INTEGRATED SYSTEMS 2.0
BTR TEST

Dr. Zainab Vora

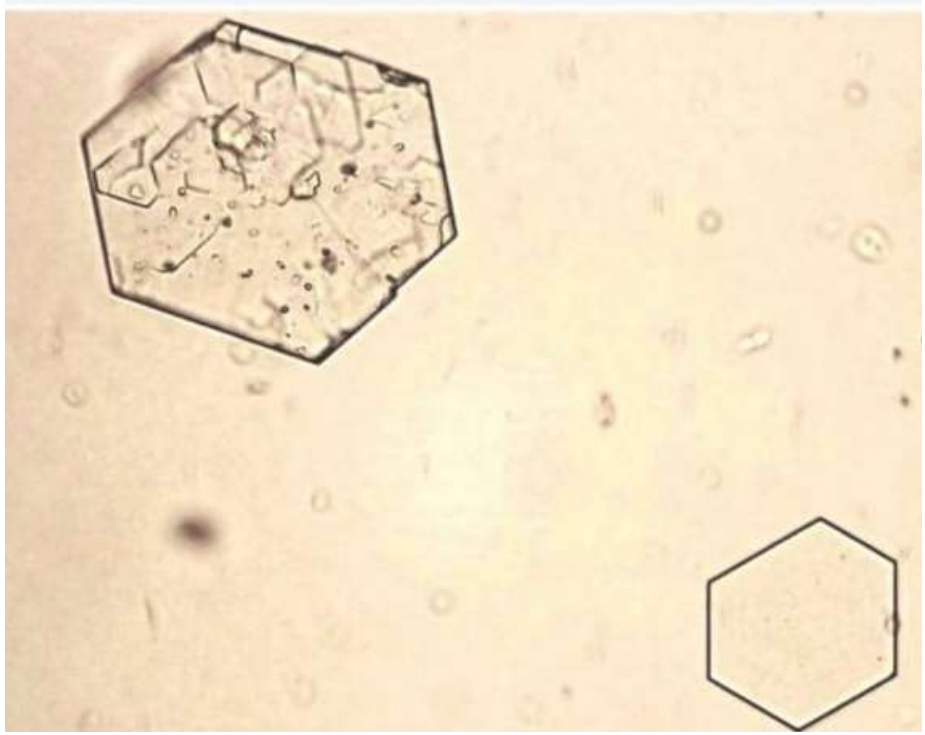
1. 16-year-old boy is brought to the emergency department with sudden onset of left-sided abdominal pain and blood in his urine. Physical examination shows costovertebral angle tenderness on the left side. Microscopic examination of the urine is shown below. Further laboratory evaluation is most likely to reveal which of the following abnormalities in this patient?

