KBMD – PATHOLOGY PYQ

Medsynapse by Dr. Nikita

1. **Which of the following is a sensitive and specific marker of intestinal inflammation? (FMGE PYQ)**

IBD - UC / crohns

a) Procalcitonin → bacteremia / sepsis

b) Fecal lactoferrin / calprotectin

c) hs CRP →

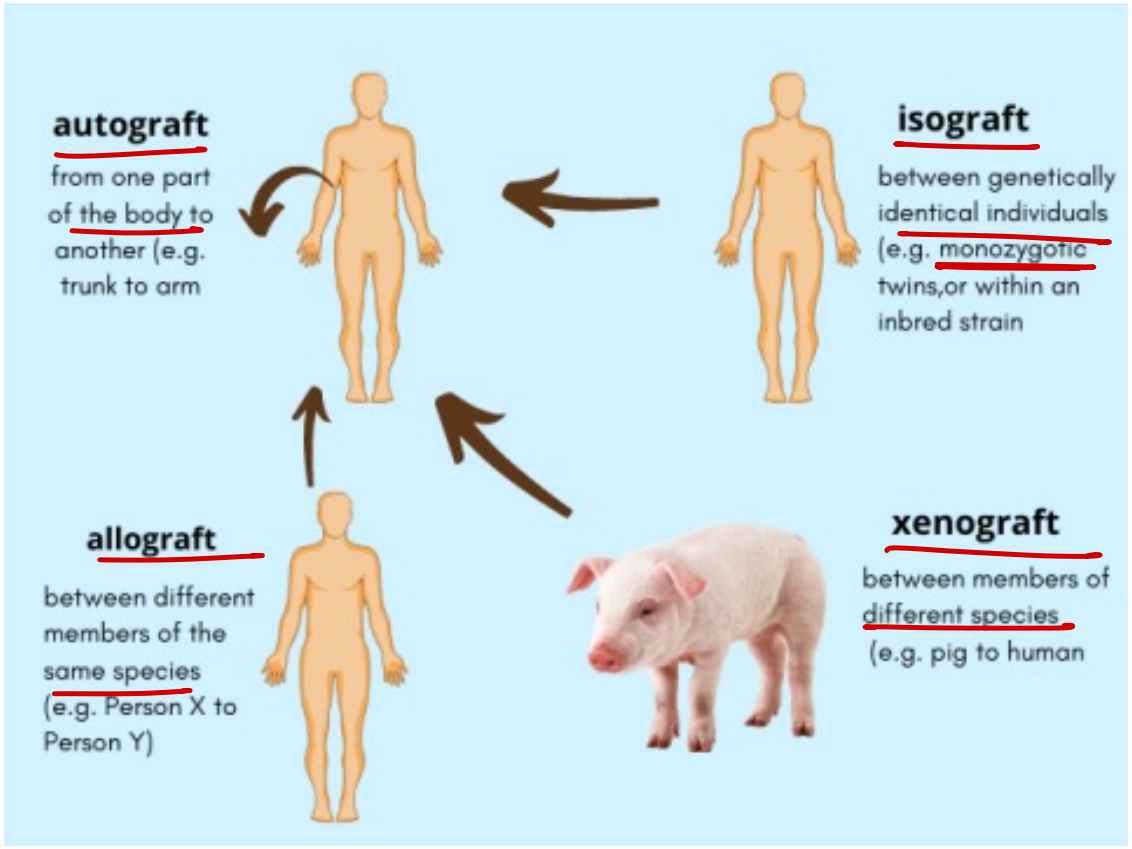
d) Tissue transglutaminase IgA

↳ celiac

Faecal calprotectin and lactoferrin provide an accurate and non-invasive diagnostic and monitoring modality for IBD.

② Graft from identical twin is called: (FMGE PYQ)

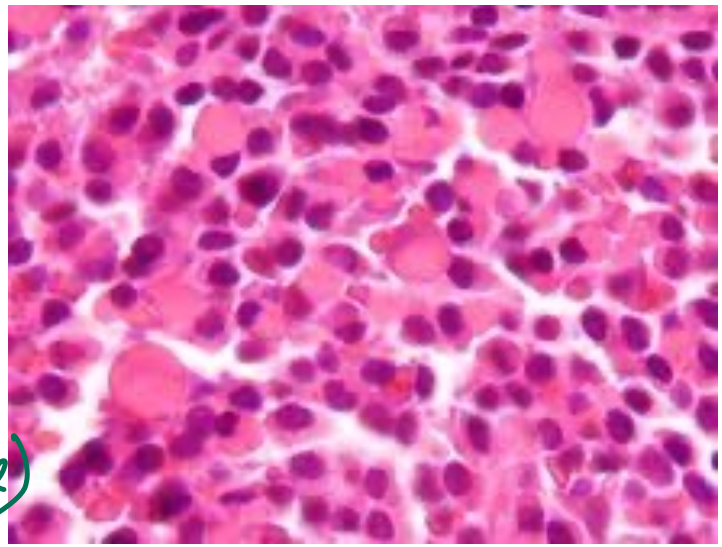
A. Allograft → diff human (same species)
B. Autograft → self
C. Isograft
D. xenograft → diff species ✗


autograft
from one part of the body to another (e.g. trunk to arm
isograft
between genetically identical individuals (e.g. monozygotic twins,or within an inbred strain
allograft
between different members of the same species (e.g. Person X to Person Y)
xenograft
between members of different species (e.g. pig to human

(3) **The following is the bone marrow biopsy of a 60-year-old man with easy fatiguability, back pain, and multiple lytic lesions in the skull. Likely diagnosis is_____ (FMGE PYQ)**

anemia

a) CML
b) CLL.
c) Multiple myeloma
d) Hairy cell leukemia



- Russell bodies – cytoplasmic
- Dutcher – nuclear
- Mott cell. of flame cell.

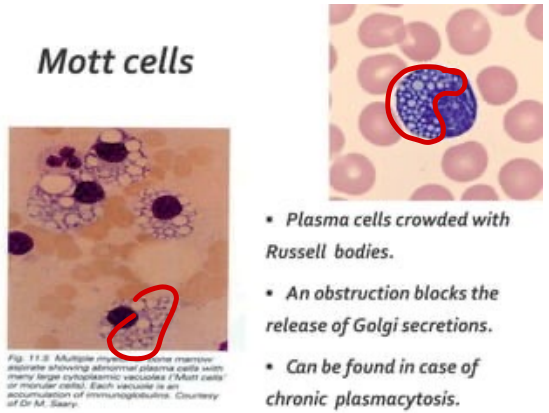
* ALP → MM (N) (not inc) (∵ no new bone)
↳ ∴ Bone scan → Cold spot (↓ activity).

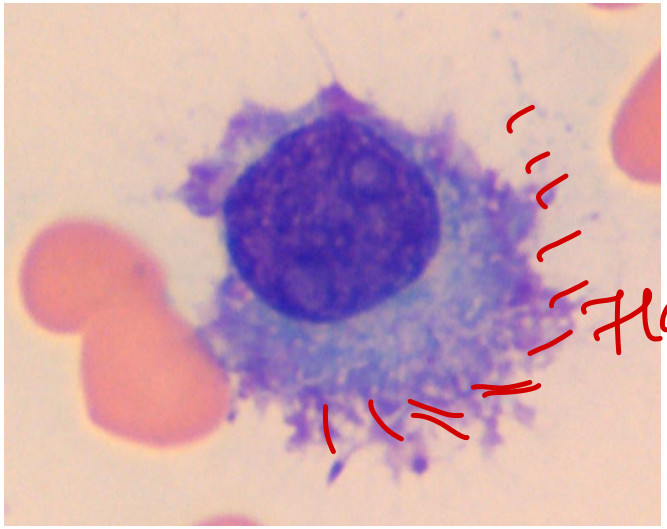
* Rx → Bortezomib.

