



Cerebellum
Get the balance right

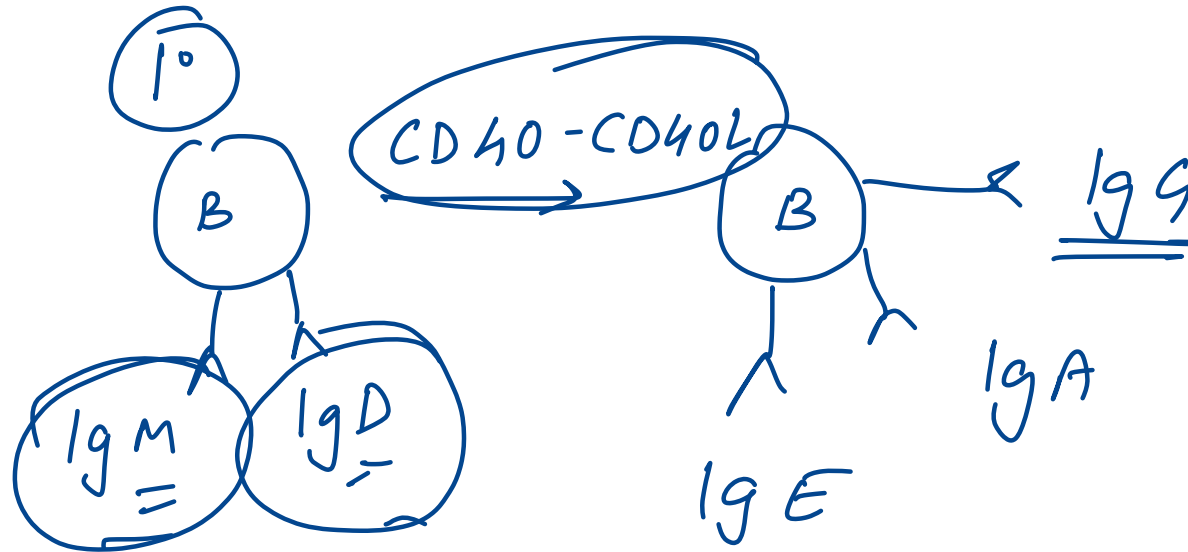
BTR General Path-Pharma-Physio - 05-09-2025

Dr. Zainab Vora

1. Due to which phenomenon, B cells express IgM and IgD antibodies at the same time?

- A. Somatic hypermutation → affinity maturⁿ
- ~~B. Alternative RNA splicing~~
- C. Affinity maturation
- D. Allelic exclusion

pyq



2. 18-month-old boy is brought to the emergency department due to blood in his stool, which the parents noticed when changing his diaper. The infant has had no previous bleeding and has been eating and drinking normally. He has a history of recurrent otitis media, frequent herpes labialis, and 2 episodes of pneumonia. On examination, the patient is well developed, well nourished, and has a fair complexion. He has eczema on his cheeks, trunk, and extremities. Scattered petechiae are also visible on his lower extremities. Laboratory studies show a platelet count of 24,000/mm³ and a leukocyte count of 9,000/mm³. Peripheral smear confirms the low platelet count and that the platelets are small. Genetic testing confirms the diagnosis. Which of the following processes is most likely affected by this patient's gene mutation?

A. Antibody class switching *xx CD40*

B. Cytoskeleton regulation

C. DNA repair → *ATM / Fanconi anemia / XP / HNPCC / SCID*

D. Maturation of T cells *SCID / DiGeorge.*

TIE
XLR

WASP

3. 3-year-old boy is brought to the emergency department for 2 days of fever, cough, and worsening shortness of breath. The patient's parents report that he recently recovered from prolonged diarrhea due to Giardia infection. Medical history is significant for recurrent ear infections treated with antibiotics since age 6 months and lobar pneumonia requiring hospitalization. Temperature is 38.7 C (101.7 F), pulse is 140/min, and respirations are 60/min. Physical examination reveals small tonsils and crackles in the lower lobe of the right lung. Which of the following is the most likely cause of this patient's recurrent infections?

A. Abnormal B-lymphocyte maturation

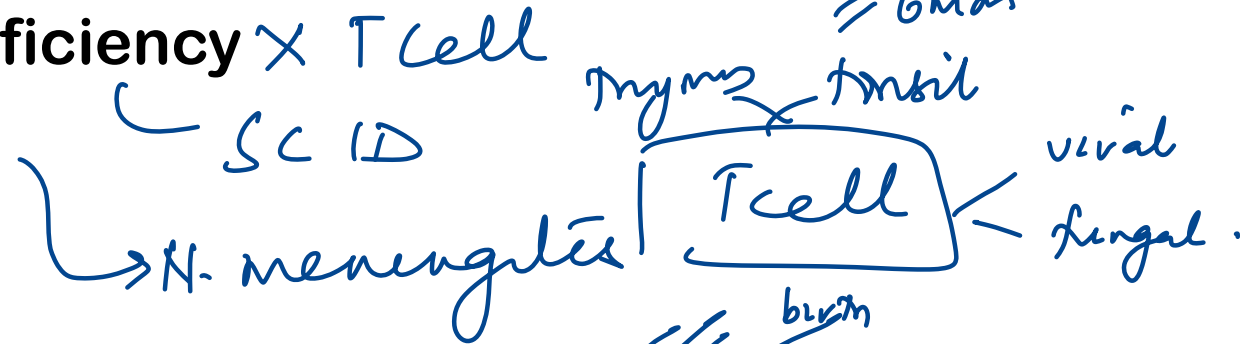
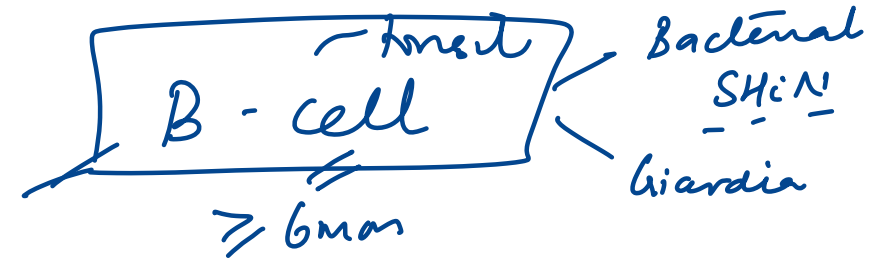
B. Adenosine deaminase deficiency X T cell

C. Complement deficiency

D. Impaired oxidative burst

CGD

2 catalase +ve SPACE

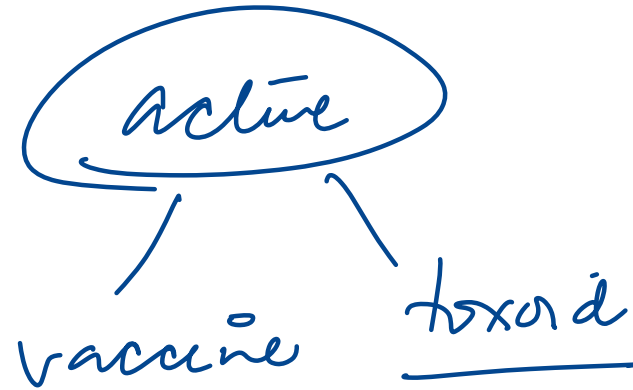


burst

4. Which of the following does not provide passive immunity?

- A. Antitoxin ✓
- B. Maternal Monoclonal Antibody ✓
- C. IgA ✓
- D. ~~Toxoid~~

PYQ



5. Which of the following mediators of inflammation is an example of a C-X-C chemokine?

A. Lipoxin LXA-4

B. IL-8

C. Lymphotoctin

D. Fractalkine

Type	Cysteine Pattern	Example Ligands	Cells Recruited
CC	Two adjacent cysteines	CCL2 (MCP-1), CCL5 (RANTES), CCL11 (Eotaxin)	Monocytes, T cells, eosinophils
CXC	Two cysteines separated by one	•CXCL8 (IL-8), CXCL10 (IP-10), CXCL12 (SDF-1).	Neutrophils, lymphocytes
CX3C	Two cysteines separated by three	•CX3CL1 (Fractalkine).	Monocytes, T cells
C	One pair, no other conserved Cs	XCL1 and XCL2 (Lymphotactins)	T cells

6. Which of the following is the most potent stimulator of naive T-cells?

pyq

- A. Mature dendritic cells
- B. Follicular dendritic cells
- C. B lymphocytes
- D. ~~NK cell~~

APC

B

D

M

B cell

Dendritic

Macrophages

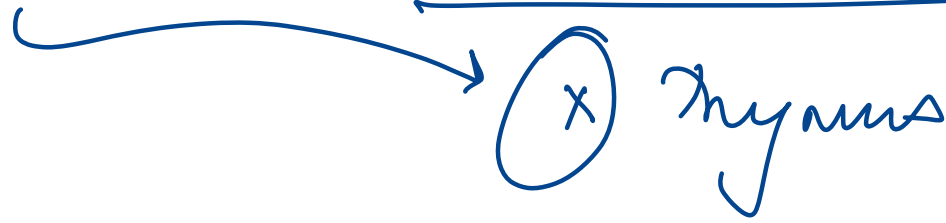
7. Nude mice are not resistant to xenograft due to the absence of?

A. B cell

B. T cell

C. Both B and T cell

D. INK cell



pyq.

8. A 2-year-old boy is evaluated for recurrent infections. He was born at term after a normal pregnancy. His mother states, "He is always sick with something and is constantly on antibiotics." The patient's past medical records indicate multiple episodes of otitis media, skin infections, and pneumonia. Incision and drainage of his skin infections revealed *Staphylococcus aureus* on bacterial culture but no purulence. Laboratory testing reveals absent **CD18** antigens on the surface of leukocytes. The patient is at greatest risk for which of the following?

A. Infection following live-virus vaccines

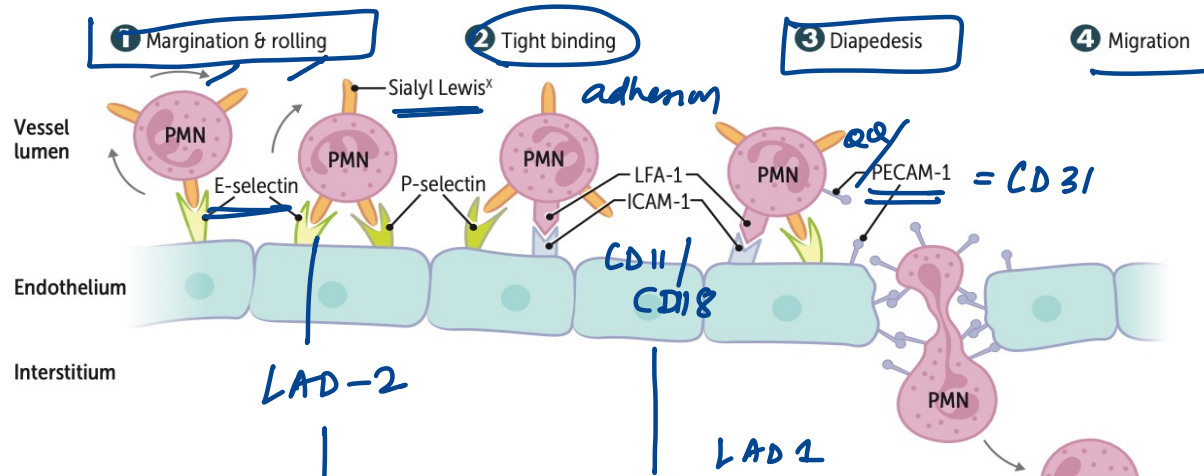
B. Infection with *Neisseria*

C. Persistent leukocytosis

D. Small or absent lymph nodes

LAD - 1

⊗ abscess / pus



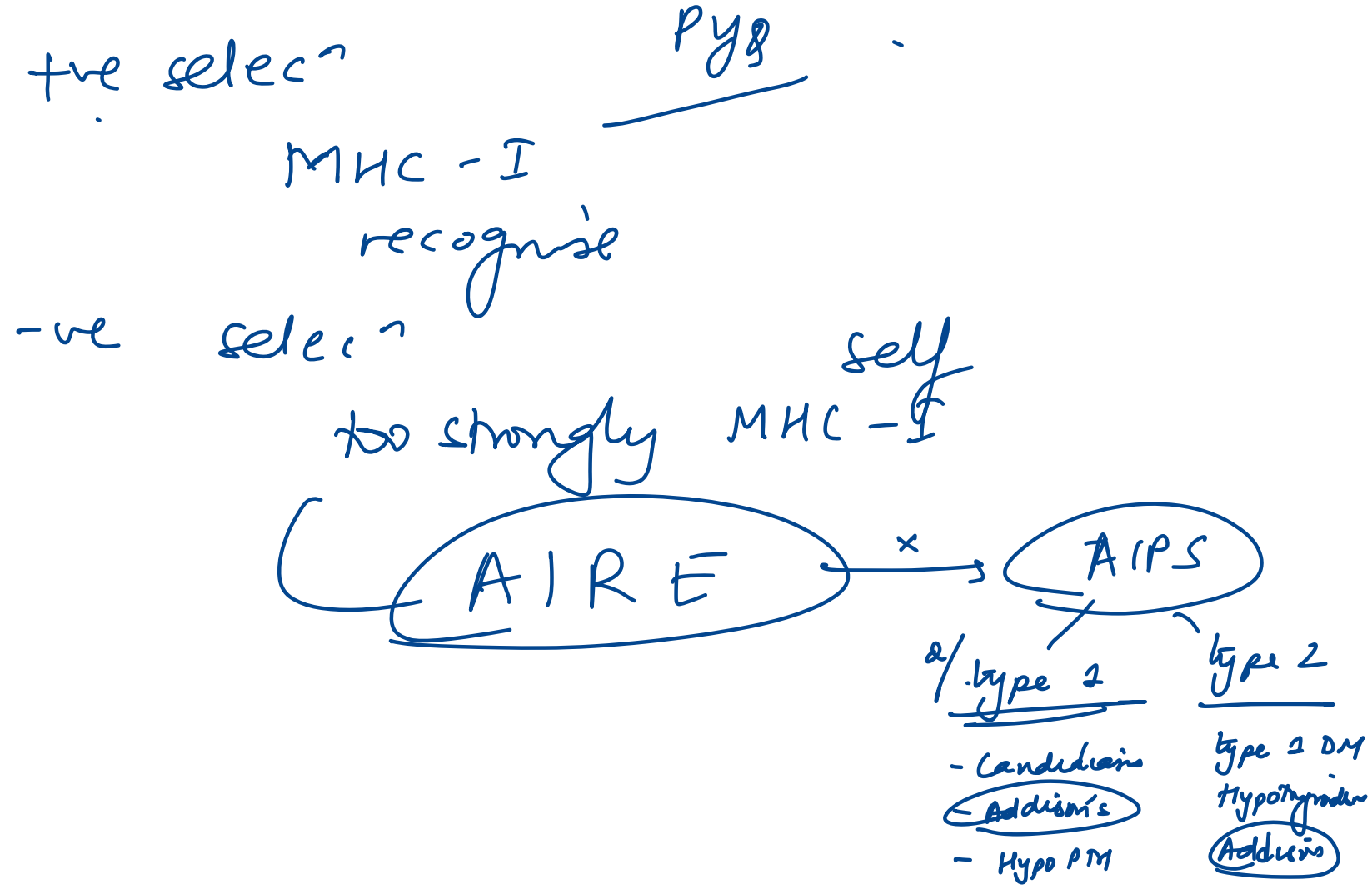
Bombay blood group

Delayed separation of cord
No pus

Chemokines
IL-8
CSa
LTB4

9. The Thymus gland is specialized in identifying the molecules of the Major Histocompatibility Complex that are presented to it. It discerns whether these cells belong to the body's own or are of foreign origin. Which specific gene is accountable for this function?

- A. NOTCH1
- B. E2A
- C. Rag 1/2
- D. AIRE**



10. Match the CD markers-

1. Pluripotent stem cells	a. CD14, CD64
2. Megakaryocytes	b. CD 41,42
3. Erythrocytes	c. CD34
4. Monocytes	d. CD71

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

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

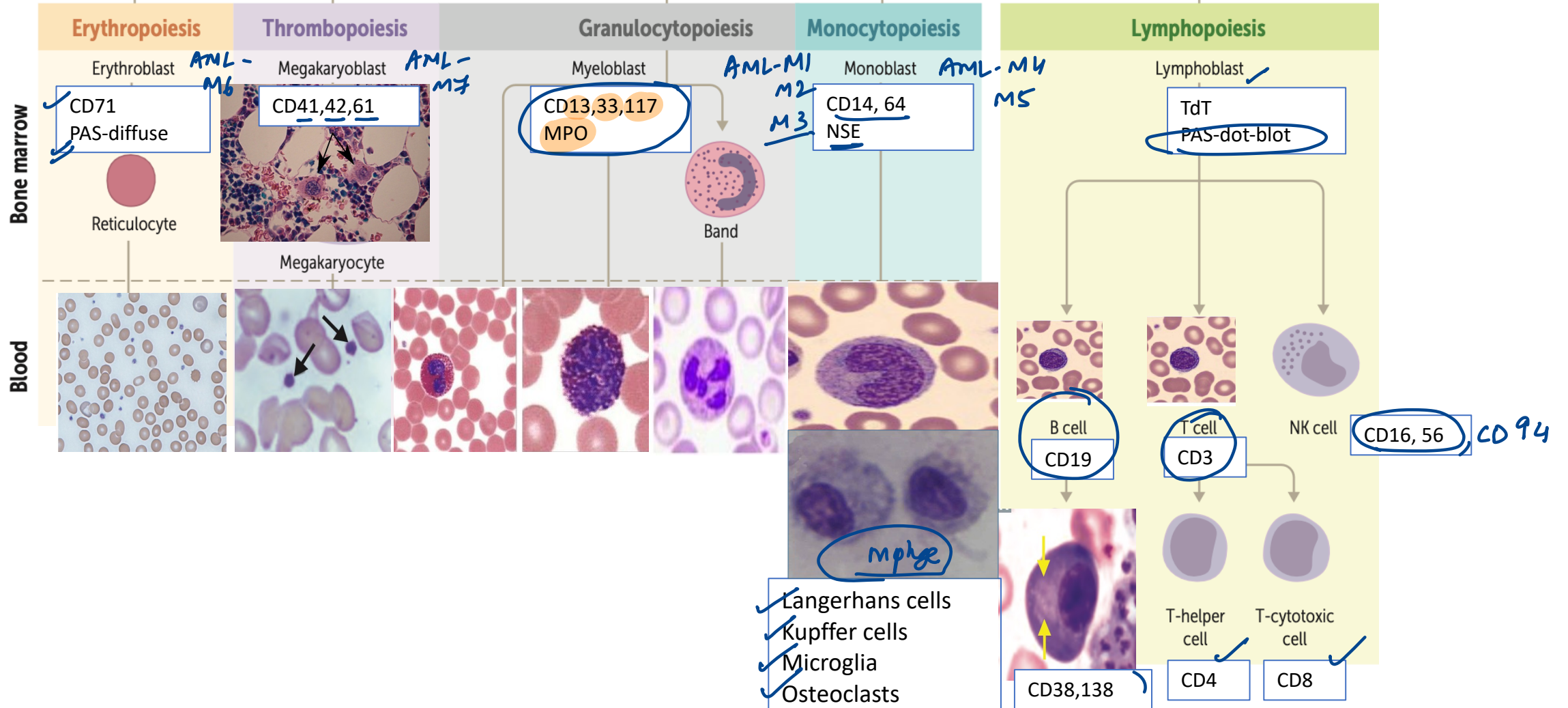
C. 1-a, 2-c, 3-b, 4-d

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

Multipotent stem cell *CD34*

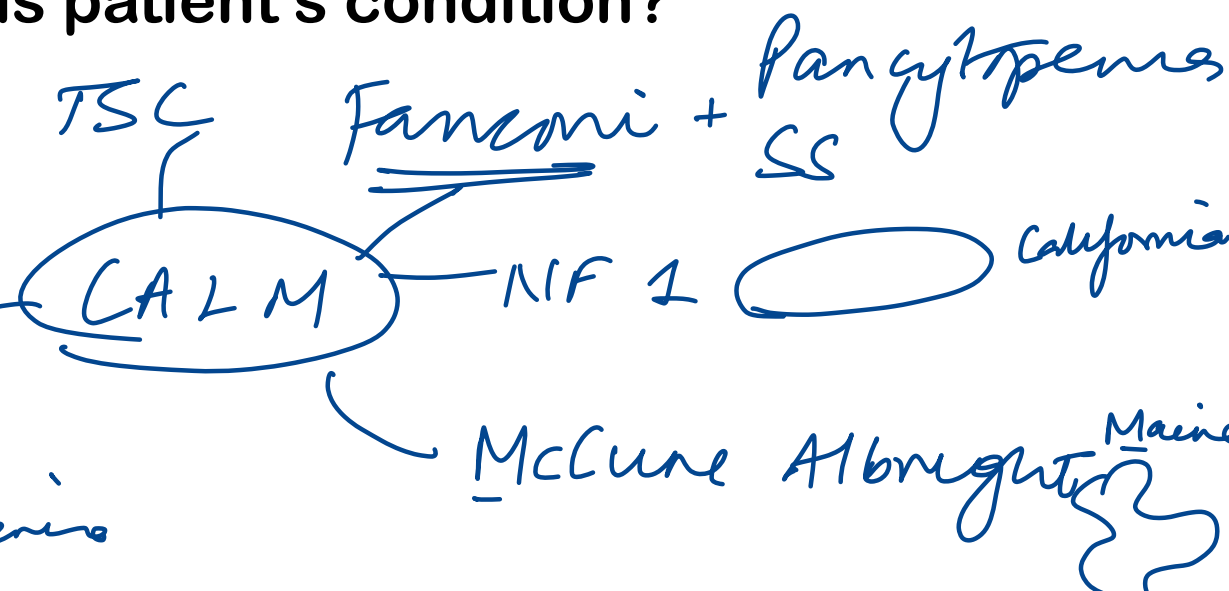
Myeloid stem cell

Lymphoid stem cell



11. A 4-year-old boy is brought to his pediatrician by his mother for recurrent nosebleeds. The mother reports that the boy has had five nosebleeds within the past 2 weeks, each lasting between 15 and 20 minutes. The patient was born at term and has been hospitalized twice for pneumonia treatment. There is no family history of serious illness. The patient is at the 8th percentile for height and the 30th percentile for weight. Vital signs are within normal limits. Examination shows a small, thin child with two flat, dark brown areas of hyperpigmentation across the upper back and a similar discoloration on the left buttock. There is bilateral esotropia. Laboratory studies show a hemoglobin concentration of 9.3 g/dL, mean corpuscular volume of 107 μm^3 , leukocyte count of 3800/ mm^3 , and platelet count of 46,000/ mm^3 . Which of the following is the most likely underlying cause of this patient's condition?

