by a non-competitive, reversible inhibition of the enzyme carbonic anhydrase.*

\* *Brinzolamide is a highly specific inhibitor of carbonic anhydrase II (CA II), which is the main carbonic anhydrase isoenzyme involved in the secretion of aqueous humour.*

\* *Inhibition caused by brinzolamide is reversible and non-competitive.*

## 21. Methotrexate is used in all except?

a) Sickle cell anemia

b) Psoriasis

c) Rheumatoid arthritis

d) Ankylosing spondylitis

Correct Answer - A

Ans. is 'a' i.e., Sickle cell anemia

### **Uses of Methotrexate**

#### **Methotrexate can be used in following conditions:**

1. Conditions which are associated with abnormally rapid cell growth..  
Neoplasia (carcinoma of breast), Psoriasis.
2. Inflammatory conditions: RA, AS, lupus, Crohn:s disease.
3. Recently methotrexate has been shown to be effective in inducing miscarriage, e.g. in ectopic pregnancy. This effect of methotrexate is attributed to its action of killing rapidly growing cells of placenta.

**22. Which one of the following is not an adverse effect of salbutamol -**

a) Tachycardia

b) Tolerance

c) Hypokalemia

d) Hypoglycemia

Correct Answer - D

**Ans. is 'd' i.e., Hypoglycemia**

Inhaled  $\beta$ -agonists have very few side effects. These are : (i) Muscle tremor & palpitation *most common*; (ii) hypokalemia; (iii) hyperglycemia; (iv) Tolerance; (v) Throat irritation; (vi) Ankle edema; and (vii) others (anxiety, headache, muscle cramps, dry mouth, arrhythmias, flushing & vasodilatation, hypoxemia, MI, sleep disturbance).

## 23. False about pioglitazone?

a) It PPAR $\gamma$  agonist

b) Metabolized in liver

c) Not given in case of diastolic dysfunction

d) It acts on insulin gene and even in absence of insulin helps in metabolism of carbohydrate

Correct Answer - D

**Ans. is 'd' i.e., It acts on insulin gene and even in absence of insulin helps in metabolism of carbohydrate**

- Pioglitazone has insulin sensitizing action, i.e., enhancing the effect of circulating insulin. Therefore, insulin is necessary for the action of Pioglitazone, and it does not lower blood glucose in persons that lack endogenous insulin.
- Pioglitazone is selective agonist for the nuclear PPAR- $\gamma$  which enhances the transcription of several insulin responsive genes.
- Pioglitazone is contraindicated in CHF.

### **Metabolism of Pioglitazone**

- Pioglitazone is extensively metabolized by hydroxylation and oxidation in liver.
- Multiple CYP isoforms are involved in the metabolism of pioglitazone. The cytochrome p450 isoforms primarily involved are CYP 2C8 (major) and CYP3A4 (to a lesser degree).

## 24. Which of the following is true about diazoxide except

a) K<sup>+</sup> channel opener

b) Can be used as antihypertensive agent

c) Causes severe hypoglycemia

d) Used in insulinoma

Correct Answer - C

Ans. is 'c' i.e., Causes severe hypoglycemia

- Diazoxide causes hyperglycemia. not hypoglycemia (see above explanation)
- Diazoxide acts mainly by inhibiting the release of insulin by activating K<sup>+</sup> channels.
- Therefore, it is used in insulinoma.  
Diazoxide has been used as *antihypertensive* agent, especially in hypertensive emergencies. However, it can cause excessive hypotension which may precipitate stroke and MI. Therefore, its use in hypertensive emergencies is obsolete now.

**25. Which of the following is directly acting skeletal muscle relaxant -**

a) Dantrolene

b) Suxamethonium

c) Pancuronium

d) Atracurium

Correct Answer - A

Ans. is 'a' i.e., Dantrolene

Dantrolene is a directly acting skeletal muscle relaxant.

## 26. Hepatotoxicity caused by valproate can be prevented by-

a) Zinc

b) Carnitine

c) Pyridoxine

d) Vit K

Correct Answer - B

Ans. is 'b' i.e., Carnitine

- Valprate is a hepatotoxic drug.
- Valproate is metabolized by CYP450 enzymes in to a minor metabolite 2-propy1-4-pentenoic acid (4-ene-VPA) which is hepatotoxic.
- Enzyme inducers like carbamazepine, phenytoin and phenobarbital can induce the microsomal enzymes and increase production of this metabolite. This increases the risk of hepatotoxicity if carbamazepine is used along with valproate.
- Valprate hepatotoxicity is more common in persons with mitochondrial enzyme deficiency and may be ameliorated by administration of *Carnitine*, which valproate therapy can deplete.

**27. Which of the following drugs can be used as a transcranial patch for treatment of parkinsonism?**

a) Levodopa

b) Rotigotine

c) Apomorphine

d) Aprantine

Correct Answer - B

Ans 'b' i.e. Rotigotine

\* Rotigotine is intended to be delivered through *transdermal patches*, so as to ensure a slow and constant dosage in a 24-hour period.

**28. Which of the following anti-Parkinson drugs has the potential to cause retroperitoneal fibrosis ?**

a) Pramipexole

b) Entacapone

c) Bromocriptine

d) Ropinirole

Correct Answer - C

Ans. is 'c' i.e., Bromocriptine

Retroperitoneal fibrosis can be caused by ergot antiparkinsonism drugs (*bromocriptine and pergolide*).

**29. A 30 year old manic patient was prescribed haloperidol one week back. For last two days he has become restless and kept pacing in the room for a day. One examination he was found to have tremors of hand. he is most likely suffering from-**

a) Anhedonia

b) Dystonia

c) Restless leg syndrome

d) Akathisia

Correct Answer - D

Ans. is 'd' i.e., Akathisia

Akathisia

o Restlessness, feeling of discomfort, agitation (complete desire to move about), but *without anxiety*.

o Between 1-8 weeks of therapy.

o Treatment —> Propranolol is DOC (central anticholinergic is alternative).

### 30. In epidural analgesia morphine acts by acting on -

a) Substantia gelatinosa

b) Axons

c) Ventral horn

d) Sensory nerve

Correct Answer - A

Ans. is 'a' i.e., Substantia gelatinosa

- Analgesic action of morphine has *spinal and supraspinal components*.
- It acts in the *substantia gelatinosa of dorsal horn* to inhibit release of excitatory transmitters from primary afferent carrying pain impulses.

**31. Dysphoria is mediated by which opioid receptor -**

a) Mu

b) Kappa

c) Delta

d) None

Correct Answer - B

Ans. is 'b' i.e., Kappa

o Euphoria Mu receptors

Dysphoria —> Kappa receptors

## 32. Which of the following is False about Pentazocine ?

a) Decreased vomiting and constipation as compared to morphine

b) Risk of addiction is less than that with morphine

c) Risk of addiction is more than that with morphine

d) It is agonist antagonist

Correct Answer - C

Ans. is 'c' i.e., Risk of addiction is more than that with morphine

Pentazocine is *agonist-antagonist* with weak antagonistic and marked  $\kappa$  agonistic action.

*Pentazocine is a  $\kappa$  (kappa) agonist with weak  $\mu$ -antagonist or partial agonist properties. It is the oldest mixed agent available. It may be used orally or parenterally. However; because of its irritant properties, the injection of pentazocine subcutaneously is not recommended*

- Its profile of action is similar to morphine with the following difference:
  1. *Analgesia is lower in efficacy than morphine and is different in character being mostly spinal ( $\mu_1$ )*
  2. *Cardiac work is increased : It causes tachycardia & rise in BP due to sympathetic stimulation and is better avoided in Coronary ischemia and Myocardial infarction.*
  3. *Sedation and respiratory depression is less than morphine.*
  4. *Vomiting is less frequent.*
  5. *Biliary spasm and constipation are less severe.*
  6. *Subjective effects are pleasurable and abuse liability is present although it is lower than that with morphine.*

**33. All of the following are approved for the treatment of relapsing-remitting multiple sclerosis (RRMS) subtype, except-**

a) IFN - beta - la

b) IFN - beta - lb

c) Glatiramer

d) Mycophenolate

Correct Answer - D

Ans. is 'd' i.e. Mycophenololate

Treatment of RRMS

\* Treatment of RRMS is divided into:?

(i) *In acute attack:* Corticosteroids are given

(ii) *Prophylaxis of acute attack (relapse) during remission:* Disease modifying agents for MS are used to reduce the biological activity.

Treatment is started by *IFN-131a or IFN-131b or Glatiramer or fingolimod*. If there is poor response or intolerance to these drugs, Natalizumab is started.

Treatment of progressive subtype of MS

\* Treatment is started with *IFN-fil a or IFN-\$lb*.

\* If there is poor response or intolerance, one of the following should be considered: (i) *Mitoxantrone*; (ii) *Azathio? prine*; (iii) *Methotrexate* (iv) *IV immunoglobulin*; (v) *Pulse cyclophosphamide*; (vi) *Pulse methylprednisolone*.

**34. Which of the following is the only drug is found to be beneficial in halting the progression on EDSS of multiple sclerosis:**

a) Glatiramer

b) IFN-beta

c) Natalizumab

d) Methotrexate

Correct Answer - C

Ans is 'c' i.e. Natalizumab

\* *EDSS (Expanded disability status scale)* is a method of quantifying disability in multiple sclerosis.

\* EDSS steps 1.0 to 4.5 refer to people with MS who are fully ambulatory. EDSS steps 5.0 to 9.5 are defined by the impairment in ambulation. EDSS 10 is defined as death due to MS.

\* Natalizumab silences disease activity and rapidly improves disability status and walking performance, possibly through delayed relapse recovery in patients with RRMS who had shown a high level of disease activity under other disease modifying drugs for multiple sclerosis.

**35. A pregnant patient with prosthetic valve should be switched to heparin (from warfarin) at -**

a) 32 weeks

b) 36 weeks

c) 40 weeks

d) Onset of labour

Correct Answer - B

**Ans. is 'b' i.e., 36 weeks**

In pregnancy warfarin should be replaced by heparin prior to conception and continued throughout the first trimester (In early pregnancy , warfarin damages organogenesis in fetus).

After the first trimester heparin should be replaced by warfarin and continued upto term (continued exposure to heparin cause osteoporosis).

Warfarin should be discontinued near term and heparin can be substituted at this stage (warfarin exacerbates neonatal hypoprothrombinemia and its control is too imprecise to be safe in labour whereas heparin can be discontinued just before labour and its anticoagulant effect wears off in about 6 hrs).

**36. All of the following increases effect of warfarin except-**

a) Cimetidine

b) Disulfiram

c) Cotrimoxazole

d) Griseofulvin

Correct Answer - D  
Ans. is ' d ' i.e., Griseofulvin

**37. All of the following drug may be used for motion sickness except -**

a) Hyoscine

b) Dicyclomine

c) Domperidone

d) Scopolmine

Correct Answer - C

Ans. is 'c' i.e., Domperidone

o Drugs used are :

a) Anticholinergics → *Hyoscine (Scopolamine)*, Dicyclomine.

b) H<sub>1</sub>-antihistaminic → Promethazine, cyclizine, meclizine, cinnarizine, etc.

o *Hyoscine (scopolamine) is the most effective drug for motion sickness.*

About option 'c'

o *Domperidone is a prokinetic drug and acts by D<sub>2</sub> blockade. It is ineffective in motion sickness as vestibular pathway does not involve dopaminergic link.*

**38. All of the following antimicrobials need dose reduction even in mild renal failure except -**

a) Ciprofloxacin

b) Clindamycin

c) Cefotaxime

d) Ethambutoles

Correct Answer - B

Ans. is 'b' i.e., Clindamycin

o Clindamycin does not require dose adjustment in renal failure.

**Antibiotics safe in renal failure which do not require dose reduction**

Tetracyclines	T: Tigecycline D: Doxycycline M: Minocycline
Cephalosporins	Cefoperazone Cefpiramide
Fluoroquinolones	Moxifloxacin Pefloxacin
Macrolides	Erythromycin Clarithromycin Azithromycin
Lincosamides	Clindamycin Quinupristin + Dalfopristin
Oxazolidinones	Linezolid

### 39. Which of the following is not an indication of cotrimoxazole?

a) Lower UTI

b) Prostatitis

c) Chancroid

d) Typhoid

Correct Answer - C

Ans. is 'c' i.e., None > Chancroid

o Actually cotrimoxazole is used in all conditions provided in options.

o Some guides have given chancroid as the answer. However, many text-books of (KDT, Satoskar, recent advances in pharmacotherapeutics, Evidence based medicine, and many others) have mentioned that cotrimoxazole is used in chancroid.

o Amongst the given options, i will also go for chancroid as Harrison (18<sup>th</sup>/e-1109) has not mentioned cotrimoxazole for the treatment of chancroid.

## 40. All are true about ESBL except?

a) Sensitive to carbapenems

b) Ambler classification is based on molecular structure

c) Classification is based on 3<sup>rd</sup> generation cephalosporin sensitivity

d) 3<sup>rd</sup> & 4<sup>th</sup> generation cephalosporin sensitivity testing is must to confirm the ESBL

Correct Answer - D

Ans. is 'd' i.e., 3<sup>rd</sup> and 4<sup>th</sup> generation sensitivity is must to confirm the ESBL

- ESBL are lactamases that mediate resistance (by hydrolyzing) to extended spectrum (third generation) cephalosporins, penicillins and monobactams .
- The fi-lactams effective against ESBL producing organisms are cephamycin or carbapenems.

### **Laboratory Diagnosis of ESBL**

- Detection of bacteria expressing ESBL is difficult.
- Although a particular ESBL will typically confer resistance to at least one particular extended spectrum (third generation cephalosporin) or aztreonam, the minimum inhibitory concentration may not be high enough for the strain to be called resistant under current interpretations of the national committee for clinical laboratory standards (NCCLS).
- Because of clinical significance of ESBL a specific guideline for the detection of ESBL expressing organisms were proposed in 1999 by NCCLS. The presence of an ESBL is suggested if "Bacterial growth is observed despite a concentration of 1 ,ug/ml of at least one of three extended spectrum cephalosporins (ceftazidime, ceftriaxone, cefotexime) or Aztreonam or growth occurs despite a concentration

of 4,ug/m1 of cefpodaxime."

**About option b**

- Classification of f3-lactahmase.
- Functional classification → Bush Classification
- Molecular classification → Ambler classification

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For any queries inbox @murtazakuchay

**41. A patient who underwent abdominal surgery, developed infection at wound site. A wound swab was sent for culture, which revealed MRSA. All of the following antibiotics can be used for his treatment except -**

a) Cefclor

b) Cotrimoxzate

c) Ciprofloxacin

d) Vancomycin

Correct Answer - A

Ans. is 'a' i.e., Cefclor

\* Ciprofloxacin, Cotrimoxazole and vancomycin are used for MRSA infections.

## 42. Dapsone is used in -

a) Dermatitis herpetiformis

b) Pityriasis rosacea

c) Contact dermatitis

d) Oculocutaneous albinism

Correct Answer - A

**Ans. is 'a' i.e., Dermatitis herpetiformis**

Dapsone is first line anti-leprotic drug.

Dapsone is also used in dermatitis herpetiformis (drug of choice), *P. jiroveci* infection in AIDS, actinomycetoma, rhinosporidiosis, toxoplasmosis and leishmaniasis.

**MOA :**

- Dapsone is an analog of para-aminobenzoic acid (PABA) and hence competitively inhibits dihydropteroate synthase (DHPS) required for folic acid synthesis.

### 43. The drug efavirenz inhibits?

a) HIV 1 Protease

b) HIV 1 reverse transcriptase

c) HIV1 Integrase

d) HIV entry into cell

Correct Answer - B

Ans is 'b' i.e. HIV1 reverse transcriptase

- Efavirenz is a non-nucleoside reverse transcriptase inhibitor.

**44. Bleomycin toxicity is characterized by hyperplasia of-**

a) Endothelial cells

b) Type I pneumocytes

c) Type II pneumocytes

d) Alveolar macrophages

Correct Answer - C

Ans. is 'c' i.e., Type II pneumocytes

## 45. Which of the following doesn't worsen angina?

a) Sumatriptan

b) Oxyfedrine

c) Dipyridamole

d) Thyroxine

Correct Answer - B

Ans. is 'b' i.e., Oxyfedrine

### Drugs that exacerbate Angina

- |   |   |                               |
|---|---|-------------------------------|
| <input type="checkbox"/> Amphetamines               | <input type="checkbox"/> Alpha blocker            | <input type="checkbox"/> Beta |
| <input type="checkbox"/> agonists                   | <input type="checkbox"/> Beta blockers withdrawal |                               |
| <input type="checkbox"/> <i>Dipyridamol</i>         | <input type="checkbox"/> Vasopressin              | <input type="checkbox"/>      |
| <input type="checkbox"/> Ergotamine                 | <input type="checkbox"/> Decongestants            |                               |
| <input type="checkbox"/> <i>Excessive thyroxine</i> | <input type="checkbox"/> Hydralazine              | <input type="checkbox"/>      |
| <input type="checkbox"/> Methysergide               | <input type="checkbox"/> Minoxidil                |                               |
| <input type="checkbox"/> Nifedipine                 | <input type="checkbox"/> Nicotine and cocaine     | <input type="checkbox"/>      |
| <input type="checkbox"/> Oxytocin                   | <input type="checkbox"/> <i>Sumatriptan</i>       |                               |
| <input type="checkbox"/> Theophylline               |   |                               |

## 46. Bremelanotide is used for -

a) Erectile dysfunction

b) LUTS

c) Hormone resistant prostate cancer

d) Metastatic RCC

Correct Answer - A

Ans is 'a' i.e. Erectile dysfunction

\* Bremelanotide is an analogue of naturally occurring peptide alpha-melanocyte-stimulating hormone (alphaMSH).

\* It stimulates erection in men and male rats, and was in clinical trials for the treatments of erectile dysfunction in men and sexual arousal disorder in women.

## 47. Which of the following drug is used in sickle cell anemia?

a) Hydroxyurea

b) Carmustine

c) Paclitaxel

d) Bleomycin

Correct Answer - A

Ans. is 'a' i.e., Hydroxyurea

- The most advance in the therapy of sickle cell anemia has been the introduction of hydroxyurea as the mainstay of therapy for patients with severe symptoms.
- Although exact mechanism of action in sickle cell anemia is not completely understood, it is believed that hydroxyurea works by increasing the production of fetal hemoglobin in the red blood cells.
- This may prevent the cells from becoming rigid and clogging vessels by retarding sickling of RBCs.
- Hydroxyurea may also exert beneficial effects on RBC hydration, vascular wall adherence and suppression of the leucocyte (granulocytes) and reticulocyte counts.

## 48. Ozurdex is?

a) 0.5 mg triamcinolone

b) 0.7 mg dexamethasone

c) 0.6 mg betamethasone

d) 0.7 mg Triamcinolone

Correct Answer - B

Ans is b' i.e. 0.7 mg dexamethasone

### **Ozurdex**

\* Ozurdex is an *intra vitreal implant* containing 0.7 mg (700µg) dexamethasone in the solid polymer drug delivery system (NOVAD UR).

\* Ozurdex is specifically indicated in *macular edema* following branch retinal vein occlusion (BRVO) or central retinal vein occlusion (CRVO).

\* Recently, efficacy of ozurdex in the treatment of intermediate and posterior uveitis has also been demonstrated.

### Mechanism of action

\* Dexamethasone is a potent corticosteroid and suppress inflammation by inhibiting multiple inhibitory cytokines resulting in decreased edema, fibrin deposition, capillary leakage and migration of inflammatory cells.

### Adverse effects and contraindications

Intraocular pressure increase, conjunctival hemorrhage, eye pain, conjunctival hyperemia, ocular hypertension, cataract, vitreous detachment, headache.

\* Contraindicated in infections, advanced glaucoma, hypersensitivity.

### Other important drug delivery system for eye

Medidur: Delivers Fluocinolone acetonide Retisert: Delivers

Fluocinolone acetonide Vitreosert: Delivers ganciclovir

Fluocinolone acetonide vtraseri. DeliverS ganciclovir

## 49. Therapeutic index of a drug signifies: *September 2005*

- a) Dose which produces maximum effect
- b) Safety margin
- c) Efficacy
- d) Maximum response that can be elicited by a drug

Correct Answer - B

Ans. B: Safety Margin

The therapeutic index/therapeutic ratio is a comparison of the amount of a therapeutic agent that causes the therapeutic effect to the amount that causes death.

It signifies safety margin.

Quantitatively, it is the ratio given by the lethal dose divided by the therapeutic dose.

A therapeutic index is the lethal dose of a drug for 50% of the population (LD50) divided by the minimum effective dose for 50% of the population (ED50).

A high therapeutic index is preferable to a low one: this corresponds to a situation in which one would have to take a much higher dose of a drug to reach the lethal threshold than the dose taken to elicit the therapeutic effect

Generally, a drug or other therapeutic agent with a narrow therapeutic range (i.e. with little difference between lethal and therapeutic doses) may have its dosage adjusted according to measurements of the actual blood levels achieved in the person taking it.

**50. Orphan drugs are:**  
***March 2010, March 2013***

- a) Commercially easy to obtain.
- b) Drugs to treat rare diseases usually
- c) Developed with an intention of monetary gain
- d) All of the above

Correct Answer - B

Ans. B: Drugs to treat rare diseases usually

An orphan drug is a pharmaceutical agent/biological products that has been developed specifically to diagnose/treat/ prevent a rare medical condition (the condition itself being referred to as an orphan disease) or a more common condition which is endemic only in poor resource countries.

There is no reasonable expectation that the cost of developing and marketing will be recovered from the sale of that drug.

Though these drugs may be life saving for some patients, they are commercially difficult to obtain.

The assignment of orphan status to a disease and to any drugs developed to treat it is a matter of public policy in many countries, and has resulted in medical breakthroughs.

A rare disease, sometimes known as an orphan disease, is any disease that is not common.

**51. Amongst the following, thrombolytics are  
LEAST in:**

a) Acute myocardial infarction

b) Peripheral arterial occlusion

c) Hemorrhagic stroke

d) Deep venous thrombosis

Correct Answer - C

Ans. C i.e. Hemorrhagic stroke

**Thrombolytic agents**

- They are used for the treatment of myocardial infarction (heart attack), thromboembolic strokes, deep vein thrombosis and pulmonary embolism to clear a blocked artery and avoid permanent damage to the perfused tissue (e.g. myocardium, brain, leg) and death.
- They may also be used to clear blocked catheters that are used in long-term medical therapy.
- Thrombolytic therapy in hemorrhagic strokes is contraindicated, as its use in that situation would prolong bleeding into the intracranial space and cause further damage.

**52. Acetazolamide decreases intraocular pressure by what mechanism:  
*September 2010***

a) Decreases aqueous humor production

b) Decreases vitreous volume

c) Increased drainage of aqueous

d) None of the above

Correct Answer - A

Ans. A: Decreases aqueous humor production

Acetazolamide(Daimox) is a noncompetitive antagonist of carbonic anhydrase. , which means that it forces the kidneys to excrete bicarbonate ( $\text{HCO}_3^-$ ), thus re-acidifying the blood.