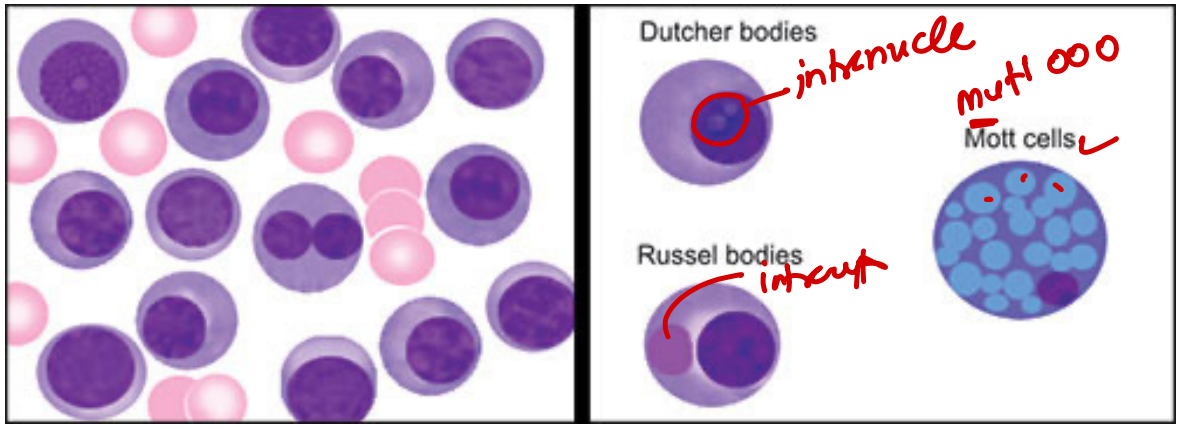
Table 2. CRAB Criteria For MM

Hypercalcemia: serum calcium >11 mg/dL
Renal insufficiency: serum creatinine >2 mg/dL or creatinine clearance <40 mL/min
Anemia: Hgb <10 g/dL
Lytic bone lesions

Hgb, hemoglobin; **MM,** multiple myeloma

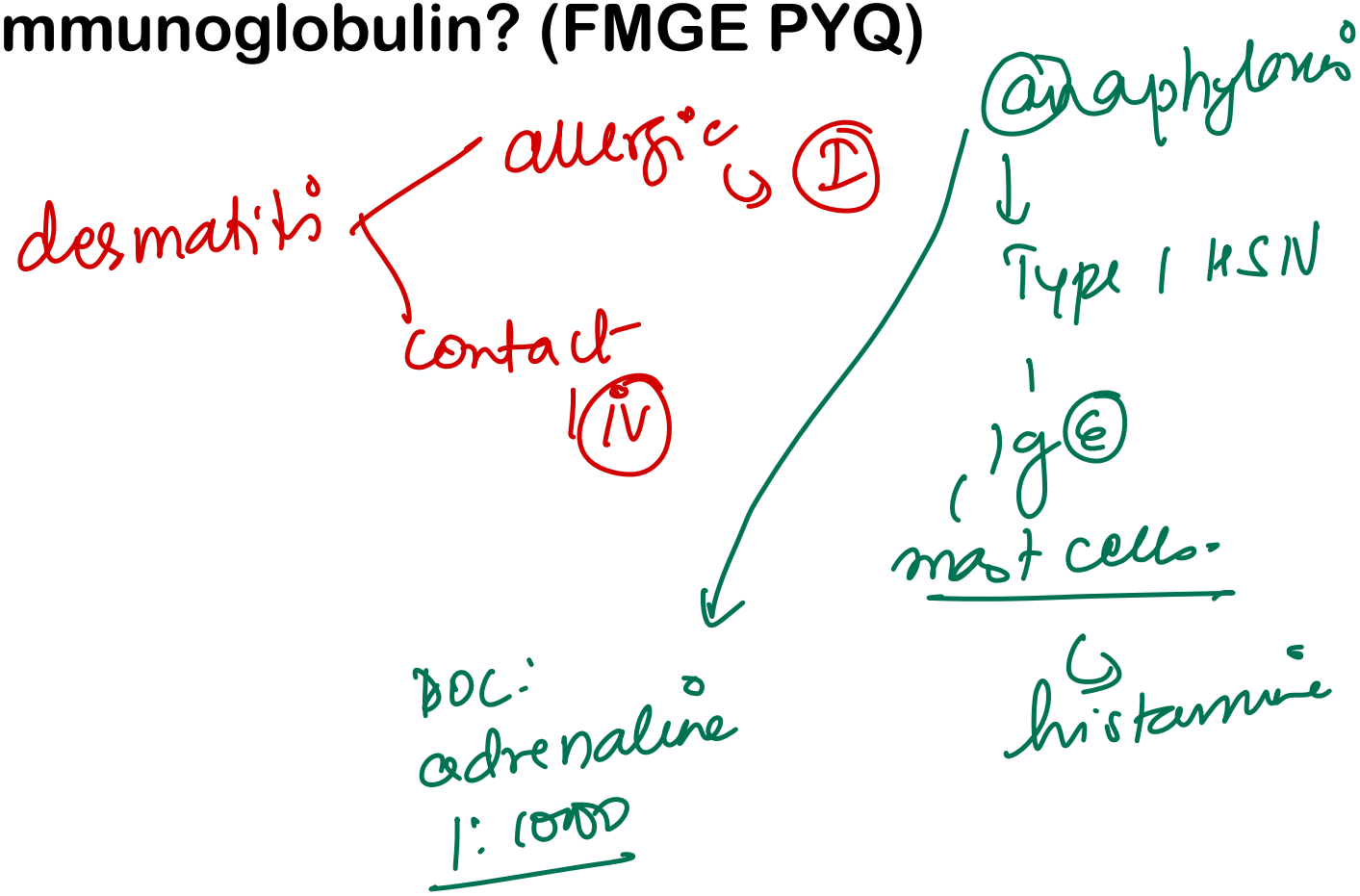






4. A person was bought to the emergency department with facial swelling, itching, and hypotension following a bee sting. The mentioned clinical features are due to the increase in which immunoglobulin? (FMGE PYQ)

a) IgA
b) IgE
c) IgM
d) IgG



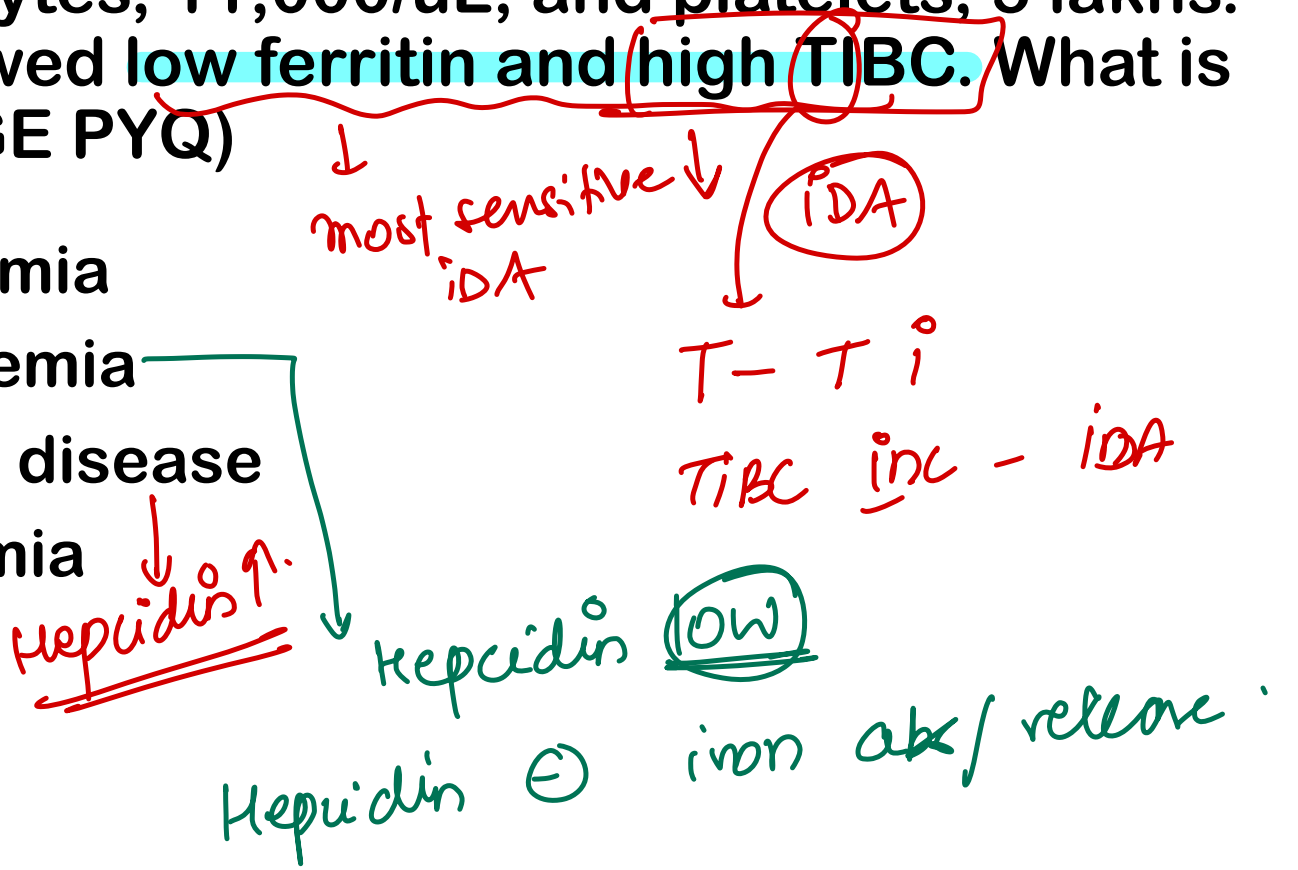
5 A 30-year-old woman presents with pallor and fatigue. Investigations revealed the following: Hb, 5 gm %; MCH, 24; low MCV; leukocytes, 11,000/uL, and platelets, 5 lakhs. The iron profile showed low ferritin and high TIBC. What is the diagnosis? (FMGE PYQ)