- A. Mutation in WAS protein *→ Wisenté*
- B. Defect in DNA crosslink repair**
- C. Acute Lymphoblastic leukemia *XX*
- D. Post Viral Autoimmune reaction *XX*

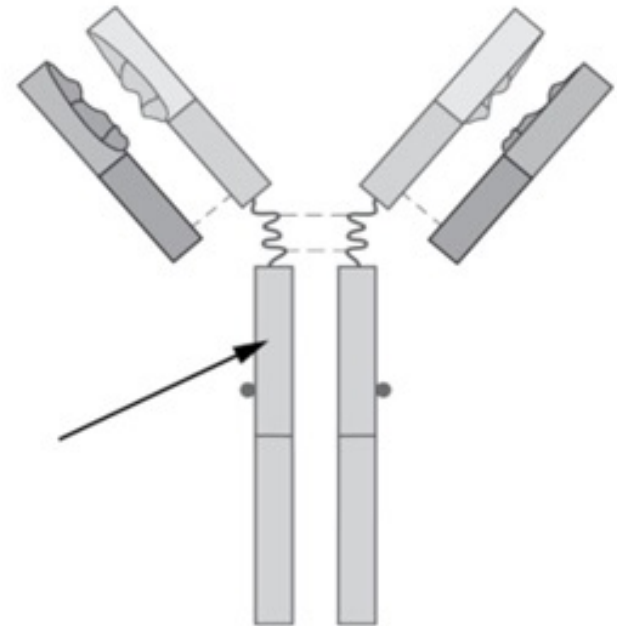


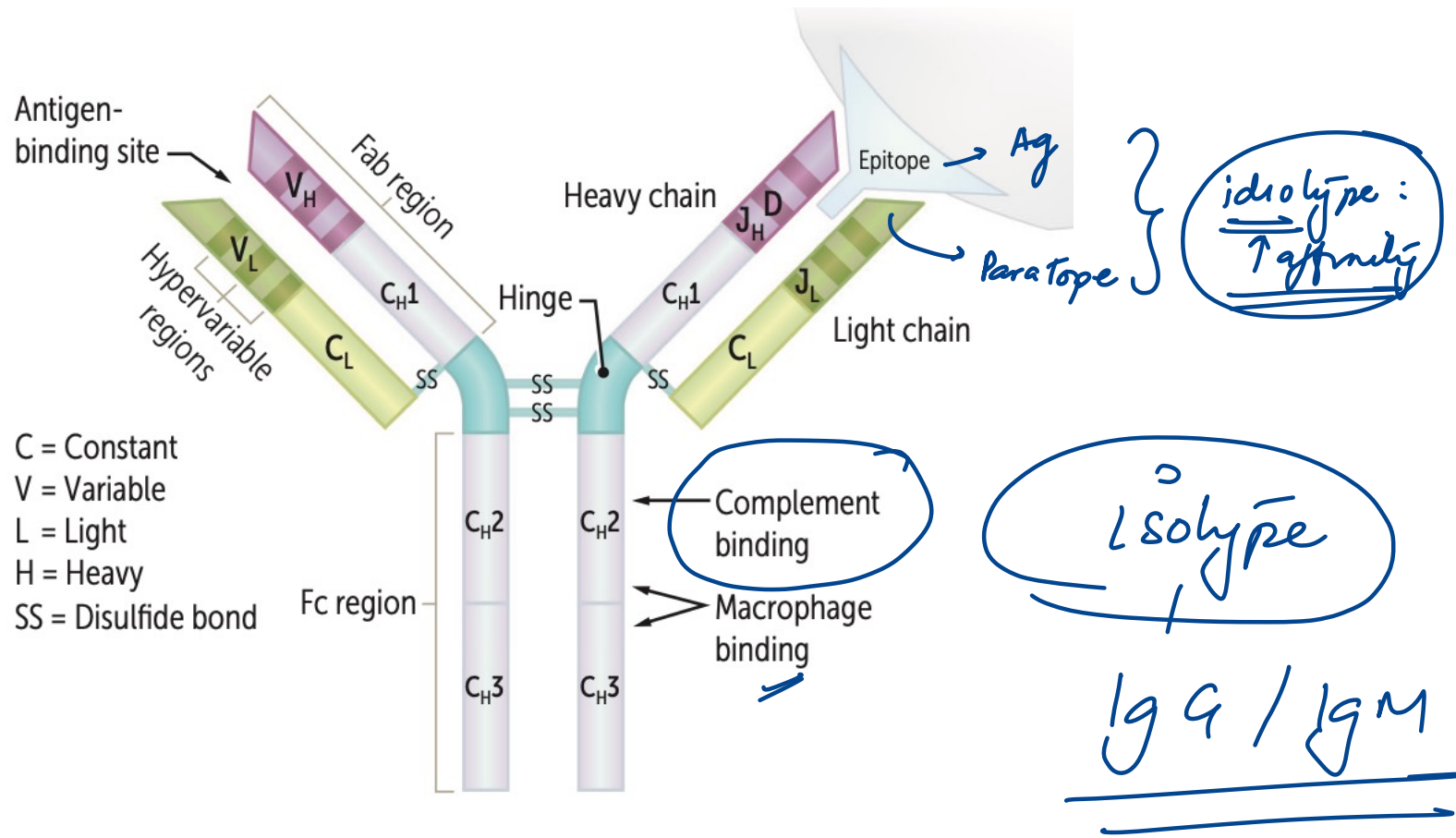
Aplastic anemia

California

12. An investigator is studying the structure and function of immunoglobulins that are transmitted across the placenta from mother to fetus. The structure indicated by the arrow is primarily responsible for which of the following immunological events?

- A. Formation of dimer
- B. Binding to mast cells
- C. Fixing of complement
- D. Attachment to antigen





13. Casoni reaction is seen in patients with hydatid cyst. Which of the following is incorrect about the immunoglobulin causing this reaction?

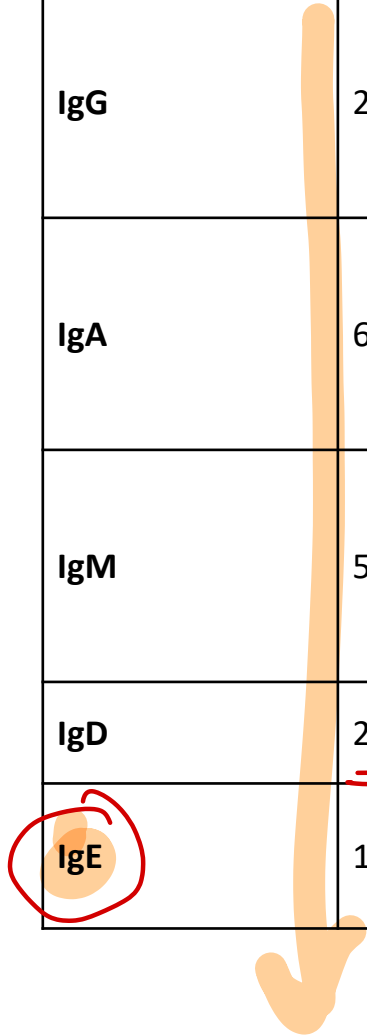
- ~~A.~~ It is the only heat stable antibody
- B. Levels are raised in helminthic infections
- C. It does not pass the placental barrier
- D. It has a half-life of 1-5 days

type I hyon
Ig E .

GAMDE

Ig Type	Half-life	Key Features
IgG	23 days	- Appears late → <u>chronic infection</u> - <u>Only Ig to cross placenta</u> - 4 subclasses - Opsonization, complement fixation, neutralization
IgA	6 days	- Two types: Serum IgA & <u>Secretory IgA (dimer)</u> - Secretory IgA → mucosal immunity
IgM	5 days	- <u>Pentamer</u> , highest molecular weight - Appears early → recent infection - Intravascular only - Agglutination, hemolysis, opsonization
IgD	<u>2-8 days</u>	- Surface Ig on B cells - Acts as antigen recognition receptor
<u>IgE</u>	1-5 days	- Type I hypersensitivity - <u>Heat-labile</u> - Increased in helminthic infections

- MM
- Come in serum
- t_{1/2}



14. A 28-year-old medical student undergoes a tuberculin skin test (TST) as part of a routine health check. He is asymptomatic with no history of recent fever, weight loss, or cough. He receives an intradermal injection of purified protein derivative (PPD) on the inner surface of his forearm. After 48 hours, a raised, erythematous induration measuring 18 mm is observed at the injection site. Which of the following interactions is critical to the development of this patient's skin reaction?

- A. CD14 on macrophages with bacterial lipopolysaccharide
- B. CD16 on NK cells ^{XX} with IgG-coated infected cells *ADCC*
- C. CD18 on neutrophils with ICAM-1 on endothelial cells *adhesion*
- D. CD28 on T lymphocytes with CD80/86 on epidermal dendritic cells

type IV hypersensitivity

TH1

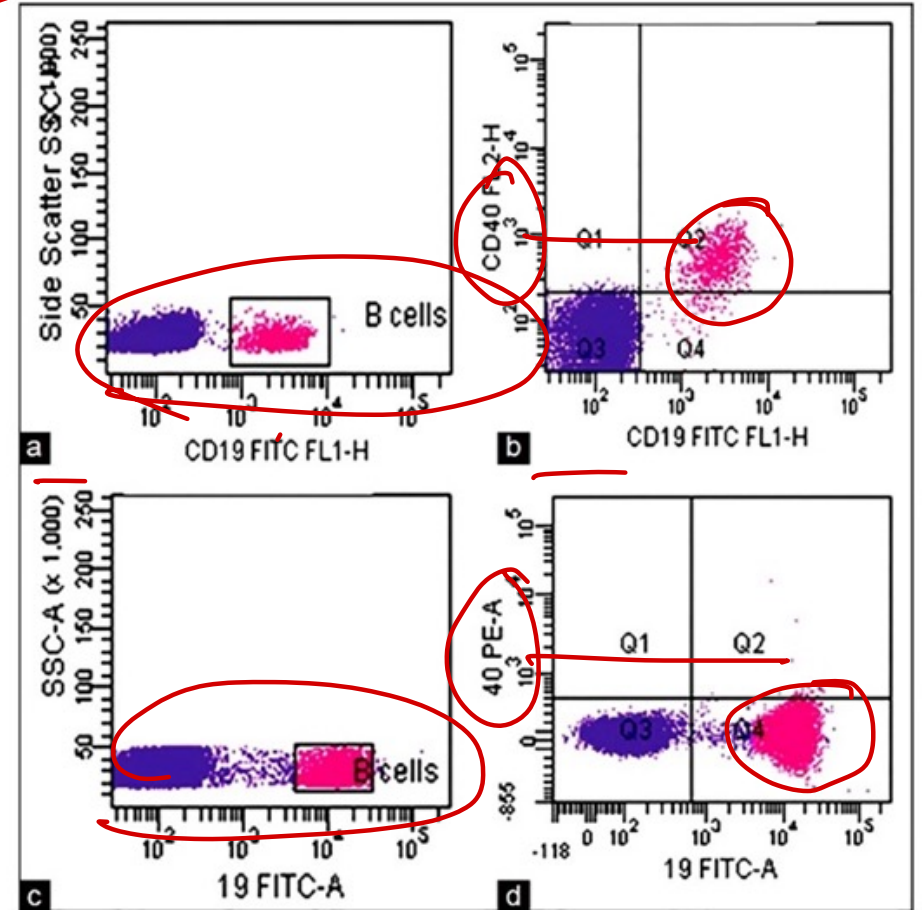
APC - Ag

15. 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?

- A. Bare lymphocytes
- B. Chronic granulocyte deficiency
- C. Hyper IgM syndrome**
- D. DiGeorge syndrome

Pyg →

CD40 xx →



16. Arrange the following sentences in the correct order for activation of B cells.

1. T-helper cells interact with the presented antigen peptides.
2. Improved quality of the immune response with affinity maturation.
3. Somatic hypermutation and immunoglobulin isotype class switching occur.
4. Antigen binding to B cell receptor.
5. Binding of CD40 ligand on T cells to CD 40 on B cells.

A. 1,2,3,4,5

B. 4,1,3,2,5

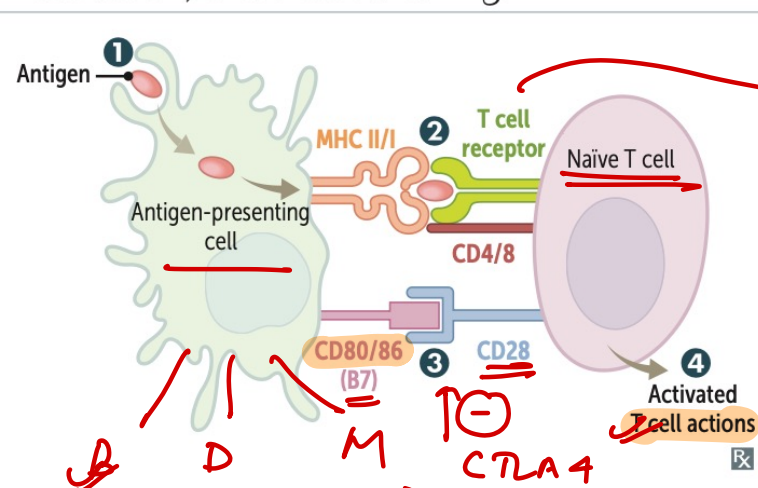
C. 4,1,5,3,2

D. 1,2,4,3,5

4, 1, 5, 3, 2

T-cell activation

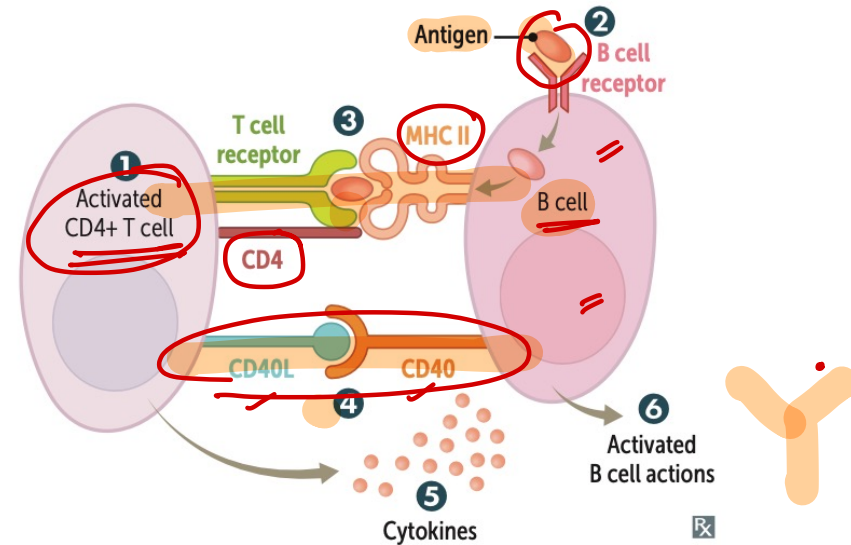
- 1 APC ingests and processes antigen, then migrates to the draining lymph node.
- 2 T-cell activation (signal 1): exogenous antigen is presented on MHC II and recognized by TCR on Th (CD4+) cell. Endogenous or cross-presented antigen is presented on MHC I to Tc (CD8+) cell.
- 3 Proliferation and survival (signal 2): costimulatory signal via interaction of B7 protein (CD80/86) on dendritic cell and CD28 on naïve T cell.
- 4 Activated Th cell produces cytokines. Tc cell able to recognize and kill virus-infected cell.



Handwritten notes:
 MHC I → all N cells / pit (x RBC) (x sperm)
 MHC II → APC

B-cell activation and class switching

- 1 Th-cell activation as above.
- 2 B-cell receptor-mediated endocytosis.
- 3 Exogenous antigen is presented on MHC II and recognized by TCR on Th cell.
- 4 CD40 receptor on B cell binds CD40 ligand (CD40L) on Th cell.
- 5 Th cells secrete cytokines that determine Ig class switching of B cells.
- 6 B cells are activated and produce IgM. They undergo class switching and affinity maturation.



17. All of the following are the part of the innate immunity except:

A. Alpha defensins ✓

~~B. B lymphocytes~~

C. Gamma Delta T lymphocytes

D. Lectin pathway

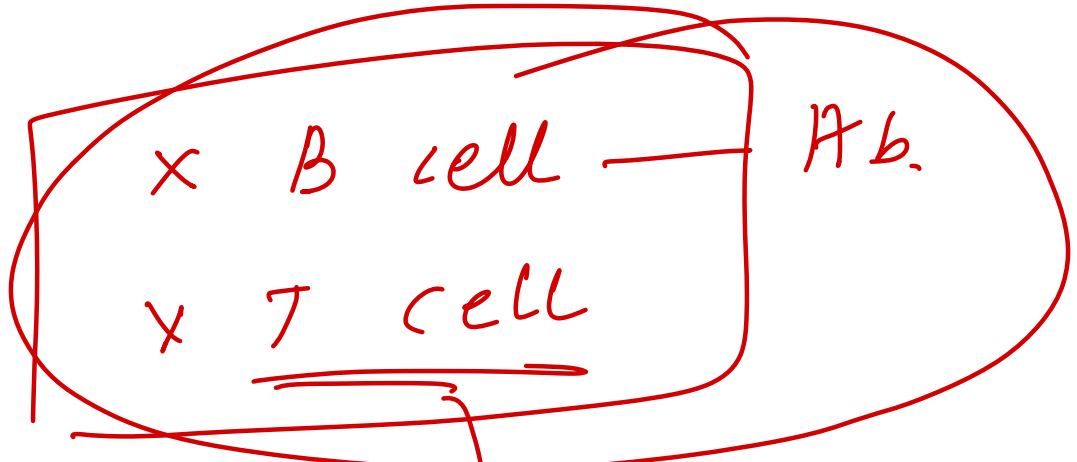
KIK cells

innate
MHC unrestricted

61/60
50%

innate

Acg



except

18. A 15-year-old girl comes to the office with gait instability. Since age 12, the patient has had mild weakness and "clumsiness" in her lower limbs that have progressed. Physical examination reveals kyphoscoliosis, pes cavus. Joint position and vibration sense are also impaired. Further evaluation reveals that she is suffering from an inherited disease. This patient is at greatest risk of dying from which of the following conditions?

A. Aortic dissection

B. Brain tumor

C. Cardiomyopathy

D. Intracranial bleeding

Friedreich ataxia

HOCM / DCM

19. Match the following with types of hypersensitivity:

1. A 38-year-old female with double vision and mass in the mediastinum	A. Type 1
2. Graft kidney showing mononuclear cell infiltrates with C4d deposition in peritubular capillaries on IF	B. Type 2
3. Renal biopsy in a patient with SLE presenting with hematuria shows thickened vessel walls with pink-staining material	C. Type 3
4. Casoni test in a patient with hydatid cyst	D. Type 4

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

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

C. 1-C, 2-D, 3-C, 4-D

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

20. Which of the following is not true regarding the procedure done using the instrument given in the image below?

- ~~A. Contraindicated if platelet count <40,000~~
- B. Breath holding is required ✓
- C. Procedure can be done in both lateral & prone position ✓
- D. Diagnosing an infiltrative or granulomatous disease ✓

<10K → transfusion



Jamshetti / BM bx

21. Match the following:

1. Swan neck deformity with activation of caspase-1,4, and release of IL-1 β in the synovial fluid	A. Pyroptosis
2. Dysregulation of glutathione peroxidase 4 and increased lipid peroxidation in a chemo-resistant breast tumor	B. Necroptosis
3. Radiation induced activation of caspase 9 and 3	C. Apoptosis
4. In a patient with sepsis, TNF-alpha mediated activation of receptor-interacting protein kinase 1 results in the disruption of the plasma membrane integrity, leading to cellular swelling	D. Ferroptosis

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

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

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

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

Caspase-independent

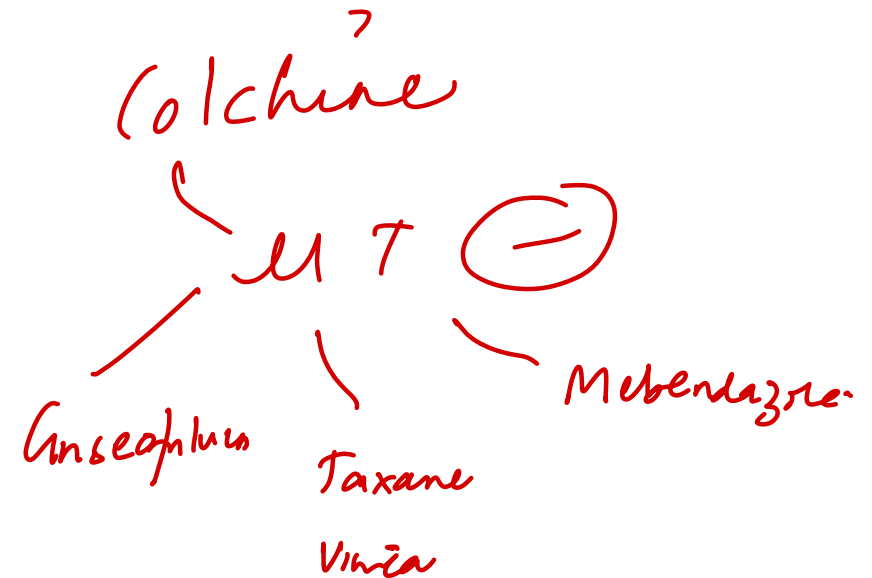
22. A 54-year-old man comes to the OPD due to severe foot pain. The patient attended a wedding reception where he drank several alcoholic beverages, then woke the following morning with pain. He has a long history of gouty arthritis, and his current symptoms are similar to previous flares of the disease. The patient is started on a new medication for gout that provides significant relief of his symptoms, but he returns to the clinic a week later with **diarrhea and persistent nausea**. The drug used in this patient most likely affects which of the following cell structures?