It also lowers intraocular tension by decreased formation of aqueous humour (It is rich in bicarbonate)

## 53. Drug acting on cell wall of gram positive bacteria:

*March 2009*

a) Gentamycin

b) Ciprofloxacin

c) Tetracycline

d) Vancomycin

Correct Answer - D

Ans. D: Vancomycin

Vancomycins bind to the peptides of the peptidoglycan monomers and block both the formation of glycosidic bonds between the sugars by the transglycosidase enzymes and the formation of the peptide cross-links by the transpeptidase enzymes. This results in a weak cell wall and osmotic lysis of the bacterium.

The fluoroquinolones (norfloxacin, lomefloxacin, fleroxacin, ciprofloxacin, enoxacin, trovafloxacin, gatifloxacin, etc.) work by inhibiting one or more of a group of enzymes called topoisomerase, enzymes needed for supercoiling, replication and separation of circular bacterial DNA.

For example, DNA gyrase is a topoisomerase that catalyzes the negative supercoiling of the circular DNA found in bacteria.

Topoisomerase IV, on the other hand, is involved in the relaxation of the supercoiled circular DNA, enabling the separation of the interlinked daughter chromosomes at the end of bacterial DNA replication.

In gram-positive bacteria, the main target for fluoroquinolones is DNA gyrase (topoisomerase II), an enzyme responsible for supercoiling of bacterial DNA during DNA replication. In gram-

supercoiling of bacterial DNA during DNA replication, in gram-negative bacteria, the primary target is topoisomerase IV, an enzyme responsible for relaxation of supercoiled circular DNA and separation of the inter-linked daughter chromosomes.

The tetracyclines (tetracycline, doxycycline, demeclocycline, minocycline, etc.) block bacterial translation by binding reversibly to the 30S subunit and distorting it in such a way that the anticodons of the charged tRNAs cannot align properly with the codons of the mRNA.

The aminoglycosides (streptomycin, neomycin, netilmicin, tobramycin, gentamicin, amikacin, etc.) bind irreversibly to the 30S subunit of bacterial ribosomes.

**54. Anti-hypertensive drug contraindicated in pregnancy is:**

***September 2005, 2010 March 2007, March 2013***

a) Hydralazine

b) Methyldopa

c) Enalapril

d) Amlodopine

Correct Answer - C

Ans. C: Enalapril

**Antihypertensive used in pregnancy**

- Alpha methyldopa
- Labetolol
- Felodipine

**Not usually initiated in pregnancy due to volume depletion but may be continued:**

- Nifedipine
- Hydralazine

ACE inhibitors, Thiazide diuretics, Angiotensin antagonists (losartan), Furosemide, propranolol and nitroprusside are unsafe/safety uncertain in pregnancy.

Foetal growth retardation, hypoplasia of organs and foetal death may occur if ACE inhibitors are given during later half of pregnancy.

**55. An old man is having benign prostatic hypertrophy. Drug useful in such a patient would be:**

***March 2012***

a) Cyproterone acetate

b) Danazol

c) Bicalutamide

d) Finasteride

Correct Answer - D

Ans: D i.e. Finasteride

**Drugs and uses**

- Cyproterone has been clinically tested in precocious puberty in boys, inappropriate sexual behaviour in men, acne and virilisation in women, but is not marketed.
- Danazol is useful in endometriosis, menorrhagia, fibrocystic breast disease and hereditary angioneurotic edema.
- Bicalutamide (more potent and longer acting congener of flutamide) is suitable for once daily administration in metastatic carcinoma of prostate.
- Treatment with finasteride has resulted in decreased prostate size and increased peak urinary flow rate in nearly 50% patients with symptomatic benign hypertrophy of the prostate (BHP). It is the only drug which can retard disease progression.

**56. Drug causing toxic optic neuropathy is:**  
***March 2009***

a) Pyrazinamide

b) Chloroquine

c) Ethambutol

d) Tetracycline

Correct Answer - C

Ans. C: Ethambutol

**Causes of nutritional optic neuropathy include tobacco, ethanol, thiamine, and vitamin B-12.**

- Causes of toxic optic neuropathy include chemicals and drugs, such as methanol, ethylene glycol, ethambutol, isoniazid, digitalis, cimetidine, vincristine, cyclosporine, toluene, and amiodarone.
- Chloroquine causes loss of vision due to retinal damage. Corneal deposits may also occur and affect vision, but are reversible on discontinuation.

## 57. Correct match of drug and mechanism of action is:

a) Brimonidine decreases aqueous production

b) Latanoprost carbonic anhydrase inhibitor

c) Pilocarpine increases uveoscleral outflow

d) Betaxolol increases trabecular outflow

Correct Answer - A

Ans.A. Brimonidine decreases aqueous production

Mechanism of Action:

Brimonidine- Lowers IOT(Intraocular tension) by 20-27% by reducing aqueous production and by increasing uveoscleral flow.

Latanoprost- Increase the uveoscleral outflow.

Pilocarpine-Increases trabecular outflow.

Betaxolol- Reduces aqueous secretion by the ciliary body.

**58. Which of the following is a Rho kinase inhibitor?**

a) Fasudil

b) Ranolazine

c) Amiloride

d) Nicorandil

Correct Answer - A

**Ans. a. Fasudil**

**59. All of the following are true about user of iodine except:**

a) It inhibits release of thyroid hormones

b) It causes acute inhibition of iodotyrosine and iodothyronine synthesis

c) It can cause iodism

d) Its use is contraindicated in hyperthyroidism

Correct Answer - D

**Ans. d. Its use is contraindicated in hyperthyroidism**

**MC therapeutic indication of  $^{131}\text{I}$  (half life-| days) is**

**hyperthyroidism due to Grave's disease or toxic nodular goiter.**

## 60. Duration of action of flumazenil :

a) 10 minutes

b) 20 minutes

c) 30 minutes

d) 40 minutes

Correct Answer - D

**Ans. d. 40 minutes**

'On IV injection, action of flumazenil *starts in seconds and* lasts for 1-2 hours; elimination t-half is 1 hour, due to rapid metabolism.'

## 61. Loading dose depends on ?

a) Volume of distribution

b) Elimination rate

c) Half life

d) Plasma volume

Correct Answer - A

**Ans. is 'a' i.e., Volume of distribution**

Loading dose is governed by volume of distribution and volume of distribution is affected by lipid solubility.

Maintenance dose is governed by clearance (excretion) of drug and half life.

## 62. Pyridoxine should be given when treating with ?

a) Isoniazid

b) Rifampicin

c) Pyrazinamide

d) Streptomycin

Correct Answer - A

Ans. is 'a' i.e., Isoniazid

- Peripheral neuritis associated with isoniaide probably relates to interference with pyridoxine (vitamin B6).
- Thus when treating a patient with isoniazid it is essential to supplement with pyridoxine to reduce chances of peripheral neuritis.

### 63. Patient on verapamil should not be given beta blocker as ?

a) Conduction block

b) Bronchospasm

c) Neurogenic shock

d) Anaphylaxis

Correct Answer - A

**Ans. is 'a' i.e., Conduction block**

**Adverse effects of CCBs**

- Nausea, constipation and bradycardia are more common with verapamil.
- Verapamil can accentuate conduction defect-should be avoided in 2<sup>nd</sup> & 3<sup>rd</sup> degree block, in sick sinus syndrome and along with 13-blocker.
- Most common side effects of DHPs are palpitation, flushing, hypotension, headache, ankle edema, drowsiness and nausea.
- Nifedipine can paradoxically increase the frequency of angina in some patients.
- Nifedine can cause voiding difficulty in elderly (relaxant effect on bladder) and glucose intolerance (decreases insulin release).

**64. Peripheral conversion of T4 to T3 is inhibited by?**

a) Propranolol

b) Diltiazem

c) Sotalol

d) Sodium iodide

Correct Answer - A  
Ans. is 'a' i.e., Propranolol

## 65. Specific antagonist for benodizaepine is ?

a) Flumazenil

b) Alprazolam

c) Di - isoprophyl phenol

d) Cremopher-ei

Correct Answer - A

Ans. is 'a' i.e., Flumazenil

Flumazenil is a benzodiazepene analogue *which competes with BZD agonists as well as inverse agonists for the BZD receptor and reverses their depressant or stimulant effects respectively.*

It also antagonizes the action of *Zolpidem, Zopiclone and Zopeplon* as these drugs also act on BZD site.

**66. All of the following statements about antianginal action of nitrates are true except?**

a) Myocardial O<sub>2</sub> consumption

b) Both pre and after load

c) Total coronary flow

d) Cause favourable redistribution of coronary flow

Correct Answer - C

**Ans. is 'c' i.e., Total coronary flow**

Mechanism of action of nitrates in Prinzmetal's angina is endothelium independent coronary vasodilation. When metabolized, organic nitrates release nitric oxide (NO) that binds to guanylyl cyclase in vascular smooth muscle cells, leading to an increase in cyclic guanosine monophosphate, which causes relaxation of vascular smooth muscle.

**"Nitrates benefit patients with variant (also known as Prinzmetal) angina by relaxing the smooth muscle of the epicardial coronary arteries and relieving coronary artery spasm."**

**Pharmacological actions of nitrates**

- The only major action is direct nonspecific smooth muscle relaxation. Preload reduction - Nitrates dilate veins more than arteries decreased venous return (preload) → decreased end diastolic size and pressure → decreased **O<sub>2</sub> consumption**.
- The most prominent action is exerted on vascular smooth muscles.
- Afterload reduction - Nitrates also produce some arteriolar dilatation → slightly decreased total peripheral resistance (afterload).

- Redistribution of coronary flow.
- Other smooth muscles - Nitrates cause relaxation of bronchi, biliary tract, esophagus → can be used in biliary colic and esophageal spasm.

**67. Post marketing surveillance included in which phase of drug clinical trial?**

a) I

b) II

c) III

d) IV

Correct Answer - D

**Ans. is 'd' i.e., IV**

Surveillance after marketing, i.e. after the drug is out in the market is a part of Phase **IV** of clinical trials. It includes follow-up of patients taking the drug and adverse drug reaction (**ADR**) reporting as well as looking for newer treatment indications

## 68. Which of the following is true

- a) Dopamine increase the hepatic and mesenteric blood flow at high dose
- b) Dobutamine decreases peripheral vascular resistance
- c) Nor-adrenaline increases the renal blood flow
- d) Adrenaline causes selective renal vasodilation

Correct Answer - B

Ans. b. Dobutamine decreases peripheral vascular resistance

**69. Which of the following is an ocular side-effect of HAART therapy**

a) Retinitis

b) Uveitis

c) Optic neuritis

d) Scleritis

Correct Answer - B

Ans. b. Uveitis

**Impact of highly active antiretroviral therapy on ophthalmic manifestations in human immunodeficiency virus:**

- Before the introduction of HAART, CMV retinitis affected 30-40% of HIV-infected individuals.
- At that time a study from our center documented CMV retinitis and cotton-wool spots caused by HIV-related microvasculopathy as the most frequently encountered ocular lesions.
- Additionally, a study conducted at our center in Indian children infected with HIV found a high prevalence of ocular and systemic lesions, most commonly anterior uveitis followed by CMV retinitis.
- Since the advent of HAART, immune recovery uveitis (IRU) has become an ocular manifestation described in patients with inactive CMV retinitis.

## 70. Best agent for premenstrual syndrome management:

a) Progesterone

b) Anxiolytics

c) SSRI

d) Vitamin E

Correct Answer - C  
Ans.'c'SSRI

**71. Which of the following is not a 2nd generation antihistamine**

a) Cetrizine

b) Cyclizine

c) Loratidine

d) Fexofenadine

Correct Answer - B  
Ans. b. Cyclizine

## 72. Treatment of choice for extended spectrum betalactamase producing enterococci

a) Amoxicillin-clavulanic acid

b) Piperacillin-Tazobactam

c) Ampicillin only

d) Ampicillin + Sulbactam

Correct Answer - B  
Ans. b. Piperacillin-Tazobactam

### **73. In new drug designing. problemn arises in**

a) Decreasing interaction of drug with target proteins

b) Increasing drug interaction with non-target proteins

c) Decreasing potency of drugs

d) Decreasing potency of drugs

Correct Answer - B

Ans. b. Increasing drug interaction with non-target proteins

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For any queries inbox @murtazakuchay

## 74. Unfavorable interaction of drug and substrate in human beings are all except:

a) Omeprazole reduces stomach acid

b) Methotrexate inhibiting folate

c) Barbiturates decreases B 12 absorption

d) Retinoic acid inhibits vitamin E

Correct Answer - A

Ans. a. Omeprazole reduces stomach acid

**Omeprazole reduces stomach acid secretion:**

**This interaction is beneficial for patients suffering from GERD without having any associated complications.**

- Rest three interactions has a bad impact on the normal healthy individuals.
- Methotrexate inhibiting folate
- Barbiturates decreases B<sub>12</sub> absorption
- Retinoic acid inhibits vitamin E

**75. A patient with glaucoma is being treated with systemic beta blocker. All of the following can be given to the patient except**

a) Brimonidine

b) Dorzolamide

c) Levobunolol

d) Prostaglandin

Correct Answer - C

Ans. c. Levobunolol

- Brimonidine, dorzolamide and prostaglandin are topical anti-glaucoma drugs. These drugs do not have systemic side effects, while levobunolol (beta-blocker) is systemic anti-glaucoma drug given orally, having systemic side effects. That is why in patients with glaucoma treated with systemic beta blockers, levobunolol may add on the side effects of beta-blockers, hence avoided in the above mentioned patient.

#### **Topical Anti-glaucoma Drugs**

##### **Adrenergic agonist**

- Non-selective: Epinephrine, Dipivefrine
- Alpha2-selective: Apraclonidine, Brimonidine

##### **Adrenergic antagonist**

- Beta—blocker (Non-selective): Timolol, Levobunolol, Carteolol, Metipranolol, Adapralol
- Betal-blocker: Betaxolol

##### **Miotics (direct parasymptomimetics)**

- Pilocarpine, Physostigmine

- Ecothiophate, Carbachol, Demecarium
- **Prostaglandin analogues**
- Latanoprost
- **Carbonic anhydrase inhibitors**
- Dorzolamide
- **Systemic Antiglaucoma Drugs**
- **Carbonic anhydrase inhibitors**
- Acetazolamide
- Dichlorphenamide
- Methazolamide
- **Hyperosmotic agents**
- Mannitol
- Glycerol

## 76. Cholinomimetic is not *used* for

a) Open angle glaucoma

b) Bradycardia

c) Cobra bite

d) Myasthenia gravis

Correct Answer - B

Ans. b. Bradycardia

- Cholinomimetic is used for Open angle glaucoma, Cobra bite and Myasthenia gravis

### **Uses of Cholinomimetic**

- Diseases of eye: Glaucoma and accommodative esotropia°
- Gastrointestinal and urinary tract: Post-operative atony°, neurogenic bladder°
- Neuromuscular junction: Myasthenia gravis°, Curare induced neuromuscular paralysis
- Heart: Certain atrial arrhythmias°
- Atropine overdoses°
- Alzheimer's disease°
- Cobra bite°: Neostigmine and endrophonium (*Harrison 18/e p3570*)

## 77. Which of the following statements about anti-epileptics is false

a) Phenytoin and carbamazepine act by prolonging Na<sup>+</sup> channel activation

b) Carbamazepine is also used in trigeminal neuralgias

c) Diazepam is an anti-epileptic

d) Lamotrigine acts by GABA mediated Cl<sup>-</sup> channel opening

Correct Answer - A

Ans. a. Phenytoin and carbamazepine act by prolonging Na<sup>+</sup> channel activation

- *Phenytoin* and carbamazepine act by prolonging Na<sup>+</sup> channel activation, it is a false statement.
- Phenytoin and carbamazepine limit the repetitive firing of action potentials evoked by sustained depolarization.
- This effect is mediated by slowing of the rate of recovery of voltage-activated Na<sup>+</sup> channels from inactivation, an action that is both voltage- and use-dependent (greater effects if membrane is depolarized.)"-

**78. Despite their short half-lives (2 hours), Proton pump Inhibitors (PPIs) cause a prolonged suppression of acid secretion (up to 48 hours) because:**

- a) They are prodrugs and undergo activation gradually
- b) They exit from the plasma and enter acid secretory canaliculi and stay there, blocking the secretion of acid for a long time
- c) They irreversibly inhibit the proton pump molecule and hence, acid secretion requires synthesis of new proton pumps
- d) They are available as enteric coated capsules, from which drug is gradually released

Correct Answer - C

Ans. c. They irreversibly inhibit the proton pump molecule and hence, acid secretion requires synthesis of new proton pumps

- Inhibition of acid secretion is also more prolonged because of the irreversible inhibition of the enzyme caused by the covalent bond to the proton pump.

**79. Drug-induced colitis is most frequently associated with:**

a) Neomycin

b) Vancomycin

c) Clindamycin

d) Chloramphenicol

Correct Answer - C  
Ans. c. Clindamycin

**80. All of the following can cause SLE-like syndrome except:**

a) INH

b) Penicillin

c) Hydralazine

d) Sulphonamide

Correct Answer - B

Ans. b. Penicillin

**Drug-Induced Lupus:**

- The drugs that undergo acetylation usually cause SLE-like syndrome as an adverse effect. These drugs include: (SHIPP)  
Sulfonamides Hydralazine Isoniazid

**81. The drug that is not banned for players by the International Olympic Committee (IOC) is:**

a) Salbutamol

b) Sodium chromoglycate

c) Erythropoietin

d) Spironolactone

Correct Answer - B  
Ans. b. Sodium chromoglycate

## 82. Which of the following traditional medicines is effective in the treatment of heart failure

a) Terminalia Arjuna

b) Neem bark extract

c) St. John's wort

d) Gingkoba biloba

Correct Answer - A

Ans. a. Terminalia Arjuna

### **Terminalia Arjuna (An ayurvedic cardioprotective botanical)**

- Although many Ayurvedic plants have shown to help coronary artery disease, Arjuna (Terminalia Arjuna) by far seems to be the best plant for heart health.
- Terminalia arjuna is a traditional ayurvedic plant containing tannins, triterpenoid saponins (arjungenin, arjunglucosides), flavonoids (arjunon, arjonolone), phytosterols, oligomeric proanthocyanidins (OPC's), calcium, magnesium, zinc, and copper.

**83. Cholinomimetic is not used in which of the following?**

a) Bradycardia

b) Glaucoma

c) Myasthenia gravis

d) Post-surgical atony or ileus

Correct Answer - A

Ans. a. Bradycardia

Cholinomimetic is used for open-angle glaucoma, cobra bite, and myasthenia gravis but not in bradycardia.

**Uses of Cholinomimetic**

Diseases of eye Glaucoma  
and accommodative  
esotropia

Atropine overdoses

Gastrointestinal and  
urinary tract

Alzheimer's disease

Postoperative atony,  
neurogenic bladder

Cobra bite: Neostigmine and  
edrophonium

Heart: Certain atrial  
arrhythmias

Neuromuscular junction: Myasthenia  
gravis, Curare induced neuromuscular  
paralysis

**84. Which of the following drug is used against bacteria Pseudomonas aeruginosa?**

a) Piperacillin-Tazobactam

b) Cefotaxime

c) Streptomycin

d) Cephalexin

Correct Answer - A

Ans. a. Piperacillin-Tazobactam

Piperacillin is used in

Pseudomonas infection

Klebsiella infection

Anaerobic-Bacteroides infection

**85. Which of the following is not a tertiary amine derivative?**

a) Atropine

b) Glycopyrrolate

c) Scopolamine

d) Hyoscine

Correct Answer - B

**Ans. b. Glycopyrrolate**

Glycopyrrolate is a synthetic quaternary anticholinergic drug, which doesn't cross the blood brain barrier and completely lacks central effects.

**86. Which of the following is a plasma expander similar to the albumin, has a molecular weight of 30,000 and causes less hypersensitivity reactions but should be used with caution?**

a) Hydroxy ethyl starch (HES)

b) Dextran

c) Polygeline

d) Polypyrrolidone

Correct Answer - C

Ans. c. Polygeline

*Polygeline is a plasma expander similar to the albumin, has a molecular weight of 30,000 and causes less hypersensitivity reactions but should be used with caution.*

**Polygeline**

- Polypeptide with average MW 30,000<sup>Q</sup>
- Exerts oncotic pressure similar to albumin<sup>Q</sup>
- Not antigenic, hypersensitivity reactions are rare<sup>Q</sup> but should be watched for.
- Does not interfere with grouping and cross matching of blood<sup>Q</sup>
- Remains stable for three years.
- It is not metabolized in the body; excreted slowly by the kidney.
- Expansion of plasma volume lasts for 12 hours.
- It is more expensive than dextran
- It can also be used for priming of heart-lung and dialysis machines

## 87. Which of the following is true about Penicillin G?

a) Broad spectrum

b) It is effective orally

c) Used for treatment of rat bite fever

d) Probenecid given along with Penicillin G decreases duration of its action

Correct Answer - C

**Ans. c. Used for treatment of rat bite fever**

**Penicillin G is not given by oral route:**

\* Penicillin G is acid labile, destroyed by gastric acid, so not given by oral route.

\* Low oral bioavailability (only useful parenterally)

**Penicillin C is not a broad-spectrum antibiotic:**

\* Penicillin G is  $\beta$ -lactam antibiotics and increases in the treatment of bacterial infections caused by susceptible, usually Gram-positive, organisms.

\* Narrow spectrum

**Penicillin G is DOC for:**

\* Anthrax

\* Actinomycosis

\* Trench mouth

\* Rat bite fever

**Probenecid is given along with Penicillin G:**

\* Increase its action because it has high affinity for the tubular OATP, so it blocks the transport of penicillin and increases its efficacy.

\* Decreases volume of distribution of penicillin G.

## **Penicillin G**

- \* MOA: It inhibits cell synthesis by interfering with the transpeptidation reactions
- \* Penicillin G is  $\beta$ -lactam antibiotics and is used in the treatment of bacterial infections caused by susceptible usually Gram-positive organisms.
- \* Resistance to penicillin G is due to 4 mechanism
- \* Inactivation of antibiotic by beta-lactamase: MC
- \* Modification of target penicillin-binding protein (PBP)
- \* Pharmacokinetics: penicillin G is acid labile, destroyed by gastric acid, so not given by oral routes
- \* Probenecid is given along with Penicillin G, increase its action because it has high affinity for the tubular OATP,
- \* so it blocks the transport of penicillin and increase its efficacy.
- \* Probenecid also decreases volume of distribution of penicillin Gs.