A. Megaloblastic anemia

B. Iron deficiency anemia

C. Anemia of chronic disease

D. Sideroblastic anemia



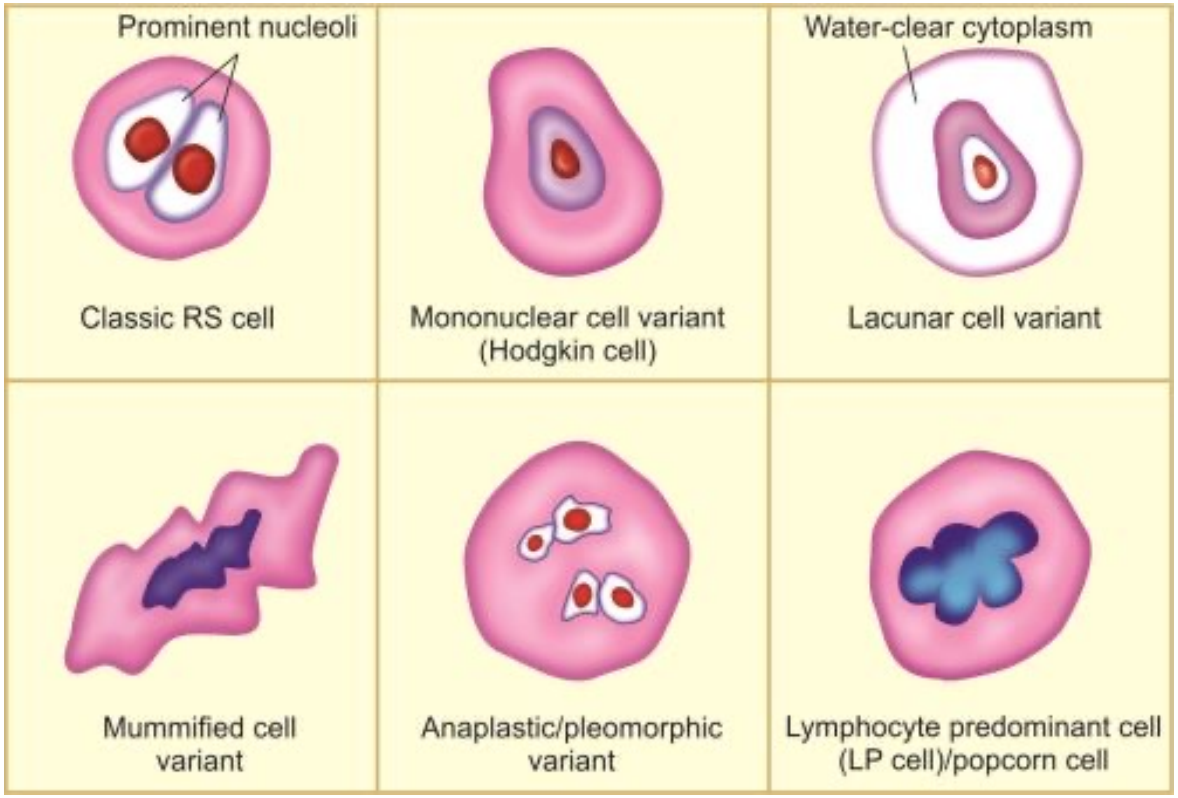
6 The cell shown below has it's origin from what type of cell? (FMGE PYQ)

A. NK cells
B. CD4 cells
C. B cells
D. CD8 cells

Hodgkin o/w → EBV → B cell: CD21

Owl eye
RS cell.

* lacunar → Nodular sclerosis
* popcorn → L. predom
Non-classical



A 24-year old male patient presents with anemia. His father and paternal aunt had a similar illness that was treated successfully by splenectomy. His peripheral blood smear is similar to that shown in the illustration below. Which of the following additional abnormalities is expected? (FMGE PYQ)

A. Decreased osmotic fragility
B. Decreased reticulocytes
C. Heinz bodies
D. Howell jolly bodies

EMA → HS.

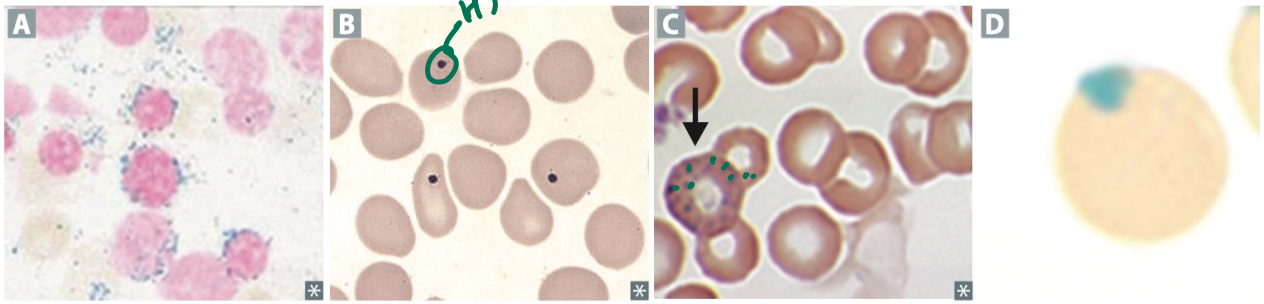
Hereditary spherocytosis	Primarily autosomal dominant. Due to defect in proteins interacting with RBC membrane skeleton and plasma membrane (eg, ankyrin, band 3, protein 4.2, spectrin). Small, round RBCs with no central pallor. ↓ surface area/dehydration → ↑ MCHC → premature removal by spleen (extravascular hemolysis).	Splenomegaly, pigmented gallstones, aplastic crisis (parvovirus B19 infection). Labs: ↓ mean fluorescence of RBCs in eosin 5-maleimide (EMA) binding test, ↑ fragility in osmotic fragility test (RBC hemolysis with exposure to hypotonic solution). Normal to ↓ MCV with abundance of RBCs. Treatment: splenectomy.

PVD prophylactic

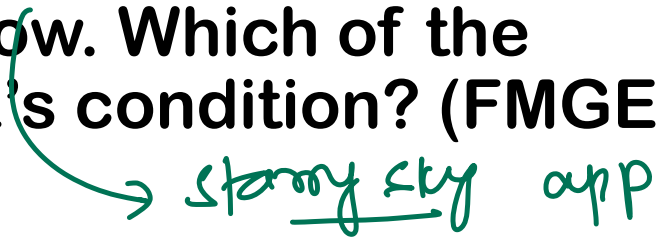
Peripheral smear		
Howell-Jolly bodies B	Functional hyposplenia (eg, sickle cell disease), asplenia	Basophilic nuclear remnants (do not contain iron) Usually removed by splenic macrophages
Basophilic stippling C	Sideroblastic anemia, thalassemias	Basophilic ribosomal precipitates (do not contain iron)
Pappenheimer bodies	Sideroblastic anemia	Basophilic granules (contain iron) "Pappen-hammer" bodies
Heinz bodies D	G6PD deficiency	Denatured and precipitated hemoglobin (contain iron) Phagocytic removal of Heinz bodies → bite cell Requires supravital stain (eg, crystal violet) to be visualized

iron + hammer.