A. Cytoskeleton

B. Golgi apparatus

C. Nucleus

D. Peroxisomes



23. Which of the following neurodegenerative disease has misfolded superoxide dismutase 1 inclusions?

- A. Amyotrophic lateral sclerosis
- B. Friedrich ataxia
- C. Spinal bulbar muscular atrophy
- D. Multiple system atrophy

SOD1

Bunina

TDP43

FTD

24. Identify the correct statements

1. Leptin serves a permissive role in puberty (T)
2. Weber-Fechner law describes the relationship between the magnitude of a physical stimulus and the perceived intensity (T)
3. Golgi complex is located in supranuclear cytoplasm in serous acinar cells. (T)
4. Ganglion cells are the third-order neurons in the optic pathway. (T)

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

$1^{\circ} \rightarrow$ Photoreceptor
 $2^{\circ} \rightarrow$ Bipolar
 $3^{\circ} \rightarrow$ GC
 \downarrow
 $4^{\circ} -$ LGN

25. Arrange in sequence the cyclins at different stages of the cell cycle starting from the G1 phase.

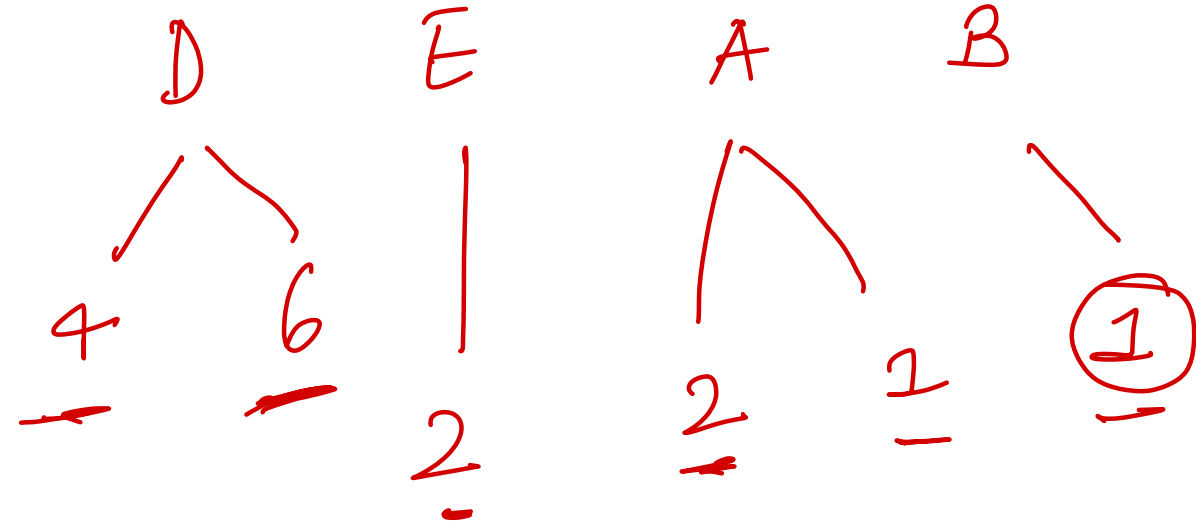
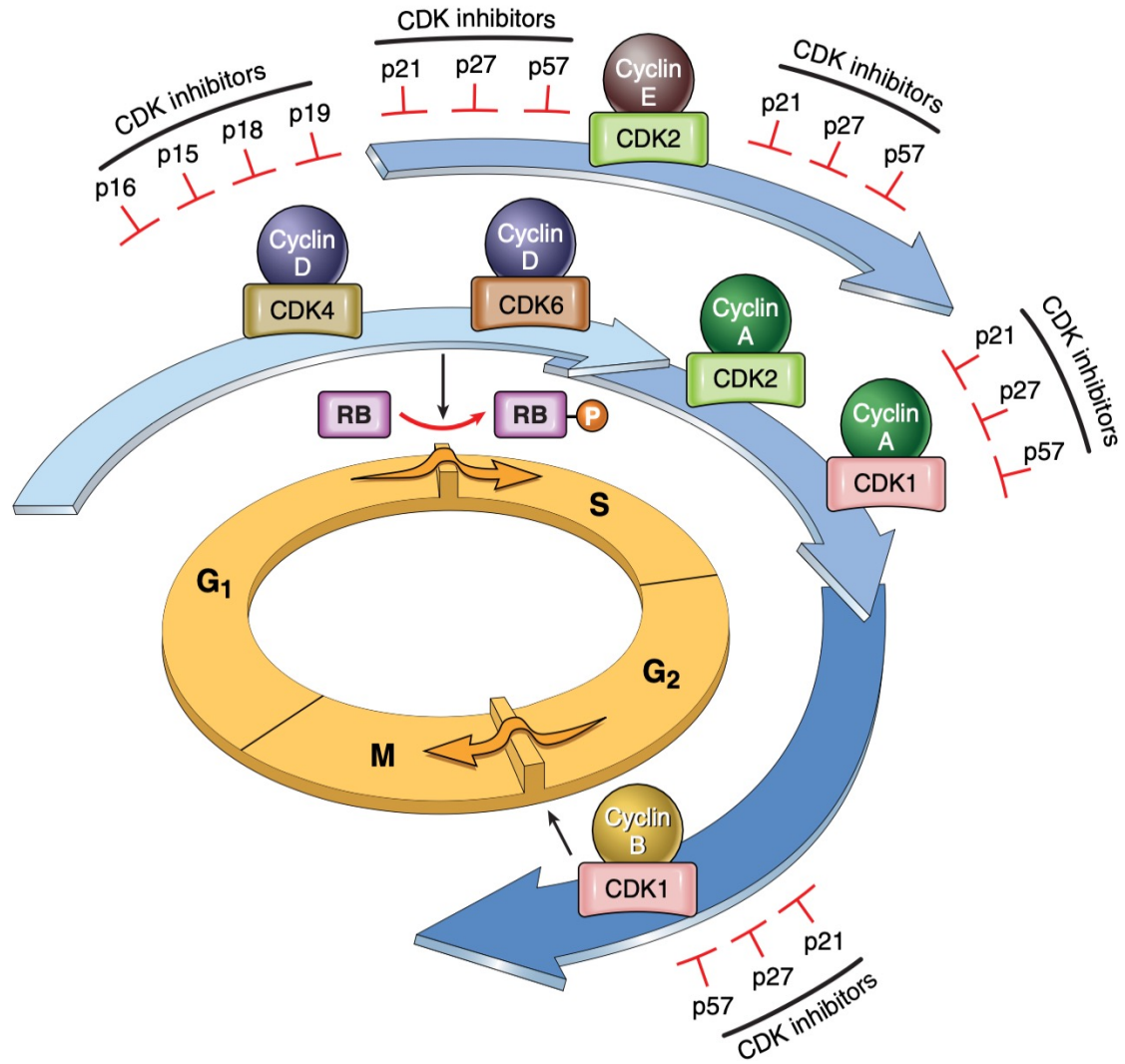
QQ

A. Cyclin B- Cyclin E- Cyclin A- Cyclin D

B. Cyclin E- Cyclin B- Cyclin A- Cyclin D

~~C. Cyclin D- Cyclin E- Cyclin A- Cyclin B~~

D. Cyclin B- Cyclin A- Cyclin E- Cyclin D



26. Which of the following statements is true about proto-oncogenes?

1. KIT has increased expression in GIST. (+)
2. KRAS mutation is more commonly associated with ~~small-cell lung carcinoma~~. her 2 adenc
3. ERBB2 over-expression is associated with breast carcinomas. (+) L-myc
4. PDGFR- β has ~~suppressed~~ expression in colorectal cancers. (+)

A. ~~2 only~~

B. 1 only

C. 1 and 3

D. 2 and 3

pyo -

(+)

her 2

adenc

L-myc

(+)

(+)

NEOPLASIA-PROTOONCOGENIC GENES

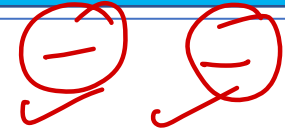
Proto-oncogenes

KRAS
HRAS
NRAS
GNAQ
GNAS
C MYC
L MYC
N MYC
ALK
RET
ABL
C-KIT
NOTCH
FLT3
ERBB1=EGFR
ERBB2=HER
BRAF
CYCLIN D1



Tumor-suppressor genes

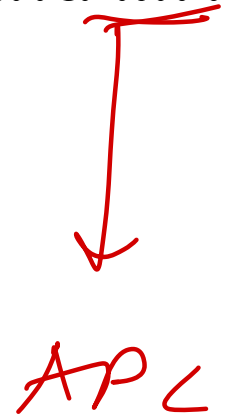
P53 -> P21 (Inhibits G1-S)
RB (inhibits G1-S)
APC
NFI
NF2
PTCH (inhibits SHH)
PTEN
SMAD2, SMAD4
VHL (HIF)
STK11
SDH
CDH1
BRCA1
BRCA 2
MSH2 / MLH1
WT1
MEN1



27. Among the following, which cells have both MHC class I and MHC class II?

1. NK cells ~~XX~~
2. B-lymphocytes ✓
3. Dendritic cells ✓
4. Platelets ~~XX~~
5. RBC ~~XX~~

MHC - I
→



A. 4, 5

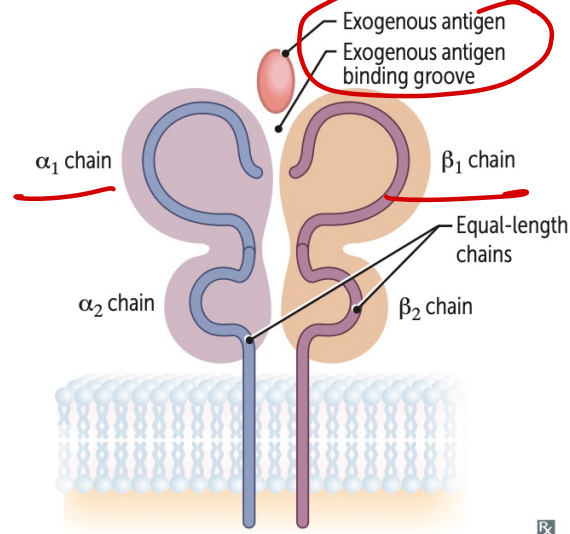
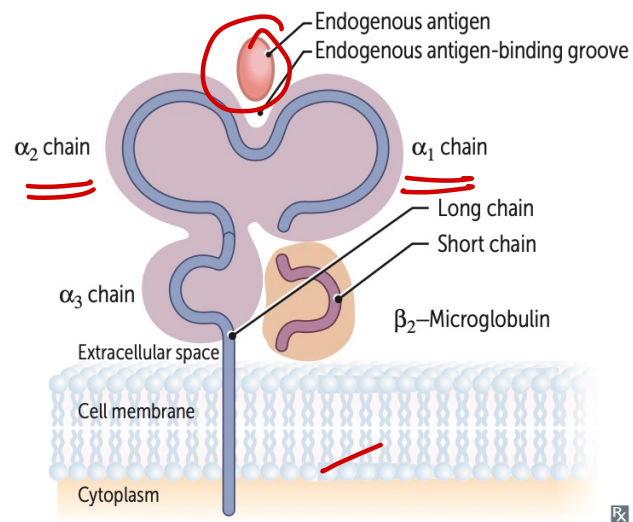
B. 1, 3, 4

C. 2, 3

D. 1, 2, 3

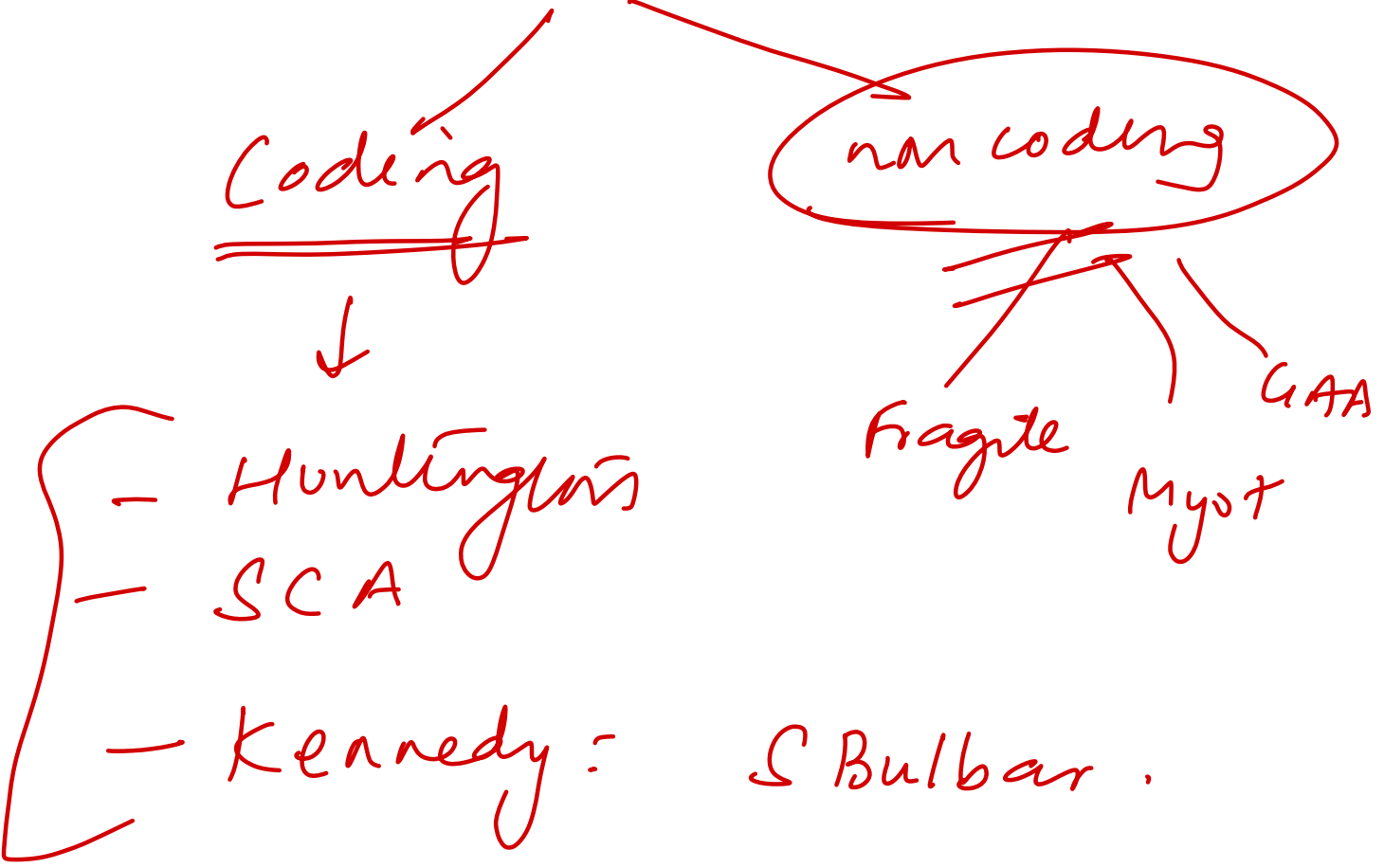
	MHC I	MHC II
LOCI	HLA- <u>A</u> , HLA- <u>B</u> , HLA- <u>C</u> MHC I loci have 1 letter	HLA- <u>DP</u> , HLA- <u>DQ</u> , HLA- <u>DR</u> MHC II loci have 2 letters
BINDING	TCR and CD8 (CD8 × MHC 1 = 8)	TCR and CD4 (CD4 × MHC 2 = 8)
STRUCTURE	1 long chain, 1 short chain (3 α, 1 β)	2 equal-length chains (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



28. Which of the following conditions is not caused by Trinucleotide repeat mutations involving coding regions?

- A. ~~Spinocerebellar ataxia~~
- B. ~~Myotonic dystrophy~~
- C. Huntington disease
- D. Kennedy disease



29. All of the following features are observed in pleomorphic adenoma except:

- A. Myoepithelial cells
- B. Keratin pearls
- C. Chondroid differentiation

D. Perineural invasion

PYA →

P A P
—————
// // //

30. Identify the correct statements:

1. In nutmeg liver, dark areas represent necrosis due to passive congestion, and white areas represent viable liver tissue. (F)

2. Sirtuins are a family of seven histone deacetylases involved in increasing insulin sensitivity. (T)

3. Long-term hemodialysis patients with renal failure lead to development of amyloidosis due to the accumulation of A β 2-microglobulin. (T)

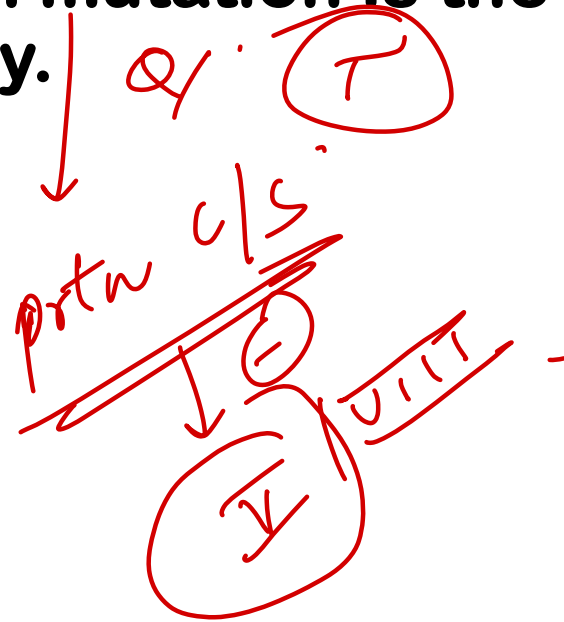
4. Factor V Leiden mutation is the most common inherited cause of hypercoagulability. (T)

A. 1, 2, 3, 4

B. 2, 4

C. 1, 3, 4

D. 1, 3



→ Carpal tunnel syndrome

31. What characteristics define necrosis among the options provided?

- 1. Disrupted cell membrane** ✓
- 2. Induces inflammation** ✓
- 3. Swelling of the cell** ✓
- 4. Can be seen physiologically** ✗ ✗
- 5. Causes nuclear fragmentation** ✗ ✗

A. 1, 2, 4, 5

B. 1, 2, 3

C. 2, 3, 4, 5

D. 1, 3, 4

Feature	Necrosis	Apoptosis
Cell size	Enlarged (swelling)	Reduced (shrinkage)
Nucleus	Pyknosis → karyorrhexis → karyolysis	Fragmentation into nucleosome-sized fragments
Plasma membrane	Disrupted	Intact; altered lipid orientation
Cellular contents	Enzymatic digestion; may leak	Intact; may be released in apoptotic bodies
Inflammation	Frequent	Absent
Role	Invariably pathologic (cell injury)	Often physiologic; may be pathologic (DNA/protein damage)

32. A 12-year-old boy has frequent episodes of facial edema around his lips. It usually occurs after an emotional stressor. He also has a family history of similar conditions. Which of the following is the main mediator of these symptoms?

A. Leukotriene

~~B. Bradykinin~~

C. Prostaglandin E2

D. Histamine

Xanthinase

HAE AD

(1 esterase ⊖)

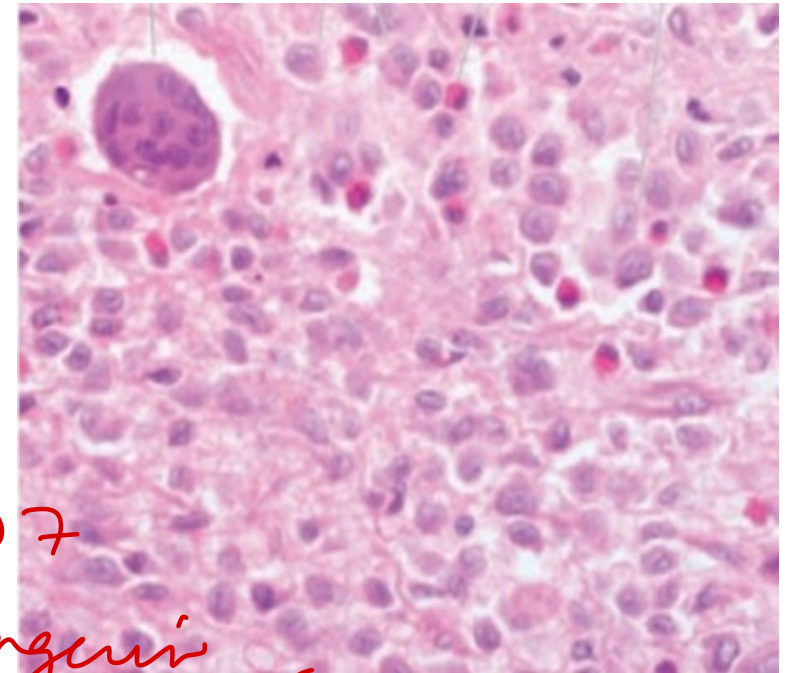
↑ bradykinin

vd / ↑ vasc permeability

ACE ⊖ ↑

33. A 7-year-old child brought to OPD with complaints of fever, erythematous rash, and bone pain. X-ray of the skull revealed multiple lytic lesions. Skin biopsy shows prominent nuclear grooves with eosinophils as in the image below. Immunohistochemistry is positive for S100, CD1a. What is the likely diagnosis?