A. Aminoaciduria

B. Hypercalciuria

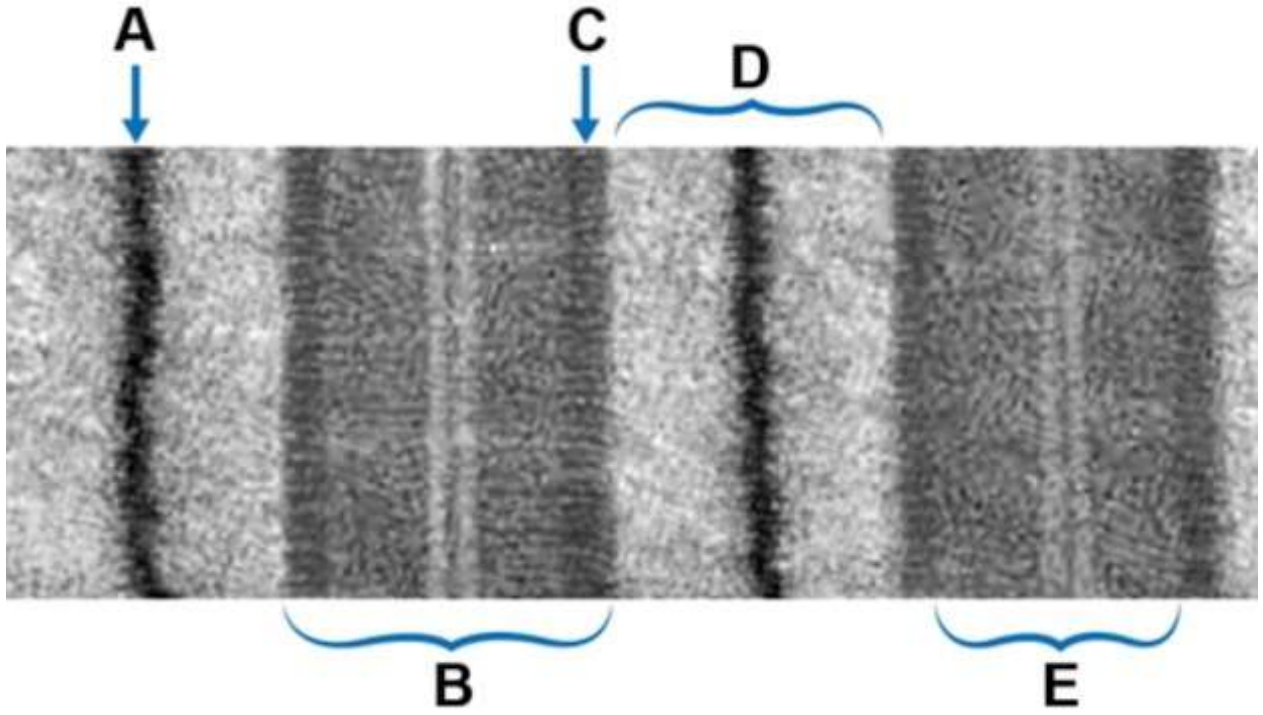
C. Hyperoxaluria

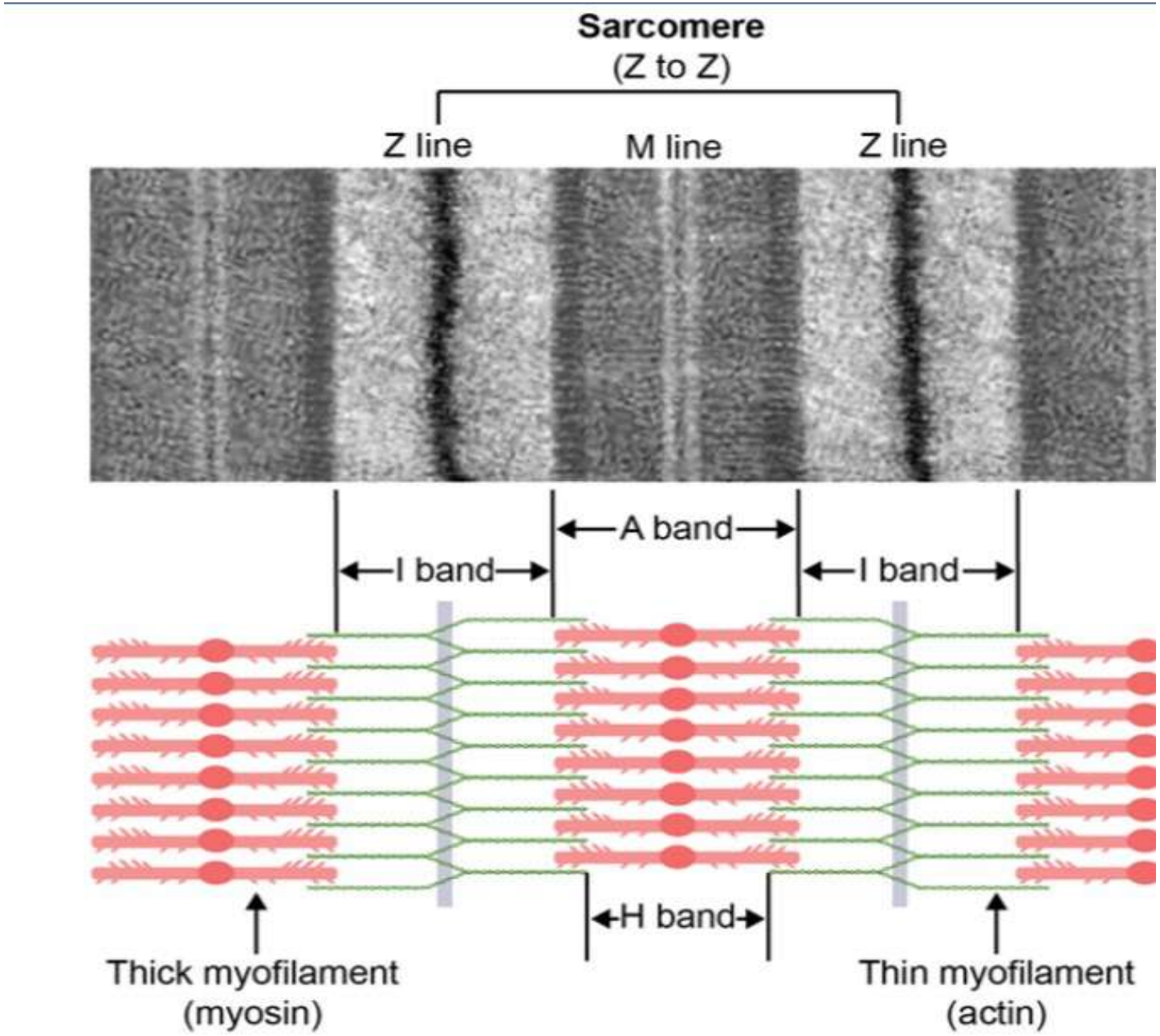
D. Hyperuricosuria



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

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




Sarcomere
(Z to Z)
Z line
M line
Z line
A band
I band
I band
H band
Thick myofilament
(myosin)
Thin myofilament
(actin)