HJ bodies -



8 A 5-year-old boy presents with weight loss, fever, and a painless swelling in the area of his jaw. CBC reveals anemia and lymphocytosis. Biopsy findings from the swelling are seen in the image below. Which of the following is not true of this patient's condition? (FMGE PYQ)



A. All forms of this tumour are highly associated with translocations of the MYC gene. c-myc → t(8,14) 8,22 2,8 8,21

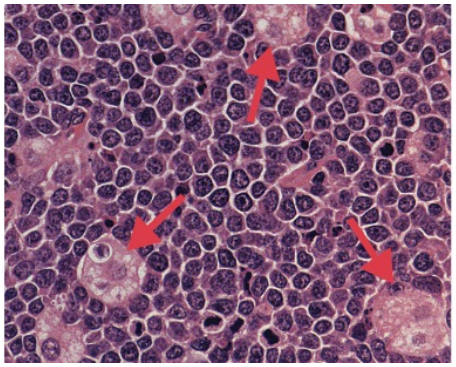
B. Endemic forms are latently infected with EBV.

C. Tumor exhibits a high mitotic index → PHH → Ki67+ → 100%

D. Neoplastic cells are BCL2 psoitive ✗

B → 8 chrom → C-myc

Burkitt lymphoma	Adolescents or young adults "Burkid" lymphoma (more common in kids)	t(8;14)—translocation of c-*myc* (8) and heavy-chain Ig (14)	"Starry sky" appearance (StarBurst), sheets of lymphocytes with interspersed "tingible body" macrophages (arrows in A). Associated with EBV. Jaw lesion B in endemic form in Africa; pelvis or abdomen in sporadic form.



Medsynapse by Dr. Nikita

Q. The histological section of a skin lesion is given below. What is the probable diagnosis? (FMGE PYQ)

A. Basal cell carcinoma
B. Squamous cell carcinoma
C. Adenocarcinoma
D. Malignant melanoma

Basal cell carcinoma	Most common skin cancer. Found in sun-exposed areas of body (eg, face). Locally invasive, but rarely metastasizes. Waxy, pink, pearly nodules, commonly with telangiectasias, rolled borders A, central crusting or ulceration. BCCs also appear as a scaling plaque (superficial BCC) B.
Squamous cell carcinoma	Second most common skin cancer. Associated with immunosuppression, chronic nonhealing wounds, and occasionally arsenic exposure. Marjolin ulcer—SCC arising in chronic wounds or scars; usually develops > 20 years after insult. Commonly appears on face C, lower lip D, ears, hands. Locally invasive, may spread to lymph nodes, and will rarely metastasize. Ulcerative red lesions. Histopathology: keratin "pearls" E. Actinic keratosis—Premalignant lesions caused by sun exposure. Small, rough, erythematous or brownish papules or plaques F. Risk of squamous cell carcinoma is proportional to degree of epithelial dysplasia.

10

Which cells in the central nervous system constitute the resident monocyte-lineage population of the CNS and accumulate in response to injury? (NEET-PG PYQ)

macrophage ↳ affected in MS

A. Oligodendrocytes → myelin central O-O eg

B. Microglial cells

C. Astrocytes → BBB, gliosis after neuronal injury

D. Ependymal cell ↳ ventricle

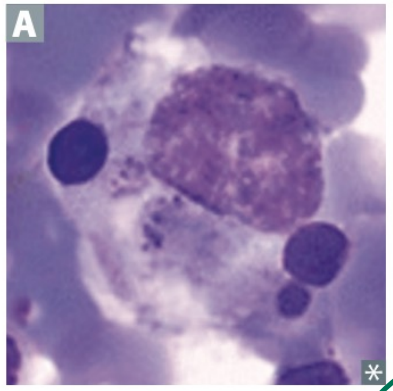
macrophage

Microglia → from mesoderm

macroph

Microglia	Activation in response to tissue damage → release of inflammatory mediators (eg, nitric oxide, glutamate). Not readily discernible by Nissl stain.	Phagocytic scavenger cells of CNS. HIV-infected microglia fuse to form multinucleated giant cells in CNS in HIV-associated dementia.

IFN γ → granuloma

Macrophages 	A type of antigen-presenting cell. Phagocytose bacteria, cellular debris, and senescent RBCs. Long life in tissues. Differentiate from circulating blood monocytes A. Activated by IFN-γ. Can function as antigen-presenting cell via MHC II. Also engage in antibody-dependent cellular cytotoxicity. Important cellular component of granulomas (eg, TB, sarcoidosis), where they may fuse to form giant cells.	*Macro* = large; *phage* = eater. Macrophage naming varies by specific tissue type (eg, Kupffer cells in liver, histiocytes in connective tissue, osteoclasts in bone, microglial cells in brain). Lipid A from bacterial LPS binds CD14 on macrophages to initiate septic shock.

ADCC ! killer cells

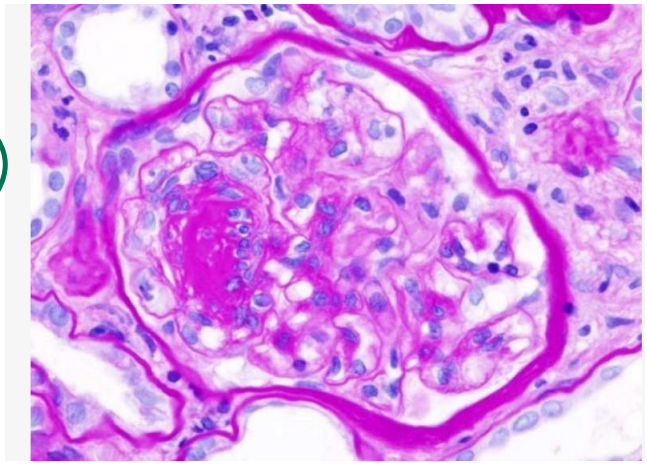
11

A 50-year-old man presented with the blurring of vision. Urine examination showed proteinuria. Fundus examination showed dot and blot hemorrhages, microaneurysms, and cotton wool spots. Histopathology of the kidney was as shown below. What is your diagnosis? (NEET-PG PYQ)

earliest in DR

DM

KW



A. Renal amyloidosis

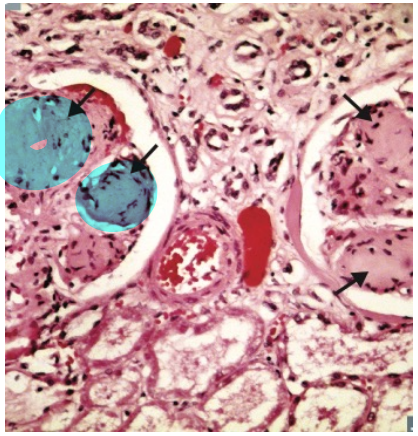
B. Focal segmental glomerulosclerosis

C. Kimmelstiel-Wilson desease — DM

D. Lupus nephritis

DM + HTN → Rx → ACE⊖

Diabetic glomerulo-nephropathy	Most common cause of ESRD in United States. Hyperglycemia → nonenzymatic glycation of tissue proteins → mesangial expansion → GBM thickening and ↑ permeability. Hyperfiltration (glomerular HTN and ↑ GFR) → glomerular hypertrophy and glomerular scarring (glomerulosclerosis) → further progression of nephropathy. Look for albuminuria with ↑ urine albumin-to-creatinine ratio. ACE inhibitors and ARBs are renoprotective.	Mesangial expansion, GBM thickening, eosinophilic nodular glomerulo-sclerosis (Kimmelstiel-Wilson lesions D)	Non-specific staining. Usually negative.	Prominent thickening of GBM with expanded mesangium, predominantly due to increased mesangial matrix, segmental podocyte effacement