- A. Rosai-Dorfman disease
- B. Kimura disease
- C. Langerhans cell histiocytosis
- D. Juvenile Xanthogranuloma



LCH

CD1a S-100 CD207

Langerin

emperipolesis

S-100 (+)

CD1a / CD207 (-)

CD68 (+)

CD207 (-)
emperipolesis

CD68 (+)
eosinophilia

34. All of the following conditions are associated with Neurosecretory bodies except:

A. Medullary thyroid carcinoma

B. Pituitary adenoma

C. Paraganglioma

D. Adrenal cortical tumor

Calcitonin ^{PTHrP}

CEA

5HT

35. Identify the correct statements

1. MCL 1 is an anti-apoptotic gene belonging to the BCL-2 family. (T)

2. Beta-pleated sheets are seen on X-ray crystallography in amyloidosis (F)

3. Complete gonadal dysgenesis in a 46XY individual is caused by the point mutation of the SRY gene. *deletion / pt mutation.*

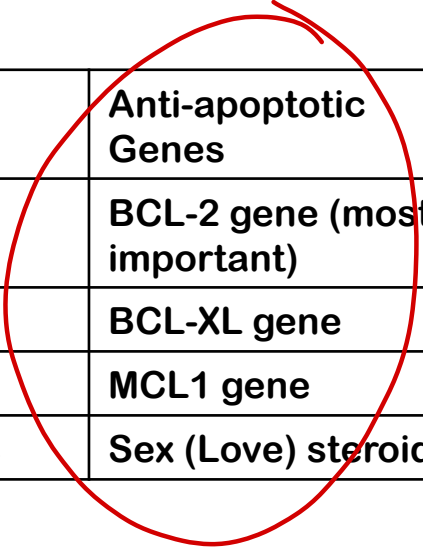
4. Diaminobenzidine is a preferred chromogen for peroxidase-mediated reactions in immunohistochemistry DAB (T)

A. 1, 2, 3, 4

B. 1, 2, 4

C. 3, 4

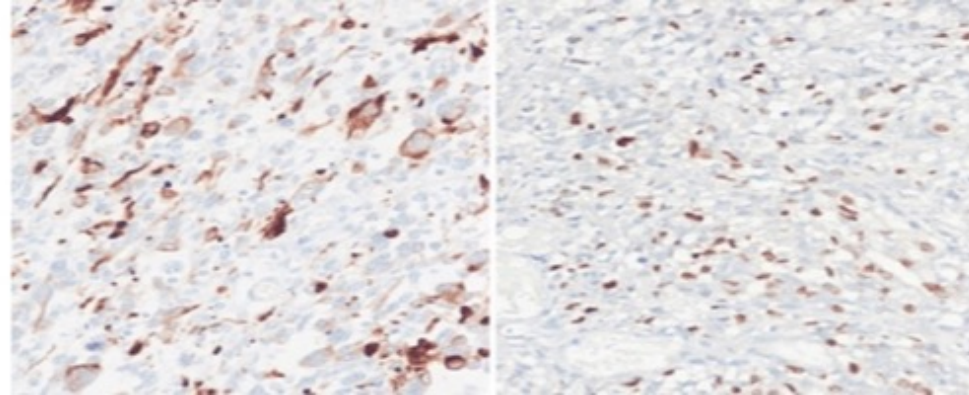
D. 1, 3



Pro-apoptotic Genes (BH1-3)	Anti-apoptotic Genes	Apoptosis Initiators/Sensors
BAK gene	BCL-2 gene (most important)	BIM gene
BAX gene	BCL-XL gene	BAD gene
p53 gene	MCL1 gene	PUMA gene
Glucocorticoids	Sex (Love) steroids	NOXA gene

36. 4-year-old child was brought to OPD with proptosis of left eye. On investigation, it was found to be a **Desmin positive** tumour. What can be the likely diagnosis?

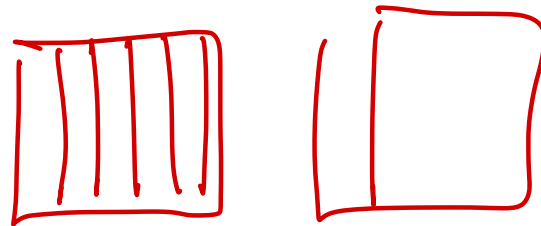
~~sk muscle~~ sk muscle.



- A. Ewing's sarcoma
- B. Embryonal rhabdomyosarcoma**
- C. Leukemia
- D. Retinoblastoma

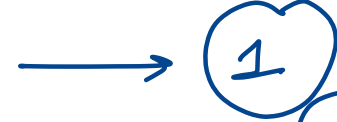
37. A diabetic nephropathy patient is an ideal candidate for renal graft transplant. Which of the following statements is true? *Py 8*

- A. The survival rate of graft is 95% in the first year *xx 85-90%*
- B. The life expectancy is doubled in a diabetic patient with renal transplant *xx*
- C. The transplantation is cost effective after the second transplant year
- D. The treatment of chronic rejection has improved *xx* over the last 10 years



38. What is the correct sequence of cellular events of inflammation?

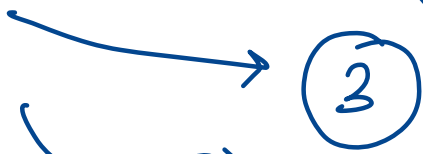
1. Selectin



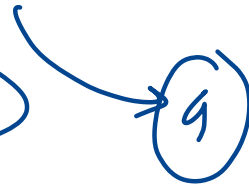
2. ICAM-1



3. CD31



4. IL-8



A. 1, 2, 3, 4

B. 2, 1, 4, 3

C. 4, 1, 2, 3

D. 3, 4, 1, 2

39. A CECT of a 35-year-old male is reported as “Hypervascular anterior mediastinal mass”. The tumor is resected and the histopathology image of the resected lymph node is shown below. What is the most probable diagnosis?

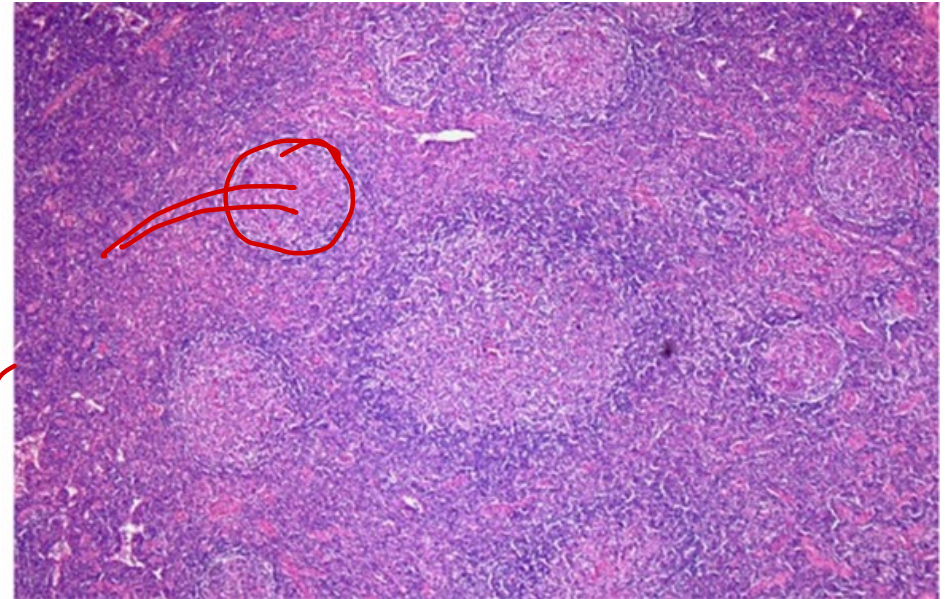
- A. Angiolymphoma
- B. Hodgkin's lymphoma
- C. Thymoma

D. Castleman disease

- HHV 8

- HIV

Plasma centric
Hyaline-vascular



Lollipop sign

40. Which mediators involved in the early phase of type 1 hypersensitivity?

- 1. Mast cell ✓
- 2. Histamine ✓
- 3. Neutrophils ✗ ✗
- 4. Prostaglandins
- 5. Leukotrienes

A. 1, 5

B. 1, 2, 3, 4

C. 1, 2, 4, 5

D. 2, 3, 4

Pyz ,

41. Antibody-dependent cellular cytotoxicity (ADCC) is seen with:

1. Natural killer (NK) cells ✓✓
2. Macrophages ✓✓
3. Neutrophils ✓✓
4. Eosinophils ✓✓
5. CD4 lymphocytes ✗✗

A. 1, 2, 3, ~~4~~, 5

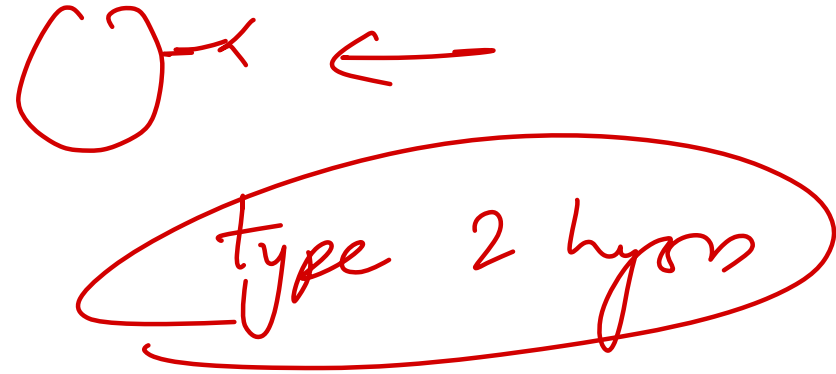
B. 2, 5

C. 1, 3, 4

D. 1, 2, 5

1, 2, 3, 4

pyq



42. True about anaphylactoid reaction are all except: QQ

A. Involves degranulation of mast cells

~~B. IgE mediated~~ → mast cell → histamine

C. Can occur on first exposure

D. Most commonly caused by NSAIDs

QQ

- NSAIDs
- (Sampter's Δ)
- Contrast mediated rxn
- Opioids

43. Identify the true statements:

1. TxA2 has platelet aggregating and vasoconstricting effect (T)

2. Lipoxin B4 inhibits neutrophil chemotaxis and adhesion to endothelium. IL-6 (T)

3. ~~IL-1, IL-18~~, TNF are pyrogenic cytokines (F) TGF β / IL-10 / Lipoxin B4

4. C3 can be activated is both common as well as alternative pathways (T)

5. T cells with a TCR composed of a γ and δ subunit are found associated with GI mucosa (T)

A. 1, 2, 3, 4

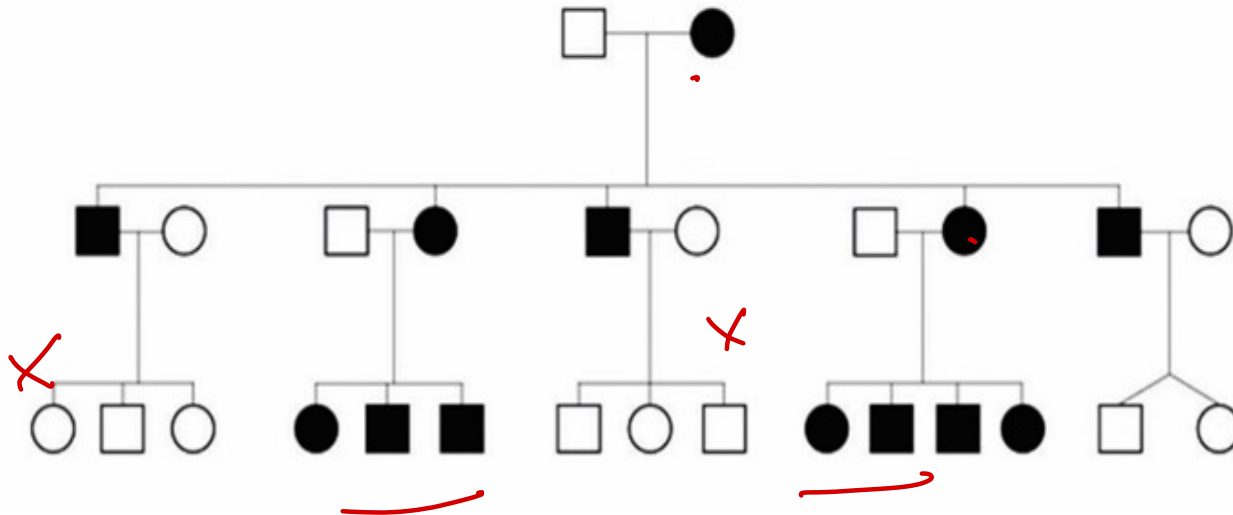
~~B. 1, 2, 4, 5~~

C. 2, 3, 4, 5

D. 2, 4

PG (T₂)

44. Identify the disorder inherited by the following pedigree



mitochondrial

A. Marfan syndrome - AD

B. Hemophilia A - XLR

C. Hemophilia C - AR

D. NARP
Neurop ataxia RP

Leyh

MELAS
===

MERRF

CPEO

LHON

Pearsons

Kearns Sayre

45. You work under a research scientist who is working on determining the association of adenocarcinoma of pancreas with a compound X. He uses a test whose steps are shown in the image below to determine the mutagenic effect and potential carcinogenicity of compound X. What is this test that he has used?

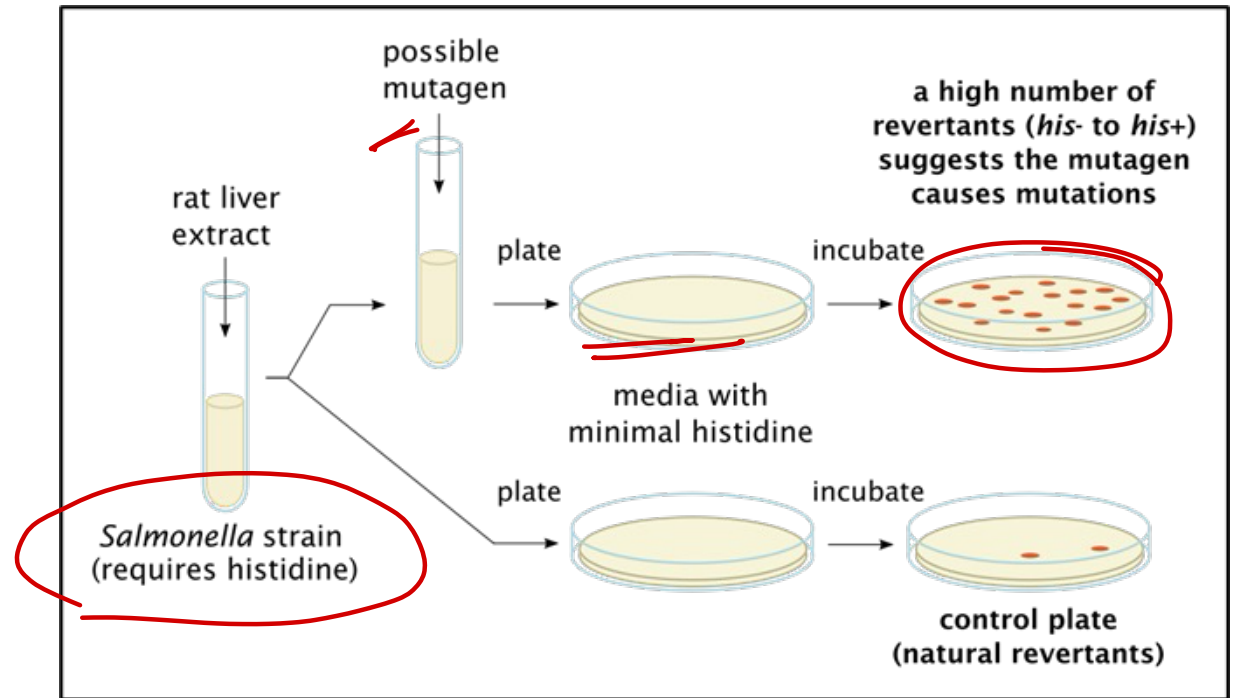
A. CGH

B. Micro nucleus test

C. Microtox bio-assay

D. Ames test

Carcinogens



46. The phlebotomist needs to collect samples from a patient for various tests. Among the options provided, which sequence of blood collection for testing ensures that the sample remains uncontaminated, considering the additives present in the collection tubes?

- A. Light blue → Red → Lavender → Grey
- B. Light blue → Lavender → Red → Grey
- C. Grey → Red → Light blue → Lavender
- D. Red → Lavender → Grey → Light blue

culture



47. All of the following are crosslinking fixatives except?

A. Glutaraldehyde

B. Formaldehyde

C. Methanol

D. Osmium tetroxide

coagulant -

Pyq

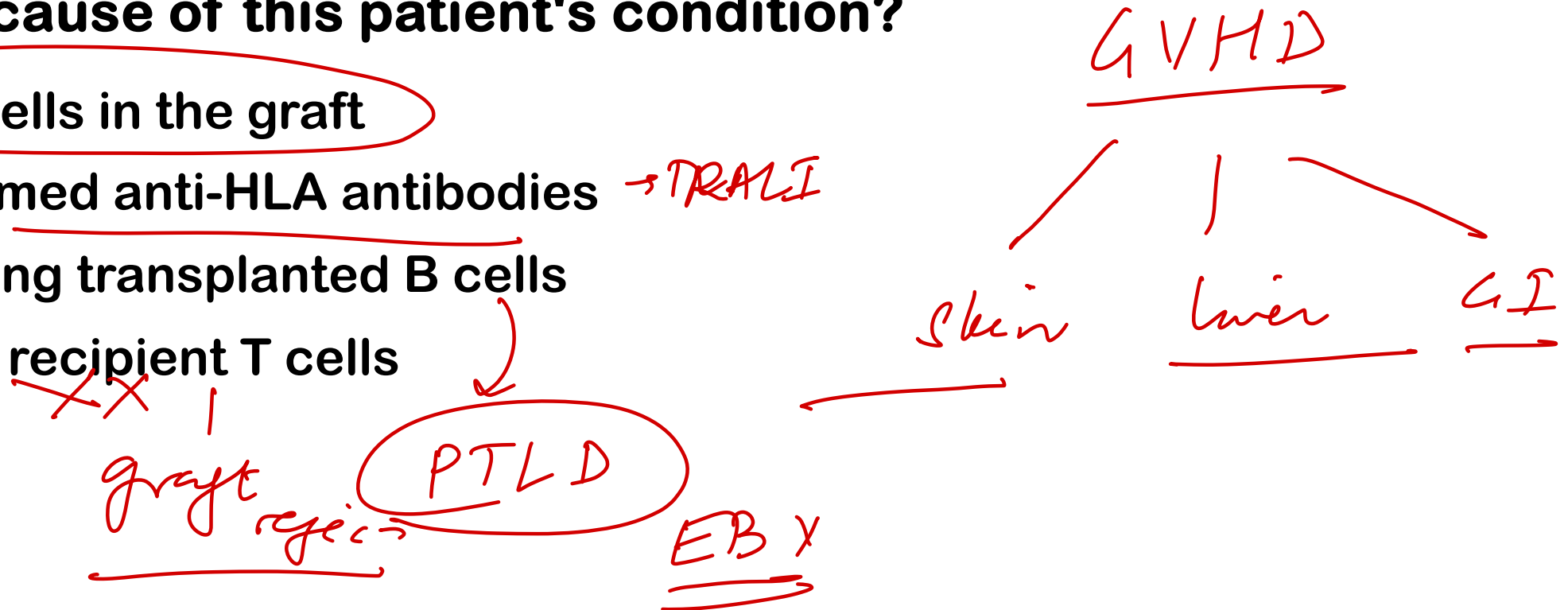
48. Two weeks after undergoing allogeneic stem cell transplant for multiple myeloma, a 55-year-old man develops a severely pruritic rash, abdominal cramps, and profuse diarrhea. He appears lethargic. Physical examination shows yellow sclerae. There is a generalized maculopapular rash on his face, trunk, and lower extremities, and desquamation of both soles. His serum alanine aminotransferase is 115 U/L, serum aspartate aminotransferase is 97 U/L, and serum total bilirubin is 2.7 mg/dL. Which of the following is the most likely underlying cause of this patient's condition?

~~A. Donor T cells in the graft~~

B. Newly formed anti-HLA antibodies → TRALI

C. Proliferating transplanted B cells

D. Activated recipient T cells



49. Which of the following stains are used to visualize the specific fibers present in the following cartilage?

A. Bielchowsky stain

~~B. Verhoeff's stain~~

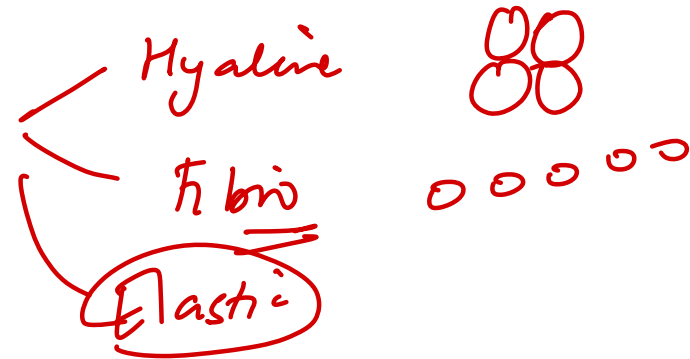
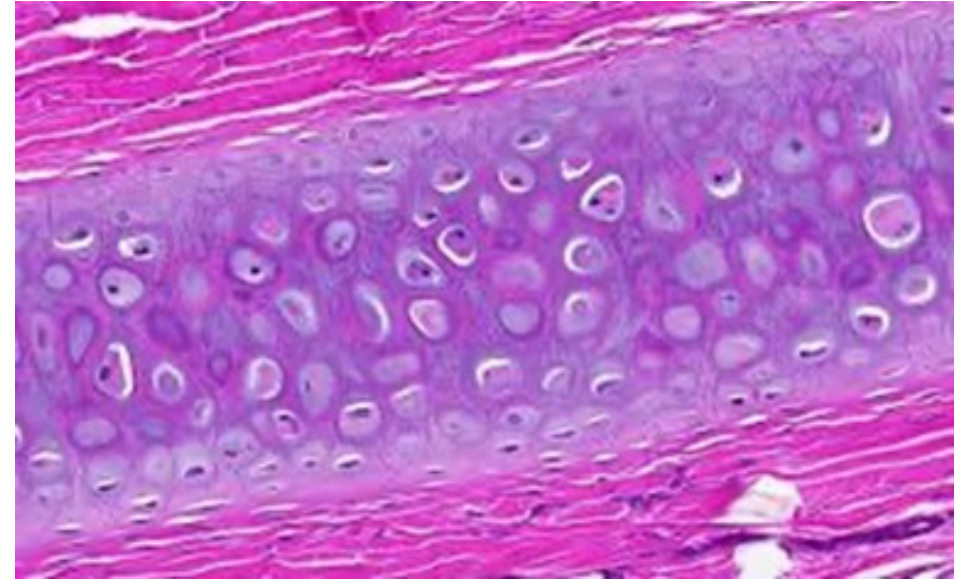
C. GMS Silver stain

D. Alcian Blue stain

→ neurons -
elastin (GCA)

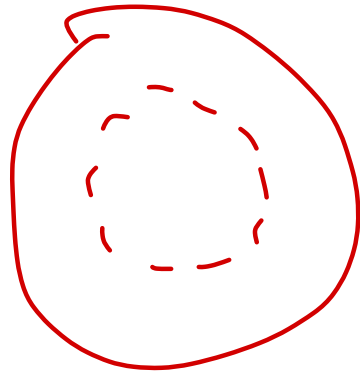
- fungal / PCP.

acidic mucin.