**88. Which of the following is incorrect about NSAIDs?**

a) Used in neuropathic pain

b) Decreases antihypertensive action of diuretics

c) Should be avoided in renal failure

d) Can be used topically

Correct Answer - A

Ans. a. Used in neuropathic pain

- NSAIDs are not used in neuropathic pain.
- NSAIDs reduce renal blood flow and thereby decrease the efficacy of diuretics, and inhibit the elimination of lithium and methotrexate.'
- NSAIDs may aggravate hypertension (high blood pressure) and thereby antagonize the effect of antihypertensives, such as ACE inhibitors and diuretic.
- Globally, topical preparations are available for diclofenac, eltenac, felbinac, ibuprofen, ketoprofen, and piroxicam.'
- Nociceptive pain usually responds to opioids and non-steroidal anti-inflammatory (NSAIDS).

## 89. All of the following are true about paclitaxel except?

- a) Stabilizes microtubules and prevent polymerization
- b) Used in ovarian, cervix and breast cancer
- c) Most commonly causes myelosuppression and alopecia
- d) Obtained from E. coli

Correct Answer - D

Ans. d. Obtained from E. coli

### **Paclitaxel**

- Alkaloid ester derived from the Western yew (*Taxus brevifolia*) and the European yew (*Taxus baccata*)Q.

### **Mechanism of Action:**

- **Mitotic spindle poison** through high-affinity binding to microtubules with enhancement of tubulin polymerization
- Binds to beta-tubulin and enhances its polymerization (a mechanism opposite to that of vinca alkaloids)
  - Microtubules are stabilized and their depolymerization is prevented.
  - Abnormal arrays or 'bundles' of microtubules are produced throughout the cell cycle
- Cytotoxic action of paclitaxel emphasizes the importance of tubulin-microtubule dynamic equilibrium.

### **Indications:**

- *Metastatic* ovarian and breast carcinoma after failure of first-line chemotherapy and relapse cases.
- Wide variety of solid tumors, including ovarian, advanced breast, non-small cell and small cell lung, head and neck, esophageal, prostate, and bladder cancer AIDS-related Kaposi's sarcomaQ

### **Side-Effects:**

- **Reversible myelosuppression, gastro intestinal mucositis and hair loss, stocking and glove neuropathy**

**90. Which of the following is not a side effect of long-term use of PPI?**

a) Hypothyroidism

b) Osteoporosis leading to hip fracture in women

c) Community acquired pneumonia

d) Clostridium difficile infection

Correct Answer - A

Ans. a. Hypothyroidism

Hypothyroidism has not yet been found to occur with proton pump inhibitors.

Diarrhea, headache, and abdominal pain

Enteric Infections

Potential Problems Due to Increased Serum Gastrin

Potential Problems Due to Decreased Gastric Acidity

## 91. Abatacept, a new drug inhibiting co-stimulation is used for the treatment of:

a) Scleroderma

b) Sjogren syndrome

c) Rheumatoid arthritis

d) Systemic lupus erythematosus

Correct Answer - C

Ans. c. Rheumatoid arthritis

### **Abatacept**

- Abatacept is a soluble fusion protein consisting of the extracellular domain of human cytotoxic T lymphocyte-associated antigen 4 (CTLA-4) linked to the modified portion of human IgGQ.

### **Mechanism of Action:**

- Inhibits the co-stimulation of T cells by blocking CD28-CD80/86 interactions
- Also, inhibit the function of antigen-presenting cells by reverse signaling through CD80 and CD86.
- Onset of action is usually slower than that of the anti-TNF agents.

### **Indications:**

- Abatacept has been shown in clinical trials to reduce disease activity, slow radiographic progression of damage, and improve functional disability in rheumatoid arthritis.
- Most patients receive abatacept in combination with methotrexate or another DMARD such as leflunomide.

### **Adverse-effects:**

- Associated with an increased risk of infection.

## 92. Which of the following drug does not cause edema?

a) Amlodipine

b) Digoxin

c) Estrogen

d) Cyclosporine

Correct Answer - B

Ans. b. Digoxin

Digoxin Side effects

Common	Rare	Not known to occur
Dizziness	Black, tarry stools	Chest pain or discomfort
Fainting	Bleeding gums	Nausea
Fast, pounding, or irregular heartbeat or pulse	Blood in the urine or stools	Shortness of breath
Slow heartbeat	Bloody vomit	Sweating
	Pinpoint red spots on the skin	Swelling of the feet and Lower legs
	Rash with flat lesions or small Raised lesions on the skin	Troubled breathing
	Severe stomach	Unusual tiredness or

pain

ureness or  
weakness

Unusual bleeding or  
bruising

- `Cyclosporine can lead to swelling of the feet or lower legs.'-  
<http://www.drugs.com/sft/cyclosporinc-side-effects.html>

**Common Drugs Causing Edema**

Antihypertensives(Calcium Channel  
Blockers: Amlodipine

Steroids

Estrogens

NSAIDs

Thiazolidinedione's

**93. Which of the following is drug of choice for pseudomembranous enterocolitis is?**

a) Oral vancomycin

b) Cephalexin

c) Clindamycin

d) Penicillin

Correct Answer - A

Ans. a. Oral vancomycin

Dizziness

Fainting

Fast,  
pounding,  
or irregular

heartbeat or pulse

Slow heartbeat

Black, tarry stools

Bleeding gums

Blood in the urine or stools . Bloody vomit . Pinpoint red spots on the skin

Rash with flat lesions or small

Raised lesions on the skin

Severe stomach pain

Unusual bleeding or bruising

**94. All of the following are true about rituximab except?**

a) Chimeric monoclonal antibody against CD-20 B cell antigen

b) Most common side effect is infusion reaction

c) First FDA drug approved for resistant lymphomas

d) Dose independent pharmacokinetics

Correct Answer - D

Ans. d. Dose independent pharmacokinetics

Pharmacokinetics of rituximab (monoclonal antibodies) is dose dependent.

Rituximab is a murine-human monoclonal IgG1 (human Fc) that binds to the CD20 molecule on normal and malignant B lymphocytes.

. Associated with mild-to- moderate infusion reactions as well as an increased risk of infection.

. Notably, there have been isolated reports of a potentially lethal brain disorder progressive multifocal leukoencephalopathy (PML), in association with rituximab therapy.

. It has been also shown to cause Tuberculosis.

## 95. Antibiotic with Time-dependent killing and post antibiotic effect?

a) Fluoroquinolones

b) Beta lactam antibiotics

c) Erythromycin

d) Clindamycin

Correct Answer - D

Ans. d. Clindamycin

Time dependent killing and prolonged post-antibiotic effect is seen with Clindamycin.

**96. Following serum levels are suggestive of lithium toxicity**

a) 2 mEq/L

b) 4 mEq/L

c) 6 mEq/L

d) 8 mEq/L

Correct Answer - A

Ans. a. 2 mEq/L

Serum level of 2 mEq/L is suggestive of lithium toxicity.

## 97. Which of the following is not converted into an active metabolite?

a) Lisinopril

b) Fluoxetine

c) Cyclophosphamide

d) Diazepam

Correct Answer - A

Ans. a. Lisinopril

All ACE inhibitors are prodrugs except captopril and lisinopril."- KDT 7/e p22-23, 501

"Diazepam generates active metabolites such as desmethyl diazepam and oxazepam."- KDT 7/e p405

Cyclophosphamide is inactive as such. Transformation into active metabolites (aldophosphamide, phosphoramidate mustard) occurs in the liver."- KDT 7/e p860

"Fluoxetine is the longest acting SSRI. Its plasma  $T_{1/2}$  is 2 days and that of its active demethylated metabolite (norfluoxetine) is 7-10 days."- KDT 7/e p461

### Pro-drug Active metabolite

**Acyclovir,  
Valacyclovir**

**Acyclovir triphosphate**

Bacampicillin

Ampicillin

Cyclophosphamide

Aldophosphamide, Phosphoramidate mustard, acrolein

Dipivefrin

Epinephrine (Adrenaline)<sup>Q</sup>

Enalapril

Enalaprilat<sup>Q</sup>

5-Mercaptopurine

Methylmercaptopurine

5-mercaptopurine	ribonucleotide
Levodopa	Dopamine <sup>Q</sup>
Alpha-methyldopa	Alpha-methylnorepinephrine
Prednisone	Prednisolone <sup>Q</sup>
Proguanil	Cycloguanil
Sulfasalazine	5-aminosalicylic acid

<b>Active drug</b>	<b>Active metabolite</b>
Allopurinol	Alloxanthine <sup>Q</sup>
Amitriptyline	Nortriptyline
Cefotaxime	Desacetyl cefotaxime
Chloral hydrate	Trichloroethanol
Codeine	Morphine <sup>Q</sup>
Diazepam	Desmethyl diazepam, Oxazepam
Digitoxin	Digoxin <sup>o</sup>
Imipramine	Desipramine <sup>Q</sup>
Losartan	E 3174
Morphine	Morphine 6-glucoronide
Primidone	Phenobarbitone, Phenylethylmalonamide
Procainamide	N-acetylprocainamide
Spirolactone	Canrenone

**98.  $\alpha_2$  agonist cause all of the following except:**

a) Analgesia

b) Hyperalgesia

c) Sedation

d) Anxiolysis

Correct Answer - B

Ans. b. Hyperalgesia

**Potential actions of alpha, agonists (DASHA) Drying of secretionsQ**

- AnalgesiaQ
- SedationQ
- HypotensionQ
- AnxiolysisQ

**99. The site of action of the loop diuretic furosemide is:**

a) Thick ascending limb of loop of Henle

b) Descending limb of loop of Henle

c) Proximal convoluted tubule

d) Distal convoluted tubule

Correct Answer - A

Ans. a. Thick ascending limb of loop of Henle

## 100. Which of the following pairs of drug and its Indications is matched incorrectly?

a) Carbamazepine - (Indication was not mentioned in the exam)

b) Octreotide - treatment of diarrhea associated with vasoactive intestinal peptide tumours

c) Desmopressin - treatment of diabetes insipidus

d) hCG - treatment of infertility in men and women

Correct Answer - A

Ans. a. Carbamazepine

### **Carbamazepine:**

- Most effective drug for complex partial seizures.
- Generalized tonic clonic and simple partial seizures
- DOC in Trigeminal neuralgiae.
- As an alternative to lithium in manic-depressive illness and acute maniac

### **Octreotide:**

- Effective in inhibiting the severe secretory diarrhea brought about by hormone-secreting tumors of the pancreas and the GI tract.

### **Desmopressin:**

- Used in central diabetes insipidus, nocturnal enuresis, nighttime urination, and von Willebrand's disease
- Also used in diagnostic workup for diabetes insipidus, in order to distinguish central from nephrogenic DI.

### **Human Chorionic Gonadotropin (hCG):**

- Treatment continues with injections of hCG 2 times a week and hMG or FSH 3 times a week until the sperm count rises to normal levels.

**101. Which of the following antitubercular drugs is associated with hypothyroidism?**

a) Rifampicin

b) Pyrazinamide

c) Ethionamide

d) Streptomycin

Correct Answer - C

Ans. c. Ethionamide

"Ethionamide is structurally similar to methimazole, has been shown to inhibit thyroid hormone synthesis, and was reported to cause hypothyroidism in several TB patients.

"Ethionamide is an antimycobacterial drugs used as a second-line agent in the treatment of multidrug-resistant tuberculosis.

It is structurally similar to methimazole, has been shown to inhibit thyroid hormone synthesis, and was last reported to cause hypothyroidism.

Hypothyroidism due to ethionamide is, at least in part, reversible after withdrawal of the drug.

**102. The most common side effect of cancer chemotherapy is nausea with or without vomiting. The anticancer drugs vary in their ability to cause nausea and vomiting. Which of the following anti-cancer drugs is least likely to cause nausea and vomiting?**

a) Chlorambucil

b) Cisplatin

c) Doxorubicin

d) Daunorubicin

Correct Answer - A

Ans. a. Chlorambucil

**Emetogenic Potential of Cytotoxic drugs**

<b>High</b>	<b>Moderate</b>	<b>Mild</b>
Cisplatin <sup>Q</sup>	Carboplatin	Bleomycin
Carmustine <sup>Q</sup>	Cytarabine	Chlorambucil <sup>Q</sup>
Cyclophosphamide <sup>Q</sup>	Procarbazine	Busulfan
Actinomycin D <sup>Q</sup>	Vinblastin	5-Fluorouracil
Dacarbazine <sup>Q</sup>	Doxorubicin <sup>Q</sup>	6-Thioguanine
Lomustine <sup>Q</sup>	Daunorubicin <sup>Q</sup>	Hydroxyurea
	Ifosfamide	Vincristine
	6-Mercaptopurine	Methotrexate
	Paclitaxel	Etoposide

Paclitaxel

Etoposide

L-asparaginase

**103. Which of the following medications essential for ameliorating the toxicity of pemetrexed:**

a) Folinic acid and vitamin B6

b) Folic acid and vitamin B12

c) Vitamin B<sub>6</sub> and Vitamin B<sub>12</sub>,

d) Folic acid and dexamethasone

Correct Answer - B

Ans. b. Folic acid and vitamin B12

**Pemetrexed Toxicity**

- Pemetrexed toxicity mirrors that of methotrexate, with the additional feature of a prominent erythematous and pruritic rash in 40% of patients.
- Dexamethasone, 4 mg twice daily on days -1, 0 and +1, markedly diminishes this toxicity.
- Unpredictably, severe myelosuppression with pemetrexed, seen especially in patients with pre-existing homocysteinemia and possibly reflecting folate deficiency, is largely eliminated by concurrent administration of low dosages of folic acid, 350-1000 mg/day, beginning 1-2 weeks prior to pemetrexed and continuing while the drug is administered.
- Patients should receive intramuscular vitamin B<sub>12</sub> (1 mg) with the first dose of pemetrexed to correct possible B12 deficiency.
- These small doses of folate and B<sub>12</sub> do not compromise the therapeutic effects.

## 104. High dose of morphine is used without much danger in ?

a) Gall bladder surgery

b) Labour

c) Myocardial infarction

d) Head injury

Correct Answer - C

Ans. is 'c' i.e., Myocardial infarction

- Morphine should be given promptly in myocardial infarction to allay apprehension and reflex sympathetic stimulation.
- Morphine should be used cautiously in gall bladder and biliary tract dysfunction as it causes spasm of sphincter of oddi and can cause acute rise of intrabiliary pressure.
- Used during labour, morphine can cause neonatal respiratory distress.
- Head injury is a contraindication for morphine use.

**105. All of the following are true about Ifosfamide except:**

a) It is nitrogen mustard

b) Metabolised by CYP3A4 to form active metabolite

c) Chloroacetaldehyde is active form

d) Less neurotoxic than cyclophosphamide

Correct Answer - D

Ans. d. Less neurotoxic than cyclophosphamide

At equivalent doses, the rate of chloroacetaldehyde generation with ifosfamide is 40 times greater than with cyclophosphamide. At equivalent doses, the rate of chloroacetaldehyde generation with ifosfamide is 40 times greater than with cyclophosphamide therefore it produces more platelet suppression, neurotoxicity and urothelial damage.

**Ifosfamide**

Ifosfamide is a synthetic analogue of cyclophosphamide

It is a nitrogen mustard alkylating agent

**Metabolism:**

Ifosfamide is a prodrug that requires metabolic activation by microsomal liver enzymes to produce biologically active compounds.

- Activation is mediated by cytochrome p450 —> CYP3A4 and deactivated by CYP3A-4 and CYP2B6
- The metabolic activation of Ifosfamide is an autoinducible process and besides producing active cytotoxic metabolites it also results in generation of some toxic metabolic byproducts that are responsible

**Side-Effects/Toxicity:**

- Ifosfamide is a cyclophosphamide analogue, it has all the potential adverse effects
- Ifosfamide metabolite, rather than the parent drug is responsible for toxicity.
- Well known toxic metabolites of Ifosfamide: Acrolein and chloroacetaldehyde.
- Acrolein is responsible for Ifosfamide induced hemorrhagic cystitis.
- Chloroacetaldehyde is responsible for renal tubular damage and neurotoxicity.

At equivalent doses, the rate of chloroacetaldehyde generation with ifosfamide is 40 times

cyclophosphamide therefore it produces more platelet suppression, neurotoxicity and urothelial

**106. Which of the following trials can be performed to determine the maximal tolerated dose of a drug?**

a) Case control study

b) Phase II Randomized control trial (RCT)

c) Phase I trial

d) Phase IV Randomized control trial (RCT)

Correct Answer - C

Ans. c. Phase I trial (Ref KDT 7/e p79, 6/e p77)

Phase I: Human Pharmacology and safety

- The emphasis is on safety and tolerability, while the purpose is to observe the pharmacodynamic effects in man, characterize absorption, and to distribution, metabolism and excretion

**107. While assessing the efficacy of a newly developed drug in comparison to placebo, the 95% confidence interval in clinical trials is used to check for:**

a) Efficacy of the drug

b) Non-efficacy of the drug

c) Both efficacy and non-efficacy of the drug

d) Either efficacy or non-efficacy of the drug

Correct Answer - A  
Answer- a (efficacy of the drug)

**108. One of the many mechanisms of adverse events is its increased binding to secondary targets, usually proteins. With respect to the primary target, the secondary target:**

a) Should be present in the same tissue as the primary target

b) Should have similar binding sites

c) Should have absolutely identical secondary structure

d) Should have a similar primary structure

Correct Answer - B

Ans. b. Should have similar binding sites (Ref: [www.plosone.org](http://www.plosone.org))

Secondary site compared to the primary site has the same sequence of binding site.

**109. Ritonavir inhibits metabolism of all of the following drugs except:**

a) Amiodarone

b) Phenytoin

c) Cisapride

d) Midazolam

Correct Answer - B

Ans. b. Phenytoin (Ref Goodman Gillman 11th/1302; Katzung 11/e p1144)

- Ritonavir inhibits metabolism of Amiodarone, Cisapride, Midazolam and but not the phenytoin'
- The majority (95%) of phenytoin is metabolized principally in the hepatic endoplasmic reticulum by CYP2C9/10 and to a lesser extent CYP2C9.'

**110. Which of the following injection is available for subcutaneous administration?**

a) Albuterol

b) Terbutaline

c) Metaproteronol

d) Pirbuterol

Correct Answer - B

Ans. b. Terbutaline (Ref KDT 7/e p133, 223, 6/e p127, 323; Katzung 11/e p344, 227)

- Terbutaline can be given by subcutaneous route.
- Terbutaline is adrenergic agonist. Its subcutaneous injection is used in patients with severe exacerbations of asthma.

**111.**

## Vasopressin antagonist acts on which part of the nephron?

a) Proximal convoluted tubule

b) Distal convoluted tubule

c) Cortical collecting tubule

d) Medullary collecting duct

Correct Answer - D

Answer- D (Medullary collecting duct)

'The mechanism by which vasopressin exerts its anti-diuretic effect is activated by V2 receptors and involves the insertion of aquaporin-2 into the apical (luminal) membranes at the principle cells of the collecting duct.'

## 112. Which of the following is true for octreotide?

a) Stimulates growth hormone secretion

b) Used in secretory diarrhea

c) Orally active

d) Contraindicated in acromegaly

Correct Answer - B

Ans. b. Used in secretory diarrhoea (Ref Goodman Gilman 12/e p1338-1339. 1346: **Katling** 11/e p650)

- Octreotide is used in secretory diarrhea
- Octreotide is an octapeptide analog of somatostatin, effective in inhibiting the severe secretory diarrhea brought about by hormone-secreting tumours of the pancreas and the GI tract."

**113. All of the following drugs are correctly matched with their metabolism except:**

a) Digoxin: p-glycoprotein

b) Simvastatin: glucuronidation

c) Verapamil: CYP3A4

d) Carvedilol: CYP2D6

Correct Answer - A

ANSWER: a. Digoxin: p-glycoprotein (Ref Goodman Gilman 12/e 759, 1346; Kat:-g p58-60i

\* P-glycoprotein is not involved in the metabolism of digoxin.

\* "The cytochrome P450 (CYP) isoform CYP3A4 serves as the major pathway for metabolism of lovastatin, simvastatin and atorvastatin.

\* Inhibition of activity of CYP3A4 can increase serum levels of these statins.

\* Glucuronidation is now considered a major pathway for elimination of the active metabolites of statins.

\* The glucuronidation is carried out by UGT1A1 and UGT1A3 enzymes.

**114. A 35-year-old male is put on thiazides for the treatment of primary hypertension. What would be the status of his urinary sodium, potassium and calcium in the first 24-hours of drug administration?**

a) Sodium and potassium increases, calcium increases

b) Sodium and potassium decreases, calcium decreases

c) Sodium and calcium increases, potassium decreases

d) Potassium and calcium increases sodium decreases

Correct Answer - A

Answer: a. Sodium and potassium increases, calcium increases (1(e j..Ciuodnian unman iLe pod,

\* Urinary sodium, potassium and calcium increase in the first 24 hours of thiazide administration.

\* The acute effects of thiazide on  $Ca^{2+}$  excretion is variable:

\* It has been seen in various trials that urinary excretion increases in the initial stages of thiazide diuretic therapy. When administered chronically, thiazide diuretics decrease  $Ca^{2+}$  excretion.

**115. The most recent oral direct thrombin inhibitor (DTI) for acute stroke prevention is:**

a) Ximelagatran

b) Idraparinux

c) Dabigatran

d) Wasfarean

Correct Answer - C

**Ans. c. Dabigatran** (Ref Katzung 11 /e p594)

The most recent oral direct thrombin inhibitor (DTI) for acute stroke prevention is Dabigatran.

"In August 2011, Dabigatran was also licensed for prevention of stroke and systemic embolism in patients with atrial fibrillation by the European authorities, after approval for this indication was received in October 2010 in USA.-

## 116. Chloroquine related eye disease risk is

a) HIV protease

b) HIV reverse transcriptase

c) HIV integrase

d) HIV entry into the cell

Correct Answer - B

Answer: . B. HIV reverse transcriptase >2 years (Ref *Goodman and Gilman 12/e p14051*)

- Chloroquine related eye disease risk is high if duration of treatment is more than 5 years

### **High Risk for Chloroquine**

- Age >60 years° High body fat°
- Duration of treatment >5 years° Liver disease°
- Daily dose >6.5 mg/kg/day of Renal disease°
- 3.0 mg/kg/day of Concomitant retinal disease°

**117.** What is the type of inhibition of acetylcholinesterase caused by organophosphates?

a) Competitive and reversible

b) Noncompetitive and irreversible

c) Uncompetitive and reversible

d) Competitive and irreversible

Correct Answer - D

**Ans: D. Competitive and irreversible**

**Inhibition type:**

- Acetylcholinesterase by organophosphates - Competitive & irreversible.
- Acetylcholinesterase by carbamates - Competitive & reversible.

**MOA:**

- Both bind at esteratic enzyme site by Competitive inhibition.
- Carbamoyl ester - Differs it to reversible & irreversible.