12 **The most important prognostic factor of Wilms tumor_____. (NEET-PG PYQ)**

A. Anaplastic histology

B. Tumor size

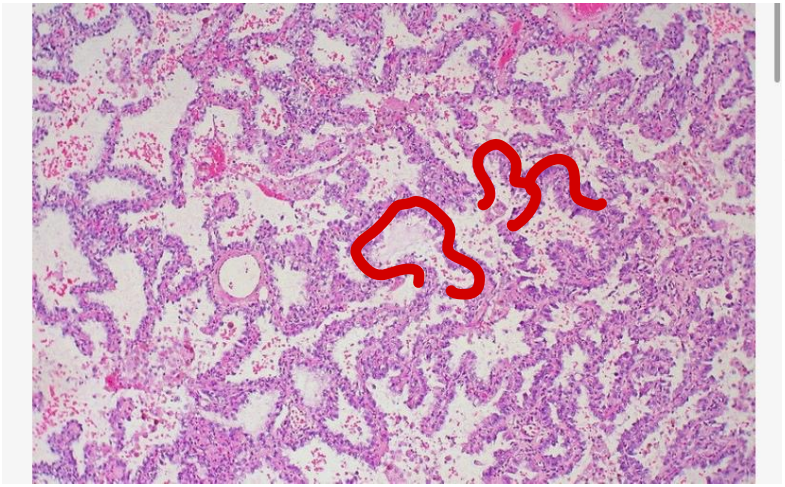
C. Age of patient

D. Mutation of chromosome 1p

- Breast Ca → axillary LN status.
- aka Nephroblastoma
  - renal
- does not cross midline
- child

W ∈ CNS

(12) A 40 year old female presents to the opd with complaints of cough, hemoptysis, dyspnoea and weight loss. Bronchoscopy suggested lung carcinoma. Lung biopsy revealed the following picture. Which of the following carcinomas is the clinical scenario suggestive of? (NEET-PG PYQ)



A. Squamous cell cancer

B. Small-cell cancer

C. Adenocarcinoma

D. Carcinoid

gland.

TTF-1 (+)

Thyroid

Non–small cell			
Adenocarcinoma	Peripheral	Most common 1° lung cancer. Most common subtype in people who do not smoke. More common in females than males. Activating mutations include *KRAS*, *EGFR*, and *ALK*. Associated with hypertrophic osteoarthropathy (clubbing). Bronchioloalveolar subtype (adenocarcinoma in situ): CXR often shows hazy infiltrates similar to pneumonia; better prognosis.	Glandular pattern, often stains mucin ⊕ B. Bronchioloalveolar subtype: grows along alveolar septa → apparent "thickening" of alveolar walls. Tall, columnar cells containing mucus.

(14) **McCallum's patch is seen mostly in the _____. (NEET-PG PYQ)**

rheumatic carditis
↓
endocardium

mitral

A. Left atrium
B. Right atrium
C. Left ventricle
D. Right ventricle

- Aschoff
- anitschkow cells.

MacCallum's patch is an irregular area of thickening in the posterior wall of the left atrium, usually due to previous severe acute rheumatic endocarditis involving the sub-endocardial connective tissue at this site.

17

A 78-year-old man has become progressively unable to live independently for the past 10 years, and he now requires assistance with activities of daily living. On physical examination, he has no motor or sensory deficits. At the time of his death, he is profoundly disabled, mute, and immobile. Histologic examination of the brain at autopsy shows atrophy, with numerous neocortical neuritic plaques and neurofibrillary tangles. The peripheral cerebral arteries and the core of each plaque stain positively with Congo red. Which of the following mechanisms is most likely responsible for his disease?

APP

B. amyloid Alzheimer

A. Aggregation of Aβ peptide

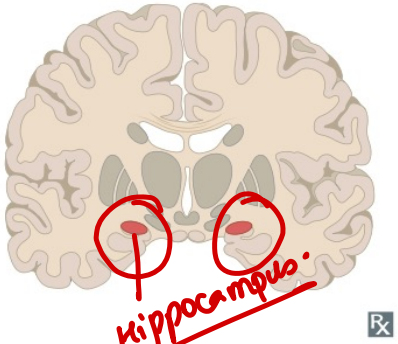
B. Conformational change in the prion protein (PrP)

C. Mutations in the tau gene → FTD tauopathy

D. Dopamine deficiency

angiopathy → bleed. recurrent lobar

Alzheimer disease



Most common cause of dementia in older adults. Advanced age is the strongest risk factor. Down syndrome patients have ↑ risk of developing early-onset Alzheimer disease, as amyloid precursor protein (APP) is located on chromosome 21. ↓ ACh in brain.

Associated with the following altered proteins:

- ApoE-2: ↓ risk of sporadic form
- ApoE-4: ↑ risk of sporadic form
- APP, presenilin-1, presenilin-2: familial forms (10%) with earlier onset

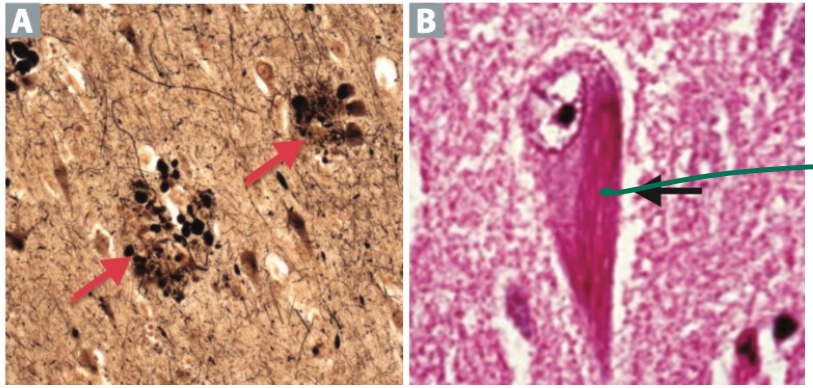
ApoE-2 is "protective," ApoE-4 is "four" Alzheimer disease.

Widespread cortical atrophy, especially hippocampus. Narrowing of gyri and widening of sulci.

Senile plaques A in gray matter: extracellular β-amyloid core; may cause amyloid angiopathy → intraparenchymal hemorrhage; Aβ (amyloid-β) is derived from cleavage of APP.

Neurofibrillary tangles B: intracellular, hyperphosphorylated tau protein = insoluble cytoskeletal elements; number of tangles correlates with degree of dementia.

Hirano bodies: intracellular eosinophilic proteinaceous rods in hippocampus.



16 **Hyperacute rejection of transplant is due to _____. (NEET-PG PYQ)**

intraop

mottled.

A. Preformed antibodies → HSN (2) AB (2)

B. Cytotoxic T-lymphocytes

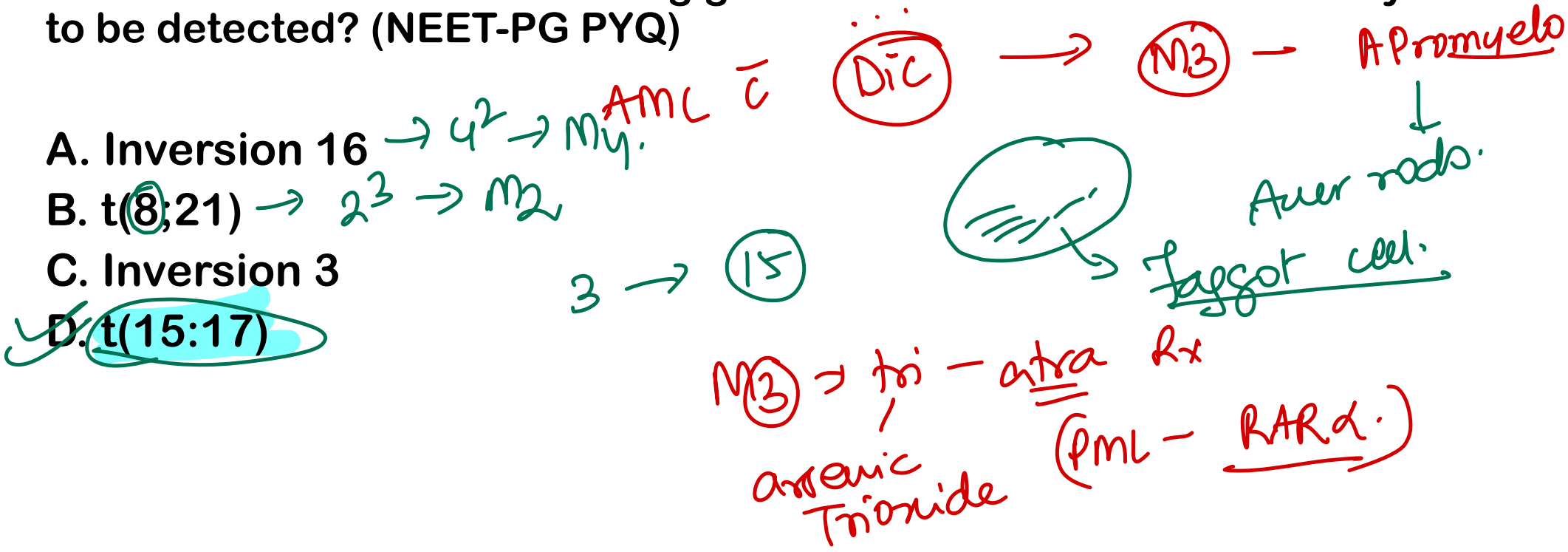
C. Circulating macrophages

D. Antidonor antibodies produced after transplantation

TYPE OF REJECTION	ONSET	PATHOGENESIS	FEATURES
Hyperacute	Within minutes	Pre-existing recipient antibodies react to donor antigen (type II hypersensitivity reaction), activate complement	Widespread thrombosis of graft vessels (arrows within glomerulus A) → ischemia and fibrinoid necrosis Graft must be removed