50. All of following are the correct statement about autophagy except?

- ~~A.~~ Is both intra and extra cellular
- B. Can happen due to nutrient deprivation
- C. Phagolysosome fuses with lysosome to form autophagolysosome
- D. Bound by a double membrane



51. Which of the following is true about nitric oxide?

pyq.

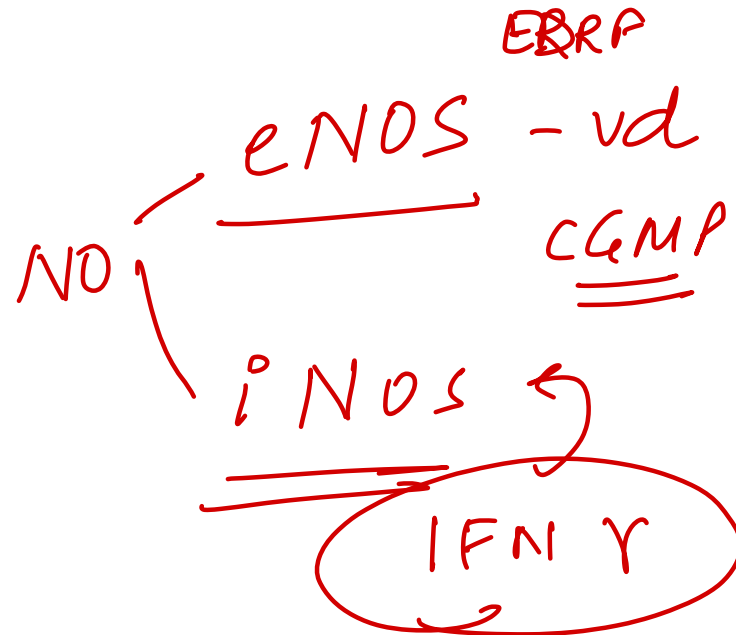
- 1. eNOS is constitutively expressed and helps regulate vascular tone.
- 2. NO helps in generation of free radicals in neutrophil at the time of inflammation
- 3. Interferon- γ (IFN- γ) or microbial products can activate inducible NOS.
- 4. Synthesis of NO requires NOS action on arginine.

A. 1, 2

B. 2, 4

C. 1, 3, 4

D. 1, 2, 3, 4



52. Which of the following substances is used for sample collection in a tube for blood alcohol concentration measurement?

A. Heparin + EDTA

B. Sodium fluoride + Potassium dichromate

C. Heparin

D. Sodium citrate

Gray

53. A 66-year-old woman has experienced pain in the area around the left knee for the past 6 weeks. MRI shows a well-circumscribed 4-cm mass superior and inferior to the patella. The mass is within soft tissue, without bony erosion. A biopsy of the mass is obtained and on microscopic examination shows a biphasic pattern of spindle cells and epithelial cells forming glands. Karyotypic analysis of tumor cells shows a t(X;18) translocation. What is the most likely diagnosis?

- A. Desmoid tumor
- B. Leiomyosarcoma
- C. Mesothelioma
- D. Synovial sarcoma

Soft Tissue Sarcoma	Common Translocation and Fusion Gene	Chromosomes Involved
Ewing sarcoma = <i>Desmoplastic</i>	<u>EWSR1-FLI1 fusion</u>	t(11;22)(q24;q12)
Synovial sarcoma	SYT-SSX1 or SYT-SSX2 fusion	t(X;18)(p11;q11)
Alveolar rhabdomyosarcoma	PAX3-FOXO1 or PAX7-FOXO1 fusions	t(2;13)(q35;q14), t(1;13)(p36;q14)
Clear cell sarcoma	EWSR1-ATF1 fusion	t(12;22)(q13;q12)
Myxoid liposarcoma	FUS-DDIT3 fusion	t(12;16)(q13;p11)
Extraskeletal myxoid chondrosarcoma	EWSR1-NR4A3 fusion	t(9;22)(q22;q12)
Desmoplastic small round cell tumor	EWSR1-WT1 fusion	t(11;22)(p13;q12)

54. All are features of venous thrombus, except:

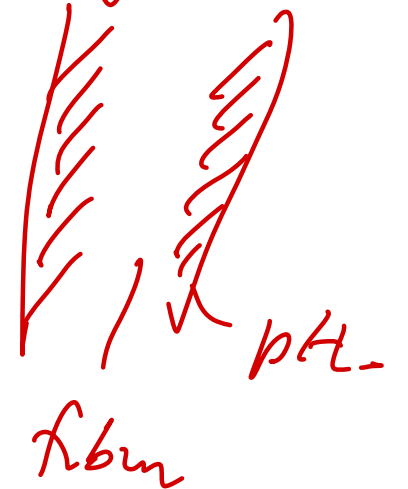
- ~~A.~~ Caused by turbulent blood flow
- B. Common in deep leg veins
- C. Propagate in antegrade manner
- D. Composed mainly of red cells (red thrombi)

stasis

arterial

white thrombus
fibrin/plt

lines of Zahn



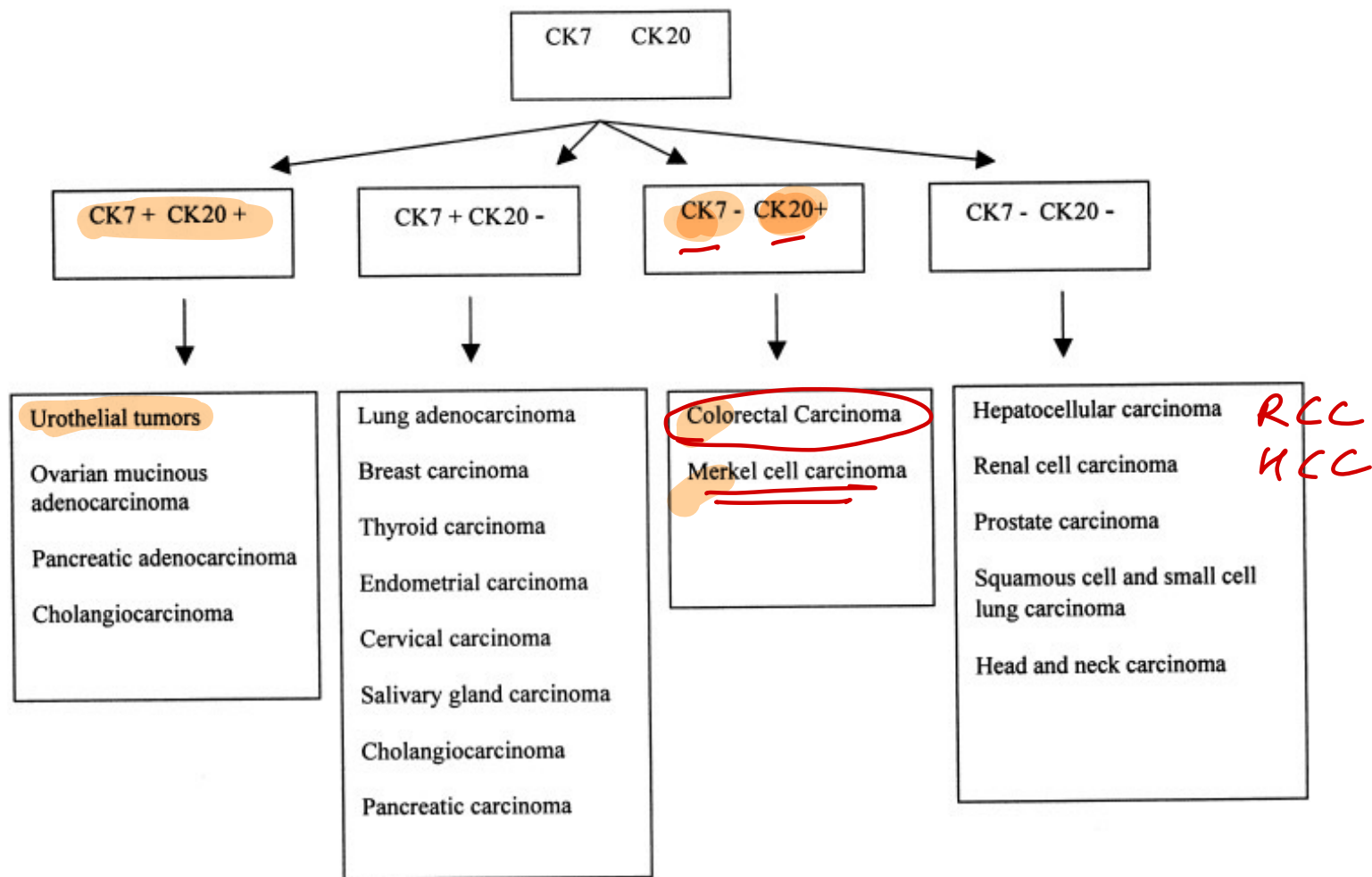
55. Which of the following pairs correctly describes the immunohistochemical property of renal cell carcinoma?

A. CK7 positive, CK20 positive

B. CK7 negative, CK20 positive

C. CK7 positive, CK20 negative

~~D. CK7 negative, CK20 negative~~



56. Upon reactivation of VZV, the virus is transported through the nerve axon to the skin. Which of the following proteins is most likely involved in the transport process leading to disease recurrence?

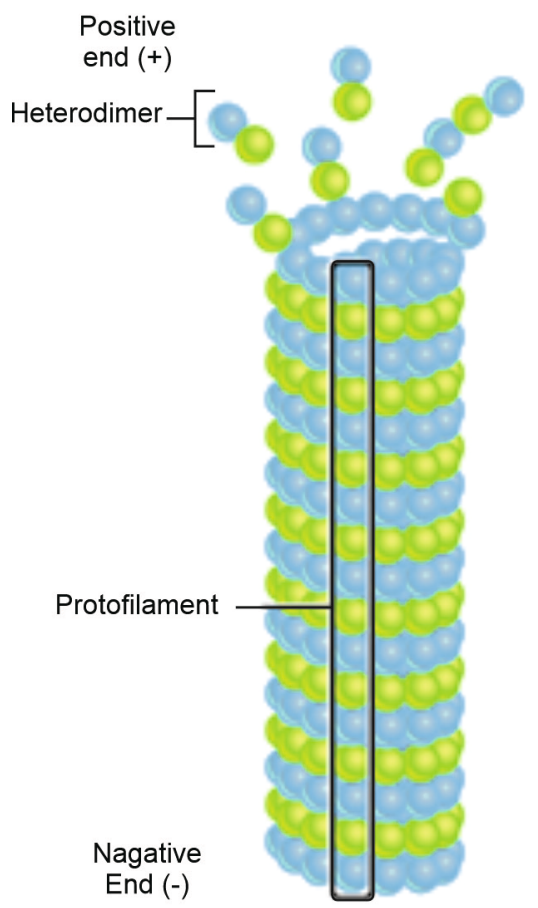
A. Dynein

B. Kinesin

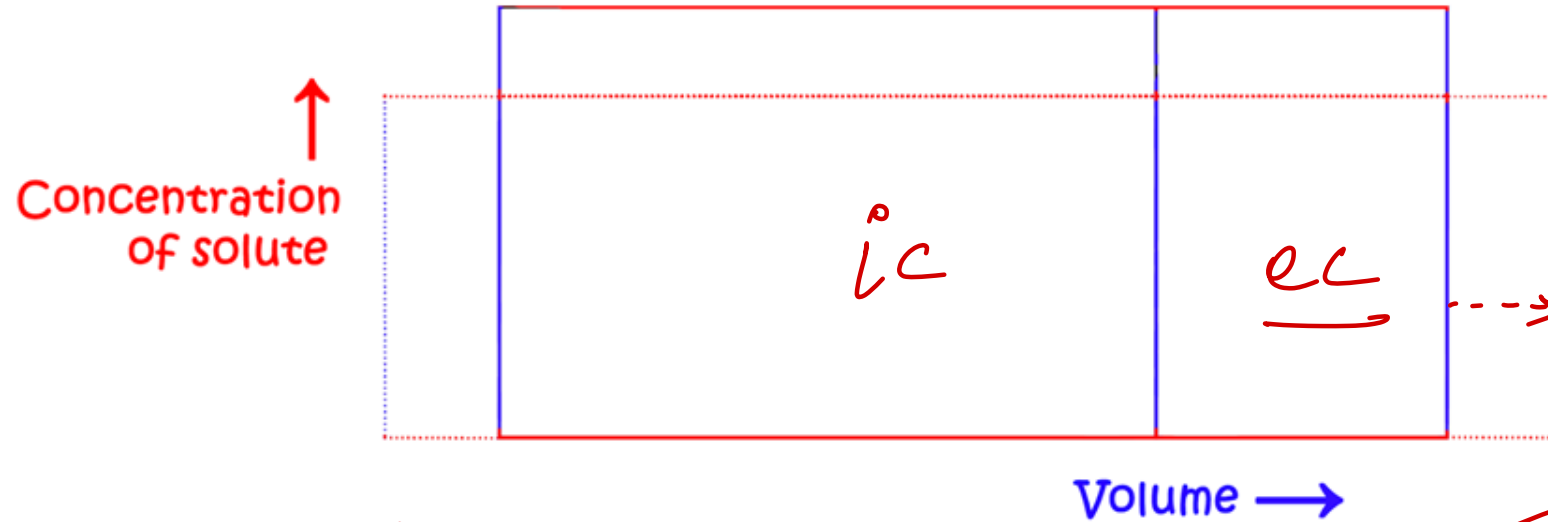
C. Lamin

D. Selectin





57. The solid line represents a normal individual, and the dotted line represents this patient. Which of the following conditions is most likely causing this patient's findings?



A. Acute gastrointestinal hemorrhage

B. Diabetes insipidus

C. Hypertonic saline infusion

D. Primary polydipsia

gain of hypotonic

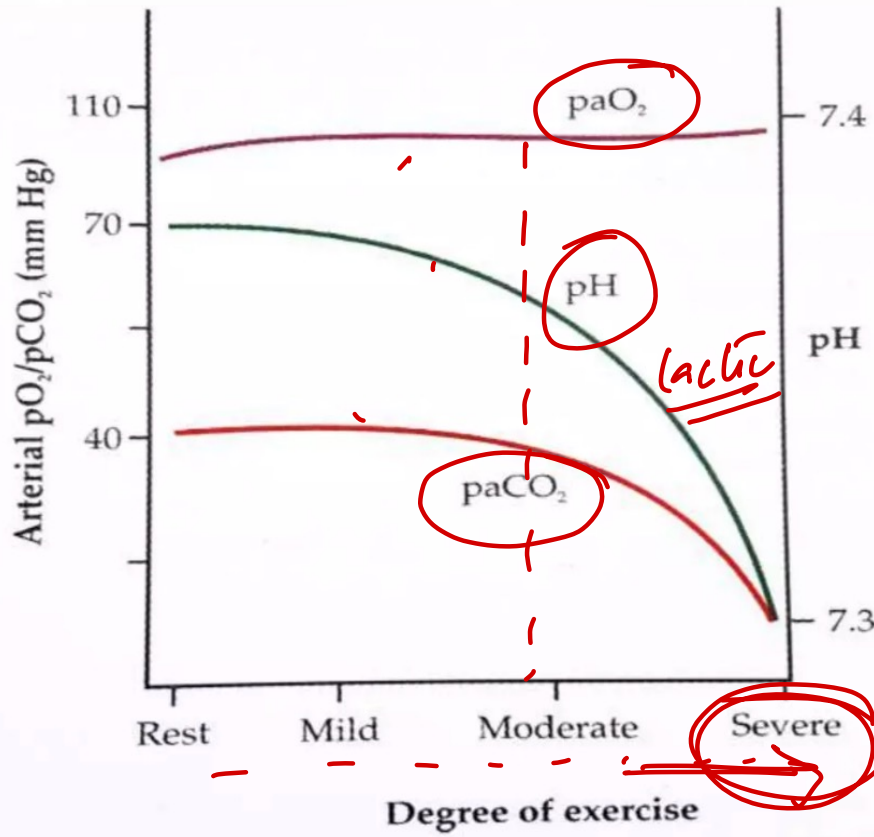
58. 23-year-old man undergoes exercise physiology testing. He jogs on a treadmill to achieve a moderate-intensity physical activity level based on a target heart rate of 50%-70% of his estimated maximum heart rate. Which of the following is expected at peak exercise?

A. PaCo₂ normal, PaO₂ normal, pH decreases, PvCo₂ high, PvO₂ low

~~B. PaCo₂ low, PaO₂ normal, pH decreases, PvCo₂ high, PvO₂ low~~

C. PaCo₂ high, PaO₂ low, pH increases, PvCo₂ high, PvO₂ low

D. PaCo₂ low, PaO₂ low, pH normal, PvCo₂ high, PvO₂ low



$pV O_2 \downarrow$
 $pV CO_2 \uparrow$

$RR / MV \uparrow \uparrow$

59. All of the following are the properties of Renshaw cells except:

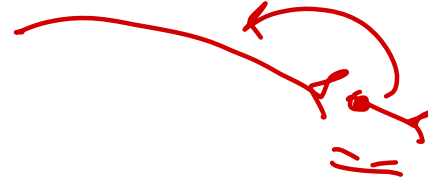
A. Lateral inhibition

B. Feedback inhibition

~~C. Feedforward inhibition~~

D. Recurrent inhibition

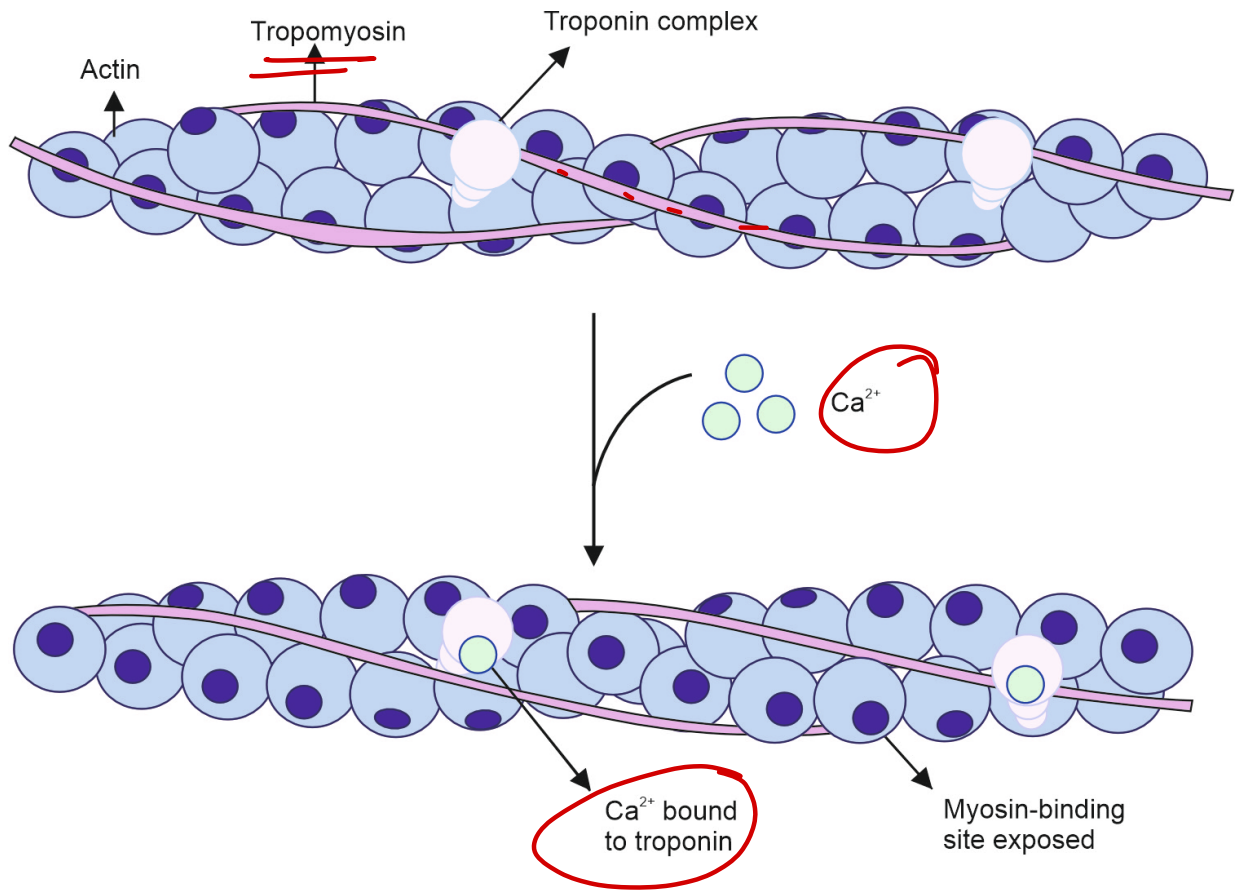
glycine



60. An 18-year-old man, who was recently started on risperidone therapy for schizophrenia, comes to the office due to involuntary deviation of his head. There is palpable tightening of the right sternocleidomastoid muscle. It is determined that the patient is experiencing a medication-induced dystonic reaction due to motor neuron hyperactivity. The persistent myocyte stimulation causes a substance to be released from the sarcoplasmic reticulum. This substance most likely binds to which of the following proteins to cause this patient's symptoms?