**118. All of the following drugs can cause hearing loss except:**

a) Vancomycin

b) Kanamycin

c) Metronidazole

d) Quinine

Correct Answer - C

Ans: C. Metronidazole

(Ref Goodman Gillman 12/e p1512,1542,1407; Katzung 13/e p802, 12/e p824)

**Drugs causing Ototoxicity**

Antibiotics	Aminoglycosides Vancomycin
Chemotherapeutic drugs	Cisplatin
Diuretics	Ethacrynic acid Furosemide
Others	Quinine Salicylates

**119. Methacholine acts at which receptor?**

a) M1

b) M2

c) M3

d) M4

Correct Answer - B

Ans: B. M2

**Methacholine is an M2 receptor agonist.**

<b>Parameter</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>
Agonists (Relatively selective)	Oxotremorine, MCN-343A	Methacholine	Bethanechol
Antagonists (Relatively selective)	Pirenzepine, Telenzepine	Methoctramine, Tripitramine	Darifenacin, Solifenacin

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For any queries inbox @murtazakuchay

## 120. Nitroglycerin is effective as sublingual medication because it is:

a) Ionic and lipid soluble

b) Ionic and less lipid soluble

c) Nonionic and highly lipid soluble

d) Nonionic and less lipid soluble

Correct Answer - C

**Ans: C. Nonionic and highly lipid soluble**

(Ref Goodman Gillman 12/e p22; KDT 7/e p6)

- Effective as sublingual medication because it is non-ionic and highly lipid soluble.

**Sublingual route of administration:**

- Avoid first pass metabolism, used in emergencies
- Drug should be nonionic having very high lipid solubility°
- Example: Nitroglycerine, Isosorbide dinitrate & Nifedipine

## 121. What is the rationale behind xenobiotic metabolism by CYP enzymes?

a) Increase in water solubility

b) Increase in lipid solubility

c) Conversion to an active metabolite

d) Makes it suitable to evaporate through skin surface.

Correct Answer - A

**Ans: A. Increase in water solubility**

Rationale behind xenobiotics metabolism by CYP enzymes is to increase water solubility.

**Xenobiotic metabolizing enzymes:**

\* Grouped into enzymes effecting phase I & II reactions.

\* Phase I reactions - Include oxidation, reduction, or hydrolytic reactions.

\* Phase II reactions – Catalyzes substrate conjugation (the phase 1 product) with a second molecule.

\* **Phase 1 enzymes à Functional group addition (–OH, –COOH, –SH, –O–, or NH<sub>2</sub>).**

- **Increases water solubility of drug.**

- Dramatically alter biological properties of drug.

- Reactions carried out by phase 1 enzymes à Drug inactivation.

(Ref. Goodman Gillman 12/e p124,125; Katzung 13/e p56, 12/e p53,54).

## 122. Which of the following is a protease inhibitor?

a) Abacavir

b) Nevirapine

c) Saquinavir

d) Enfuvirtide

Correct Answer - C

**Ans: C. Saquinavir**

**Protease inhibitors:**

- Lopinavir, Indinavir, Saquinavir, Nelfinavir, Ritonavir, Amprenavir, Darunavir & Atazanavir (1st line drug).

**Saquinavir:**

- **1<sup>st</sup> first approved HIV protease inhibitor.**
- **A peptidomimetic hydroxyethylamine.**

**Mechanism:**

- Block viral protease enzyme necessary to produce mature virions upon budding from host membrane.

*(Ref Goodman Gillman 12/e p1648; Katzung 13/e p852-853, 12/e p870; KDT 7/e p810)*

## 123. Which of the following diuretic can be given in mild to moderate hypertension?

a) Potassium sparing diuretic

b) Osmotic diuretic

c) Thiazide diuretic

d) Loop diuretic

Correct Answer - C

Ans: C. Thiazide diuretic

### **Thiazide diuretics :**

- Given in mild to moderate hypertension.
- Low-dose thiazide diuretics used alone or in combination with other antihypertensive drugs.
- Safe, efficacious, inexpensive & reduce clinical events.

### **MOA:**

- Inhibits Na/Cl- pump in DCT à Increases sodium excretion.
- In long term - Acts as vasodilators.
- Provide additive blood pressure-lowering effects (On combination with beta blockers, ACE-I, ARBs).

### **Drug of Choice in Hypertension**

<b>Condition</b>	<b>Drug of Choice</b>
Hypertension	Thiazides
Hypertension with BPH	Prazosin
Hypertension with diabetes mellitus	ACE inhibitors
Hypertension with ischemic heart disease (angina)	Beta-blockers
Hypertension with chronic kidney disease	ACE inhibitors
Hypertension in pregnancy	Alpha-methyldopa

Hypertensive emergencies

Nicardipine +  
Esmolol

Hypertensive emergencies in cheese reaction

Phentolamine

Hypertensive emergencies in clonidine  
withdrawal

Phentolamine

Hypertensive emergencies in aortic dissection

Nitroprusside +  
Esmolol

Hypertensive emergencies in pregnancy

Labetalol

- (Ref: Harrison 19/e p1623).

## 124. Which of the following does not act by increasing insulin secretion?

a) Rosiglitazone

b) Rosiglitazone

c) Exenatide

d) Sitagliptin

Correct Answer - A

**Ans: A. Rosiglitazone**

- Rosiglitazone does not act by increasing insulin secretion.

**Rosiglitazone:**

- Oral antihyperglycemic agent.
- Belongs to Thiazolidinediones (Tzds).
- Potent & highly selective agonist for peroxisome proliferator activated receptor gamma (PPAR $\gamma$ )
- PPAR receptors - Found in tissues important for insulin action such as adipose tissue, skeletal muscle & liver (highest level in adipose tissue).

**MOA:**

- Acts primarily by decreasing insulin resistance.
- Decreases insulin resistance in muscles, adipose tissues & liver - By enhancing fatty acids storage & increasing adiponectin levels.
- Results in increased insulin dependent glucose disposal & decreased hepatic glucose output.

*(Ref Harrison 19/e p2057; 18/e, p270, p269,2; Katzung 13/e p738, 12/e p757)*

**125.** Which of the following drugs cause Heterochromia iridis?

a) Latanoprost

b) Prednisolone

c) Timolol

d) Olopatadine

Correct Answer - A

Ans: A. Latanoprost

**Heterochromia of Iris:**

- Congenital anomaly characterized by variations in the iris color.
- Heterochromia iridium: Colour of one iris differs from the other.
- Heterochromia iridis: One sector of the iris differs from the remainder of iris.

**Causes:**

- Waardenburg syndrome.
- Fuch's heterochromic iridocyclitis.
- Horner syndrome.
- Melanosis oculi.
- Drugs: Prostaglandin analogues (Latanoprost)
- Iris melanoma.

**126. All of the following drugs cause amorphous whorl like corneal deposits except:**

a) Chloroquine

b) Amiodarone

c) Indomethacin

d) Chlorpromazine

Correct Answer - D

**Ans: D. Chlorpromazine**

- (Ref Goodman Gillman 12/e p1793; Parsons 22/e p220, 21/e p214).

**Systemic Agents with Ocular Side-effects**

<b>Drugs</b>	<b>Ocular Side-effects</b>
• Amiodarone	• Deposits in the inferior and central cornea in a whorl-like pattern termed verticillata.
• Indomethacin	• Appears as fine tan or brown pigment in the epithelium.
• Atovaquone	
• <b>Chloroquine</b>	• <b>Deposits seldom affect vision</b>
• Hydroxychloroquine	• Deposits disappear slowly if the medication is stopped.
	• Brown pigmentary deposits in the cornea, conjunctiva, and eyelids.
	• Brown pigments generally are found in Descemet's membrane and the posterior cornea. They typically do not affect vision.
• Chlorpromazine	
• Thioridazine	• Ocular deposits generally persist after discontinuation of the medication and can even worse, perhaps because the medication

deposits in the skin are slowly released and accumulate in eye.

## 127. Best antihypertensive drug used in pulmonary hypertension is:

a) Digoxin

b) Furosemide

c) Amlodipine

d) Bosentan

Correct Answer - D

Ans: D. Bosentan

(Ref Harrison 19/e p1659, 18/e p2079)

### Treatment of Pulmonary Arterial Hypertension

Endothelin-  
Receptor  
Antagonists

- Bosentan & ambrisentan are approved for the treatments of
- Bosentan is contraindicated in patients who are on cyclosporine or glyburide concurrently.
- Sildenafil and tadalafil are approved for the treatment of PAH

Phosphodiesterase-  
5 Inhibitors

- MC side effect is headache
- Neither drug should be given to patients who are taking nitro vasodilators.
- Iloprost is approved via inhalation for PAH°.
- Epoprostenol is approved as a chronic IV treatment of PAH.

Prostacyclins

- Treprostinil, an analogue of poprostenol, is approved for PAH and may be given intravenously, subcutaneously, or via inhalation.
- The intravenous prostacyclins have the greatest efficacy as treatments for PAH and are often

Lung  
Transplantation

effective in patients who have failed all other treatments.

- Lung transplantation is considered for patients who, while on an intravenous prostacyclin, continue to manifest right heart failure.

## 128. Which of these drugs is a calcineurin inhibitor?

a) Cyclosporine

b) Methotrexate

c) Azathioprine

d) Mycophenolate mofetil

Correct Answer - A

Ans: A. Cyclosporine

**Cyclosporine:**

- Calcineurin inhibitor.

**MOA:**

- Targets intracellular signaling pathways induced as consequence of T cell–receptor activation.

## 129. Which of the following is an antifibrinolytic agent?

a) Dabigatran

b) Protamine

c) Alteplase

d) Epsilon aminocaproic acid

Correct Answer - D

Ans: D. Epsilon aminocaproic acid

(Ref Goodman Gilman 12/e p867; Katzung 13/e p599-600, 12/e p616; KDT 7/e p628, hie p6081)

### **Epsilon-aminocaproic acid:**

- Synthetic inhibitor of plasmin-plasminogen system.
- Only commercially available & potent antifibrinolytic agent.

**130. At low infusion rates of 3-5 mcg/kg/min, what action is produced by dopamine?**

a) Vasoconstriction

b) Increased renal blood flow

c) Increased cardiac contractility

d) Decreased blood pressure

Correct Answer - B

Ans: B. Increased renal blood flow

(Ref: Goodman Gilman 12/e p355; KDT 7/e p134. 6/e p507)

**Action of dopamine:**

**At low concentrations (2 to 5 mcg/kg per minute):**

- Primarily acts on vascular D1 receptors.
- Mainly renal, mesenteric & coronary beds.
- By activating adenylyl cyclase à raising intracellular cyclic AMP concentrations.
- D1 receptor stimulation à Vasodilation.
- Increases in glomerular filtration rate, renal blood flow & Nat<sup>+</sup> K<sup>+</sup> - ATPase pump.

## 131. Platelet aggregation is blocked by aspirin due to its action on:

a) Prostacyclin

b) PGF 2 alpha

c) Thromboxane A2

d) Phospholipase C

Correct Answer - C

Ans: C. Thromboxane A2

(Ref: Goodman Gilman 12/c n868.- Katzung, 13/c p621. 12/e p638: KDT 7/e p195, 6/e p186. 60('

### **Aspirin MOA:**

- Blocks TxA2 production.
- By acetylating a serine residue near active site of platelet cyclooxygenase-1 (COX-1).

### **COX-1:**

- Enzyme producing cyclic endoperoxide precursor of TxA2.
- Platelets do not synthesize new proteins → Hence aspirin action on platelet COX-1 is permanent, lasting.
- Until platelet life (7-10 days).
- Repeated doses of aspirin produces cumulative effect on platelet function.

### **TxA2 (thromboxane A2):**

- Major cyclooxygenase product in platelets.
- Labile inducer of platelet aggregation.
- Potent vasoconstrictor.

## 132. Phase 1 clinical trial is done for:

a) Drug safety

b) Pharmacodynamics

c) Efficacy

d) Dosing

Correct Answer - A

Ans: A. Drug safety

(Ref Goodman Gilman 12/e p79; .Katzung 13/e p12, 12/e p75; KDT 7/e p63-64, 6/e p77)

- **Safety, pharmacodynamics & dosing - Tested in Phase 1 clinical trial.**
- **Drug safety - Most important primary end point.**

**133. Which of the following drugs acting on dilator pupillae has an action analogous to that of pilocarpine on sphincter papillae?**

a) Timolol

b) Epinephrine

c) Neostigmine

d) Tropicamide

Correct Answer - B

Ans: B. Epinephrine

(Ref Goodman Gilman 12/e p326,. Katzung, 13/e p162, 12/e p160,. KDT 7th/e p153. 6th/e p123).

- Epinephrine acts on dilator pupillae, causing the dilatation of pupil analogous to that of pilocarpine on sphincter papillae.
- Sympathetic stimulation of adrenergic receptors causes the contraction of the radial muscle and subsequent dilation of the pupil.
- Parasympathetic stimulation causes contraction of the circular muscle and constriction of the pupil.

### 134. Which of the following drugs does not affect DNA synthesis?

a) Rifampicin

b) Linezolid

c) Nitrofurantoin

d) Metronidazole

Correct Answer - B

Ans: B. Linezolid

(Ref Goodman Gilman 13/e p796, 12/e p1537; Katzung 12/e p817; KDT 7/e p758, 817, 6/e p669)

- Linezolid inhibits protein synthesis by binding to the P site of the 50S ribosomal subunit and preventing formation of the larger ribosomal-fMet-tRNA complex that initiates protein synthesis.
- Nitrofurantoin - Works by damaging bacterial DNA.
- Metronidazole - Forms toxic free radical metabolites in the bacterial cell that damage DNA.
- Rifampicin - Inhibit DNA-dependent RNA polymerase.

### 135. What does low volume of distribution of a drug mean?

a) Low bioavailability

b) Does not accumulates in tissues

c) Low absorption

d) Not metabolized in the body

Correct Answer - B

Ans: B. Does not accumulates in tissues

(Ref: KDT 7/e p17, 18, 6/e p18)

**Low volume of distribution:**

- Implies that the drug remains confined to the plasma compartment without getting distributed in the body tissues.

## 136. Which of the following drugs is not used in treatment of bird flu?

a) Oseltamivir

b) Ribavirin

c) Zanamivir

d) Peramivir

Correct Answer - B

Ans: B. Ribavirin

(Ref Harrison 19/e p1214; Goodman Gilman 12/e p1609, 1615; Katzung 13/e p861, 12/e p886, 887; KDT 7/e p798, 804, 6/e p777)

### Oral ribavirin:

- Used for chronic HCV infection, not the bird flu.
- Standard treatment for chronic HCV infection - Oral ribavirin combined with injected pegIFN alfa-2A or -2B.

### DOC for bird flu (H5N1).

**Oseltamivir** Treatment of uncomplicated influenza A or B in healthy adults.

**Administered by inhalational route.**

**Zanamivir** Treatment of uncomplicated influenza A or B in healthy adults.

**Peramivir** Administered IV

Activity against both influenza A & B viruses

**Laninamivir** Long acting neuraminidase inhibitor  
Effective against oseltamivir resistant virus

**Amantadine** Active against influenza A only

**Rimantadine** Longer acting than Amantadine, active against influenza A only

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**137. What are the appropriate instructions to be given while prescribing bisphosphonates to a patient:**

a) To be given empty stomach with a glass of water

b) Taken along with food

c) Stop if features of gastritis develop

d) Stop if bone pains occur.

Correct Answer - A

Ans: A. To be given empty stomach with a glass of water

(Ref: Gilman 12/e p1296; Katzung 13/e p754. 12/e p776; KDT 7/e p344, 6/e p334; 19/e p2.

**Esophageal irritation:**

- Minimized by taking the drug with full glass of water and remaining upright for 30 minutes or by using the intravenous forms of these compounds.

**GI side effects:**

- Oral bisphosphonates (including alendronate, ibandronate & risedronate) - Cause heartburn, esophageal irritation /esophagitis.
- Also cause abdominal pain & diarrhea.
- Symptoms often abate when patients take the medication after an overnight fast, with tap or filtered water (not mineral water), and remain upright.

## 138. Absorption of which of the following drugs is increased after a fatty meal?

a) Amphotericin B

b) Griseofulvin

c) Ampicillin

d) Aspirin

Correct Answer - B

Ans: B. Griseofulvin

(Ref: Goodman Gilman 12/e p1585; Katzung 13/e p632, 12/e p855, KUT 7/e p790, 6/e p760)

- The oral administration of a 0.5 g dose of griseofulvin produces peak plasma concentrations of 1µg/mL in 4 hours.
- Improved drug absorption along with a fatty meal.

### Drug Absorption

#### Reduced/Delayed by Food

**Ampicillin**°

**Aspirin**°

**Atenolol**°

**Azithromycin**°

**Captopril**°

Cefaclor

Cephalexin

Ciprofloxacin

Didanosine

**Indinavir**°

**Isoniazida**

Loratidine

Nafcillin

**Penicillin G or V**°

**Phenobarbital**°

**Phenytoin**°

**Rifampin**°

**Sucralfate**°

**Tetracycline**°

**Doxycycline**°

#### Drug Absorption increased by food

**Atovaquone**°

**Carbamazepine**°

**Chlorthiazide**°

**Cefuroxime**°

**Clofazimine**°

**Diazepam**°

**Erythromycin**

**Ganciclovir**°

**Hydrochlorothiazide**°

**Itraconazole**<sup>a</sup>

**Lithium**°

Lovastatin

Methylphenidate

**Metoprolol**°

Nelfinavir

Nitrofurantoin

**Propranolol**°

Propoxyphene

**Ritonavir**°

**Saquinavir**°

**Spirolactone**

**\*Hydralazine**°

### 139. Steroids do not have a role in management of which of these tumors?

a) Kaposi sarcoma

b) Chronic lymphoid leukemia

c) Hodgkin's lymphoma

d) Multiple myeloma Gram-stain, oropharynx

e) PAS, intestine

Correct Answer - A

Ans: A. Kaposi sarcoma

(Ref Harrison 19/e p1270, 716; Goodman Gilman 12/e p1755; Katzung 13/e p954-955, 12/e p706; KDT 7/e p284-285, 6/e p285)

#### **Steroids - Therapeutic uses in cancer:**

- Used as cytotoxic agents in treatment of acute leukemia in children & malignant lymphoma in children & adults.
- Component of curative regimens for Hodgkin's & non-Hodgkin's lymphoma, multiple myeloma & CLL.
- Glucocorticoids - Extremely helpful in controlling autoimmune hemolytic anemia & thrombocytopenia associated with CLL.
- Dexamethasone - Used in conjunction with radiotherapy - Reduces edema related to tumors in critical areas such as superior mediastinum, brain & spinal cords.

**140. Which of these anticonvulsants causes contraction of visual field?**

a) Levetiracetam

b) Phenytoin

c) Vigabatrin

d) Ethosuximide

Correct Answer - C

Ans: C. Vigabatrin

**Vigabatrin:**

- Causes irreversible diffuse atrophy of the retinal nerve fiber layer.
- Most effect on the outer area (as opposed to the macular, or central area) of the retina, leading to the contraction of the visual field.
- Retinal toxicity attributed to taurine depletion.

**141. Which one of the following is a gender-specific side-effect of valproate?**

a) Polycystic ovarian syndrome

b) Alopecia

c) Weight loss

d) Tremor

Correct Answer - A

Ans: A. Polycystic ovarian syndrome

**Side-effects of Valproic Acid**

MC side effects are transient

GI symptoms (anorexia, nausea & vomiting)

Effects on the CNS: Sedation, ataxia & Rash, alopecia Stimulation of appetite & weight gain.

Increase the chance of polycystic ovary syndrome (PCOS) in women with epilepsy or bipolar disorders

Elevation of hepatic transaminases, microvesicular steatosis Acute pancreatitis Hyperammonemia Neural tube defects

**142. Etanercept is a disease-modifying drug used in management of rheumatoid arthritis. What is its mechanism of action?**

a) Inhibition of TNF alpha

b) COX-2 inhibition

c) IL-6 inhibition

d) Stabilization of mast cells

Correct Answer - A

Ans: A. Inhibition of TNF alpha

Gilman 12/e p182; KDT7/e p883, 6/ep205).

**Etanercept:**

- Fusion protein produced by recombinant DNA.
- It fuses the TNF receptor to the constant end of the IgG1 antibody.
- It reduces the effect of naturally present TNF.
- Hence a TNF inhibitor, functioning as a decoy receptor that binds to TNF.

**143. Which of the following drugs is not used in detoxification of chronic alcoholics?**

a) Flumazenil

b) Disulfiram

c) Acamprosate

d) Naltrexone

Correct Answer - A

Ans: A. Flumazenil

(Ref: Goodman Gilman 12/e p468; Kaaung 13/e p3 7 7, 394, 12/e p381, 399; KDT 6/e p385; Harrison 19/e p2727, 8/c 1)2727)

**Flumazenil:**

- GABA<sub>A</sub> receptor antagonist.
- Used intravenously to treat benzodiazepine overdoses.
- Help reverse anesthesia.
- Not used in alcohol detoxification.
- Rest given drugs have a role in alcohol detoxification.

**144. Drug having both alpha and beta agonist property:**

a) Fenoldopam

b) Dopamine

c) Epinephrine

d) Phenylephrine

Correct Answer - C

Answer- C. Epinephrine

- Epinephrine is having both alpha and beta agonist property.
- Adrenaline (Epinephrine) acts on both alpha and beta receptors

**145. Which of the following drugs can be stopped abruptly without any withdrawal symptoms?**

a) Escitalopram

b) Fluoxetine

c) Fluvoxamine

d) Sertraline

Correct Answer - B

Answer- B. Fluoxetine

Fluoxetine has the lowest incidence of discontinuation syndrome among several antidepressants including paroxetine and venlafaxine. The longer half life of fluoxetine will avoid any withdrawal symptoms because this medication effectively tapers itself from the patient's system over a few days.

**146. Ability of body to eliminate the drug from body is called as:**

a) Volume of distribution

b) Clearance

c) Steady state

d) Rate of elimination

Correct Answer - B

Answer- B. Clearance

- Ability of body to eliminate the drug from body is called as Clearance.
- $CL = \text{Rate of elimination}/C$

## 147. Which of the following is true about carbamazepine?

a) Not associated with agranulocytosis

b) Has been known to cause Steven-Johnson's syndrome

c) Causes serious nephrogenic toxicity

d) Drug monitoring is not required

Correct Answer - B

Answer- B. Has been known to cause Steven-Johnson's syndrome

- Carbamazepine has been known to cause Steven-Johnson's syndrome.
- High risk-
  1. Nevirapine
  2. Oxycam (NSAIDs)
  3. Thiacetazone
  4. Allopurinol
  5. Carbamazepine
  6. Lamotrigine

**148. Tricyclic anti-depressants produce side-effects like dry mouth, urinary retention due to action on:**

a) Muscarinic receptors

b) Nicotinic receptors

c) Adrenergic receptors

d) Serotonergic receptors

Correct Answer - A

Answer- A. Muscarinic receptors

- Tricyclic anti-depressants produce side-effects like dry mouth, urinary retention due to action on Muscarinic receptors.
- 'Tricyclic antidepressants have anticholinergic side-effects, acts on muscarinic receptors, manifested as dry mouth, bad taste' constipation, epigastric distress, urinary retention (specially in males with enlarged prostate), blurred vision, palpitation.'