A 20-year-old boy presented with a one-day history of bleeding gums, subconjunctival bleed, and purpuric rash.
Investigations revealed the following results: Hb: 6.4 gm/dL; TLC: 26, 500 cells/mm3; Platelet: 35,000 mm3; prothrombin time: 20 sec with a control of 13 sec; partial thromboplastin time: 50 sec; and Fibrinogen 10 mg/dL. Peripheral smear was suggestive of acute myeloblastic leukemia. Which of the following genetic abnormalities is most likely to be detected? (NEET-PG PYQ)

A. Inversion 16
B. t(8;21)
C. Inversion 3
D. t(15:17)

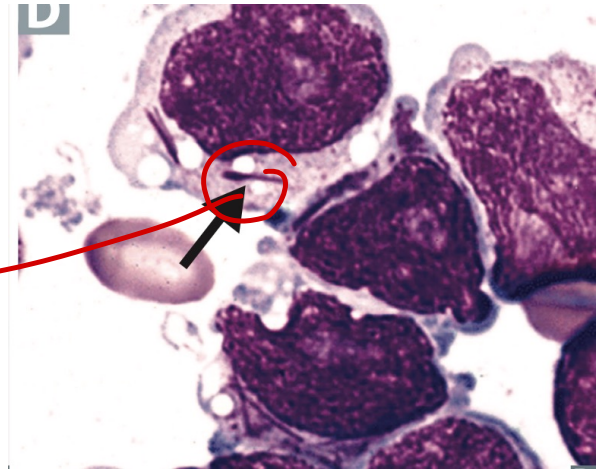


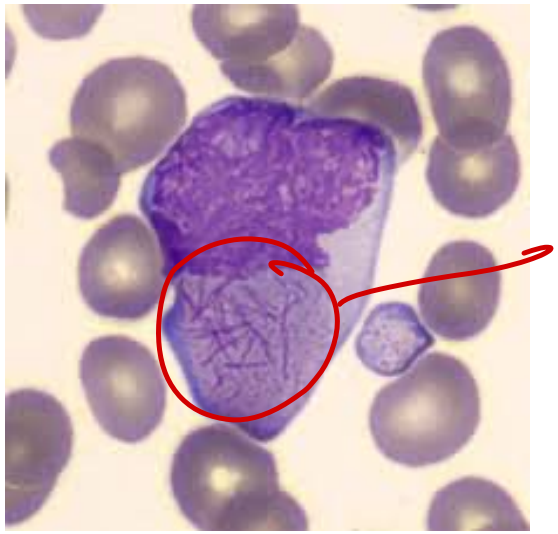
Acute myelogenous leukemia

Median onset 65 years. Auer rods D; myeloperoxidase ⊕ cytoplasmic inclusions seen mostly in APL (formerly M3 AML); ↑↑↑ circulating myeloblasts on peripheral smear. May present with leukostasis (capillary occlusion by malignant, nondistensible cells → organ damage).

Risk factors: prior exposure to alkylating chemotherapy, radiation, benzene, myeloproliferative disorders, Down syndrome (typically acute megakaryoblastic leukemia [formerly M7 AML]).

APL: t(15;17), responds to all-*trans* retinoic acid (vitamin A) and arsenic trioxide, which induce differentiation of promyelocytes; DIC is a common presentation.





18 **The most common lung neoplasm associated with hypercalcemia is _____ (NEET-PG PYQ)**

↳ SCAmous

A. Squamous cell carcinoma

B. Adenocarcinoma → A Osteoarthropathy

C. Carcinoid

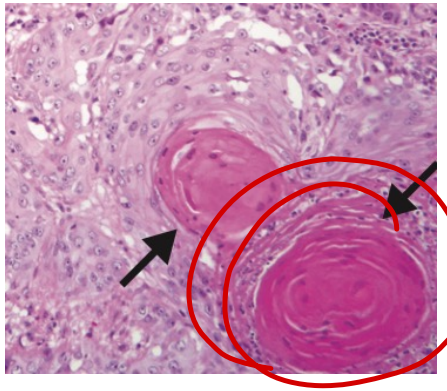
D. Small cell carcinoma

S C C

SIADH Cushing Lambert.

s-central

Squamous cell carcinoma	Central	Hilar mass C arising from bronchus; cavitation; cigarettes; hypercalcemia (produces PTHrP).	Keratin pearls D and intercellular bridges (desmosomes).



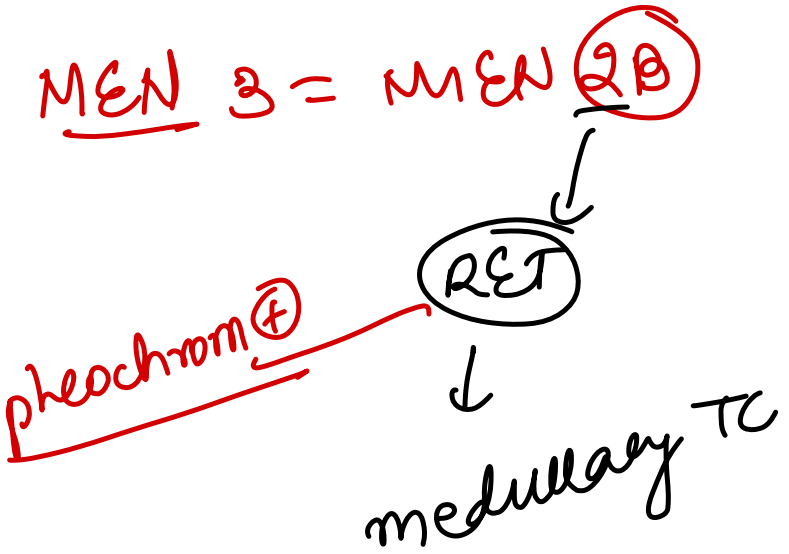
19 A patient with marfanoid habitus, hyperparathyroidism, and neuromas of the tongue presents with a cervical mass. The most likely cause of the cervical mass is_____. (NEET-PG PYQ)

A. Papillary carcinoma

B. Paraganglioma

C. Medullary carcinoma

D. Lymphoma



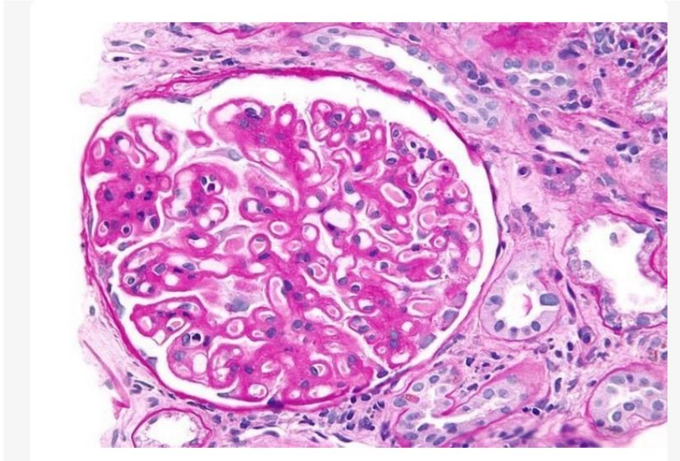
A 40-year-old man presents with complaints of facial puffiness and frothy urine. Given below is the histological image of the condition. What do you think is the diagnosis? (INI PYQ)