- A. Actin
- B. Myosin
- C. Tropomyosin
- D. Troponin

Ca^{2+}



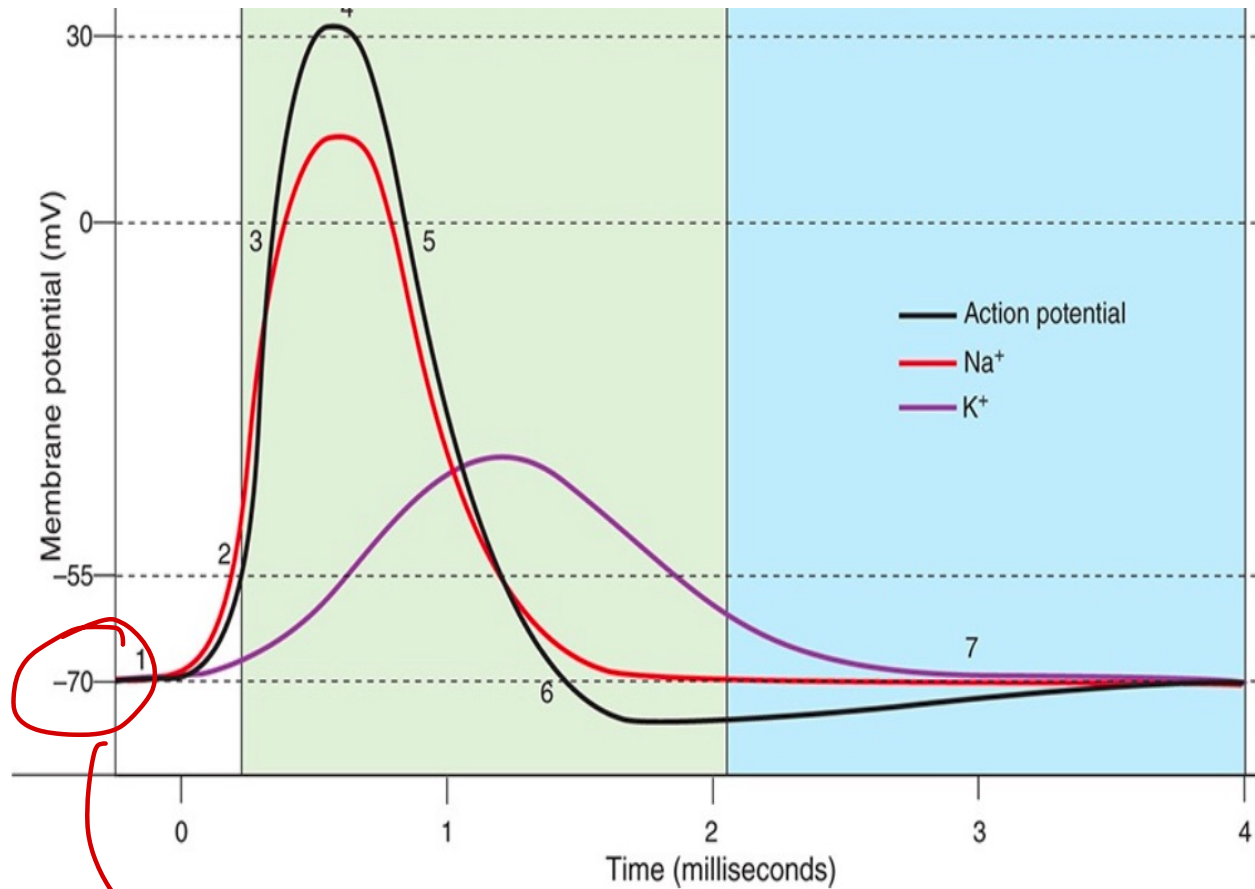
61. The resting membrane potential(RMP) of the nerve is - 70mV. Increased permeability of which ion is responsible for the RMP?

A. Calcium

B. Sodium

C. Potassium

D. Chloride



↑ K⁺ : +ve

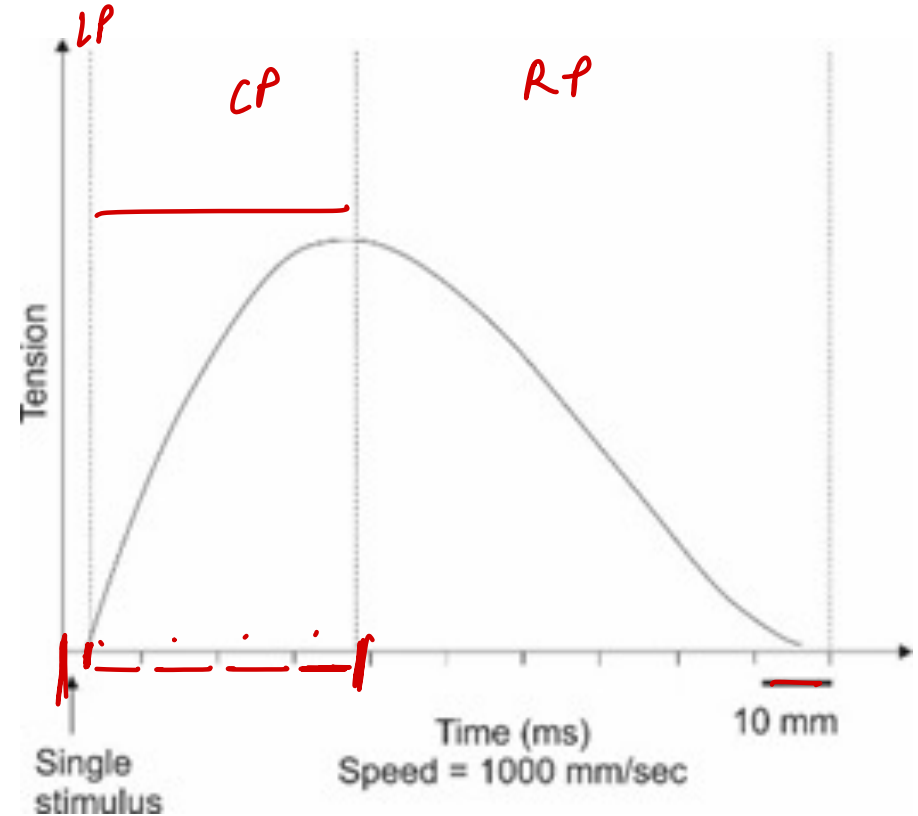
RMP: K⁺

62. Given below is the demonstration of tetanisation in the gastrocnemius muscle of a frog. Identify the tetanising frequency?

- A. 20-25 Hz
- B. 30-35 Hz
- C. 15-20 Hz
- D. 10-15 Hz

$$TF = \frac{1}{CP}$$

25
100%
✓



63. Sequentially arrange the steps involved in excitation-contraction coupling of smooth muscle cells.

1. Myosin phosphorylation
2. Increased influx of Ca^{2+} into the cell
3. Activation of calmodulin-dependent myosin light chain kinase
4. Binding of myosin to actin

A. 2-1-3-4

B. 2-1-4-3

C. 3-2-1-4

D. 2-3-1-4



2-3-1-4

64. What is the normal insensible water loss?

A. 100 ml/hr

B. 150 ml/hr

C. 50 ml/hr

D. 200 ml/hr

Pyq

500ml/day

65. A 29-year-old goes on a month-long trek across the Himalayas. Which of the following physiological adaptations would you expect to see in him at high altitudes following acclimatization?

1. Erythropoietin secretion increases (↑)
2. Tissue myoglobin decreases (↑)
3. Tissue content of cytochrome oxidase increases (↑)
4. pH of blood increases (↑)

- A. 1, 3 & 5
- B. 2, 3, & 5
- C. 1, 3, 4
- D. 1, 2, 3, 4

↑ventilⁿ

resp alkalosis

renal compens

HCO_3^-

days

-2° PC EPO ↑

Physiological Changes at High Altitude

Respiratory Adaptations

- **Increased Ventilation**

- **Renal Compensation:** The kidneys compensate respiratory alkalosis by excreting bicarbonate over days, allowing sustained hyperventilation.

Hematological Adaptations

- **Polycythemia**

- **Increased 2,3-BPG**

Cardiovascular Adaptations

- **Increased Heart Rate and Cardiac Output**

- **Hypoxic Pulmonary Vasoconstriction**

- **Increased Blood Pressure**

Cellular and Metabolic Changes

- **Increased Capillary Density and Mitochondrial Efficiency:** Enhances oxygen utilization in muscles.

- **Upregulation of Hypoxia-Inducible Factors (HIFs):** Modulates gene expression to adapt to low oxygen.

Other Effects

- **Sleep Disturbances:** Due to periodic breathing and hypoxia.

- **Increased Cerebral Blood Flow:** To maintain brain oxygenation but may contribute to high-altitude cerebral edema.

- **Muscle Atrophy and Weight Loss:** Due to metabolic adjustments and reduced appetite.

66. A 72-year-old woman is admitted to the hospital for treatment of unstable angina. Cardiac catheterization shows occlusion that has caused a 50% reduction in the diameter of the left circumflex artery. Resistance to blood flow in this vessel has increased by what factor relative to a vessel with no occlusion?

A. 64

B. 16

C. 8

D. 32

$$\frac{1}{r^4}$$

$$- \quad 2 \times 2 \quad \times \quad 2 \times 2$$

67. A 48-year-old man with diabetes undergoes stress testing. He walks for 7 minutes without chest pain. Peak heart rate is 132/min, BP increases from 95 to 112 mmHg. Which of the following parameters was most likely decreased during peak stress?

A. Cardiac output

B. Left ventricular end-diastolic pressure

C. Systemic systolic blood pressure

~~D. Total systemic vascular resistance~~

↑

↑ (N)

↑
isotonic

↑

preload ↑

↓

CO ↑

⇒

DBP ↓

MAP ↓

68. In the study of appetite regulation, which of the following polypeptides is known to increase appetite?

A. Neuropeptide Y

B. Leptin






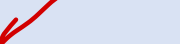
C. Glucagon related peptide 1

D. Serotonin

Adiponectin
↓
Adipocytes

Decrease Feeding (Anorexigenic)	Increase Feeding (Orexigenic)
α -Melanocyte-stimulating hormone (α -MSH)	Neuropeptide Y (NPY)
Leptin	Agouti-related protein (AGRP)
Serotonin	Melanin-concentrating hormone (MCH)
Norepinephrine	Orexins A and B
Corticotropin-releasing hormone	Endorphins
Insulin	Galanin (GAL)
Cholecystinin (CCK)	Amino acids (glutamate and γ -aminobutyric acid)
Glucagon-like peptide (GLP)	Cortisol
Cocaine- and amphetamine-regulated transcript (CART)	Ghrelin
Peptide YY (PYY)	Endocannabinoids

69. Match the following with the mode of cellular transport:

1. Oxygen		A. Simple diffusion
2. GLUT		B. Facilitated diffusion
3. SGLT		C. Primary active transport
4. Na ⁺ /Iodide symporter		D. Secondary active transport
5. Na ⁺ /K ⁺ ATPase		
6. proton pump		

A. 1-A, 2-B, 3-B, 4-C, 5- D, 6-D

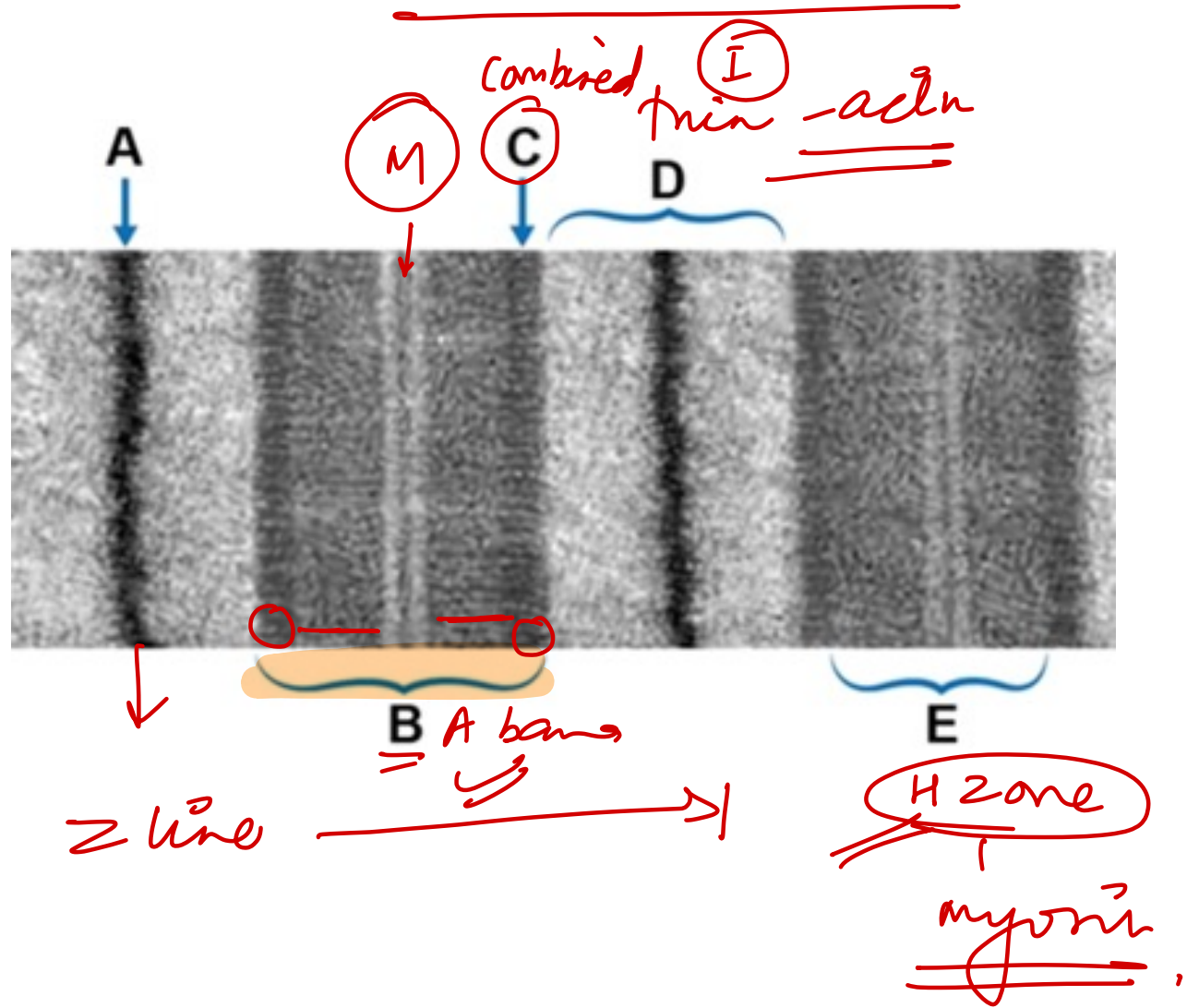
B. 1-B, 2-A, 3-B, 4-C, 5- D, 6-D

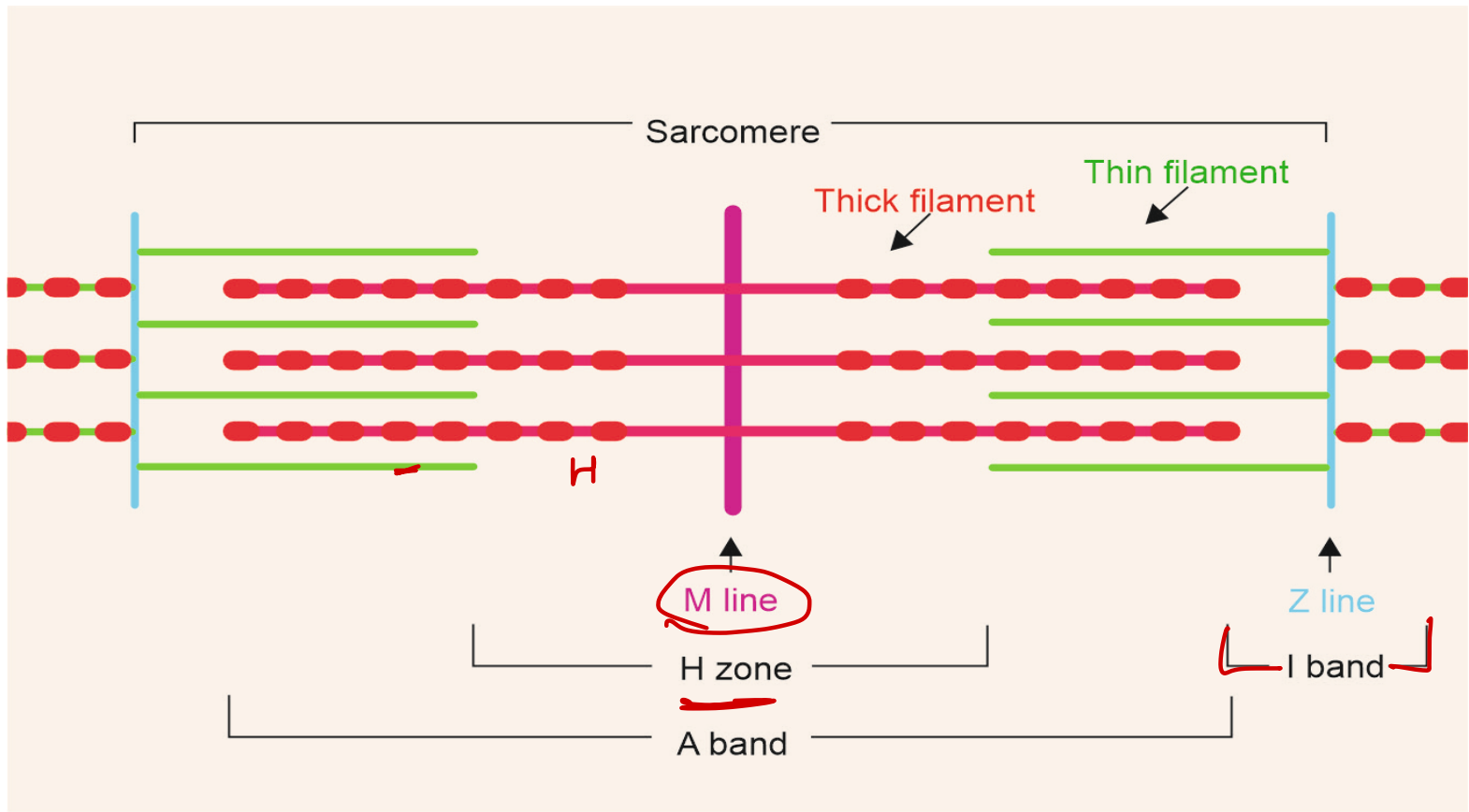
C. 1-A, 2-B, 3-D, 4-D, 5- C, 6-C

D. 1-A, 2-B, 3-B, 4-D, 5- C, 6-C

70. Which of the following regions contain only thick filaments and no thin filaments?

- A. A
- B. C
- C. D
- ~~D. E~~

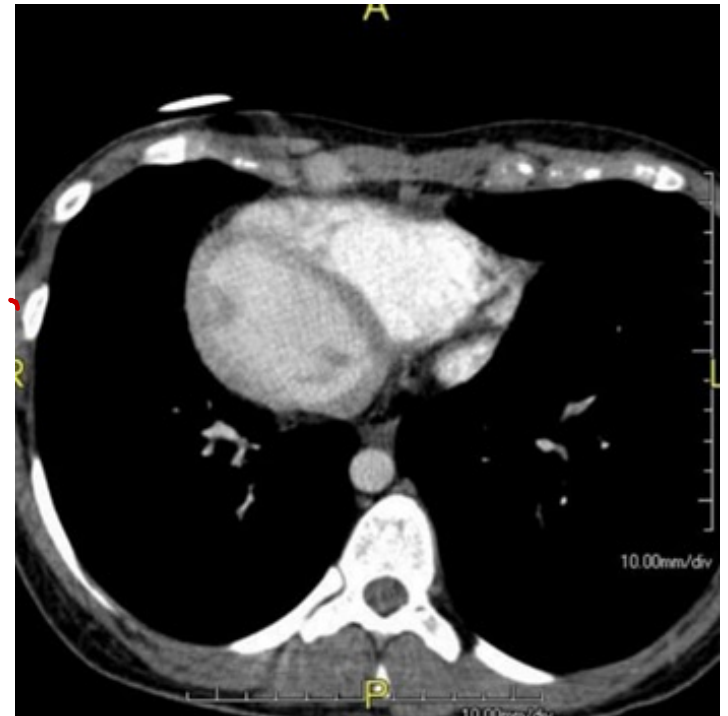




71. A 31-year-old man comes to the physician for evaluation of chronic cough, sinus pain, and nasal discharge. He has a history of frequent upper respiratory infections and recurrent sinusitis since childhood. He is also concerned about fertility, as he and his wife have been trying to conceive for 5 years unsuccessfully. Pulmonary examination shows crackles and wheezing throughout both lung fields. A CT scan of the chest is shown. The most likely cause of this patient's condition is a defect in which of the following molecular structures?