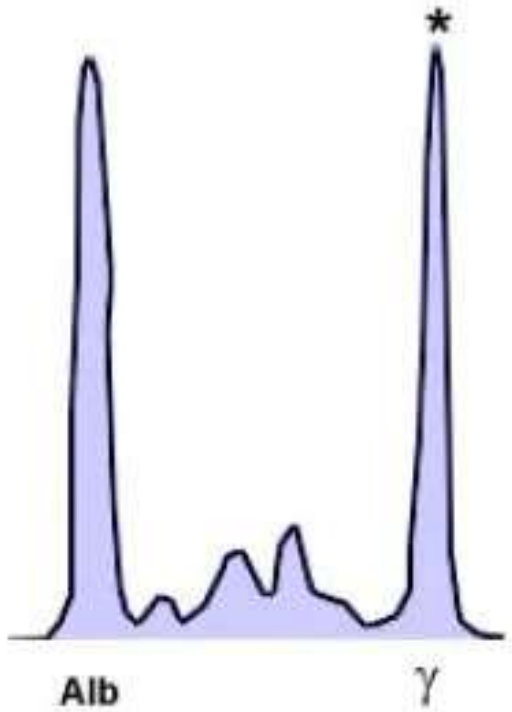
3. A 67-year-old man is evaluated for persistent lower back pain and fatigue. Laboratory testing shows anemia and renal dysfunction. Serum electrophoresis of the serum proteins is shown below. A medication that blocks cellular proteasome action is administered. This treatment is most likely to cause which of the following effects on the abnormal cells?

A. Augmented cytotoxic T-cell response

B. Decreased DNA methylation

C. Impaired RNA splicing

D. Increased apoptosis



4. 34-year-old man is evaluated in the clinic due to difficulty walking over the past 2 weeks. His symptoms have resulted in several recent falls. The physician asks him to stand with his feet close together, arms to the sides, and eyes closed. This maneuver most likely tests for abnormalities in which of the following?

A. Cortical sensory integration
B. Gait
C. Motor coordination
D. Proprioception

5. A 34-year-old woman comes to the office due to exertional dyspnea. The patient has a history of lgA nephropathy; she received hemodialysis for 2 years before undergoing kidney transplantation last month. Chest x-ray reveals cardiomegaly and pulmonary congestion. Further evaluation determines that her symptoms are likely due to persistence of the arteriovenous fistula that was used for hemodialysis. Which of the following physiologic changes in1) cardiac output, 2) systemic vascular resistance and 3) venous return respectively are present in this patient due to the fistula?

A. Decreases, increases, decreases

B. Decreases, increases, increases

C. Increases, increases, decreases

D. Increases, decreases, increases

6. 64-year-old woman is brought to the emergency department due to confusion and lethargy. The patient was asymptomatic when her husband left for work in the morning, but when he arrived home, he found her in bed weak and disoriented. The patient's medical conditions include type 2 diabetes mellitus and hypertension, for which she takes multiple medications. Laboratory testing shows an elevated serum C-peptide level. If her current condition is due to an antidiabetic drug, which of the following is the most likely culprit agent?

A. Acarbose

B. Canagliflozin

C. Glyburide

D. Long-acting insulin

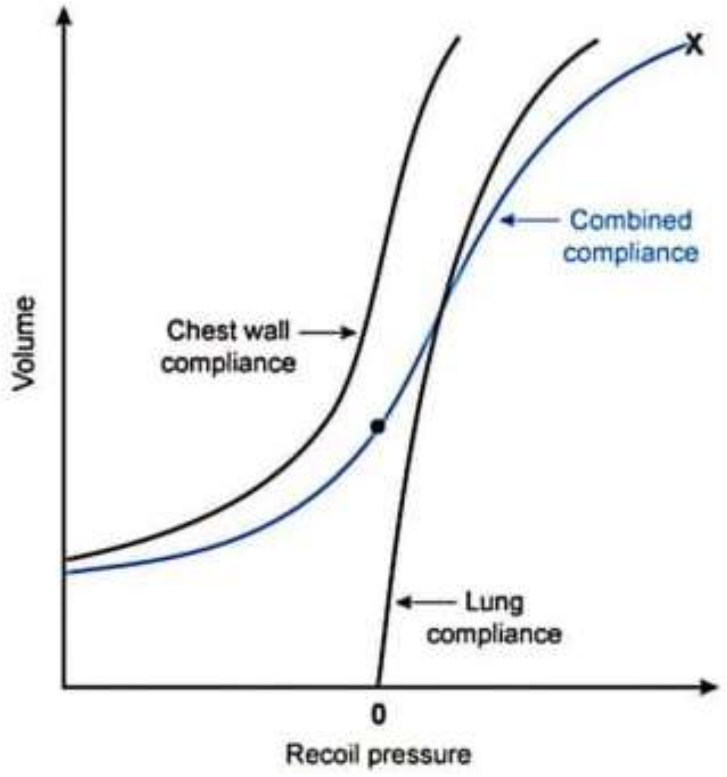
7. The combined compliance of the lung and chest wall of a healthy individual is measured and plotted as shown below. It is noted that the intrapleural pressure at the end of maximal inspiration is -8 cm H20 (marked x). Which of the following is the best estimate of the intrapleural pressure at the point marked by the black dot?