**149. Which of the following anticholinergic agent does not cross the blood brain barrier?**

a) Glycopyrrolate

b) Atropine

c) Hyoscine butylbromide

d) Hyoscine hydrobromide

Correct Answer - D

Answer- D. Hyoscine hydrobromide

- Glycopyrrolate is a synthetic quaternary anticholinergic, which doesn't cross the blood brain barrier and completely lacks central effects.

**150. Compared to unfractionated heparin, Low molecular weight heparin (LMWH) has reliable anticoagulant action because:**

a) It interferes with thrombin and antithrombin III simultaneously

b) It is less protein bound

c) It is given subcutaneously

d) It is cleared by macrophages

Correct Answer - B

Answer- B. It is less protein bound

Compared to unfractionated heparin, Low molecular weight heparin (LMWH) has reliable anticoagulant action because it is less protein bound.

**Indications of LMW heparins:**

- Prophylaxis of DVT and pulmonary embolism in high-risk patients undergoing surgery stroke or other immobilized patients
- Treatment of established DVT
- Unstable angina
- To maintain patency of cannulae and shunts in dialysis patients and in extracorporeal circulation.

**151. Which of the following is a mixed alpha and beta agonist?**

a) Dobutamine

b) Fenoldopam

c) Epinephrine

d) Phenylephrine

Correct Answer - C

Answer- C. Epinephrine

Adrenaline (Epinephrine) acts on both alpha and beta receptors

**152. True statement regarding methadone are all except:**

a) It is a long acting  $\mu$ -receptor agonist

b) It is rapidly absorbed from the gastrointestinal tract and is detected in plasma 30 minutes after oral administration

c) The primary use of methadone is relief of chronic pain

d) The onset of analgesia is 30-60 minutes after parenteral administration and 1-2 hours after oral administration

Correct Answer - D

Answer- D. The onset of analgesia is 30-60 minutes after parenteral administration and 1-2 hours after oral administration

**Methadone:**

- It is a long-acting  $\mu$  opioid receptors agonist with pharmacological properties qualitatively similar to those of morphine.
- Well absorbed from the GI tract and can be detected in plasma within 30 minutes of oral ingestion.
- Primary uses are relief of chronic pain, treatment of opioid abstinence syndrome, and treatment of heroin users.
- Onset of analgesia occurs 10-20 minutes after parenteral administration and 30-60 minutes after oral medication.

**153. Which of the following pair of drugs and its indications is matched incorrectly?**

a) Carbamazepine – (Indication was not mentioned in the exam)

b) Octreotide – treatment of diarrhea associated with vasoactive intestinal peptide tumours

c) Desmopressin – treatment of diabetes insipidus

d) hCG – treatment of infertility in men and women

Correct Answer - A

Answer- A. Carbamazepine – (Indication was not mentioned in the exam)

**Most effective drug for complex partial seizures.**

- Generalized tonic clonic and simple partial seizures
- DOC in Trigeminal neuralgia.
- As an alternative to lithium in manic depressive illness and acute mania.

**154. Which of the following third generation cephalosporin has activity against MRSA (Methicillin Resistant Staphylococcus Aureus)?**

a) Ceftriaxone

b) Ceftobiprole

c) Aztreonam

d) Cephalexin

Correct Answer - B

**Answer- B. Ceftobiprole**

- There is something wrong about this question. No 3rd generation cephalosporin has anti-MRSA activity. Ceftobiprole and ceftaroline, two cephalosporins having anti MRSA activity are 5th generation cephalosporins.
- 'Ceftobiprole is a broad-spectrum cephalosporin with demonstrated in vitro activity against Gram-positive cocci, including methicillin-resistant *Staphylococcus aureus* (MRSA) and methicillin-resistant *S. epidermidis*, penicillin-resistant *S. pneumoniae*, *Enterococcus faecalis*, Gram-negative bacilli including AmpC-producing *Escherichia coli* and *Pseudomonas aeruginosa*, but excluding extended-spectrum beta-lactamase-producing strains.

## 155. Dexmedetomidine is a:

a) Centrally acting alpha-2 agonist

b) Centrally acting alpha-2 antagonist

c) Peripherally acting alpha-2 agonist

d) Peripherally acting alpha-2 antagonist

Correct Answer - A

**Answer- A. Centrally acting alpha-2 agonist**

- 'Dexmedetomidine is an alpha-2 agonist with strong sedative properties. It has a half-life of 2-3 hours and is metabolized
- in the liver and excreted, mainly as metabolites, in the urine.

## 156. Mechanism by which Ach decreases heart rate is by:

a) Delayed diastolic depolarization

b) Increase in plateau

c) Decrease preload

d) Increase afterload

Correct Answer - A

Ans: A. Delayed diastolic depolarization

- Acetyl choline decreases heart rate primarily by inhibiting the spontaneous depolarization of cells in SA node; also known as diastolic depolarization. This is achieved by inhibition of the funny current in the SA node.

### **Effect of acetylcholine on cardiovascular system**

Heart rate decreases	Ach inhibits funny current generation in the pacemaker cells of SA node
AV conduction decreases	Ach blocks L type calcium channels in the AV node
Atrial contraction decreases > ventricular contraction	Atrium is supplied by cholinergic fibers more than the ventricles. Ach opens potassium channels and decreases cyclic AMP in the myocardial cells.
Vasodilation	Ach increases calcium in endothelial cells, which stimulates calcium dependent ENOS and releases NO which causes vasodilation.

## 157. Which is gametocidal for all species:

a) Quinine

b) Chloroquine

c) Primaquine

d) None

Correct Answer - C

Ans: C. Primaquine

Ref: Goodman Gilman's The Pharmacological Basis of Therapeutics  
13<sup>th</sup> edn; Page no. 980, NVBD Guidelines

<b>Drugs</b>	<b>Action</b>
Chloroquine	<ul style="list-style-type: none"><li>• Schizontocidal for all species</li><li>• Gametocidal for PV, PO and PM</li><li>• No action on hypnozoites</li></ul>
Quinine	<ul style="list-style-type: none"><li>• Primary blood schizontocidal</li><li>• Little effect on sporozoite</li><li>• Gametocidal to PV and PM</li></ul>
Artemisinin group	<ul style="list-style-type: none"><li>• Blood schizontocidal</li><li>• Gametocidal action recently described</li></ul>
Mefloquine	<ul style="list-style-type: none"><li>• Strong schizontocidal action against all species</li><li>• Gametocidal against PV, PM and PO</li><li>• Sporontocidal act</li></ul>
Halofantrine	<ul style="list-style-type: none"><li>• Schizontocidal to all species</li><li>• No action on latent tissue form of PV and gametocytes</li></ul>
Atovaquone	<ul style="list-style-type: none"><li>• Blood schizontocidal (Used primarily for MDR PF)</li></ul>
Pyronaridine	<ul style="list-style-type: none"><li>• Schizontocidal for PF, PV and MDR PF</li></ul>

Sulfadoxine -  
Pyrimethamine

- Active against blood schizonts of PF. Less active against other species
- Destroys late hepatic stage and latent forms of PV and PO

Primaquine

- Gametocidal to all species, mainly PF.
- No action on erythrocyte stage of PF, though active

Proguanil

- Weak schizontocidal action against all species.

**158. Which of the following is correct regarding T3 and T4 acting on TRH?**

a) It activates phospholipase A

b) It acts on transcription factor

c) It acts by increasing cAMP

d) It is a tyrosine kinase receptor

Correct Answer - B

Ans: b. It acts on transcription factor

Ref: Goodman Gilman's The Pharmacological Basis of Therapeutics 1.3' edn; Page no. 791

- Thyrotropin releasing hormone (TRH) acts on Gq subtype of receptors on thyrotrope cells in pituitary; this activates protein kinase C which increases synthesis of TSH.
- TSH acts on Gs subtype of receptors on thyroid cells and increases cyclic AMP, which leads to an increase in production of sodium iodide symporter, thyroid peroxidase and thiol endopeptidase. All these are crucial for synthesis and release of T3 and T4.
- T3 and T4 act on thyroid receptors which are nuclear receptors and hence act via modulating the transcription factors.
- Increased T3 and T4 levels decrease release of TSH by decreasing the transcription factors for both TSH and TRH.

### 159. Store a drug in a cool place refers to:

a) Below freezing point of water

b) 0°

c) 2°-4°

d) 8°-15°

Correct Answer - D

Ans: d. 8°-15°

Ref: Vogel Drug Discovery/Page no. 235

#### Drug Storage Temperature

Condition	Temperature
Freezer	-20° to -10°C
Refrigerator	2°-8°C
Cold	Temperature not exceeding 8°C
Cool	8°-15°C
Room temperature	15°-30°C
Warm	30°-40°C
Excessive heat	Above 40°C

**160. A patient requires ceftriaxone 180 mg. You have a 2 ml syringe with 10 divisions per ml. The vial contains 500 mg/5 ml of ceftriaxone. How many divisions in the 2 ml syringe will you fill to give 180 mg ceftriaxone?**

a) 18

b) 1.8

c) 20

d) 2

Correct Answer - A

**Ans. a. 18**

18 divisions in the 2 ml syringe should be filled to give 180 mg ceftriaxone.

**161. A patient of septic shock was given intravenous norepinephrine. The response to this drug is best checked by:**

a) Increase in heart rate

b) Decrease in heart rate

c) Increase in mean arterial pressure

d) Decreased renal perfusion and reduced urine output

Correct Answer - C

**Ans. c. Increase in mean arterial pressure**

Noradrenaline is a powerful peripheral vasoconstrictor and inotrope and used in patients of septic shock and cardiogenic shock.

Noradrenaline causes peripheral vasoconstriction thereby increasing diastolic blood pressure as well as venous return. The increase in diastolic blood pressure and systolic blood pressure can increase mean arterial pressure (MAP) which is the therapeutic outcome expected in any septic shock patient as a response to vasopressor.

**162. A morbidly obese diabetic woman was on failed metformin therapy. She has the history of pancreatitis and family history of bladder cancer. Patient does not want to take injections. Which of the following would be suitable to reduce her glucose levels?**

a) Liraglutide

b) Sitagliptin

c) Canagliflozin

d) Pioglitazone

Correct Answer - C

**Ans. C. Canagliflozin**

Canagliflozin is a Sodium-Glucose Co-Transporter 2 Inhibitor, given orally and reduces body weight. For the given clinical scenario, Canagliflozin is the preferred drug, as Sitagliptin increases the risk of acute pancreatitis, use of pioglitazone is associated with a small increased risk of bladder cancer and Liraglutide is given subcutaneously.

**163. Which of the following is an example of placebo?**

a) Herbal medication with no known effect

b) Physiotherapy

c) Sham surgery

d) Cognitive behavioral therapy

Correct Answer - C

**Ans. C. Sham surgery**

Sham surgery is a faked surgical intervention that omits the step thought to be therapeutically necessary. In clinical trials of surgical intervention, sham surgery is an important scientific control. This is because it isolates the specific effects of the treatment as opposed to the incidental effects caused by anesthesia, the incisional trauma, pre- and post-operative care, and the patients perception of having had a regular operation. Thus, sham surgery serves an analogous purpose to placebo drugs, neutralizing biases such as the placebo effect.

**164. An unknown drug is being tested in experimental setup. The results obtained are given in the table. From these actions, new drug is likely to be:**

Parameter	Placebo treated	New drug treated
Heart rate	72	86
Systolic BP	110	150
Diastolic BP	80	68
Tremors	Absent	Present

a) Beta-1 and beta-2 agonist

b) Alpha-1 antagonist and beta-2 agonist

c) M2 and M3 agonist

d) Alpha-1 and beta-1 agonist

Correct Answer - A

**Ans. A. Beta-1 and beta-2 agonist**

Beta-1 stimulation increases heart rate and systolic blood pressure. Beta-2 stimulation cause vasodilation and thus decreases diastolic blood pressure and tremors. Hence, the drug appears to be beta-1 and beta-2 agonist.

**165. Which of the following instructions should be given to a lactating mother regarding drug usage?**

- a) No advice is required as most of the drugs are secreted negligibly in the milk
- b) Take drugs with longer half-life
- c) Tell her to feed the baby just before next dose
- d) Tell mother to feed when it is least efficacious

Correct Answer - C

**Ans. C. Tell her to feed the baby just before next dose**

Regarding drug usage, lactating mother should be advised to feed the baby just before next dose because least plasma concentration of the drug will just before the next loading dose.

**"Feeding the baby just before the mother takes a drug results in the baby receiving the lowest possible drug concentration. "**

**166. Treatment of choice for a patient with gonococcal as well as non-gonococcal urethritis is:**

a) Ceftriaxone 250 mg IM single dose

b) Cefixime 400 mg oral single dose

c) Ciprofloxacin 500 mg oral single dose

d) Azithromycin 2 gm oral single dose

Correct Answer - D

**Ans. d. Azithromycin 2 gm oral single dose**

Treatment of choice for a patient with gonococcal as well as non-gonococcal urethritis is Azithromycin 2 gm oral single dose.

"Gonococcal Infections: Because co-infection with *C. trachomatis* occurs frequently, initial treatment regimens must also incorporate an agent (e.g., azithromycin or doxycycline) that is effective against chlamydial infection. Pregnant women with gonorrhea, who should not take doxycycline, should receive concurrent treatment with a macrolide antibiotic for possible chlamydial infection. A single 1-g dose of azithromycin, which is effective therapy for uncomplicated chlamydial infections, results in an unacceptably low cure rate (93%) for gonococcal infections and should not be used alone. A single 2-g dose of azithromycin, particularly in the extended-release microsphere formulation, delivers azithromycin to the lower gastrointestinal tract, thereby improving tolerability."

**167. A patient presented with acute exacerbation of bronchial asthma. Salbutamol inhalation didn't improve the condition of the patient. So, intravenous corticosteroids and aminophylline were added and the condition improved. What is the mechanism of action of corticosteroids in this condition?**

a) They cause bronchodilatation when given with xanthines

b) They increase bronchial responsiveness to salbutamol

c) They increase the action of aminophylline on adenosine receptors

d) They increase the mucociliary clearance

Correct Answer - B

**Ans. b. They increase bronchial responsiveness to salbutamol**

- Corticosteroids has a dual effect in acute asthma with an early facilitator effect on airway beta-2 adrenoreceptor sensitivity and a later effect on airway inflammation, which further emphasizes the need for corticosteroids to be administered as early as possible during an acute asthma attack.
- The molecular mechanism of action of corticosteroids involves several effects on the inflammatory process. The major effect of corticosteroids is to switch off the transcription of multiple activated genes that encode inflammatory proteins such as cytokines, chemokines, adhesion molecules, and inflammatory enzymes. This

effect involves several mechanisms, including inhibition of the transcription factor NF- $\kappa$ B, but an important mechanism is recruitment of HDAC2 to the inflammatory gene complex, which reverses the histone acetylation associated with increased gene transcription. Corticosteroids also activate anti-inflammatory genes, such as mitogen-activated protein (MAP) kinase phosphatase-1, and increase the expression of IQ-receptors. Most of the metabolic and endocrine side effects of corticosteroids are also mediated through transcriptional activation.

**168. A healthy volunteer was taken for a blood experiment. A history was taken from the volunteer before the experiment regarding exposure of NSAIDs, which he specifically denied. But on testing, the BT was found to be increased All of the following can be causative agent except:**

a) Theophylline

b) Cephalosporin

c) Anti-depressants

d) Multivitamins containing Vitamin K

Correct Answer - D

**Ans: D. Multivitamins containing Vitamin K**

(Ref. Goodman Gilman 12/e p1043, 1499; Katzung 13/e p1145)

- Routine use of multivitamins with Vitamin K doesn't cause thrombocytopenia.

**Vitamin K:**

- Used as Warfarin antidote (anticoagulant) excess.

**Drug-induced immune thrombocytopenia (DITP):**

- In acute thrombocytopenia patients.

**Most Common Causes of DITP**

**Antiplatelet** • Abciximab, Eptifibatide, Tirofiban

**Analgesics** • Acetaminophen, Ibuprofen, Naproxen

**Antibiotic** • Ampicillin, Piperacillin, Ethambutol, Cephalosporins

**Drugs acting on CNS** • Carbamazepine, Haloperidol, Phenytoin, Antidepressants

**Anti-Cancer** • Irinotecan, Oxaliplatin (selective thrombocytopenia apart from pancytopenia)

**169. Which of the following drugs can be given in renal failure safely?**

a) Saxagliptin

b) Linagliptin

c) Vildagliptin

d) Sitagliptin

Correct Answer - B

**Ans: B. Linagliptin**

(Ref Goodman Gilman 12/e p1264; Katzung 13/e p740, 12/e p761; FDA website: [http://www.fda.gov/Safety/MedWatch/SafetyInformation/ircm3 I 9215.htm](http://www.fda.gov/Safety/MedWatch/SafetyInformation/ircm3%209215.htm))

**Linagliptin:**

- Given safely in renal failure.
- **Chronic kidney disease:**
- Major complication in type 2 diabetes.
- Metformin usage is challenging.
- More severe renal disease → Less likely for metformin use.
- Due to safety concerns.

**170. Metformin causes | severe, sometimes life-threatening side effect of lactic acidosis. All of the following factors increase the risk of lactic acidosis except:**

a) Advanced age

b) Smoking

c) Liver dysfunction

d) Renal failure

Correct Answer - B

**Ans: B. Smoking**

(Ref Goodman Gilman 12/e p1259; Katzung I 3/e p736-737, 12/e p75)

- Smoking does not increase lactic acidosis risk in patients taking metformin.

**Lactic acidosis & metformin:**

- Metformin use in patients with concurrent conditions with poor tissue perfusion (sepsis, myocardial infarction, CHF & renal failure).
- Decreased GFR → Increases plasma metformin levels → By reducing drug clearance from circulation.

**Metformin – Contraindications**

- Severe pulmonary disease.
- Decompensated heart failure.
- Severe liver disease
- Chronic alcohol abuse.
- Renal disease.

- Conditions predisposing to tissue anoxia (e.g., chronic cardiopulmonary dysfunction) – Due to increased lactic acidosis risk.

**171. Drug advertisement letter is a necessary component of each drug formulation and contains various information about the drug like drug dosing, frequency and half-life. Which of the following information need not be given in the drug advertisement letter?**

a) Research papers and other articles proving efficacy of the drug

b) Date of expiry of the drug

c) Rare, but serious life threatening adverse-effects

d) Common, not so serious adverse-effects

Correct Answer - B

**Ans: B. Date of expiry of the drug**

(Ref Goodman Gilman 12/e p1883; Manual of Experimental and Clinical Pharmacology/p 345).

- Date of drug expiry need not to be given in drug advertisement letter.  
**Regulated according to The Federal Food, Drug, and Cosmetic Act.**
  - Amended (Food and Drug Administration Modernization Act of 1997).
  - Permits use of print & television advertising for prescription drugs.
- Drug advertisements:**
- Contain summary information relating to side effects, contraindications & effectiveness.
- Current advertising regulations:**

- Specify that this information disclosure needs to include all risk information in a product's approved labeling or must direct consumers to healthcare professionals to obtain this information.  
**Print advertisements:**
- Include reprinting of risk-related sections of product's approved labeling (package insert).  
**Television advertising:**
- Not includes reprinting of risk-related.  
**Note:**
- Advertisements cannot be false **or misleading or omit material facts.**
- Must present fair balance between effectiveness & risk information.

**172. All of the following are potentially serious side effects of thioamide group of antithyroid drugs except:**

a) Hepatic dysfunction

b) Severe rash

c) Agranulocytosis

d) Anaphylaxis

Correct Answer - D

**Ans: D. Anaphylaxis**

(Ref. Goodman Gilman 12/e p1149; Katzung 13/e p671, 12/e p688)

**Adverse effects of anti-thyroid drugs:**

- Most serious reaction: Agranulocytosis
- MC reaction: Mild, purpuric, urticarial papular rash.
- Less frequent complications: Pain & stiffness in joints, paresthesias, headache, skin pigmentation & loss of hair.
- ANCAs in ~50% of patients receiving propylthiouracil.
- Cholestatic jaundice - More common with methimazole than propylthiouracil.
- Propylthiouracil-associated hepatic failure.

**173. Which of the following correctly represents the sequence of the rate of topical drug absorption?**

a) Postauricular skin > scalp > scrotum > dorsal aspect of hand > sole

b) Postauricular skin > scrotum > scalp > dorsal aspect of hand > sole

c) Scalp > scrotum > postauricular skin > dorsal aspect of hand > sole

d) Scrotum > scalp > postauricular skin > dorsal aspect of hand > sole

Correct Answer - B

**Ans: B. Postauricular skin > scrotum > scalp > dorsal aspect of hand > sole**

(Ref Goodman Gilman 12/e p22, 1803, 1806).

- Correct sequence of systemic absorption via transdermal drug application:
  - Postauricular skin > scrotum > scalp > dorsal aspect of hand > sole .
- Rate of absorption:**
- Ranking order from fastest to slowest:**
- Postauricular skin > Scrotum > Abdomen > Scalp > Forearm > Palm = under surface of foot.
- Cause:**
- Differences due a combination of skin thickness, hair follicles, density of skin capillaries, lipid content & degree of skin hydration.

**174. Which of the following sites is least commonly preferred for insulin injection?**

a) Anterior thigh

b) Lateral thigh

c) Dorsum of arm

d) Around umbilicus

Correct Answer - B

**Ans: B. Lateral thigh**

(Ref Goodman Gilman 12/e p1252)

**Insulin injection:**

- Usually injected into subcutaneous tissues of abdomen, buttock, anterior thigh, or dorsal arm.
- Absorption most rapid from abdominal wall, followed by arm, buttock & thigh.

## 175. Which of the following is not true for rifabutin as compared to rifampicin?

a) Rifabutin has the longer half-life than rifampicin

b) Rifabutin has lesser incidence of drug-interactions

c) Rifabutin is more efficacious against MAC as compared to rifampicin

d) Rifabutin is more efficacious for pulmonary TB as compared to rifampicin

Correct Answer - D

**Ans: D. Rifabutin is more efficacious for pulmonary TB as compared to rifampicin**

(Ref Goodman Gilman 12/e p1550, 1552, 1554, 1568; Katzung 12/e p845)

**Rifabutin:**

- Stronger activity against Mycobacterium avium complex (compared to rifampicin).
- Ineffective against Mycobacterium tuberculosis.

	Rifabutin	Rifampicin (Rifampin)	Rifapentine
Protein binding	71	85	97
Oral	20	68°	-
t <sub>max</sub> (hours)	2.5-4.0	1.5-2.0	5.0-6.0°
Half-life (hours)	32-67°	2-5°	14-18
Intracellular/extracellular	9	5	24-60°
Autoinduction	40%°	38%	20%
CYP3A induction	Weak	Pronounced	Moderate
CYP3A substrate	Yes°	No	No



## 176. Which of the following is not used in osteoporosis?

a) Milnacipran

b) PTH

c) Strontium ranelate

d) Denosumab

Correct Answer - A

**Ans: A. Milnacipran**

(Ref. Goodman Gilman 12/e p1299; Katzung 13/e p761-762, 12/e p775; Harrison 19/e p2493, 18/c' p3120; Apley 9/e p /3 I-133)

**Milnacipran:**

- Serotonin–norepinephrine reuptake inhibitor (SNRI).
- Approved for treatment of pain in fibromyalgia, not in osteoporosis.