- A. IL-12 receptor
- B. IL-2R gamma chain
- C. NADPH oxidase
- D. Dynein arm**

Kartagener



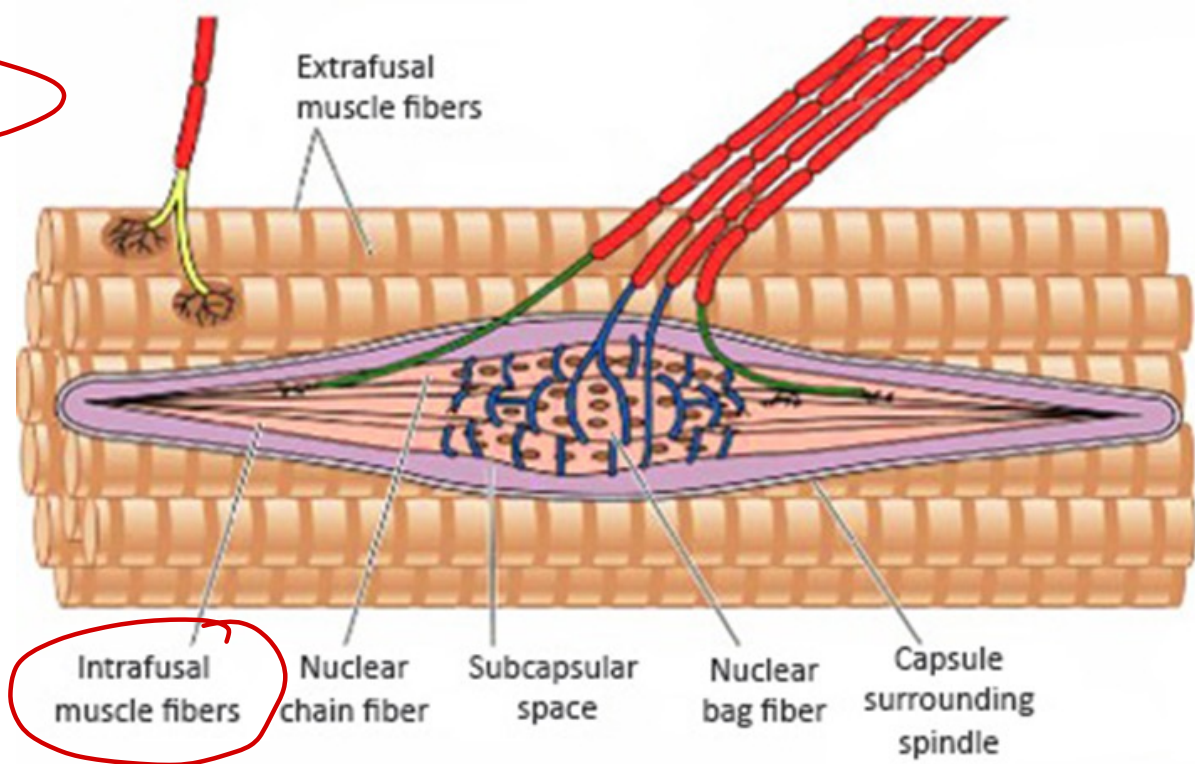
72. The motor supply of the muscle spindle is which of the following?

A. Alpha neuron

B. Gamma neuron *efferent*

C. Beta neuron

D. Delta neuron



afferent Ia *II*
dynamic *static* *efferent* *γ* *spindle*

73. Sour taste is mediated by:

py 8

A. TRPV1 Channel

B. Metabotropic Receptor

C. GPCR T1R1

D. GPCR T1R3

metabotropic (2^o messenger)

Taste	Receptor Type	Key Receptor Examples	Transduction Mechanism	Neurotransmitter
Sweet	GPCR	TAS1R2 + TAS1R3	G-protein → PLCβ2 → IP3 → TRPM5 channel → ATP release	ATP
Umami	GPCR	TAS1R1 + TAS1R3	Same as sweet	ATP
Bitter	GPCR	TAS2R family	Same as sweet	ATP
Sour	Ion channels	PKD2L1, TRPV1	Proton influx → depolarization	Serotonin
Salty	Ion channels	ENaC	Sodium influx → depolarization	Unknown (likely ATP)

ionotropic

74. All of the following are true regarding Na⁺/K⁺ ATPase structure, except:

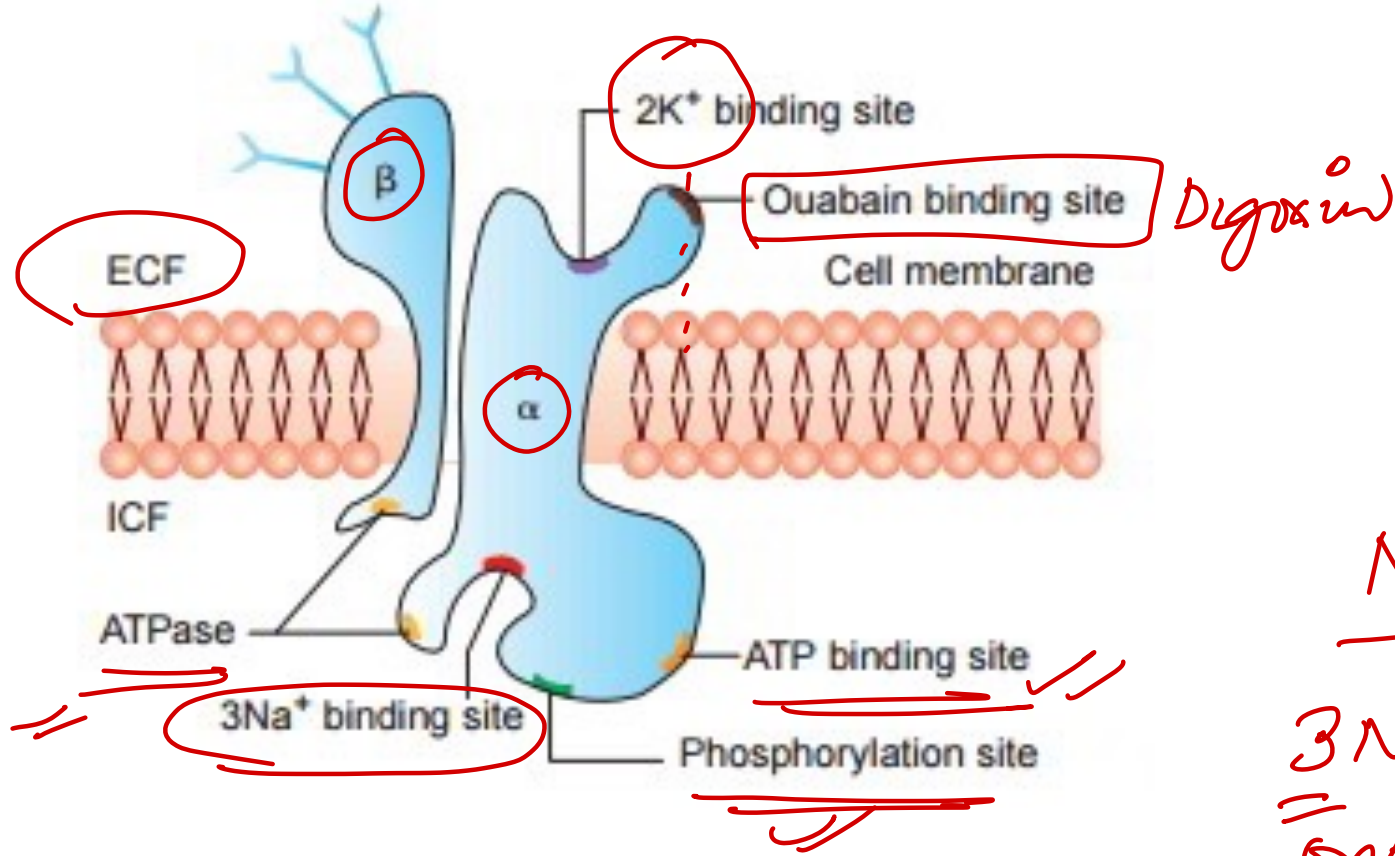
A. ATP binding site is located intracellularly ✓

B. K⁺ binding site is on the extracellular side ✓

C. Ouabain binds to the ~~cytoplasmic~~ domain

D. Phosphorylation site is intracellular ✓

Digoxin ✓



Coupling ratio: 3:2
 Stimulated-Thyroid, insulin, Aldosterone

NO K 1 A
 3Na out
 2 K in

75. All are correct statements about muscle tension curves, except:

A. Passive tension increases with muscle stretch

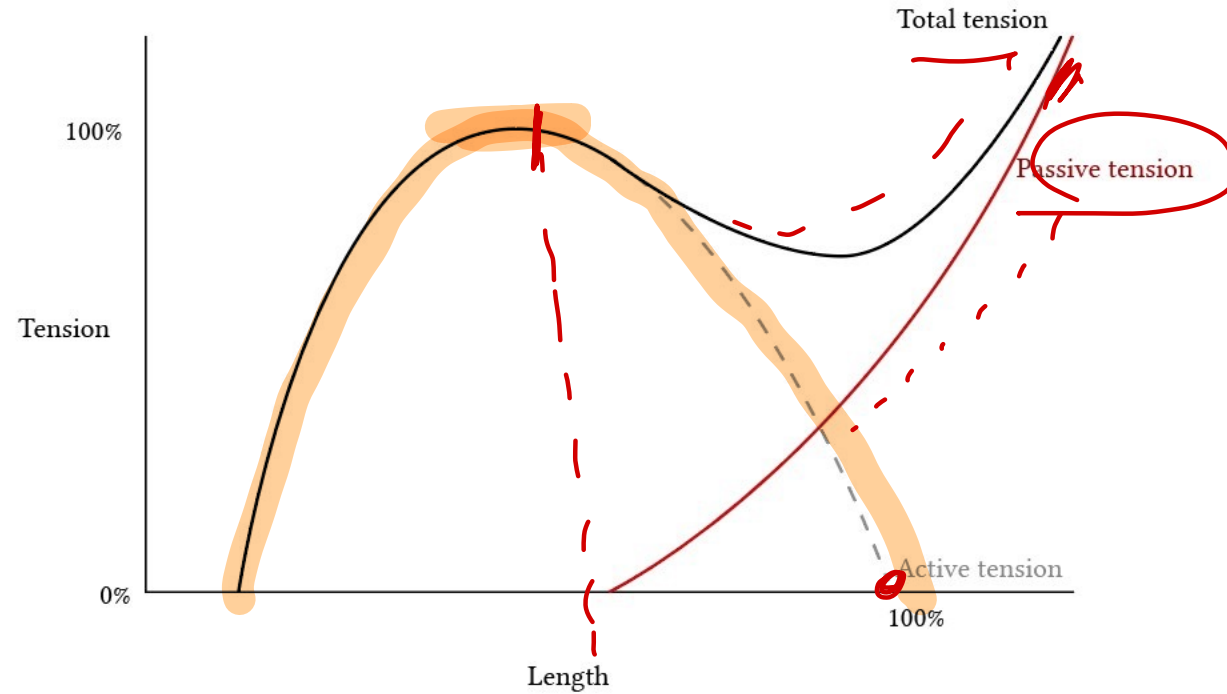
B. Active tension is highest at optimal length

T

C. Total tension equals sum of passive and active tension

T

~~D. Passive tension is highest at resting muscle length~~



Component	Source	Behavior
Active tension	Actin-myosin interaction	Maximal at optimal length (~100%)
Passive tension	Elastic connective tissues	Rises after the muscle is stretched
Total tension	Active + Passive	Composite of both

76. Match the neurotransmitter with its correct receptor type:

A. GABA-A – Ionotropic

B. Glycine – G-Protein Coupled Receptor

C. Nicotinic – G-Protein Coupled Receptor

~~D. GABA-B – Ionotropic~~

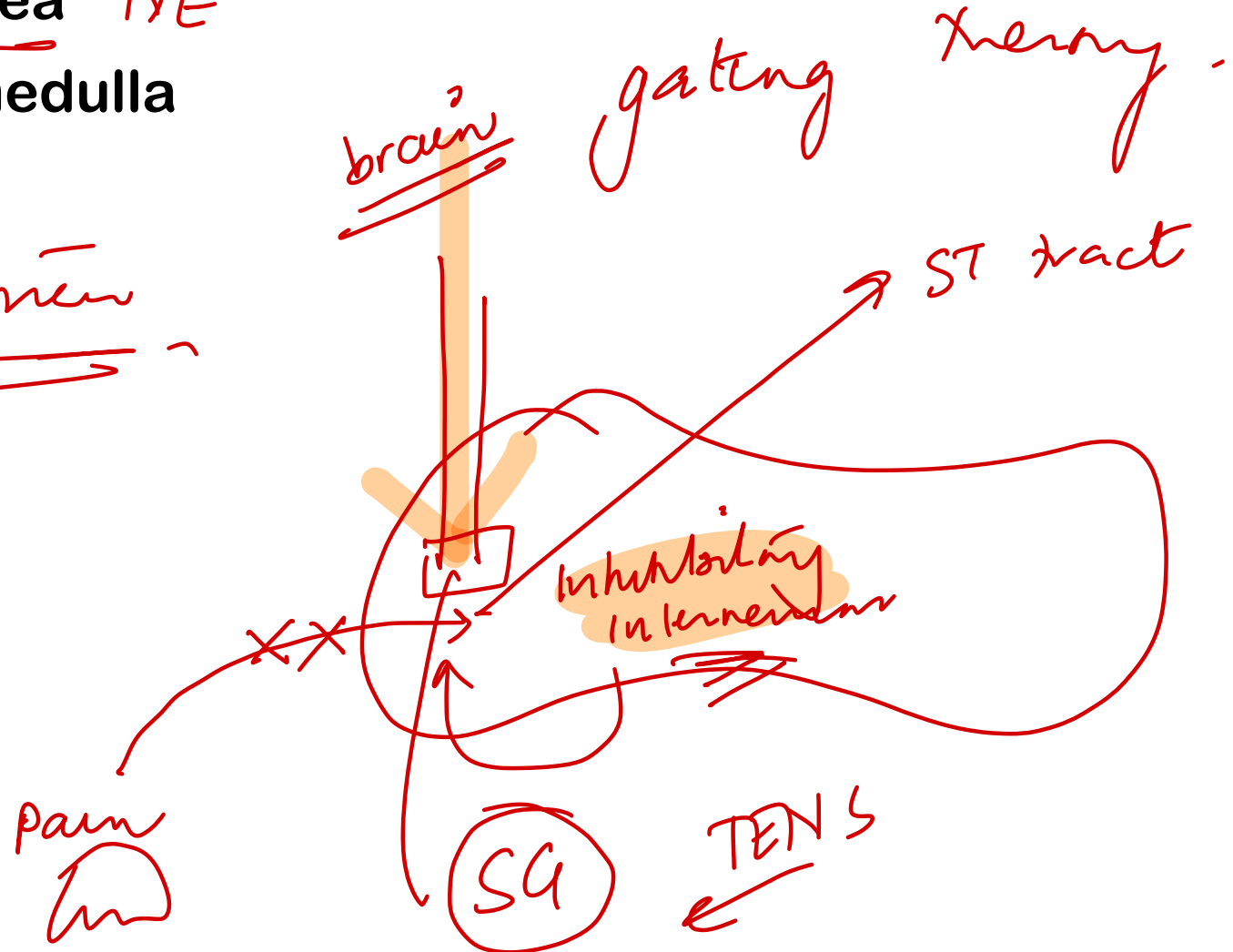
Neurotransmitter	Receptor Type
Glutamate	- Ligand-gated ion channels: NMDA, AMPA
GABA	- Ligand-gated: GABA A, GABA C
Acetylcholine	- Nicotinic → Ligand-gated
Norepinephrine, 5HT, Dopamine, AchM GABA-B Glycine	GPCR (except 5HT3 which is ligand-gated)

GABA-B



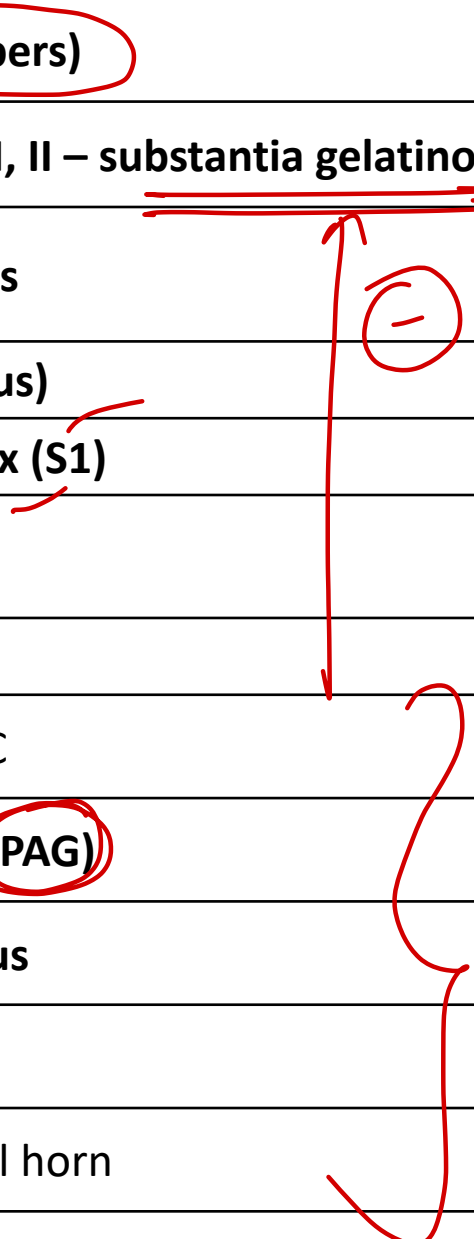
77. The serotonergic cell bodies of the analgesia pathway projecting to the dorsal horn of the spinal cord are located in which part of the brain?

- A. Periaqueductal gray area NE
- B. Rostral ventromedial medulla
- C. Locus ceruleus NE
- D. ~~Nucleus raphe~~ serotonergic



Structure	Function
Nociceptors (A δ , C fibers)	Detect noxious stimuli (thermal, mechanical, chemical)
Dorsal horn (Lamina I, II – substantia gelatinosa)	First synapse; neurotransmitters: glutamate, substance P
Second-order neurons	Cross midline (anterior white commissure) → ascend in spinothalamic tract
Thalamus (VPL nucleus)	Relay to cortex
Somatosensory cortex (S1)	Conscious perception of pain

Structure	Function / Neurotransmitter
Prefrontal cortex, ACC	Modulates perception & emotional response
Periaqueductal gray (PAG)	Activates descending inhibition pathways
Nucleus raphe magnus	Releases serotonin → inhibits pain at spinal level
Locus ceruleus	Releases norepinephrine → inhibits pain
Interneurons in dorsal horn	Release enkephalins, dynorphins → inhibit 1st/2nd order synapse



78. Which of the following is the most appropriate treatment for COPD in a patient with dementia? M ⊖

- A. Tolterodine bladder
- B. ~~Tiotropium~~ bronchi
- C. Telenzepine MI - stomach
- D. Tropicamide ⊖

79. A new aminoglycoside antibiotic is developed that is believed to be particularly effective against Pseudomonas. The volume of distribution of the drug is measured in a group of volunteers and is determined to be 4.5 L. This new drug is most likely to have which of the following properties?

A. It has low molecular weight ~~XX~~

B. It is lipophilic ↑ V_d

C. It does not bind to albumin ~~XX~~

~~D. It is highly charged~~

↓
 V_d

~~plasma vol~~

80. A 65-year-old man is brought to the emergency department after developing sudden-onset right-side weakness and difficulty speaking. He has a history of paroxysmal atrial fibrillation and has been taking warfarin for the past several years with a stable prothrombin time. His wife adds that he started taking a new drug 2 weeks ago, but she does not remember its name. Transesophageal echocardiogram reveals a small thrombus in the left atrium. This patient most likely started taking which of the following drugs recently?

- A. Amiodarone → (-)
- B. Cimetidine → (-)
- C. Ciprofloxacin → (-)
- D. ~~St John's wort~~ (+)

CYP (+)

2 7 9 10
1 1
CYP 2C9

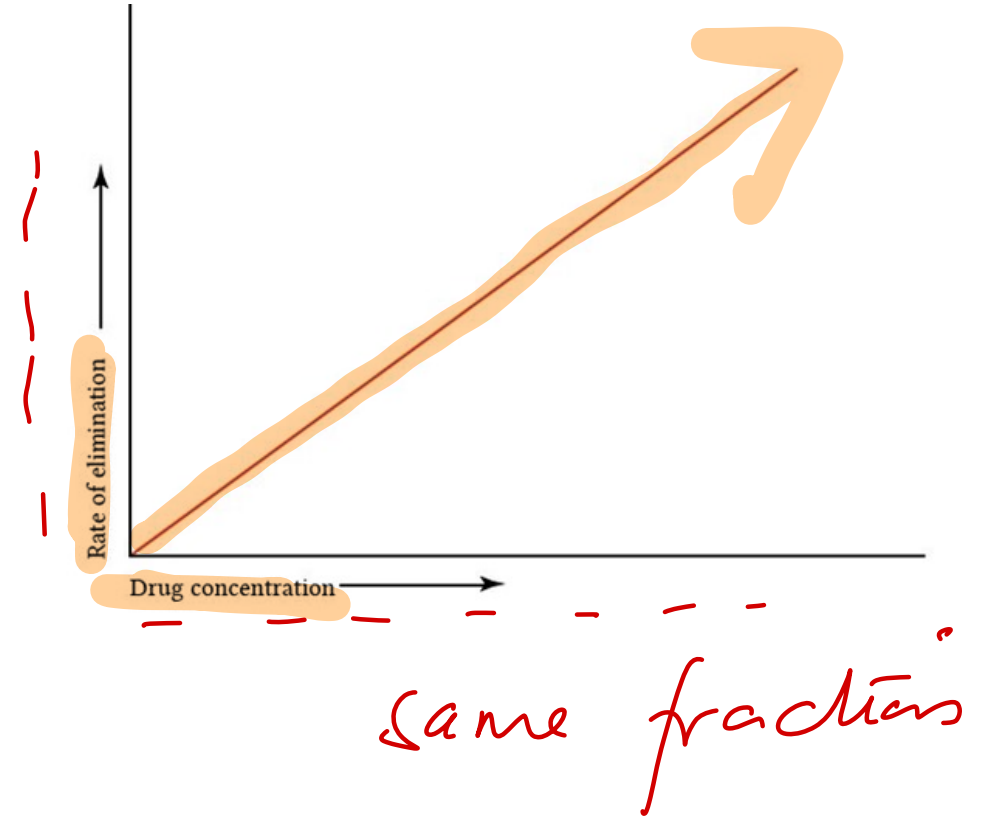
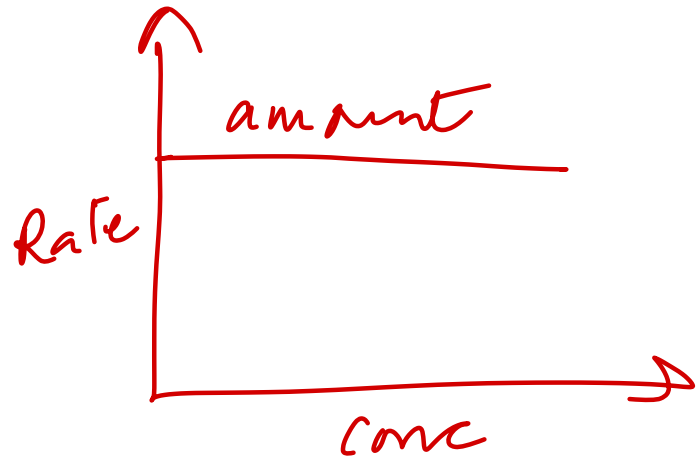
Enzyme inducers	Enzyme inhibitors
Griseofulvin	Valproate
Phenobarbitone	Ketoconazole
Phenytoin	Cimetidine
Rifampicin	Omeprazole
Carbamazepine	Ciprofloxacin
Nevirapine	Erythromycin
Smoking, Ethanol	INH

St John's wort

*Amiodarone
Verapamil*

81. Identify the drug pharmacokinetics from the graphs:

- A. Zero order kinetics
- B. First order kinetics**
- C. Second order kinetics
- D. Cannot be determined from the images



82. Oral digoxin is being given to a 65-year-old male as a maintenance dose. A target plasma concentration of 0.70 ng/mL is decided upon. The digoxin clearance for this particular individual is calculated as 60 mL/min. Knowing that the oral bioavailability of digoxin is 70%, what is the dosing rate in this patient?