A. +10 cm H2O

B. + 5 cm H2O

C. -5cm H20

D. 0cm H20



8. A 61-year-old woman is hospitalized due to chest pressure and shortness of breath. Two days ago her husband died in a car accident. ECG shows normal sinus rhythm with T-wave inversions in the anterior leads. Echocardiogram shows hypokinesis of the apical wall with decreased left ventricular ejection fraction. Diagnostic coronary angiography shows no evidence of obstructive coronary artery disease. Which of the following is the likely cause of this patient's initial presentation?

A. Catecholamine-induced myocardial stunning

B. Ischemia-induced transmural myocardial necrosis

C. Myocardial hypertrophy and fibrosis due to uncontrolled hypertension

D. Myocardial infiltration by mature lymphocytes

9. A 34-year-old man comes to the emergency department due to severe headache. The patient describes unbearable, throbbing pain around his right eye that awakened him. Over the past week, he has had several similar episodes, which spontaneously resolved after 20-30 minutes. On physical examination, he appears restless and paces in the room. There is mild conjunctival injection and miosis of the right eye. Neurologic examination shows no abnormalities. Which of the following is the most likely cause of this patient's current symptoms?

A. Cavernous sinus thrombosis

B. Cluster headache

C. Migraine without aura

D. Trigeminal neuralgia

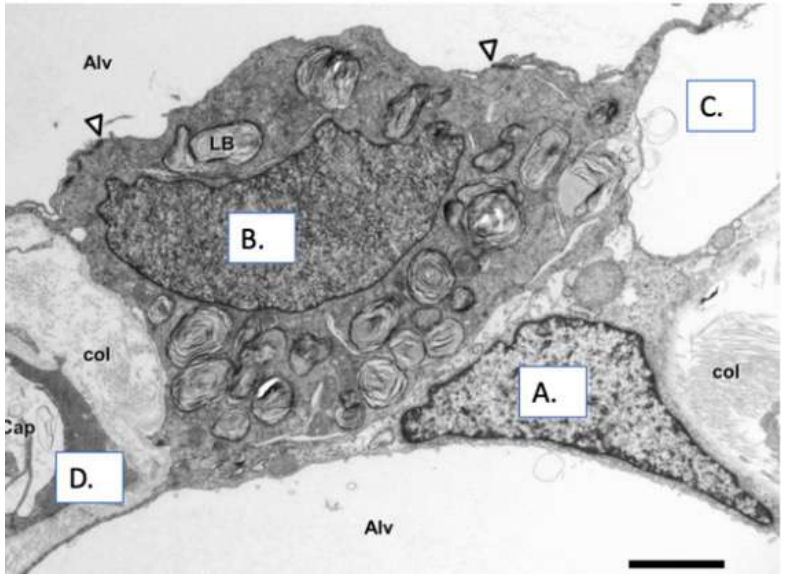
10. Physicians conduct a series of animal experiments to determine pulmonary tissue regeneration capacity. During one of the experiments, lung alveoli are exposed to NO2 and massive necrosis of the epithelial lining ensues. Histologic examination of the injured tissues a month later shows partial recovery of the alveolar epithelial lining. This regenerated tissue is most likely derived from which of the following cells?

A. A

B. B

C. C

D. D



11. A 70-year-old man comes to the OPD due to increasing headaches, nausea, and vomiting. Medical history is significant for a transient ischemic attack that led to a right carotid endarterectomy 5 years ago. Blood pressure is 220/120 mm Hg and pulse is 70/min. Bilateral abdominal bruits are present. Blood testing in this patient would most likely show which of the following?