### Drugs useful in Osteoporosis

- | Inhibit Bone Resorption   | Stimulates Bone  | Both action               |
|---|--|---------------------------|
| <ul style="list-style-type: none"><li>• Bisphosphonates: Alendronate, risedronate &amp; etidronate</li><li>• Calcium receptor agonist: Cinacalcet</li><li>• Calcitonin</li><li>• SERMs: Tamoxifen, raloxifene</li><li>• Gallium nitrate</li><li>• RANKL inhibitors: Denosumab</li></ul> | <ul style="list-style-type: none"><li>• Teriparatide</li><li>• Calcium</li><li>• Calcitriol</li><li>• Fluoride</li></ul> | <p>Strontium ranelate</p> |

**177. Pigmentation of nail is caused by all of these drugs except:**

a) Cyclophosphamide

b) Chlorpromazine

c) Chloroquine

d) Amiodarone

Correct Answer - D

**Ans: D. Amiodarone**

(Ref: KDT 7/e p534)

**Amiodarone:**

- Cause corneal deposits.
- Not causes nail pigmentation.

**Causes of Melanonychia or Nail Pigmentation**

- Phenothiazines like
- Chloroquine
- Minocycline
- Arsenic
- Clofazimine
- Clomipramine
- Cyclophosphamid
- Fluconazole
- Fluoride
- Gold salts
- Ibuprofen
- Ketoconazole
- Lamivudine
- Mercury
- Phenytoin
- Psoralen
- Roxithromyci
- Steroids
- Sulfonamide
- Tetracycline
- Thallium
- Timolo
- Zidovudine

**178. Digoxin is obtained from a plant product and has a half-life of 36 hours. How does this information help us in formulating treatment?**

a) To adjust maintenance dose of digoxin required to keep the blood levels within therapeutic range

b) Intravenous administration in emergency and urgent dosing

c) Long half-life permits alternate day dosing

d) It requires a high loading dose to be administered

Correct Answer - A

**Ans: A. To adjust maintenance dose of digoxin required to keep the blood levels within therapeutic range**

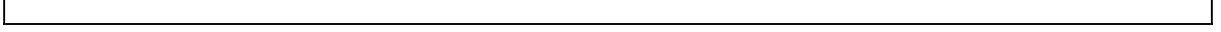
(Ref Goodman Gilman 12/e p33. 37: KDT 7/e p31, 515)

**Half- life of drug:**

- Determines the maintenance dose of digoxin.
- Helps maintain therapeutic plasma levels.
- Maintenance dose also determined by creatinine clearance.

**Half-life of dioxin:**

- 36 to 48 hrs in patients with normal renal function.
- 3.5 to 5 days in anuric patients.
- In patients with normal renal function, an oral daily maintenance dose without loading dose → steady-state blood concentration in approximately 7 days.
- Hence daily maintenance dose decided based on half-life of the drug.
- Usual digoxin therapeutic serum concentrations range - 0.8 to 2 ng/mL.
- (Note: Loading dose governed by volume of distribution).



## 179. CYP50 inhibition is least by:

a) Pantoprazole

b) Rabeprazole

c) Lansoprazole

d) Omeprazole

Correct Answer - B

**Ans: B. Rabeprazole**

(Ref: Goodman Gilman 12/e p1990; Katzung131e p1060, 12/e p1089; KDT 7/e p653).

**Rabeprazole:**

- Exclusively metabolized by CYP2C19 and does not cause any inhibition of CYP450.
- Highest efficacy.
- Lansoprazole - Most potent.
- Rabeprazole & pantoprazole have no significant drug interactions.
- The FDA has issued a warning about a potentially important adverse interaction between clopidogrel and proton pump inhibitors.
- Proton pump inhibitors should be prescribed to patients taking clopidogrel only if they have an increased risk of gastrointestinal bleeding or require them for chronic gastro-esophageal reflux or peptic ulcer disease, in which case agents with minimal CYP2C19 inhibition (pantoprazole or rabeprazole) are preferred

**180. Black deposits on conjunctiva in a patient with glaucoma are seen with the use of:**

a) Prostaglandins

b) Carbonic anhydrase inhibitors

c) Epinephrine

d) Beta blocker

Correct Answer - C

**Ans: C. Epinephrine**

(Ref: Goodman Gilman 12/e p286, 326; Katzung 13/e p161, 12/e p160; The Cornea by Smolin and Thoft's/p504)

- Black deposits on conjunctiva in a patient with glaucoma are seen with use of epinephrine. Latanoprost is associated with iris hyperpigmentation.
- Epinephrine is unstable in alkaline solution; when exposed to air or light, it turns pink from oxidation to adrenochrome and then brown from formation of polymers.

**181. All of these are G2 phase blockers  
except:**

a) Etoposide

b) Topotecan

c) Paclitaxel

d) Daunorubicin

Correct Answer - C

**Ans: C. Paclitaxel**

(Ref: Goodman Gilman 121e p1708; Katzung 13/e p932, 121e p963; KDT 7/e p865)

**Paclitaxel:**

- Taxane, which act by causing disruption of the cell's microtubule function by stabilizing microtubule formation.
- Acts on the M-phase of cell division.
- Binds specifically to the  $\beta$ -tubulin subunit of microtubules and antagonizes the disassembly of this key cytoskeletal protein, with the result that bundles of micro-tubules and aberrant structures derived from microtubules appear in the mitotic phase of the cell cycle.
- Arrest in mitosis follows.

## 182. L-asparaginase is used in the treatment of:

a) AML

b) ALL

c) CML

d) CLL

Correct Answer - B

**Ans: B. ALL**

(Ref: Goodman Cilrmm 12/c p1720; Katzung 13le p938-939, 12/e p968; KDT 7le p868).

\* Asparaginase (L-asparagine amidohydrolase) is an enzyme used to treat childhood ALL

\* Drug is isolated and purified from *Escherichia coli* or *Erwinia chrysanthemi* for clinical use.

- It hydrolyzes circulating L-asparagine to aspartic acid and ammonia.

- Because tumor cells in ALL lack asparagine synthetase, they require an exogenous source of L-asparagine.

- Thus, depletion of L-asparagine results in effective inhibition of protein synthesis.

\* In contrast, normal cells can synthesize L-asparagine and thus are less susceptible to the cytotoxic action of asparaginase.

### 183. All are Gp IIb/IIIa inhibitors except:

a) Prasugrel

b) Abciximab

c) Tirofiban

d) Eptifibatide

Correct Answer - A

**Ans: A. Prasugrel**

(Ref Goodman Gilman 13/e p595, 12/e p870; Katzung 13/e p595, 12/e p612; KDT 7/e p631)

- Prasugrel reduce platelet aggregation by inhibiting the ADP pathway of platelets. It irreversibly blocks the ADP receptor on platelets.
- Targets for platelet inhibitory drugs:**
- Inhibition of prostaglandin synthesis (aspirin).
  - Inhibition of ADP- induced platelet aggregation (clopidogrel, prasugrel, ticlopidine).
  - Blockade of glycoprotein IIb/IIIa receptors on platelets (abciximab, tirofiban, and eptifibatide). Dipyridamole & cilostazol - Additional antiplatelet drugs.

## 184. Angiotensin receptor blocker (ARB) with PPARgamma function as well is:

a) Olmesartan

b) Candesartan

c) Telmisartan

d) Eprosartan

Correct Answer - C

**Ans: C. Telmisartan**

(Ref: Yamagishi S, Takeuchi M. Telmisartan is a promising cardiometabolic sartin due to its unique PPAR-gamma-inducing property. Med Hypotheses. 2005;64(3):476-8)

- **Angiotensin receptor blocker (ARB) with PPAR-gamma function as well is telmisartan.**

**Telmisartan:**

- Act as a partial agonist of peroxisome proliferator-activated receptor-gamma (PPAR-gamma).
- Due to its unique PPAR-gamma-modulating activity, telmisartan is a promising 'cardiometabolic sartin', that targets both diabetes and CVD in hypertensive patients.
- The binding affinity to PPAR-gamma is highest for telmisartan followed by lisinopril and valsartan.

## 185. Ganglionic transmission is mediated by:

a) Presynaptic alpha-receptors

b) Postsynaptic beta-receptors

c) Postsynaptic dopaminergic receptors

d) Postsynaptic nicotinic receptors

Correct Answer - D

**Ans: D .Postsynaptic nicotinic receptors**

(Ref: Goodman Gilman 13/e p108, 12/e p255; Katzung 13/e p108, 12/e p98).

- Ganglionic transmission is mediated by nicotinic receptors present post-synaptically.
- Nicotinic acetylcholine (ACh) receptor mediates neurotransmission post-synaptically at the neuromuscular junction and peripheral autonomic ganglia.
- In CNS, controls release of neurotransmitters from presynaptic sites.
- The receptor is called the nicotinic acetylcholine receptor – Due to both alkaloid nicotine & neurotransmitter ACh can stimulate the receptor.

**186. Among the following properties of dopamine, which of them is not helpful in acute shock?**

a) Alpha-1 agonist action leading to peripheral vasoconstriction

b) Increase in renal perfusion due to agonist action on D1 receptors

c) Releases noradrenaline and causes positive inotropic effect

d) Direct action on heart via beta-1 receptors

Correct Answer - B

**Ans: B. Increase in renal perfusion due to agonist action on D1 receptors**

(Ref: Goodman Gilman 13le p1062, 12/e p355; KDT 71e p134, 6le p507)

- Dopamine at low concentrations (2 to 5 mug/kg per minute) primarily acts on vascular D<sub>1</sub> receptors, especially in the renal, mesenteric, and coronary beds.
- Increased renal perfusion caused by dopamine due to D<sub>1</sub> agonism (at low doses) doesn't improve survival in acute shock.

## 187. Antiemetic action is due to which property of metoclopramide?

a) 5-HT<sub>3</sub> antagonist

b) D<sub>2</sub> antagonist

c) 5-HT<sub>4</sub> agonist

d) M<sub>3</sub> antagonist

Correct Answer - B

**Ans: B. D<sub>2</sub> antagonist**

(Ref: Goodman Gilman 12/e p1325; Katzung 13/e p1062, 12/e 0092; KDT 7/e p665).

**Metoclopramide:**

- Dopamine D<sub>2</sub> receptor antagonist.
- Mixed 5-HT<sub>3</sub> receptor antagonist & 5-HT<sub>4</sub> receptor agonist.
- Antiemetic action due to its antagonist activity at D<sub>2</sub> receptors in the chemoreceptor trigger zone in the central nervous system-this action prevents nausea & vomiting triggered by most stimuli.
- At higher doses, 5-HT<sub>3</sub> antagonist activity may also contribute to the antiemetic effect.

**188. In the management of anaphylaxis, which action of adrenaline is not observed?**

a) Bronchodilation by beta-receptors

b) Cardiovascular effects of beta-receptors

c) Action on blood vessels by alpha-receptors

d) Action on presynaptic alpha-receptors

Correct Answer - D

**Ans: D. Action on presynaptic alpha-receptors**

(Ref: Goodman Gilman 12/e p209, 302, 308)

- Activation of presynaptic  $\alpha_2$  receptors inhibits the release of NE and other co-transmitters from peripheral sympathetic nerve endings.
- Activation of  $\alpha_2$  receptors in the pontomedullary region of the CNS inhibits sympathetic nervous system activity and leads to a fall in blood pressure.
- Action on presynaptic alpha-receptors ( $\alpha_2$  receptors) is not helpful in management of anaphylactic shock.

## 189. Which of these statements depicts vasomotor reversal of Dale?

a) Propranolol followed by adrenaline

b) Propranolol followed by noradrenaline

c) Decrease in heart rate on adrenaline administration after phentolamine has been given

d) Noradrenaline followed by propranolol

Correct Answer - C

Ans: C. Decrease in heart rate on adrenaline administration after phentolamine has been given

(Ref: KDT 7/e e p131, 140).

- This was first demonstrated by Sir HH Dale (1913) and is called vasomotor reversal of Dale.
- Blockade of vasoconstrictor alpha-1 (also alpha-2) receptors reduces peripheral resistance and causes pooling of blood in capacitance vessels → venous return and cardiac output are reduced → Fall in BP.
- Postural reflex is interfered with → marked hypotension occurs on standing → dizziness and syncope. Hypovolemia accentuates the hypotension.
- Decrease in heart rate on adrenaline administration after phentolamine has been given depicts vasomotor reversal of Dale.
- The alpha-blocker abolishes the pressor action of adrenaline (injected IV in animals), which then produces only fall in BP due to beta-2 mediated vasodilatation.

## 190. Which of these drugs is an antidote for fibrinolytic therapy?

a) Epsilon aminocaproic acid

b) Protamine

c) Heparin

d) Streptokinase

Correct Answer - A

### **Answer- A. Epsilon aminocaproic acid**

- Epsilon aminocaproic acid is an antidote for fibrinolytic therapy. Epsilon-aminocaproic acid is a synthetic inhibitor of the
- plasmin-plasminogen system. It is the only potent antifibrinolytic agent, which is commercially available.
- "Aminocaproic acid is a lysine analog that competes for lysine binding sites on plasminogen and plasmin, blocking the
- interaction of plasmin with fibrin.
- Fibrinolytic overdose - Epsilon Amino Caproic Acid (EACA)

**191. A drug X was given continuous intravenous infusion at 1.6 mg/min. The clearance of the drug is 640 mL/min. With a half-life of 1.8 hours, what would be the steady state plasma concentration of drug?**

a) 0.002 mg/mL

b) 0.004 trig/mL

c) 2.88 mg/mL

d) 3.55 mg/mL

Correct Answer - A

**Answer- A. 0.002 mg/mL**

C<sub>pss</sub> is directly proportional to the dose rate & inversely proportional to the clearance of drug.

- C<sub>pss</sub> = Dose rate/clearance
- Dose rate= 1.6 mgiml; Clearance= 640 ml/min
- C<sub>pss</sub> = 1.6/640 = 0.0025 mg/ml = 0.002 mg/ml

## 192. Lente insulin is composed of:

a) 30% Amorphous + 70% Crystalline insulin

b) 30% Crystalline + 70% Amorphous insulin

c) Same as NPH insulin

d) Only 70% amorphous insulin

Correct Answer - A

**Answer- A. 30% Amorphous + 70% Crystalline insulin**

Lente insulin is a 7:3 mixture of long acting ultralente (crystalline) and short-acting semilente (amorphous) insulin zinc

- suspension.
- Long Acting
- Insulin glargine
- Insulin detemir
- Insulin degludec
- Protamine zinc insulin

### 193. Storage of drug in the tissues is suggested by:

a) Large volume of distribution

b) Small volume of distribution

c) Excretion in urine

d) Excretion in saliva

Correct Answer - A

#### **Answer- A. Large volume of distribution**

- Volume of distribution ( $V_D$ ) is the theoretical volume that would be necessary to contain the total amount of an administered drug at the same concentration, which is observed in the blood plasma.
- The  $V_D$  of a drug represents the degree to which a drug is distributed in body tissue rather than the plasma.
- $V_D$  is directly correlated with the amount of drug distributed into tissue; a higher  $V_D$  indicates a greater amount of tissue distribution.
- A  $V_D$  greater than the total volume of body water (approximately 42 liters in humans) is possible, and would indicate that the drug is highly distributed into tissue

**194. Which of the following disease modifying anti-rheumatoid drugs acts by increasing extracellular adenosine?**

a) Leflunomide

b) Hydroxychloroquine

c) Azathioprine

d) Methotrexate

Correct Answer - D

**Answer-D. Methotrexate**

- "Methotrexate is the DMARD of choice for the treatment of RA and is the anchor drug for most combination therapies.
- At the dosages used for the treatment of RA, methotrexate has been shown to stimulate adenosine release from cells, producing an anti-inflammatory effect.
- Methotrexate (MTX) is a folic acid analog that binds with high affinity to the active catalytic site of dihydrofolate reductase (DHFR).

**195. A 70 years old hypertensive patient with stage 5 chronic kidney disease was diagnosed recently with Type 2 diabetes mellitus. He doesn't want to take injectable insulin. Which of the following oral hypoglycemic agents will be preferred in this patient, which won't require any renal dose modification?**

a) Linagliptin

b) Repaglinide

c) Vildagliptin

d) Glimepiride

Correct Answer - A

**Answer- A. Linagliptin**

linagliptin has the ability to be safely dosed in chronic kidney disease patients. Chronic kidney disease is a major complication in type 2 diabetes

Linagliptin .No dose required linagliptin for patients with renal impairment

**196. A patient is administered 200 mg of a drug. 75 mg of the drug is eliminated from the body in 90 minutes. If the drug follows first order kinetics, how much drug will remain after 6 hours?**

a) 12.5 mg

b) 25 mg

c) 30 mg

d) 50 mg

Correct Answer - C

**Answer- C. 30 mg**

Drug remains in the body at the end of 4th 90 minutes (6 hours) :

$48.7 - 18.3 = 30.4$  (Approx. 30 mg)

## 197. Mechanism of action of Oseltamivir (Tamiflu) as an antiviral agent is:

- a) Inhibition of M2 receptor
- b) Neuraminidase inhibition
- c) Inhibition of RNA dependent DNA polymerase
- d) Apoptosis of infected cells

Correct Answer - B

### **Answer- B. Neuraminidase inhibition**

The neuraminidase inhibitors oseltamivir and zanamivir, analogs of sialic acid, interfere with release of progeny influenza virus from infected host cells, thus halting the spread of infection within the respiratory tract. These agents competitively and reversibly interact with the active enzyme site to inhibit viral neuraminidase activity at low nanomolar concentrations.

**198. Which of the following is a bactericidal drug against Mycobacterium leprae?**

a) Erythromycin

b) Ofloxacin

c) Cotrimoxazole

d) Amoxicillin

Correct Answer - B

**Answer- B. Ofloxacin**

Ofloxacin Over 99.9% bacilli were found to be killed by 22 daily doses of ofloxacin monotherapy

## 199. Mechanism of action of protease inhibitors is:

- a) Inhibition of translation
- b) Inhibition of assembly of viral proteins
- c) Inhibition of proviral RNA synthesis
- d) Inhibition of conversion of RNA to DNA

Correct Answer - B

### **Answer- B. Inhibition of assembly of viral proteins**

"Protease Inhibitors: These drugs prevent proteolytic cleavage of HIV gag and pol precursor polypeptides that include essential structural (p17, p24, p9, and p7) and enzymatic (reverse transcriptase, protease, and integrase) components of the virus. This prevents the metamorphosis of HIV virus particles into their mature infectious form-" - Goodman Gilman

**200. Idiosyncratic side-effects of carbamazepine are all except:**

a) Steven-Johnson syndrome

b) Agranulocytosis

c) Rash

d) Blurred vision

Correct Answer - D

**Answer- D. Blurred vision**

Diplopia (not the blurring of vision) is a dose related side effect of carbamazepine, while others are idiosyncratic, reactions.

"The most common dose-related adverse effects of carbamazepine are diplopia and ataxia. The diplopia often occurs first and may last less than an hour during a particular time of day

## 201. Which of the following drugs is a P-glycoprotein inducer?

a) Azithromycin

b) Ketoconazole

c) Itraconazole

d) Rifampicin

Correct Answer - D

### **Answer- D. Rifampicin**

Rifampicin induces the isoenzymes CYP3A4, 2C8, 2C9, 2C19, 286, and the transporter P-glycoprotein. When coadministered with drugs that are substrates of the same enzymes, their metabolism may be accelerated resulting in lower concentration and less efficacy.

### **Inducer-**

- Amprenavir
- Clotrimazole
- Dexamethasone
- Indinavir
- Morphine
- Nelfinavir
- Phenothiazine
- Retinoic acid
- Rifampin
- Ritonavir
- Saquinavir
- St John's wort

**202. What drug is used for prophylaxis against *Pneumocystis jirovecii* in patients on chemotherapy?**

a) Cotrimoxazole

b) Amoxicillin

c) Dexamethasone

d) Cephalosporin

Correct Answer - A

**Answer- A. Cotrimoxazole**

Drug of choice for prophylaxis and treatment of pneumocystis infection in both immunocompetent as well as immunocompromised is cotrimoxazole.

Cyclospora, Isospora & *Pneumocystis jirovecii* - Cotrimoxazole

**203. Patient is a known case of epilepsy, taking levetiracetam 1 gm BD. He is now seizure free from 2 years but he developed agitation and anger issues interfering with day to day activities as a result of the drug intake. What should be the next best step?**

- a) Stop levetiracetam and start on a different antiepileptic
- b) Discontinue the drug as he is seizure free
- c) Slowly taper the drug over next 6 months
- d) Continue levetiracetam since a 5-year seizure free interval is needed

Correct Answer - C

**Answer- C. Slowly taper the drug over next 6 months**

Stopping or switching an antiepileptic is based on seizure free period & compliance or adverse effects of the drug.

Withdrawal of therapy should be gradual over 2-3 months, in the question 6 months. Anti-epileptic drug therapy should never be stopped abruptly. Even if new drug is to be added/replaced, the previous drug should be gradually stopped otherwise it can lead to breakthrough seizures.

**204. In an animal model, the phenomenon of vasomotor reversal of dale can be demonstrated by:**

a) Stimulation of alpha-1 followed by stimulation of beta-2

b) Block of alpha-1 followed by stimulation of beta-2

c) Stimulation of alpha-1 followed by block of beta-2

d) Stimulation of beta-1 receptor followed by block of beta-2 receptor

Correct Answer - B

**Answer- B. Block of alpha-1 followed by stimulation of beta-2**

In an animal model, the phenomenon of vasomotor reversal of dale can be demonstrated by block of alpha-1 followed by stimulation of beta-2.

**205. A 50-year-old male has fever for the past 1-week with abdominal distention and loss of appetite. It is not responding to antibiotics and antiparasitics. Widal test is negative but RK39 dipstick test is positive.**

**Which of the following drugs can be used in the above patient?**

a) Bedaquiline

b) Linezolid

c) Fluconazole

d) Liposomal Amphotericin B

Correct Answer - D

Ans: D. Liposomal Amphotericin B

Ref *Katzung, 13th ed, Pg. 901-902*

- RK39 dipstick test is a rapid immunochromatographic test being widely used in the diagnosis of visceral leishmaniasis.
- Out of the given options Liposomal Amphotericin B is the only drug which is used to treat visceral leishmaniasis.

**206. Which of the following antifungal drug is developing drug resistance and has not been prescribed for tinea cruris and tinea corporis for the last 2 years?**

a) Griseofulvin

b) Terbinafine

c) Itraconazole

d) Voriconazole

Correct Answer - A

Ans: A. Griseofulvin

Ref: *Katzung, 13<sup>th</sup>ed., pg.832 and*

*<https://www.ncbi.nlm.nih.gov/pmc/articles/>*

*\* PMC4804599/*

\* Among various options, topical terbinafine for 4 weeks appears to be the treatment of choice for limited disease (tinea corporis/cruris/pedis).