A. 40 ng/min

~~B. 60 ng/min~~

C. 70 ng/min

D. 80 ng/min

$$\text{maint dose} = \frac{\text{conc} \times CL}{f}$$

$$= \frac{0.7 \times 60}{0.7} \times 100$$

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

A. Aztreonam ✓✓

~~B. Vancomycin~~ ✓✓

C. Ceftriaxone X

D. Piperacillin X

GPC

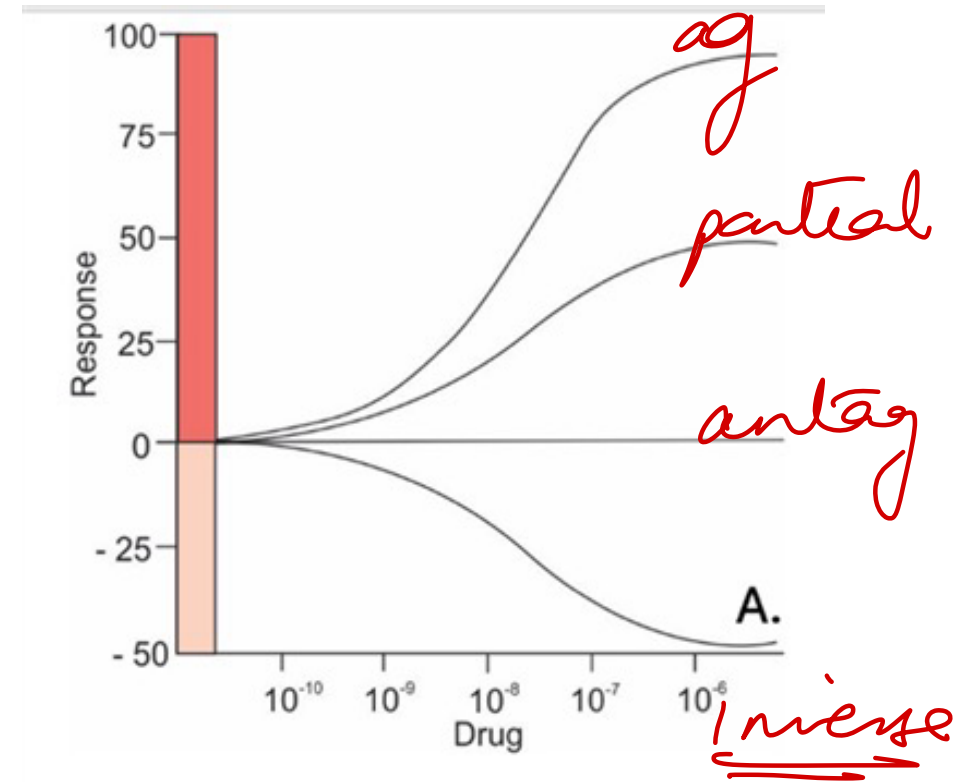
GN

PYQ

84. Match the following drugs-receptor combination appropriate for A

- A. Salbutamol at beta-2 receptor +
- B. Naloxone at opioid receptors *ant*
- C. Buprenorphine at opioid receptor *P*
- D. Carboline at benzodiazepine site
of GABA-A receptor

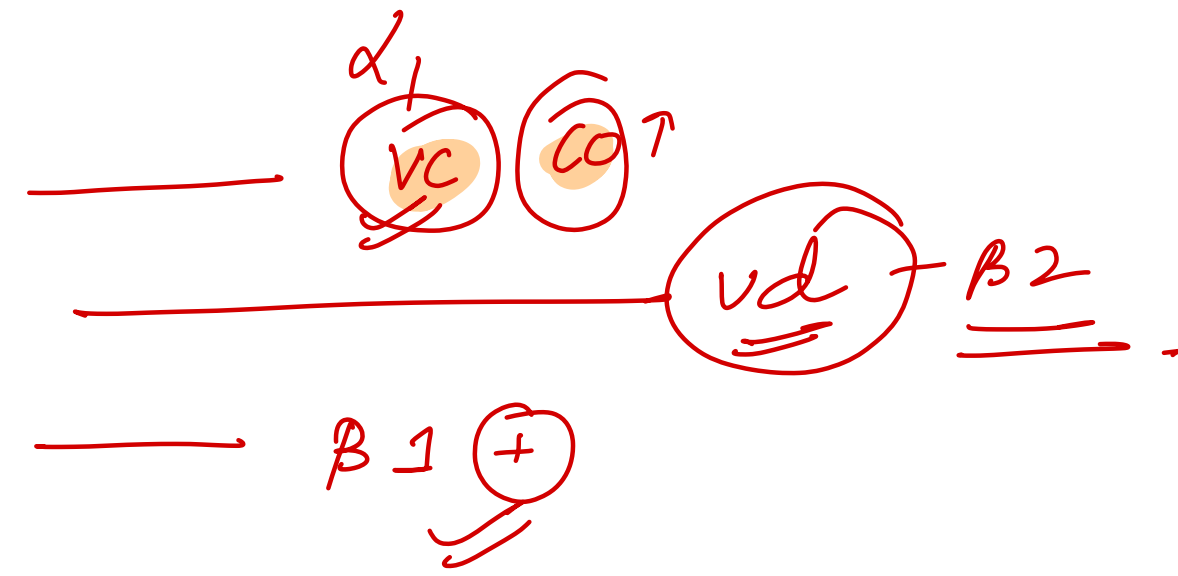
anxiety ⊕



85. The following table gives BP values before and after administration of drug 'X'. What would be the probable mechanism of action of drug 'X'?

Drug X			
SBP	120	→	150
DBP	80	→	68
HR	72	→	86

→ ↑SBP ↑DBP ↑HR



A. α1 agonist and β1 agonist

B. M2 agonist and M3 agonist X X ↓HR

C. α 1 antagonist and β2 agonist ↓BP

D. β1 agonist and β2 agonist

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

- A. Gentamicin
- B. Vancomycin
- C. Amphotericin B
- D. Doxycycline**

PYQ

The drugs which are secreted in bile and safe in renal disease include:

Cef in: Cefoperazone, Ceftriaxone

The: Tigecycline

R: Rifampicin

E: Erythromycin

N: Nafcillin

A: Ampicillin

L: Lincosamide (Clindamycin)

D: Doxycycline

87. A manufacturer substitutes a drug partly by another drug and doesn't add it in the label. What is this type of drug called?

A. Misbranded drug

B. Adulterated drug

C. Unethical drug

D. Spurious drug



88. A new antibiotic developed for the treatment of infections caused by resistant gram-positive cocci has a volume of distribution of 11L. It is eliminated by first-order kinetics and has a half-life of 10 hours. If given by a continuous infusion, approximately how much time would it require for the drug to achieve a 95% plasma steady state concentration?

A. 10 hours

B. 20 hours

C. 30 hours

~~D. 40 hours~~

4.5 $t_{1/2}$

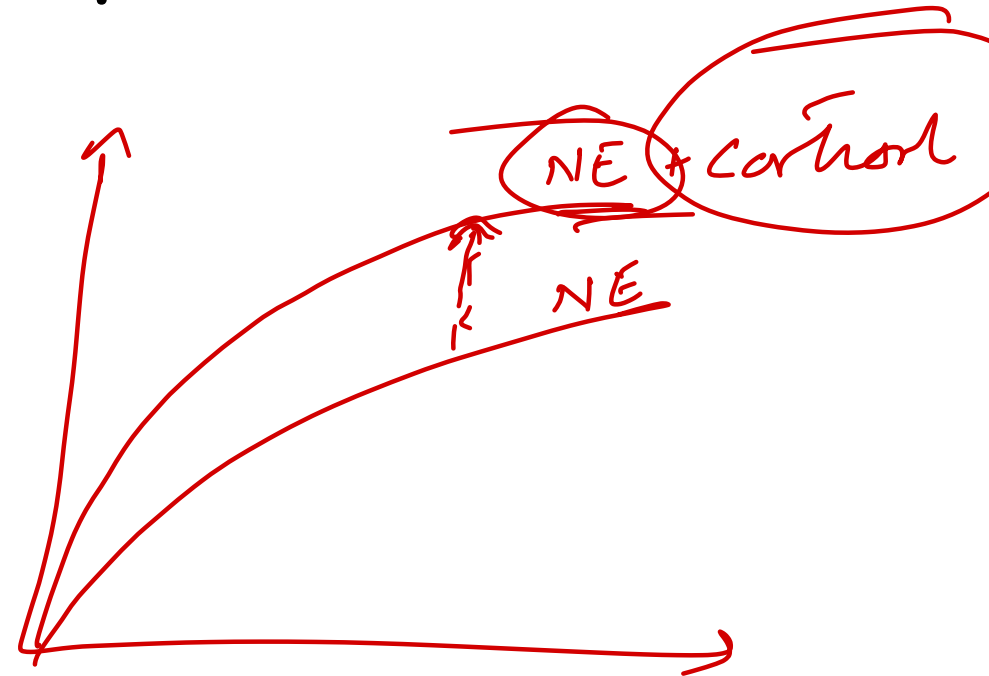
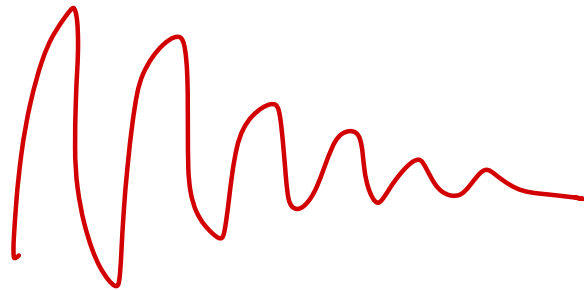
89. Physiologists conduct a series of experiments on hypophysectomized animals to investigate the effects of cortisol on vascular reactivity. Their initial tests show that administration of cortisol alone does not elicit a vascular response. Next, the researchers measure vascular reactivity to an infusion of norepinephrine both with and without pretreatment with cortisol. The results of their experiments are shown in the graph below. Which of the following pharmacologic principles best describes the effect of cortisol in this experiment?

A. Additive effect = $1 + 1 = 2$

B. Synergistic effect = $1 + 1 = 2.5$

C. Permissiveness

D. Tachyphylaxis



90. A 45-year-old male with erectile dysfunction was prescribed sildenafil. He develops bluish-green vision. Inhibition of which enzyme is the cause?

- A. Phosphodiesterase 3
- B. Phosphodiesterase 5
- C. Phosphodiesterase 6
- D. Phosphodiesterase 2

PDE 5 (—)

92. All of the following are correctly matched drug-induced liver pathologies, except:

MAY 1/21

- A. Valproate – Microvesicular steatosis
- B. Halothane – Massive necrosis
- ~~C. Methotrexate – Cholestatic pattern~~
- D. Allopurinol – Fibrin ring granulomas

Pathology/Pattern	Causative Agent
Cholestatic pattern	Contraceptive and anabolic steroids
Spotty hepatocyte necrosis	Methyldopa, phenytoin
Massive necrosis	Acetaminophen, halothane
Chronic hepatitis	Isoniazid
Microvesicular steatosis	Valproate, tetracycline, aspirin (Reye syndrome), ART
Fibrosis and cirrhosis	Alcohol, methotrexate, enalapril, vitamin A
Noncaseating epithelioid granulomas	Sulfonamides, amiodarone, isoniazid
Fibrin ring granulomas	Allopurinol

93. Match the incorrect pair of drugs and enzyme/reaction they inhibit:

A. Azathioprine: PRPP synthetase

B. Mycophenolate: IMP → GMP conversion *IMP deH* ⊖

C. Leflunomide: Carbamoyl phosphate → Orotic acid

~~D. 5FU: Dihydrofolate reductase~~

Thymidylate synthase ⊖

Mtx

94. All of the following anti-retroviral drugs are given orally except:

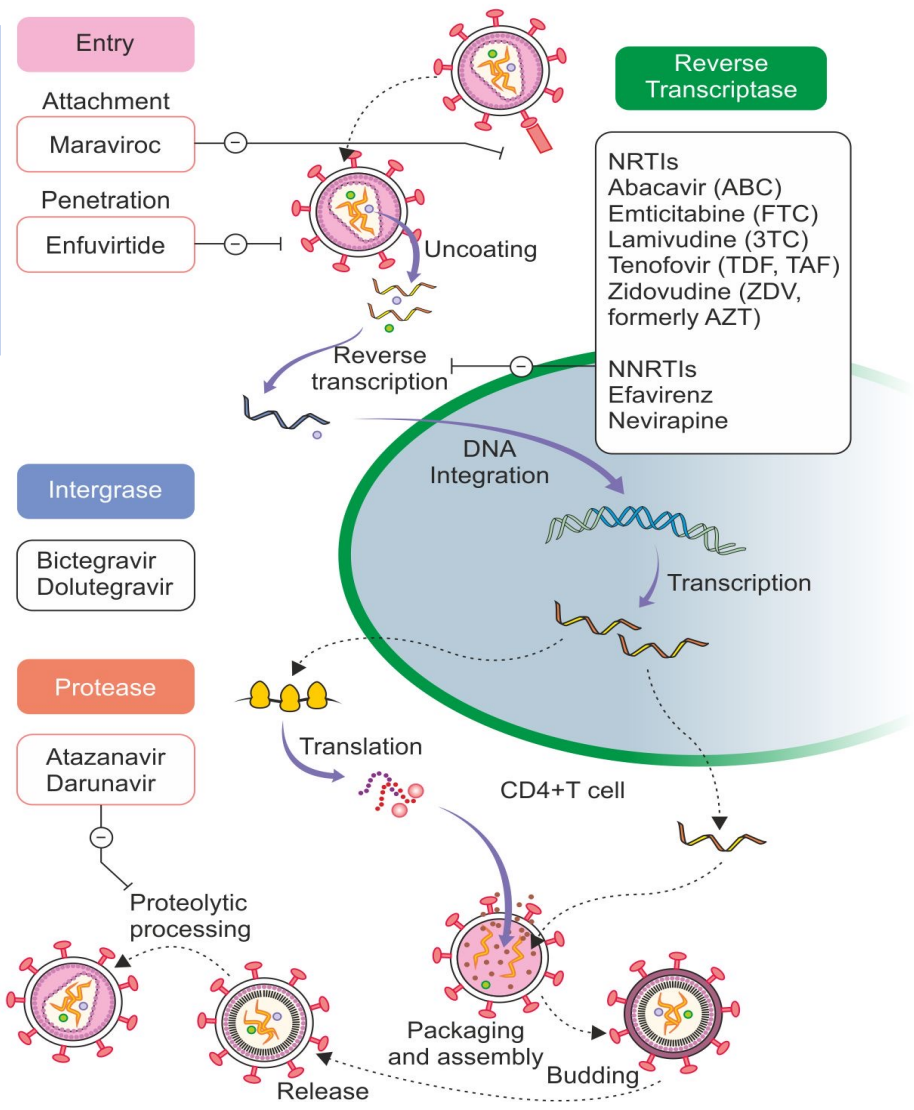
~~A. Ibalizumab~~

B. Efavirenz

C. Fostemsavir

D. Abacavir

gp120-
 Fostemsavir (oral)
 gp41-
 Enfuvirtide
 CD4:
 Ibalizumab
 CCR5:
 Maraviroc (oral)



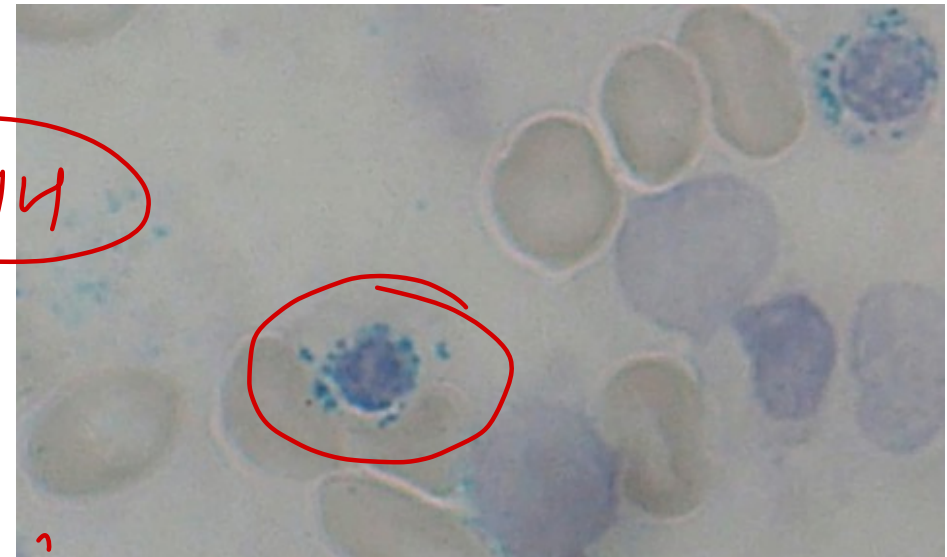
95. A 46-year-old man comes to the physician for a pre-employment wellness examination. A tuberculin skin test is administered and he develops a raised, erythematous 12 mm lesion on his forearm within 48 hours. An x-ray of the chest shows no abnormalities. He is started on the recommended antibiotic treatment for latent tuberculosis. Four weeks later, he returns for a follow-up examination. Laboratory studies show a hemoglobin concentration of 9.3 g/dL, serum alanine aminotransferase activity of 86 U/L, and serum aspartate aminotransferase activity of 66 U/L. A photomicrograph of a Prussian blue-stained bone marrow smear is shown. Which of the following is the mechanism of action of the drug responsible for this patient's findings?

- A. Inhibition of dihydropteroate synthase
- B. Binding to 50S ribosomal subunit
- C. Inhibition of mycolic acid synthesis**
- D. Inhibition of arabinosyltransferase

→ Sulfonamides

INH

→ Ethambutol



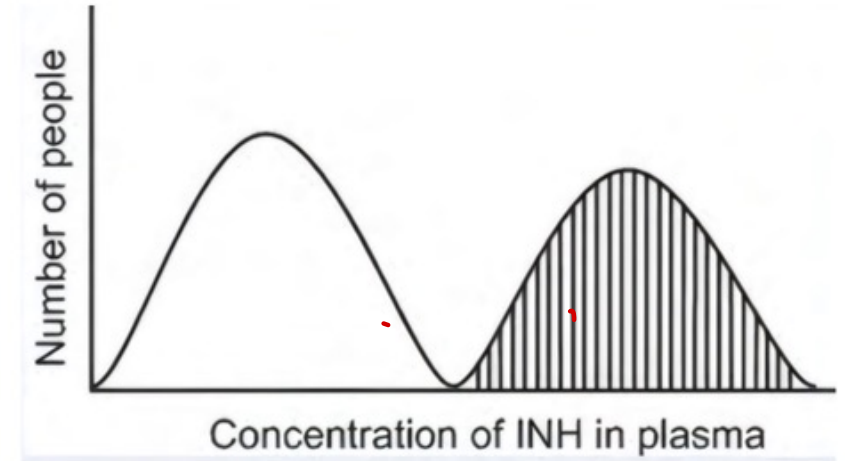
96. A group of researchers is studying the variability in drug metabolism across individuals using isoniazid. Variation in which of the following metabolic processes is the most likely explanation for this observation?

A. Methylation

B. Hydrolysis

C. Acetylation

D. Glucuronidation



acetylⁿ
✓ ✓ ✓ ✓
S H I P ✓
—————
—————

97. Which of the following organs can differentiate between the action of epinephrine and nor-epinephrine?

A. Atrioventricular node β_1

B. Iris of the eye α/B

C. Bronchus β_2

D. Renal juxtaglomerular apparatus β_1

$\alpha_1 | \alpha_2 | \beta_1 | \beta_2$

$\alpha_1 / \alpha_2 > \beta_1$

β_2

98. Which of the following is used to monitor PCM (paracetamol) toxicity?

~~A. Rumack-Matthew~~

B. Matzke

C. Hartford

D. Naranjo

Vancomycin / Ag } nephrotoxic

Adverse drug

99. Which of the following drugs need labelling as “Dangerous to use except under medical supervision”?

A. Schedule G drugs

~~B. Schedule H drugs~~

C. Schedule J drugs

D. Schedule X drugs

↔ prescriptions -

→ (X) ⊕

↪ addictive

100. Match the following drugs with the reactivation of infections they are associated with:

1. Bortezomib	→	A. HSV ^{Q/}
2. Rituximab	→	B. HEP B / TB
3. TNF alpha inhibitors	→	C. TB
4. Fingolimod	→	D. <u>HZV</u>

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

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

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

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

Thank You