A. Low renin, low aldosterone, high angiotensin II, low potassium
B. High renin, high aldosterone, high angiotensin II, low potassium
C. Low renin, high aldosterone, high angiotensin II, low potassium
D. Low renin, low aldosterone, low angiotensin II, high potassium

12. 28-year-old woman comes to the emergency department with acute-onset abdominal pain, nausea, and confusion. She has no significant past medical history and does not use tobacco or alcohol as they have made her feel sick in the past. A sample of her urine is reddish in color and darkens on standing for 24 hours. Intravenous dextrose is administered, and her symptoms improve significantly. Dextrose infusion most likely improved this patient's condition by affecting which of the following pathways?

A. Gluconeogenesis

B. Fatty-acid-synthesis

C. Ketone-body formation

D. Porphyrin synthesis

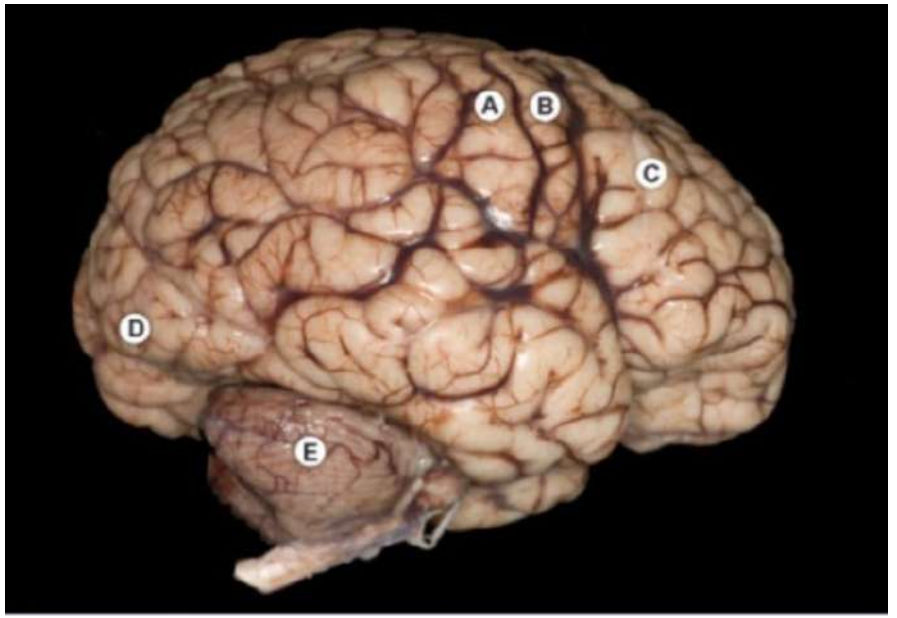
13. 65-year-old man with a history of atrial fibrillation comes to the office due to numbness of his left hand for the past 3 weeks. When the eyes are closed, he is unable to recognize the letters written on his left hand with a stylus. Muscle strength is normal in all extremities. Deep tendon reflexes are 2+. Gait is normal. This patient most likely has a lesion in which of the following locations of the brain?

A. A

B. B

C. C

D. D



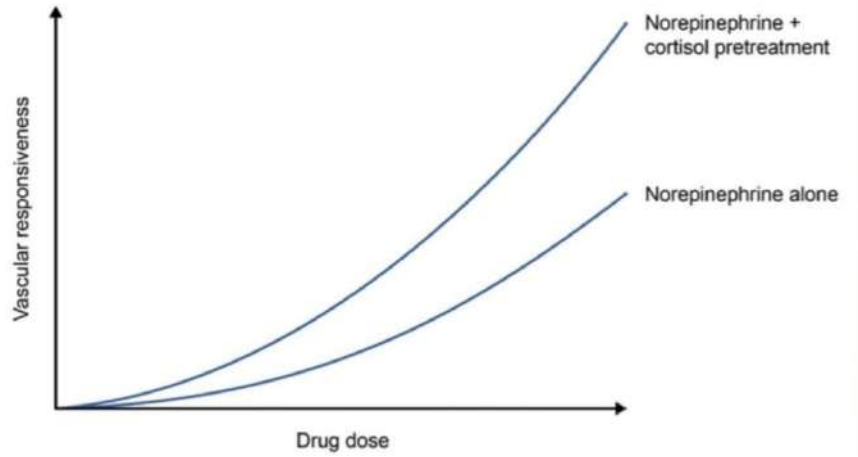
14. Physiologists conduct a series of experiments on hypophysectomized animals to investigate the effects of cortisol on vascular reactivity. Their initial tests show that administration of cortisol alone does not elicit a vascular response. Next, the researchers measure vascular reactivity to an infusion 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