- For more extensive disease, the choice is less clear.

\* It is also effective orally.

\* Both terbinafine (250 500 mg/day tbr 2 6 weeks) and itraconazole (100- 200 mg/day for 24 weeks) appear to be effective.

\* Voriconazole is also an effective drug for these conditions.

**207. Which of the following gives the rate of drug absorption in plasma concentration graph?**

a) T<sub>max</sub> and C<sub>max</sub>

b) Area under the curve

c) T<sub>max</sub> alone

d) C<sub>max</sub> alone

Correct Answer - A

Ans: A. T<sub>max</sub> and C<sub>max</sub>

Ref: *Sharma & Sharma's Principles of Pharmacology, 7<sup>th</sup> ed., pg. 30-31 and <http://www.europeanreview.org/wp/wp-content/uploads/6.pdf>.*

- From the plasma concentration graph, we obtain three important parameters
- C<sub>max</sub> is the peak plasma concentration
- T<sub>max</sub> i.e. time to attain the peak plasma concentration or C<sub>max</sub>
- AUC (Area under the curve) of plasma concentration time graph
- The 1<sup>st</sup> two parameters i.e. C<sub>max</sub> and the T<sub>max</sub> are the indicators of the rate of absorption.

**208. From which of the following routes, bioavailability of the drug is likely to be 100 percent?**

a) Subcutaneous

b) Intravenous

c) Intramuscular

d) Intradermal

Correct Answer - B

Ans: B. Intravenous

*Ref: Lippincott, 6th ed., pg. 3-4 and sharma & sharma's Principles of Pharmacology, 3'd ed., pg. 18-20*

- Intravenous (iv) route, the drug enters the systemic circulation directly, bypassing the first pass metabolism, so there is 100% bioavailability by this route.

**209. Hepatic First pass metabolism will be bypassed by the following routes of drug administration except?**

a) Oral

b) Intravenous

c) Sublingual

d) Intradermal

Correct Answer - A

Ans: A. Oral

*Ref: Goodman & Gilman, 13<sup>th</sup> ed., pg. 16-17 and sharma & sharma's Principles of Pharmacology, 3<sup>d</sup> ed., pg. 18-20*

- Oral route has certain disadvantages notably the 1<sup>st</sup> pass metabolism in liver before reaching the systemic circulation.

**210. Which of the following is wrongly matched regarding mechanism of action of anti-fungal drugs?**

a) Azoles (fluconazole, itraconazole, miconazole): Inhibit lanosterol alpha demethylase thereby preventing ergosterol synthesis

b) Flucytosine: Inhibit microtubulesynthesis thus preventing mitosis

c) Echinocandins (caspofungin); act by inhibiting beta 1,3 glucan synthesis

d) Amphotericin B binds with ergosterol resulting in disruption of cell membrane causing micropores and leakage of ions and cell death

Correct Answer - B

Ans: B. Flucytosine: Inhibit microtubulesynthesis thus preventing mitosis

Ref: Lippincott, 6h ed, pg. 535-541 and KatTung, 13th ed., pg. 926-933

- Flucytosine is a pyrimidine anti-metabolite anti-fungal drug.
- It enters the fungal cell via permease enzyme and then converted into compounds like 5-Fluorouracil, S-Fluorodeoxyuridine and 5'-monophosphate.
- It then inhibits nucleic acid synthesis by inhibiting the enzyme thymidylate synthase.

## 211. Latest drug recently approved for Amyotrophic Lateral sclerosis is?

a) Piracetam

b) Ceftriaxone

c) Edaravone

d) Doxycycline

Correct Answer - C

Ans: C. Edaravone

Ref

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5737249/> and <https://www.ainotropic.com/nootropics/piracetam/>

- Edaravone is a novel neuroprotective agent for the treatment of amyotrophic lateral sclerosis (ALS)

## 212. Which of the following drugs is not used in Rheumatoid arthritis?

a) Etanercept

b) Leflunomide

c) Febuxostat

d) Methotrexate

Correct Answer - C

Ans: C. Febuxostat

*Ref: Goodman and Gilman, 13<sup>th</sup> ed., pg. 704 and Sharma & Sharma's Principles of Pharmacology, 3<sup>rd</sup> ed., pg' 383, 385-387.*

- Febuxostat is used for the treatment of chronic gout.
- It is non-purine inhibitor (allopurinol is a purine analogue) of xanthine oxidase.
- It is more potent and selective than allopurinol.

## 213. Which of the following act through G protein coupled receptors?

a) Ach Muscarinic receptors

b) Insulin receptors

c) Ach Nicotinic receptors

d) GABA-A receptors

Correct Answer - A

Ans: A. Ach Muscarinic receptors

Ref: Lippincott, 6'ted., Pg. 27-28

- M1, M2, M3, M4 and M5 are Ach Muscarinic receptors.
- They are G protein coupled receptors

**214. A patient requires 180 mg ceftriaxone. The vial contains 500 mg/5ml of ceftriaxone. You have a 2 ml syringe with 10 divisions per ml. How many divisions in the 2 ml syringe will you fill to give 180 mg ceftriaxone?**

a) 9

b) 18

c) 10

d) 12

Correct Answer - B

Ans: B. 18

- 500 mg/ 5 ml means 100 mg/ml. Since 100 mg is present in 1 ml, therefore, 180 mg of drug is present in 1.8 ml.
- Now it is clear that we must administer 1.8 ml of the above solution to administer the desired amount of drug.
- Last thing is to calculate the divisions to administer 1.8 ml.
- 10 division per ml means each 0.1 ml is equal to 1 division.
- Therefore, 1.8 ml will be equal to 18 divisions.

## 215. Which of the following drugs is not used in typhoid fever?

a) Amikacin

b) Ciprofloxacin

c) Cefixime

d) Azithromycin

Correct Answer - A

Ans: A. Amikacin

Ref: *Sharma & Sharma's Principles of Pharmacology, 3d ed., pg. 74t-749* and [htrys://www.uplodate.com/contents/treatment-and-prevention-of-enteric-typhoid-und-paratyphoid-fever#HS](https://www.uplodate.com/contents/treatment-and-prevention-of-enteric-typhoid-und-paratyphoid-fever#HS)

- Amikacin is a commonly used aminoglycoside.
- Antimicrobial spectrum of aminoglycosides does not include salmonella.
- It is used in gentamycin and tobramycin resistant infections.
- It is used for organisms like Pseudomonas, Proteus, and Serratia. It is also effective in MDR-TB.

**216. A patient from north-eastern states was diagnosed to have infection with P. falciparum malaria. What is the most appropriate drug for this patient?**

a) Artemether plus lumefantrine

b) Sulfadoxine plus pyrimethamine

c) Chloroquine

d) Mefloquine

Correct Answer - A

Ans: A. Artemether plus lumefantrine

Ref: <http://www.nvbdc.gov.in/Doc/Guidelines-Malaria-Diagnostic-Treatment-2014.pdf>

- Artemisinin Combination Therapy (ACT) should be given to all the confirmed P. falciparum cases.
- The ACT recommended in the National Program all over India except northeastern states is artesunate (AS) daily for 3 days and Sulfadoxine-pyrimethamine (SP) on Day 0.
- Northeastern states presently recommended ACT in national drug policy is fixed dose combination of Artemether-lumefantrine.
- Hence, the clear-cut answer of this question is Artemether plus lumefantrine.

**217. Which of the following drug is commonly used in treatment for cancer associated thromboembolism**

a) Low molecular weight heparin

b) anti-thrombin III inhibitors

c) Direct Xainhibitors

d) Warfarin

Correct Answer - A

Ans: A. Low molecular weight heparin

- Current guideline-endorsed therapy options for cancer-associated thrombosis include low molecularweight heparin (LMWH), unfractionated heparin (UFH), warfarin & fondaparinux.
- All current guidelines recommend LMWH for at least 3-6 months in cancer-associated VTE.

## 218. Effect of Potassium ionophore valinomycin on beta cells of pancreas is?

a) Decrease the secretion of insulin

b) Insulin secretion increases

c) C-peptide secretion increases

d) Increase secretion of both insulin and C- peptide

Correct Answer - A

Ans: A. Decrease the secretion of insulin

Ref:

<https://www.sciencedirect.com/science/article/pii/0304416578903008>  
and <http://www.ej-e-online.org/content/88/1/13>

- Valinomycin interferes with the insulin releasing effect of glucose by increasing the potassium permeability of the B cell membrane.

**219. Which drug causes flagellate pigmentation of skin?**

a) Bleomycin

b) Minocycline

c) Vincristine

d) Daunorubicin

Correct Answer - A

Ans: A. Bleomycin

Ref: Goodman and Gilman, 13,th ed., pg. 1193

- Few case reports of bleomycin induced flagellate dermatitis and pigmentations are available in literature.

**220. Which of the following drug is commonly used for community acquired pneumonia in OPD?**

a) Vancomycin

b) Ceftriaxone

c) Azithromycin

d) Streptomycin

Correct Answer - C

Ans: C. Azithromycin

Ref: <https://www.uptodate.com/contents/treatment-of-community-acquired-pneumonia-in-adults-in-the-outpatient-setting#H4>

- Only one drug which is active orally i.e. Azithromycin.
- We require OPD based treatment; hence Azithromycin is the best answer here.

**221. A medical student presented to the ED with protracted vomiting. For this he was given an antiemetic following which he developed abnormal posturing. Which of the following is the most likely drug to be given?**

a) Metoclopramide

b) Ondansetron

c) Domperidone

d) Dexamethasone

Correct Answer - A

Ans: A. Metoclopramide

*Ref: Katzung, 13<sup>th</sup> ed, pg. 1070 and Lippincott, 6<sup>th</sup> ed, pg. 408*

- This is a typical case of metoclopramide induced extrapyramidal side effect (EPS) in the form of DYSTONIAS.
- Metoclopramide crosses BBB and blocks central D2 receptors.
- The major side effects of metoclopramide include EPS, such as those seen with the phenothiazine antipsychotics

**222. Stoppage of which of the following drugs can result in anxiety and insomnia causing discontinuation syndrome?**

a) Venlafaxine

b) ImiPramine

c) Valproate

d) Olanzapine

Correct Answer - A

Ans: A. Venlafaxine

*Ref: Katzung, 13<sup>th</sup> ed., pg. 524-525 and Goodman & Gilman, 13<sup>th</sup> ed., pg. 27372.*

- Sudden withdrawal of Shorter acting antidepressants particularly SSRIs (paroxetine and sertraline) and SNRI (venlafaxine) can lead to discontinuation syndrome and troublesome side effects.
- These symptoms may include dizziness, headache, nervousness, nausea, anxiety and insomnia.
- Out of the options provided Venlafaxine is the best answer.

## 223. Heparin acts via which of the following adjuvants?

a) Antithrombin III

b) Protein C

c) Protein S

d) Thrombomodulin

Correct Answer - A

Ans: A. Antithrombin III

*Ref: Goodman & Gilman, 13th ed, pg. 588*

- Heparin binds to antithrombin III (AT-III) and accelerates the rate at which it inhibits various coagulation proteases.

**224. Manufacturer of a drug company labels that the drug contains 500 mg of paracetamol. On analysis' it was found to contain only 200 mg of drug. Which type of drug it is known as?**

a) Counterfeit drug

b) Adulterant drug

c) Spurious drug

d) Unethical drug

Correct Answer - A

Ans: A. Counterfeit drug

Ref:<https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUs> and <http://www.globalforumljd.org/sites/default/files/docs/tlibrary/IIIflO-Evolution%20of%20Definitions%20Definition.pdf> and <http://www.cdsco.nic.in/writereaddata/Gaidelines%20under%20new962sions9.pdf>

- According to the US FDA Counterfeit medicine is fake medicine.
- It may be contaminated or contain the wrong or no active ingredient.
- They could have the right active ingredient but at the wrong dose.
- Counterfeit drugs are illegal and may be harmful to your health.

**225. Preferred drug for the treatment of uncomplicated grade 2 hypertension in a 48 year old man is**

a) Chlorthalidone

b) Triamterene

c) Spironolactone

d) Furosemide

Correct Answer - A

**Ans. A. Chlorthalidone**

- Thiazide diuretics are inexpensive, are generally well tolerated, and are recommended as a first-line therapy in the treatment of hypertension in the elderly population.
- Thiazide diuretics are as effective as any drug for first-line treatment of hypertension in the elderly population is the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) study.
- Patients who received the diuretic had a lower incidence of CV events (secondary outcomes) compared with the other groups. The diuretic treatment group had lower HF rates compared with the CCB group

## 226. Propranolol is drug of choice for -

a) Ulcerated infantile hemangioma

b) Lymphangioma

c) Pyogenic granuloma

d) Capillary malformation

Correct Answer - A

**Ans. A. Ulcerated infantile hemangioma**

**Ref:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3800297/>

- Infantile hemangiomas (IHs) are the most common benign pediatric soft-tissue tumors.
- Ulceration—the most frequent complication of IH—tends to heal poorly and is associated with pain, bleeding, infection, and scarring.
- Mainstay treatment modalities include propranolol ( $\beta$ -blocker) and corticosteroids, whose effectiveness is countered by a need for long-term medication and risk of systemic adverse effects and ulcer recurrence.

**227. All are used for postpartum hemorrhage except -**

a) Misoprostol

b) Dinoprostone

c) Prostaglandin F2 alpha

d) Oxytocin

Correct Answer - B

**Ans. B. Dinoprostone**

- Postpartum hemorrhage, the loss of more than 500 mL of blood after delivery, occurs in up to 18 percent of births and is the most common maternal morbidity in developed countries.

**Dinoprostone:**

- Naturally occurring prostaglandin E2 (PGE2). It has important effects in labour.
- It also stimulates osteoblasts to release factors which stimulates bone resorption by osteoclasts.
- As a prescription drug it is used as a vaginal suppository, to prepare the cervix for labour and to induce labour.

**Indication:**

- For the termination of pregnancy during the second trimester (from the 12th through the 20th gestational week as calculated from the first day of the last normal menstrual period), as well as for evacuation of the uterine contents in the management of missed abortion or intrauterine fetal death up to 28 weeks of gestational age as calculated from the first day of the last normal menstrual period.
- In the management of nonmetastatic gestational trophoblastic disease (benign hydatidiform mole).
- Other indications include improving the cervical inducibility (cervical

"ripening") in pregnant women at or near term with a medical or obstetrical need for labor induction, and the management of postpartum hemorrhage.

## 228. Most commonly implicated drug for acute liver failure is -

a) Paracetamol

b) Valproate

c) Warfarin

d) Tetracyclines

Correct Answer - A

**Ans. A. Paracetamol**

- **Acute liver failure** after administration of **paracetamol** at the maximum recommended daily dose in adults.
- **Paracetamol** is the most commonly used analgesic and antipyretic in the world; it can be bought without prescription in most countries despite being the commonest cause of **acute liver failure** in western Europe.
- Prescribing information suggests that it is safe to use in adults in divided doses that total 4 g daily.
- Malnutrition, starvation, chronic alcohol misuse, and concomitant use of drugs that induce cytochrome P450 enzymes increase the risk of hepatotoxicity induced by paracetamol.

**229. There was an outbreak of MRSA in the hospital and it was found that a nurse of NICU had MRSA colonisation of anterior nares. What is the best treatment?**

a) Topical bacitracin

b) Oral Vancomycin

c) Inhaled colistin

d) IV cefazolin

Correct Answer - A

**Ans. A. Topical bacitracin**

- MRSA (methicillin-resistant Staphylococcus aureus) infection is a life-threatening bacterial infection caused by Staphylococcus aureus that is resistant to the antibiotic methicillin. Severe cases usually require hospitalization for treatment.
- MRSA infections are usually treated with systemic antibiotics, either orally or intravenously.
- Topical bacitracin in combination with neomycin and polymyxin B might be added to the therapy.

**230. Fixed drug eruptions are frequently seen with?**

a) Penicillin

b) Sulfonamide

c) Cetirizine

d) Roxithromycin

Correct Answer - B

**Ans. B. Sulfonamide**

**Drugs causing fixed drug eruption**

- Paracetamol (Phenacetin)
- Sulfonamides
- NSAIDs
- Aspirin
- Barbiturates
- Dapsone
- Tetracyclines
- Phenylbutazone

## 231. All are topical hemostatic agents except?

a) Bone wax & patty

b) HemCon bandage

c) Quikclot

d) Fixclot

Correct Answer - D

**Ans. D. Fixclot**

- Topical hemostatic agents are used when surgical hemostasis is inadequate or impractical. The majority of routine, elective operations are performed in patients with normal hemostasis and with minimal blood loss.
- The two main categories of topical hemostatic agents are physical agents, which promote hemostasis using a passive substrate, and biologically active agents, which enhance coagulation at the bleeding site

## 232. In iron poisoning drug Desferoxamine is given.what is its mechanism of action -

a) By binding with trivalent Fe<sup>3+</sup>

b) -by inhibiting Hepcidin

c) -by inhibiting DMT1

d) -by inhibiting ferroportin

Correct Answer - A

**Ans. A. By binding with trivalent Fe<sup>3+</sup>**

- Deferoxamine works in treating iron toxicity by binding trivalent (ferric) iron (for which it has a strong affinity), forming ferrioxamine, a stable complex which is eliminated via the kidneys.
- 100 mg of deferoxamine is capable of binding approximately 8.5 mg of trivalent (ferric) iron.
- Deferoxamine works in treating aluminum toxicity by binding to tissue-bound aluminum to form aluminoxamine, a stable, water-soluble complex.
- The formation of aluminoxamine increases blood concentrations of aluminum, resulting in an increased concentration gradient between the blood and dialysate, boosting the removal of aluminum during dialysis.
- 100 mg of deferoxamine is capable of binding approximately 4.1 mg of aluminum.

**233. A bank employee felt depressed with no interest in activities came to AIIMS OPD. He was started on Escitalopram. Which of these adverse effects cannot be explained with escitalopram?**

a) Vivid dreaming

b) Anorgasmia

c) Sialorrhea

d) Nausea

Correct Answer - C

**Ans. C. Sialorrhea**

- Escitalopram belongs to a class of drugs known as selective serotonin reuptake inhibitors (SSRI).
- Improves your energy levels and feelings of well-being and decrease nervousness.
- Used to treat depression and anxiety.
- **MOA:**
  - Works by helping to restore the serotonin balance in the brain.
- **S/E:**
  - Headache, Nausea, Ejaculation disorder, Somnolence, Insomnia, Dry mouth, Constipation, Fatigue, Libido decreased, Inability to achieve orgasm, Gas (flatulence), Toothache, Weight gain, Menstrual disorder, Neck/shoulder pain, Runny nose & Flu-like syndrome.

**234. Chlorpromazine act on which of the following receptors -**

- 1. D2 and 5HT2 receptors**
- 2. GABA and Beta-adrenergic receptors**
- 3. Muscarinic M1 and alpha-adrenergic receptors**
- 4. H1 receptors**

a) 1, 3 and 4 are correct

b) Only 2 is correct

c) 1 and 2 are correct

d) All are correct

Correct Answer - A

**Ans. A. 1, 3 and 4 are correct**

**Chlorpromazine:**

- Chlorpromazine is a psychotropic agent indicated for the treatment of schizophrenia. It also exerts sedative and antiemetic activity.
- Chlorpromazine has actions at all levels of the central nervous system-primarily at subcortical levels-as well as on multiple organ systems.
- Chlorpromazine has strong antiadrenergic and weaker peripheral anticholinergic activity; ganglionic blocking action is relatively slight.
- It also possesses slight antihistaminic and anti serotonin activity.
- A traditional antipsychotic agent with anti-emetic activity.

**MOA:**

- Exerts its antipsychotic effect by blocking postsynaptic dopamine receptors in cortical and limbic areas of the brain, thereby preventing

the excess of dopamine in the brain.

- This leads to a reduction in psychotic symptoms, such as hallucinations and delusions.
- Chlorpromazine appears to exert its anti-emetic activity by blocking dopamine receptors in the chemical trigger zone (CTZ) in the brain, thereby relieving nausea and vomiting.

**235. Which of the following is/are the adverse effect of SGLT2 inhibitors?**

- 1. Ketoacidosis**
- 2. Urosepsis**
- 3. Fournier's gangrene**
- 4. Angioedema**

a) 1,2 and 4 are correct

b) 1, 2 and 3 are correct

c) Only 4 is correct

d) All are correct

Correct Answer - B

**Ans. B. 1, 2 and 3 are correct**

**Sodium-glucose co-transporter-2:**

- Sodium-glucose co-transporter-2 [SGLT-2] present in proximal tubules.
- Glucose is freely filtered across glomerulus & is 100% reabsorbed in proximal tubules, via SGLT-2.

**Sodium-glucose co-transporter-2 inhibitors (SGLT-2 inhibitors):**

- SGLT-2 inhibitors act by inhibiting this transporter → Causing glucosuria in diabetics → causes weight loss.
- Effective orally.
- Efficacy reduced in renal failure.

**Side effects:**

- Ketoacidosis, Urosepsis, Fournier's gangrene, Increased incidence of UTI & genital infections.

**236. Assertion: Large doses of acyclovir are recommended for treating genital herpes in HIV positive patients.**

**Reason: Frequent recurrence of genital herpes is seen in HIV patients.**

a) Both Assertion and Reason are true and Reason is correct explanation of Assertion

b) Assertion & reason are true, reason is not the right explanation for assertion

c) Assertion is true & reason is false

d) Both assertion & reason are false

Correct Answer - A

**Ans. A. Both Assertion and Reason are true and Reason is correct explanation of Assertion**

**ACYCLOVIR**

- Antiviral drug.
- Requires virus-specific enzyme for conversion to active metabolite inhibiting DNA synthesis & viral replication.
- Varicella-zoster viruses are not as sensitive as herpes simplex viruses.

**INDICATIONS:**

- **Herpes simplex:**
  - For genital primary infections.
  - Oral acyclovir - Faster healing rate than acyclovir ointment.
- **For herpes simplex keratitis:**
  - Local/oral therapy is successful.

- Herpes simplex encephalitis& herpes simplex neonatorum
- Must be treated intravenously.
- **Frequently relapsing herpes simplex (labial/genital):**
- Long-term, prophylactic acyclovir administration.

## 237. Mention the true/false statements about digoxin toxicity?

a) The earliest manifestation of digoxin toxicity are gastrointestinal symptoms

b) Non-specific vision changes may be noted in digoxin toxicity

c) Early toxicity may not correlate with serum levels and Neurological symptoms may occur without corresponding cardiovascular changes

d) All

Correct Answer - D

**Ans. All are true about digoxin toxicity.**

### **DIGOXIN TOXICITY:**

#### **Features:**

- Generally unwell & lethargy.
- Nausea & vomiting.
- Confusion.
- Yellow-green vision.
- Arrhythmias (e.g. AV block, bradycardia)
- Dizziness.