A. Membranous nephropathy

B. Focal segmental glomerulosclerosis

C. Membranproliferative nephritis

D. Dense deposit disease



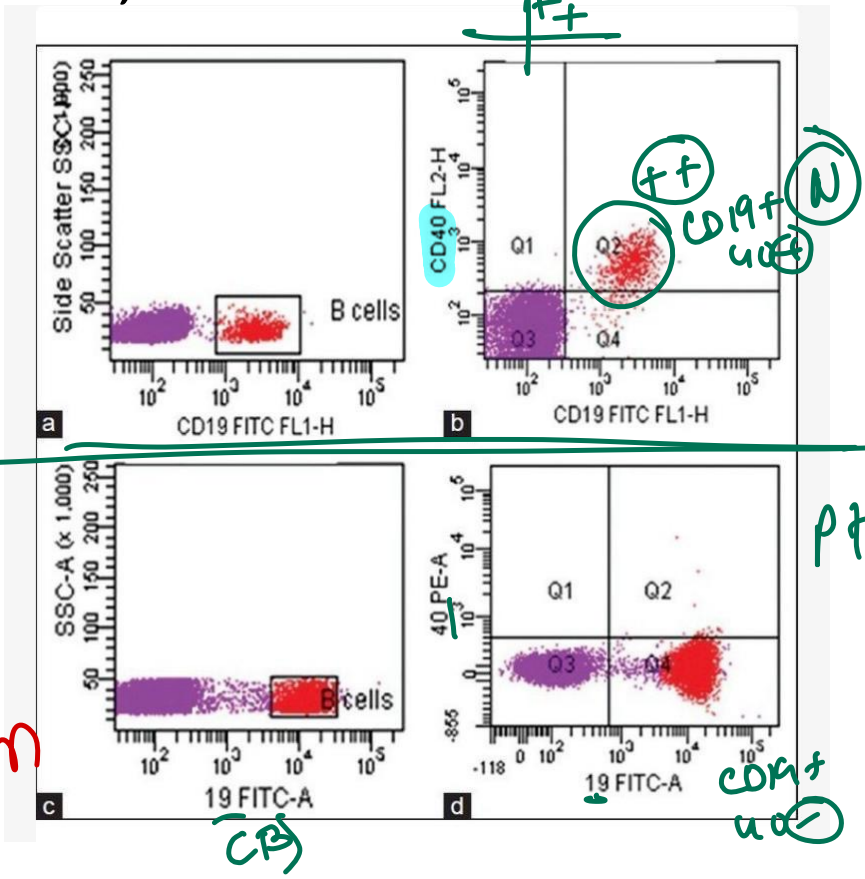
A 3-year-old boy presents with recurrent bacterial infections and Pneumocystis jiroveci pneumonia. The flowcytometry analysis of the boy (Boxes C & D) is shown below (Boxes A & B are normal). What is the most likely diagnosis? (INI PYQ)

A. Bare lymphocytes

B. Chronic granulocyte deficiency

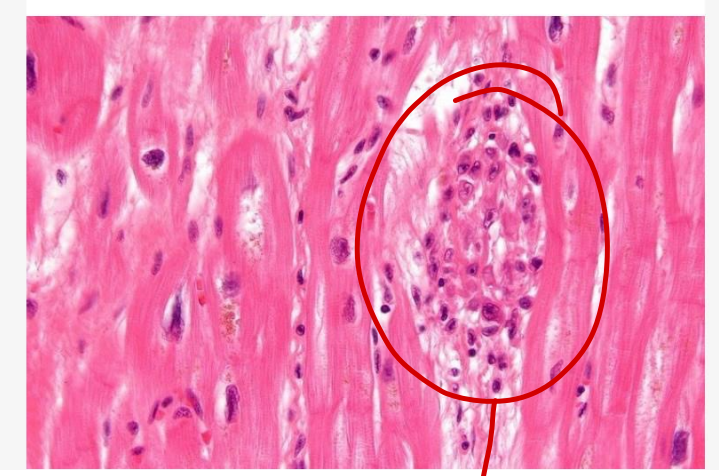
C. Hyper IgM syndrome

D. DiGeorge syndrome



22

A 30-year-old male patient presents with severe dyspnoea. Echocardiography showed mitral stenosis with vegetation. The vegetation present on the mitral valve was excised and its HPE image is given below. What is the most likely diagnosis? (INI PYQ)



A. Rheumatic valvular disease

B. Infective endocarditis

C. Myxoma

D. Sarcoidosis

↳ AV block

23 Immunohistochemistry marker for cyclinD1 negative mantle cell lymphoma is _____. (INI PYQ)

CD5+, CD23−

t(11, 14)

Sucks – SOX

~~A~~. SOX11

B. MYD88

C. ITRA

D. ANNEXIN V

↳ apoptosis

Ai → 

(24) A young boy from high altitude came with fever and weakness and had the following reports - Hemoglobin 17 g%, TLC is 21,000 with neutrophils 25, lymphocytes 30, eosinophils 5, myelocytes and metamyelocytes 40 in peripheral smear. Next step in the investigation should be:

A. Philadelphia chromosome – CML · t(9;22)

B. JAK mutation → PCV

C. Erythropoietin levels

D. Bone Marrow biopsy with reticulin stain

low → PCV → myeloprolif

high → hypoxia reached

25 All are true about von Willebrand disease, except that_____. (INI PYQ)

A. Type 1 is most common.
B. Type 2 is a qualitative defect.
C. Type 3 is autosomal dominant.
D. Type 3 is severe.

Von Willebrand Disease

Classification

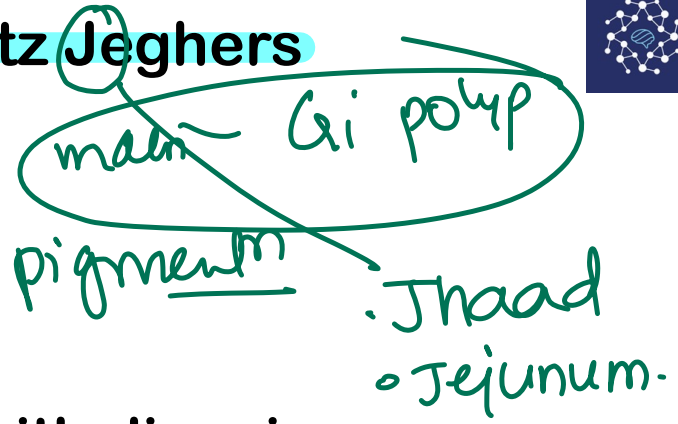
Type	Defect	Inheritance	Clinical Manifestations
Type 1 (Accounts for ~¾ of cases)	Quantitative defect (i.e. not enough vWF)	Autosomal dominant	Bleeding: None – severe
Type 2 (Type 2A, 2B, 2M, 2N)	Qualitative defect (i.e. dysfunctional vWF)	Autosomal dominant (common) Autosomal recessive (uncommon)	Bleeding: Moderate – severe
Type 3 (Accounts for <5% of cases)	Profound quantitative defect (i.e. a total or near total absence of vWF)	Autosomal recessive	Bleeding: Severe (Clinically similar to hemophilia A)

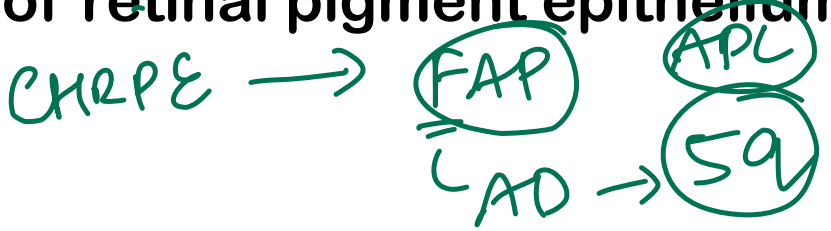
26

Which of the following is correct regarding Peutz Jeghers Syndrome?