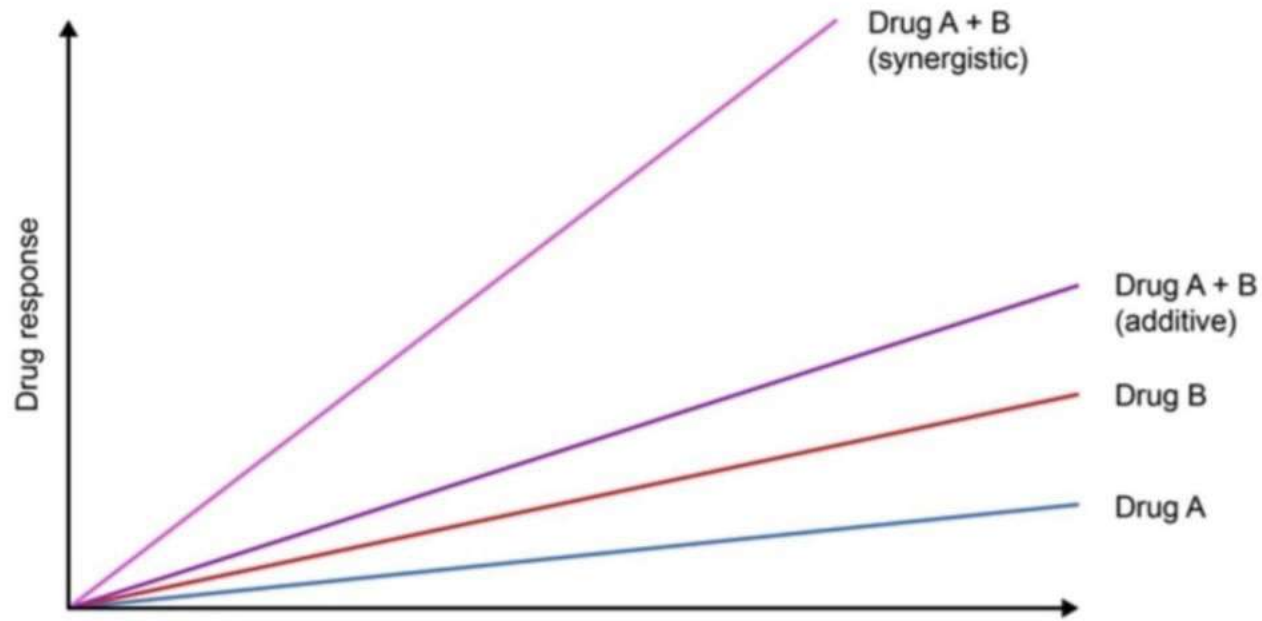
B. Synergistic effect

C. Permisiveness

D. Tachyphylaxis



Differences between synergistic and additive response



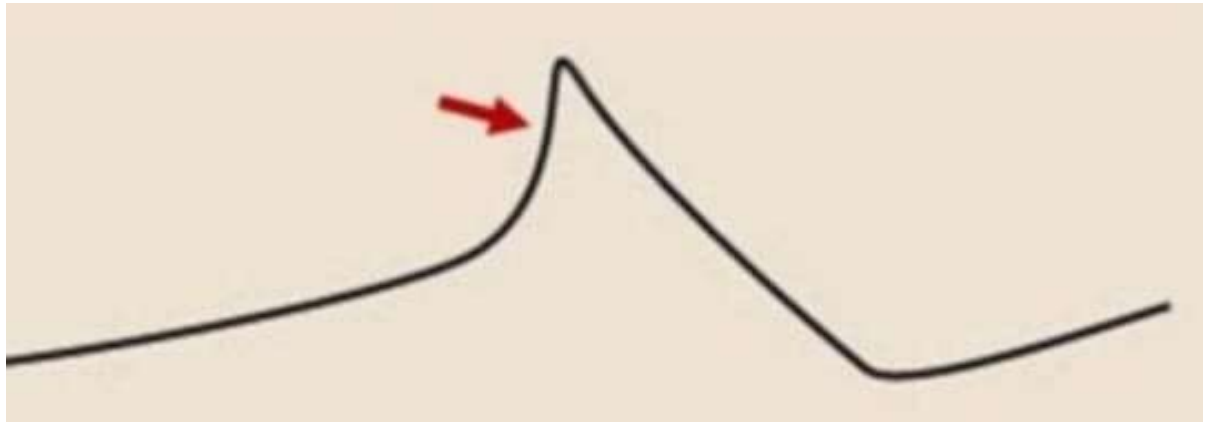
15. Special electrodes are used to detect the change in membrane potential of a specific type of cardiac cell. These changes are recorded on the graph below. The deflection indicated by the arrow is most likely caused by movement of which of the following ions?