#### **Precipitating factors:**

- **Renal disease**
- **Hypokalaemia**
- **Hypomagnesemia**
- Hypoalbuminemia
- Hypothermia
- Hypothyroidism
- **Hypercalcemia.**
- Hyponatremia

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For any queries inbox @murtazakuchay

- Acidosis.
- Myocardial ischemia.
- **Partial AV block.**

**Drugs:**

- **Amiodarone.**
- **Quinidine.**
- **Verapamil.**
- **Spirolactone.**
- **Furosemide.**
- **Hydrochlorothiazide** - Compete with DCT secretion, hence reducing excretion.

**Management**

- **Digibind.**
  - **Correct ventricular arrhythmia by lignocaine.**
  - Bradyarrhythmias by propranolol.
  - Atrial tachyarrhythmias by atropine.
- Phenytoin.  
Monitor K+

## 238. Mention the true/false statements about drug resistant malaria?

a) Not present in India

b) Quinine with clindamycin or doxycycline is still effective treatment

c) Artemether with lumefantrine is useful

d) Monotherapy with artemisinin derivatives is not useful due to high relapse rate

Correct Answer - B:C:D

**Ans: B, C. D.**

**A & C are false.**

- **Multidrug resistance** of *P. Falciparum* is seen when the parasite is resistant to more than two operational antimalarial compounds of different chemical classes and modes of action.
- Generally, the two classes first affected are the 4-aminoquinolines and the antifolates (diaminopyrimidine, sulfonamides).
- Drug resistance results in a delay in or failure to clear asexual parasites from the blood, which allows production of the gametocytes that are responsible for transmission of the resistant genotype.

**Drug resistance in India:**

- In India, chloroquine-resistant *P. falciparum* malaria has been observed with increasing frequency across the country in recent years.
- Considering this, the Government of India has recommended the combination of artesunate and Sulfa-Pyrimethamine as the treatment of choice for *P. falciparum* (and mixed) infections all across the country.

- In north east India, where resistance to SP has been documented, the National Drug Policy recommends the use of Artemether and Lumefantrine for the treatment of *P. falciparum* malaria. *P. vivax* remains sensitive to chloroquine all across the country.

**239. Aspirin and phenobarbitone are acidic drugs whereas diazepam is a basic drug. Mention the true/false statements about these drugs?**

a) Aspirin is present in mainly non-ionised form in stomach, hence can be easily absorbed

b) Diazepam is mostly absorbed from intestine

c) Phenobarbitone can be absorbed from the stomach but most of the absorption occurs in small intestine due to its large surface area

d) No drug is absorbed in the large intestine due to its very low surface area

Correct Answer - A:B:C

**Ans: A, B & C are True**

**D & E are false**

- Acidic drugs with pKa 3.5:
    - Largely unionized at acid gastric pH & absorbed from stomach.
    - Eg: Aspirin.
  - Basic drugs with pKa 10:
    - Largely ionized & are absorbed only in intestines.
    - Eg: Atropine
  - Unionized form is lipid soluble & ionized form is water soluble.
  - Medium is same, hence drugs cross membrane.
- Acidic drugs are lipid soluble (un-ionized form) in acidic medium.**
- Eg: In acidic gastric pH these acidic drugs are more likely to be absorbed from stomach.

- Due to presence of unionized (lipid soluble) form.
- Hence, **aspirin is more likely to be absorbed in stomach than morphine or atropine (basic drugs).**
- This is reason for **aspirin-induced gastric mucosal irritation.**
- **Ion trapping:**
- **Unionized drugs reverts back to ionized form within cell (pH 7.0) before passing to ECF.**
- Referred as “**ion trapping**”.
- Ie., Weak electrolyte crossing a membrane to encounter a pH from which it is not able to escape easily.
- Basic drugs attain higher concentration intracellularly (pH 7.0 vs 7.4 of plasma).

## 240. Match the following drugs with their ocular adverse effects

Drug	Adverse Effect
1. Amiodarone	A. Blepharoconjunctivitis
2. Hydroxychloroquine	B. Angle-closure glaucoma
3. Systemic steroids	C. Retinopathy
4. Digoxin	D. Optic neuritis
	E. Yellow vision
	F. Cataract
	G. Corneal microdeposits

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

b) 1-C, 2-F, 3-A, 4-E

c) 1-G, 2-C, 3-F, 4-E

d) 1-F, 2-G, 3-B, 4-C

Correct Answer - C

**Ans. C. 1-G, 2-C, 3-F, 4-E**

- Amiodarone - Corneal microdeposits.
- Hydroxychloroquine - Retinopathy
- Systemic steroids - Cataract
- Digoxin - Yellow vision.

**241. Match the following drugs with organism they are used for**

Drug	Organism
1. Praziquantel	A. Filaria
2. Diethylcarbamazine	B. Giardia
3. Nitazoxanide	C. Strongyloides
4. Mebendazole	D. Tapeworms
	E. Leishmania
	F. Ascaris lumbricoides

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

b) 1-D, 2-A, 3-B, 4-F

c) 1-G, 2-C, 3-F, 4-E

d) 1-F, 2-G, 3-B, 4-C

Correct Answer - B

**Ans. B. 1-D, 2-A, 3-B, 4-F**

- Praziquantel - Tapeworms
- Diethylcarbamazine - Filaria
- Nitazoxanide - Giardia
- Mebendazole - Ascaris lumbricoides

**242. Match the following anaesthetic agents with their appropriate property?**

Drug	Adverse Effect
1. Propofol	A. Rigid chest syndrome
2. Fentanyl	B. Pulmonary vasoconstriction
3. Midazolam	C. Avoided in patients with egg Allergy
4. Nitrous oxide	D. Hypotension
	E. Dissociative anaesthesia
	F. Adrenal insufficiency

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

b) 1-D, 2-A, 3-B, 4-F

c) 1-G, 2-C, 3-F, 4-E

d) 1-F, 2-G, 3-B, 4-C

Correct Answer - A

**Ans. A. 1-C, 2-A, 3-D, 4-B**

- Propofol - Avoided in patients with egg Allergy
- Fentanyl - Rigid chest syndrome
- Midazolam - Hypotension
- Nitrous oxide - Pulmonary vasoconstriction

**243. Match the following drug poisonings with their antidotes -**

Drug overdose	Antidote
1. HCN	A. Trimethadione
2. Paracetamol	B. Nalorphine
3. Morphine	C. Bupropion
4. Nicotine	D. Diazepam
	E. N-acetylcysteine
	F. Amyl nitrite

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

b) 1-D, 2-A, 3-B, 4-F

c) 1-G, 2-C, 3-F, 4-E

d) 1-F, 2-E, 3-B, 4-A

Correct Answer - D

**Ans .D. 1-F, 2-E, 3-B, 4-A**

- HCN - Amyl nitrite
- Paracetamol - N-acetylcysteine
- Morphine - Nalorphine
- Nicotine - Trimethadione

**244. Which one of the following drugs are not used in heart failure?**

a) Metoprolol

b) Nesiritide

c) Trimetazidine

d) Sacubitril

Correct Answer - C

**Ans. C. Trimetazidine**

\* Trimetazidine is not used in heart failure.

\* Trimetazidine is a newer antianginal drug that is a pFOX inhibitor which partially inhibits the fatty acid oxidation pathway in the myocardium. This decreases the oxygen requirement of the heart.

**245. Pegloticase used in which of the following conditions?**

a) Chronic Gout

b) Psoriatic arthritis

c) RA

d) Paralytic Ileus

Correct Answer - A

**Ans. A. Chronic Gout**

\* Pegloticase is a medication for the treatment of Severe, Treatment - Refractory, Chronic Gout.

\* It is a third line treatment in those in whom other treatments are not tolerated.

\* **Drug is administered by infusion intravenously.**

**246. Match the following:**

**1. Omalizumab -**

**2. Itolizumab -**

**3. Daclizumab -**

**4. Belimumab -**

**A. AntiCD6**

**B. ANTICd25**

**C. Anti IGE**

**D. Anti IgG1**

**E. Anti B cell activator**

a) 1 - C, 2 - A, 3 - B, 4 - E

b) 1 - D, 2 - C, 3 - B, 4 - E

c) 1 - C, 2 - A, 3 - D, 4 - E

d) 1 - E, 2 - D, 3 - C, 4 - E

Correct Answer - A

**Ans. A. 1 - C, 2 - A, 3 - B, 4 - E**

\* Omalizumab - Anti IGE

\* Itolizumab - AntiCD6

\* Daclizumab - ANTICd25

\* Belimumab - Anti B cell activator.

## 247. Z track technique is used for

a) Monitoring of lithium therapy

b) Monitoring of carbamazepine therapy

c) Administration of long acting depot antipsychotics

d) Administration of nicotine patches

Correct Answer - C

**Ans. C. Administration of long acting depot antipsychotics**

\* Z-Tracking technique a) Stretch/displace the skin by pulling it laterally away from the intended point of injection.

**248. Assertion: In a patient admitted to hospital for community acquired pneumonia, combination therapy of beta lactams and azithromycin is given.  
Reason : This combination covers gram positive organisms and anaerobes.**

a) Both reason and assertion are true

b) Assertion is true but reason is false.

c) Assertion is true but reason is partially true for assertion

d) Both assertion & reason are not true.

Correct Answer - B

**Ans. B. Assertion is true but reason is false.**

\* Combination is given to cover atypical bacteria.

\* **The CDC and others recommend outpatient oral empirical antibiotics with a macrolide, doxycycline, or an oral betalactam (amoxicillin, cefuroxime [Ceftin], or amoxicillin/clavulanate [Augmentin]) or inpatient treatment with an intravenous betalactam (cefuroxime, ceftriaxone [Rocephin], cefotaxime [Claforan]) or a combination of ampicillin/sulbactam (Unasyn) with a macrolide**

## 249. Prucalopride drug is ?

a) 5HT4 agonist

b) 5HT2b agonist

c) 5HT2b antagonist

d) 5HT2a agonist

Correct Answer - A

**Ans. A. 5HT4 agonist**

\* Prucalopride is a drug acting as a selective, high affinity 5-HT4 receptor agonist which targets the impaired motility associated with chronic constipation, thus normalizing bowel movements.

\* Approved for use in Europe in 2009.

\* Prucalopride, a first in class dihydro-benzofuran-carboxamide, is a selective, high affinity serotonin (5-HT4) receptor agonist with enterokinetic activities.

\* Prucalopride alters colonic motility patterns via serotonin 5-HT4 receptor stimulation: it stimulates colonic mass movements, which provide the main propulsive force for defecation.

\* The observed effects are exerted via highly selective action on 5-HT4 receptor.

\* Prucalopride has >150-fold higher affinity for 5-HT4 receptors than for other receptors.

**250. Which of the following cause an increase in ACh release from the presynaptic neuron?**

a) Blocking calcium channels on presynaptic

b) Blocking chloride channel on presynaptic

c) Blocking Na channel

d) Blocking K channels

Correct Answer - D

**Ans. D. Blocking K channels**

\* Potassium channel blocker will cause an increase in ACh release from the presynaptic neuron.

\* Blockade of presynaptic potassium channels promotes activation of voltage-gated calcium channels leading to the increased release of acetylcholine in the neuromuscular junction. Aminopyridines used in the treatment of Lambert-Eaton myasthenic syndrome acts by this mechanism and improves the muscle strength in the patients

**251. Which of the following is a schedule X drug?**

a) Thalidomide

b) Colistin

c) Ketamine

d) Halothane

Correct Answer - C

**Ans. C. Ketamine**

\* The following are the Schedule X drugs mentioned in the Drugs and Cosmetics Rules 1945: Amobarbital, Amphetamine, Barbital, Cyclobarbital, Dexamphetamine, Ethchlorvynol, Glutethimide, Meprobamate, Methamphetamine, Methylphenidate, Methylphenobarbital, Phencyclidine, Phenmetrazine, Secobarbital.

## 252. Why glycopyrrolate is used as pre-anesthetic medication :

a) it is used because it is an anxiolytic

b) Because it decreases the secretions

c) It's used as an induction agent

d) Both A & B

Correct Answer - D

**Ans. D. Both A & B**

### **Premedication/Preanaesthetic medication:**

\* Refers to drug usage before anesthesia to have pleasant & safe anesthetic experience.

### **Need for premedications:**

\* Relief of anxiety & apprehension preoperatively.

\* Facilitate smooth induction.

\* Amnesia for preoperative & postoperative events.

\* Supplement & potentiate analgesic action of anesthetics.

\* Reduces anaesthetic dose.

\* Decrease secretions & vagal stimulation to avoid undesirable reflex.

\* Prevention of post-operative nausea & vomiting.

\* Extendable antiemetic effect into post-operative period.

\* To decrease any chances of aspiration.

\* Decrease acidity & volume of gastric juice for reduced damage, if aspirated.

\* Note: For elective surgeries, hemoglobin should be at least 10 gm/dl or more.

## 253. Vitamin D toxicity is treated with

a) Chloroquine

b) Hydroxychloroquine

c) Dexamethasone

d) Ketoconazole

Correct Answer - C

**Ans. C. Dexamethasone**

\* Dexamethasone is used in the treatment of hypercalcemia due to vitamin D toxicity. Glucocorticoid (Dexamethasone, prednisolone etc) therapy will decrease plasma calcium levels by blocking the action of vitamin D(1,25 D) which results in reduced intestinal calcium absorption and increased urinary excretion of calcium.

\* Other drugs like chloroquine and hydroxychloroquine are less effective in treating hypercalcemia due to vitamin D toxicity.

**254. Post operative thromboprophylaxis by low molecular weight heparin is best done by which route of administration?**

a) Subcutaneous

b) Intravenous

c) Inhalational

d) Intramuscular

Correct Answer - A

**Ans. A. Subcutaneous**

\* Both heparin 5,000 units subcutaneously every 8 hours and enoxaparin 40 mg subcutaneously once daily provide highly effective and safe prophylaxis for patients undergoing colorectal surgery.

## 255. What is the dose of adrenaline in anaphylactic shock?

a) 0.5 ml in 1:1000

b) 0.5 ml in 1:10000

c) 1 ml in 1:1000

d) 1.5 ml in 1:1000

Correct Answer - A

**Ans. A. 0.5 ml in 1:1000**

Severe hypersensitivity reactions, anaphylactic shock

### **IM Injection:**

\* Adults: The usual dose is 500 micrograms (0.5ml of adrenaline 1/1000). If necessary, this dose may be repeated several times at 5-minute intervals according to blood pressure, pulse and respiratory function.

\* Half doses of adrenaline may be safer for patients who are taking amitriptyline, imipramine or a beta blocker.

### **Paediatric population:**

\* The following doses of adrenaline 1/1,000 are recommended:

<b>Age</b>	<b>Dose</b>
Over 12 years	0.5 mg IM (0.5ml 1:1000 solution)
6 - 12 years	0.3 mg IM (0.3ml 1:1000 solution)
6 months - 6 years	0.15 mg IM (0.15ml 1:1000 solution)
Under 6 months	0.01mg/kg IM (0.01ml/kg 1:1000 solution)

\* If necessary, these doses may be repeated at 5-15 -minute intervals according to blood pressure, pulse and respiratory function.

**256.**

**Like all opioids, tramadol acts as an analgesic drug by stimulating mu opioid receptors. Apart from this, the additional mechanism of action of tramadol is?**

a) Serotonin and nor-adrenaline reuptake inhibition

b) Anticholinergic

c) Antihistaminic

d) Serotonin and dopamine reuptake inhibition

Correct Answer - A

**Ans. A. Serotonin and nor-adrenaline reuptake inhibition**

\* Tramadol differs from other traditional opioid medications in that it doesn't just act as a  $\mu$ -opioid agonist, but also affects monoamines by modulating the effects of neurotransmitters involved in the modulation of pain such as serotonin and norepinephrine which activate descending pain inhibitory pathways.

\* Tramadol's effects on serotonin and norepinephrine mimic the effects of other SNRI antidepressants such as duloxetine and venlafaxine.

\* Tramadol exists as a racemic mixture consisting of two pharmacologically active enantiomers that both contribute to its analgesic property through different mechanisms and are also themselves metabolized into active metabolites: (+)-tramadol and its primary metabolite (+)-O-desmethyl-tramadol (M1) are agonists of the  $\mu$  opioid receptor while (+)-tramadol inhibits serotonin reuptake and (-)-tramadol inhibits norepinephrine reuptake.

\* These pathways are complementary and synergistic, improving tramadol's ability to modulate the perception of and response to

pain.

**257. Adverse effect of Foscarnet includes all except?**

a) Hypercalcemia

b) Hyperkalemia

c) Hypocalcemia

d) Hypokalemia

Correct Answer - B

**Ans. B. Hyperkalemia**

**Potential adverse effects of foscarnet include :-**

- \* Renal impairment, hypo- or hypercalcemia, hypo- or hyperphosphatemia, hypokalemia, and hypomagnesemia.
- \* Penile ulceration associated with Foscarnet therapy may be due to high level of ionized drug in the urine.
- \* Nausea, vomiting, anemia, elevation of liver enzymes, and fatigue have been reported.
- \* The risk of anemia may be additive in patients receiving concurrent zidovudine.
- \* CNS toxicities include headache, hallucinations, and seizures.

**258. Which of the following is clinical use of tafenoquine?**

a) Radical cure of Plasmodium vivax

b) Prophylaxis of malaria in pregnancy

c) Treatment of severe falciparum malaria

d) Treatment of malaria in children < 2 years

Correct Answer - A

**Ans. A. Radical cure of Plasmodium vivax**

\* Tafenoquine (TQ) is an 8-aminoquinoline anti-malarial drug which is in development as a single-dose treatment for the radical cure of P.vivax malaria when given with standard doses of chloroquine.

**259. A nurse got accidental prick from the HIV infected needle. Which of the following is T/F regarding the management of this nurse?**

- a. Lamivudine used as monotherapy in post-exposure prophylaxis (t/f)**
- b. Washing hands advised(t/f)**
- c. Viral markers at the time of prick(t/f)**
- d. Repeat serology at 6 weeks (t/f)**

a) b,c,d true a false

b) a, b true c,d false

c) b,c true a,d false

d) All true

Correct Answer - A

**Ans. A. b,c,d true a false**

\* Lamivudinemonotherapy is the incorrect option. Instead, dual drug therapy of Tenofovir 300mg + Lamivudine 300mg (FDC) is recommended.

**260. Vasodilatation is caused by:**

a) Serotonin

b) Histamine

c) LT C4

d) Thromboxane A2

Correct Answer - B

**Ans. B. Histamine**

\* Histamine causes marked dilatation of smaller blood vessels that include arterioles, capillaries, and venules.

## 261. GPCR that does not act through opening of potassium channels is?

a) Muscarinic M2 receptor

b) Dopamine D2 receptor

c) Serotonin 5 HT1 receptor

d) Angiotensin 1 receptor

Correct Answer - D

### **Ans. D. Angiotensin 1 receptor**

\* Four G protein gated inwardly-rectifying potassium (GIRK) channel subunits have been identified in mammals: GIRK1, GIRK2, GIRK3, and GIRK4. The GIRK subunits come together to form GIRK ion channels.

\* Activation of the IKACH channels begins with release of acetylcholine (ACh) from the vagus nerve onto pacemaker cells in the heart.

\* ACh binds to the M2 muscarinic acetylcholine receptors, which interact with G proteins.

## 262. Which of the following is used for the treatment of paucibacillary leprosy?

a) 2 drugs for 6 months

b) 3 drugs for 6 months

c) 2 drugs for 12 month

d) 3 drugs for 12 months

Correct Answer - B

**Ans. B. 3 drugs for 6 months**

\* 3 drug therapy for 6 months is the latest recommended regimen for the treatment of Paucibacillary leprosy.

\* WHO Multi-Drug Therapy (MDT) for the treatment of Leprosy

Age group	Drug	Duration of Treatment
Adult	Rifampicin 600 mg once a month	12 months(Multibacillary)
	+ Clofazimine 300 mg once a month and 50 mg daily	
	+ Dapsone 100 mg daily	6 months(Paucibacillary)
	Rifampicin 450 mg once a month	

	+	
Children (10–14 years)	Clofazimine 150 mg once a month and 50 mg daily.	12 months(Multibacillary) 6 months(Paucibacillary)
	+	
	Dapsone 50 mg daily	
	Rifampicin 10 mg/kg once a month	
	+	
Children	Clofazimine 6 mg/kg once a month, 1 mg/kg daily	12 months(Multibacillary) 6 months(Paucibacillary)
	+	
	Dapsone 2 mg/kg daily	

## 263. Which of the following statements about tedizolid is true?

a) It causes peripheral neuropathy as an adverse effect

b) It is active against gram positive organisms

c) It has poor oral bioavailability

d) It is active against anaerobes

Correct Answer - B

**Ans. B. It is active against gram positive organisms**

\* Tedizolid Phosphate is an oxazolidinone-class antibiotic prodrug indicated in adults for the treatment of acute bacterial skin and skin structure infections (ABSSSI) caused by susceptible isolates of several Gram-positive bacteria.

\* Following administration via oral or intravenous route, tedizolid phosphate prodrug is converted by plasma phosphatases to its active moiety, tedizolid.

\* The active metabolite of tedizolid binds to the 50S bacterial ribosomal subunit, inhibiting protein synthesis and causing its bacteriostatic effects.

\* Tedizolid is an effective and potent alternative to linezolid for the treatment of patients with Gram-positive ABSSSI due to MRSA or MSSA.

\* Increased potency allows for once daily dosing with reduced total dosages, improving the side effect profile of this drug.

\* Of note, the minimum inhibitory concentrations of tedizolid appear to be largely unaffected by the chloramphenicol-florfenicol resistance (cfr) gene, which has been implicated in a number of published linezolid-resistant organism outbreaks.

\* OPTIC NEUROPATHY, PERIPHERAL NEUROPATHY ARE LESS

SEEN WITH TEDIZOLID THAN OTHERS IN SAME CLASS

## 264. Antimalarial drug used for causal prophylaxis act at which stage of developmental cycle

a) Gametogony

b) Erythrocytic schizogony

c) Pre-erythrocytic schizogony

d) Exo-erythrocytic schizogony

Correct Answer - C

**Ans. C. Pre-erythrocytic schizogony**

**Pre-erythrocytic schizogony**

- \* Occurs inside the parenchymal cells of liver.
- \* Merozoites are liberated into blood.
- \* Drugs acting on this stage will prevent infection of RBC and clinical attack of malaria causal prophylaxis.
- \* Drugs are
- \* Proguanil & Tetracycline → for falciparum.

## 265. Drugs used in urea cycle disorders to reduce ammonia?

a) Phenyl butarone

b) Phenyl butyrate

c) L - Carnitine

d) Isoleucin

Correct Answer - B

**Ans: B. Phenyl butyrate**

Urea cycle disorders are inherited disorders where ammonia is not turned into uric acid properly and so it builds up in the blood.

Regular intake of sodium phenylbutyrate helps reduce the levels of ammonia.

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