A. Arborizing pattern of smooth muscle
B. Loss of heterozygosity in the STK11 gene
C. Multiple GI polyps
D. Autosomal recessive
E. Congenital hypertrophy of retinal pigment epithelium is seen

A. B,D,E
B. A,B,C
C. A,C,D
D. B,C,E





Peutz-Jeghers syndrome

Autosomal dominant syndrome featuring numerous hamartomatous polyps throughout GI tract, along with hyperpigmented macules on mouth, lips, hands, genitalia. Associated with ↑ risk of breast and GI cancers (eg, colorectal, stomach, small bowel, pancreatic).

intussusception

peutz

27 A 13-year-old female child presents with primary amenorrhea and short stature. Examination shows webbed neck, widely spaced nipples, and absent secondary sexual characteristics. USG abdomen shows small uterus and streak ovaries. The most common karyotypic abnormality seen in individuals with the given clinical condition is _____. (INI PYQ)

45 XO

A. Missing entire X chromosome

B. Isochromosome of the long arm 46,X,i(X)(q10) resulting in the loss of the short arm

C. Deletion of portions of both long and short arm

D. Deletion of portions of short or long arm

28

A patient who receives recurrent transfusions for thalassemia develops fever and chills during this time. There is no evidence of hemolysis. Which of the following measures can decrease the rate of transfusion reactions? (INI PYQ)

A. Leukoreduced RBCs

B. Antibiotics

C. Irradiation

D. Washed RBCs

NHFTR
↓
cytokines by donor WBCs.
↓
∴ WBC removed

Q. **HLA genes are located on chromosome_____. (INI PYQ)**

A. 6p

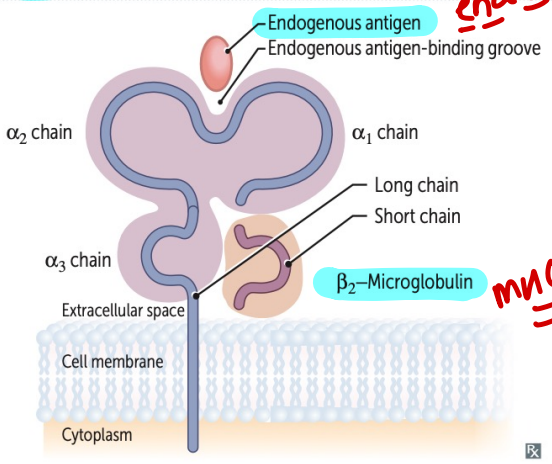
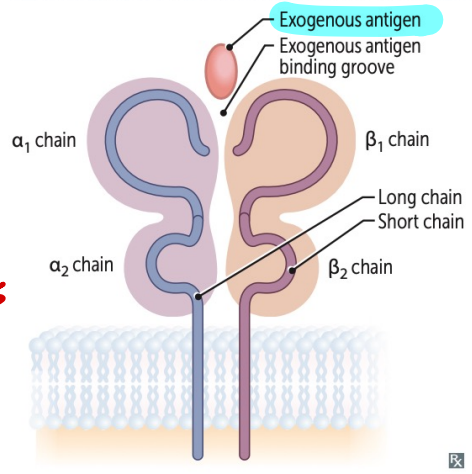
B. 9p

C. 8q

D. 7p

Major histocompatibility complex I and II

MHC encoded by HLA genes. Present antigen fragments to T cells and bind T-cell receptors (TCRs).

	MHC I	MHC II
LOCI	HLA-A, HLA-B, HLA-C MHC I loci have 1 letter	HLA-DP, HLA-DQ, HLA-DR MHC II loci have 2 letters
BINDING	TCR and CD8 (CD8 × MHC 1 = 8)	TCR and CD4 (CD4 × MHC 2 = 8)
STRUCTURE	1 long chain, 1 short chain	2 equal-length chains (2 α, 2 β)
EXPRESSION	All nucleated cells, APCs, platelets (except RBCs)	APCs
FUNCTION	Present endogenous antigens (eg, viral or cytosolic proteins) to CD8+ cytotoxic T cells	Present exogenous antigens (eg, bacterial proteins) to CD4+ helper T cells
ANTIGEN LOADING	Antigen peptides loaded onto MHC I in RER after delivery via TAP (transporter associated with antigen processing)	Antigen loaded following release of invariant chain in an acidified endosome
ASSOCIATED PROTEINS	β_2-microglobulin	Invariant chain
STRUCTURE		

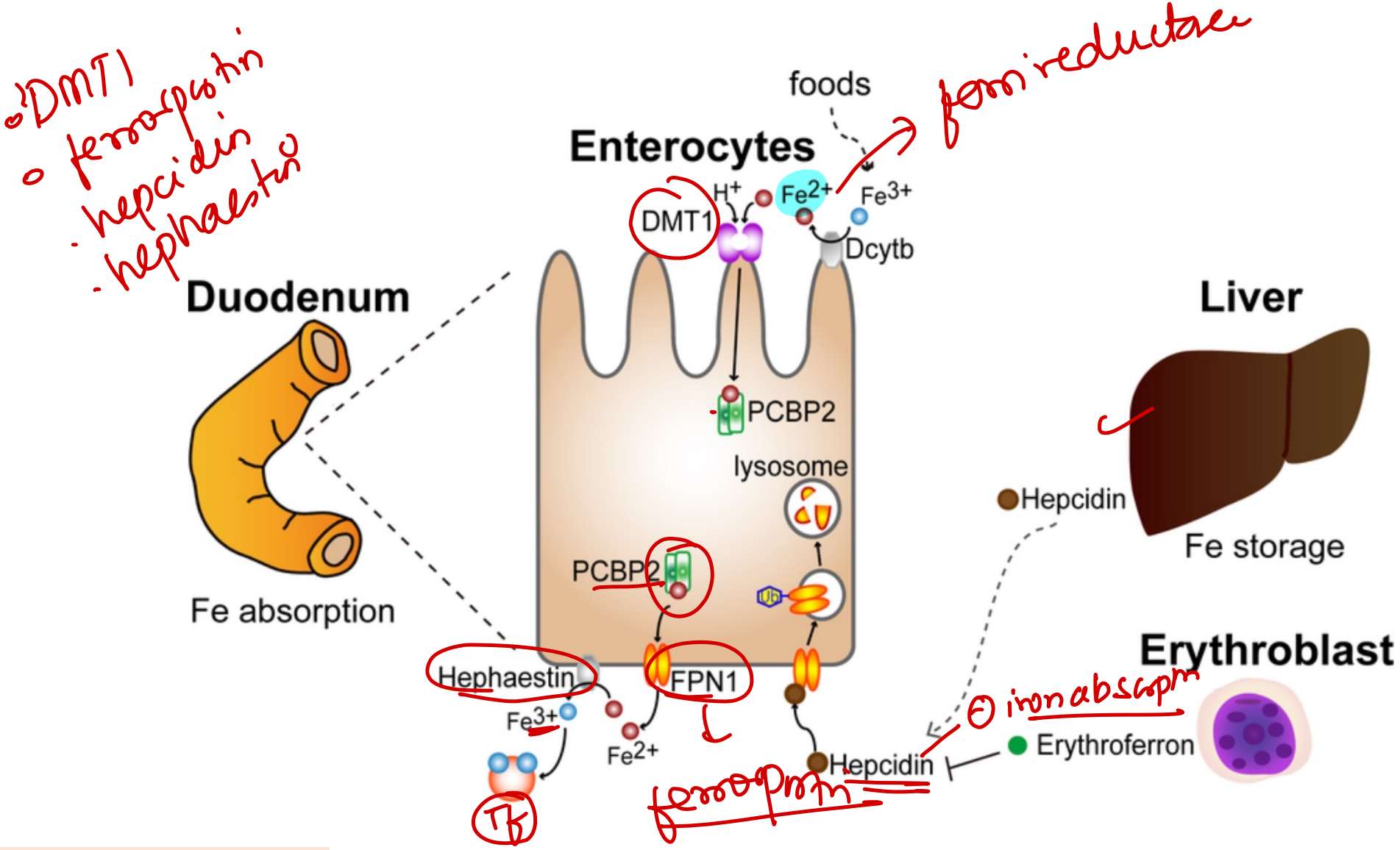
30 Which transporter is required for the transport of iron into the enterocyte? (INI PYQ)

A. Ferroportin → into circulation

B. Divalent metal transporter 1 (DMT 1) — Fe 2+

C. Divalent metal transporter 2 (DMT 2)

D. Hephaestin → Fe2+ → Fe3+ → Transferrin


DMT1
ferroportin
hepcidin
hephaestin
foods
ferireductase
Enterocytes
H+
Fe2+
Fe3+
DMT1
Dcytb
Duodenum
Liver
PCBP2
lysosome
Hepcidin
Fe storage
PCBP2
Fe absorption
Hephaestin
FPN1
Erythroblast
iron absorption
Fe3+
Fe2+
Erythroferron
Hepcidin
TF
ferroportin