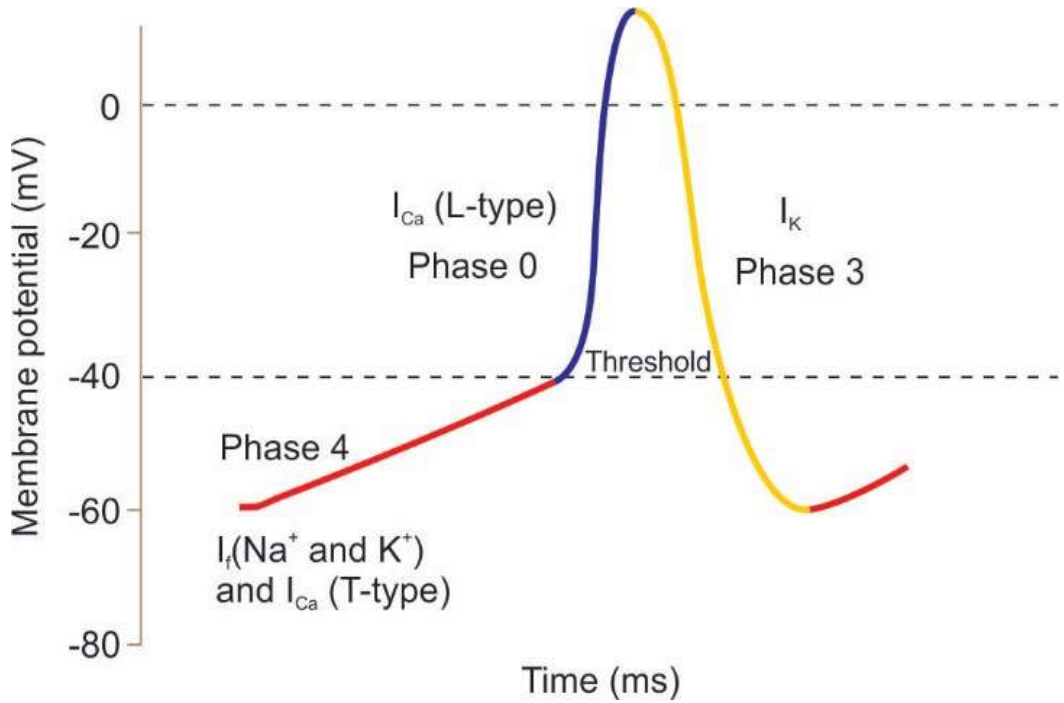
A. Sodium

B. Potassium

C. Calcium

D. Chloride




0
-20
-40
-60
-80
Membrane potential (mV)
I_{Ca} (L-type)
Phase 0
I_K
Phase 3
Threshold
Phase 4
I_f(Na^+ and K^+)
and I_{Ca} (T-type)
Time (ms)

16. 29-year-old nulligravid woman comes to the office due to a 2-month history of worsening bilateral nipple discharge. Her last menstrual period was 3 months ago, and home pregnancy tests have been negative. On physical examination, visual fields are intact. Brain imaging shows a 0.6-cm pituitary mass. Pharmacotherapeutic treatment is begun, and on a follow-up visit the patient reports that her symptoms are improving. Which of the following is the most likely mechanism of action of this medication?

A. Increased estrogen effect on the pituitary

B. Inhibition of gonadotropin-releasing hormone secretion

C. Inhibition of hypothalamic dopaminergic neurons

D. Stimulation of pituitary dopamine receptors

17. A 40-year-old female came with complaints of chest pain, palpitation and shortness of breath. On auscultation, a mid-diastolic murmur was heard and on examination, a prominent 'a' wave on JVP was found. What is the most appropriate diagnosis among the following options?

A. Mitral Stenosis
B. Tricuspid Stenosis
C. Tricuspid Regurgitation
D. Mitral Regurgitation

18. A patient has hyperkalemia, raised uric acid levels and is going through hemodialysis. While this, patient develops drowsiness, had a seizure and got hypotensive. What can be given in treatment for this condition?

A. Mannitol

B. Nesiritide

C. Ethacrynic Acid

D. Bumetanide

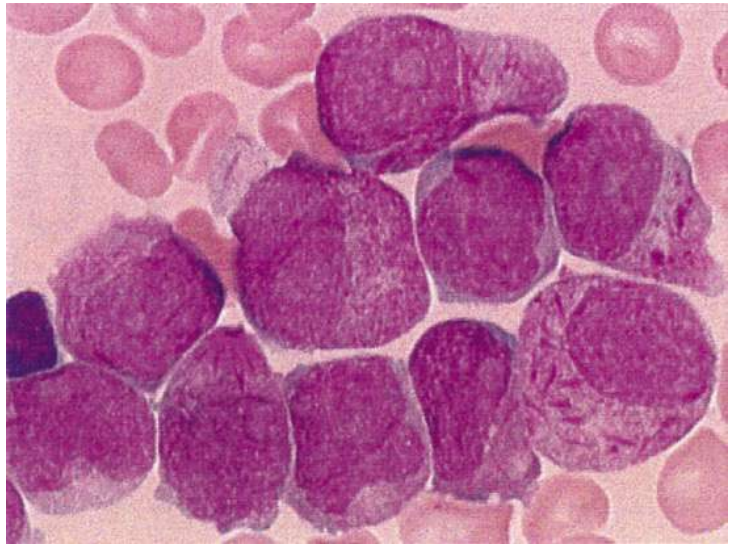
19. 42-year-old man is hospitalized with fever and persistent sore throat. On physical examination, his temperature is 38.3 C (101 F), blood pressure is 120/80 mm Hg, pulse is 94/min, and respirations are 16/min. There are several bruises on his trunk, and blood is oozing from his intravenous catheter venipuncture sites. His blood fibrinogen level is 110 mg/dL (normal 150-400 mg/dL). Bone marrow biopsy is shown here. Chromosomal analysis of these immature cells is most likely to show which of the following abnormalities?

A. t (8;14)

B. t (9;22)

C. t (14;18)

D. t (15;17)



20. 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. An increase in which of the following is expected at the peak of his exertion?

A. Venous blood mean CO_2 content

B. Arterial blood mean O_2 content

C. Hemoglobin affinity for O_2

D. pH of the arterial blood

21. A 2-year-old boy is brought to the OPD due to poor weight gain and frequent urination. His weight percentile has decreased from 60th percentile to 10th percentile, consistent with failure to thrive. Physical examination reveals frontal bossing. He is found to have glucosuria on urinalysis, although his serum glucose is within normal limits. Additional serum laboratory studies reveal hypophosphatemia, hypokalemia, and a normal anion gap metabolic acidosis. Which of the following structure/function combinations is most likely defective in this patient?

A. DCT, secretion of hydrogen ions

B. PCT, reabsorption of bicarbonate

C. Collecting duct, secretion of hydrogen ions

D. PCT, generation of ammonia

22. A 20-year-old woman comes to the emergency department due to bloody stools. For the past month, she has also had decreased energy. Skin examination shows pallor and scattered bruises in various stages of healing throughout the trunk. The abdomen is soft without organomegaly. Complete blood count results are as follows:
Hemoglobin: 7.2 g/dL
Mean corpuscular volume 90 um^3
Platelets: 10,000/mm^2
Leukocytes: 1050/mm^3
Neutrophils 5%
Lymphocytes 95%
Which of the following is the most likely cause of this patients condition?

A. Autoimmune-induced loss of self-renewing hematopoietic stem cells
B. Bone marrow replacement by constitutively active tyrosine kinase-stimulated cells
C. Splenic hyperactivity with cell trapping by the reticuloendothelial system
D. Ineffective hematopoiesis secondary to micronutrient deficiency

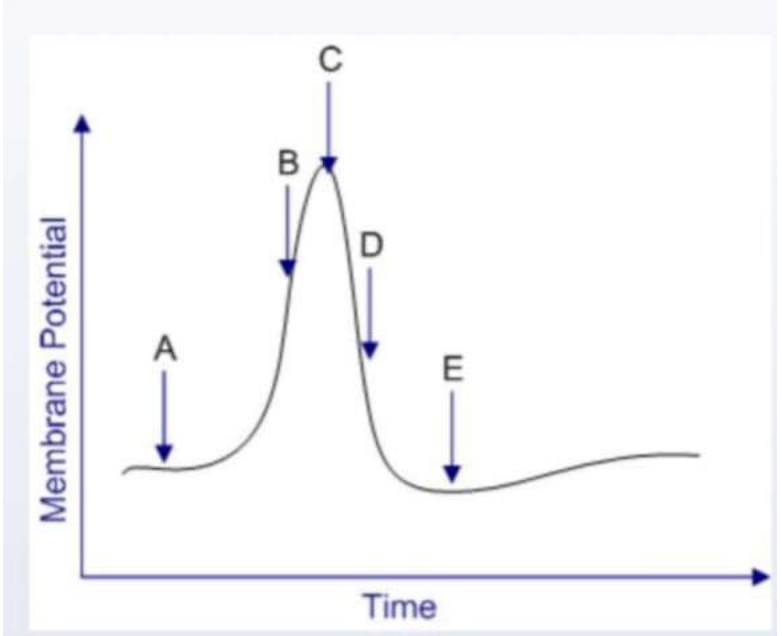
23. Neurophysiologists are studying recordings of the membrane potential from a giant squid axon. A portion of their recordings is shown on the slide below. The membrane is most permeable to potassium ions at which of the following points?

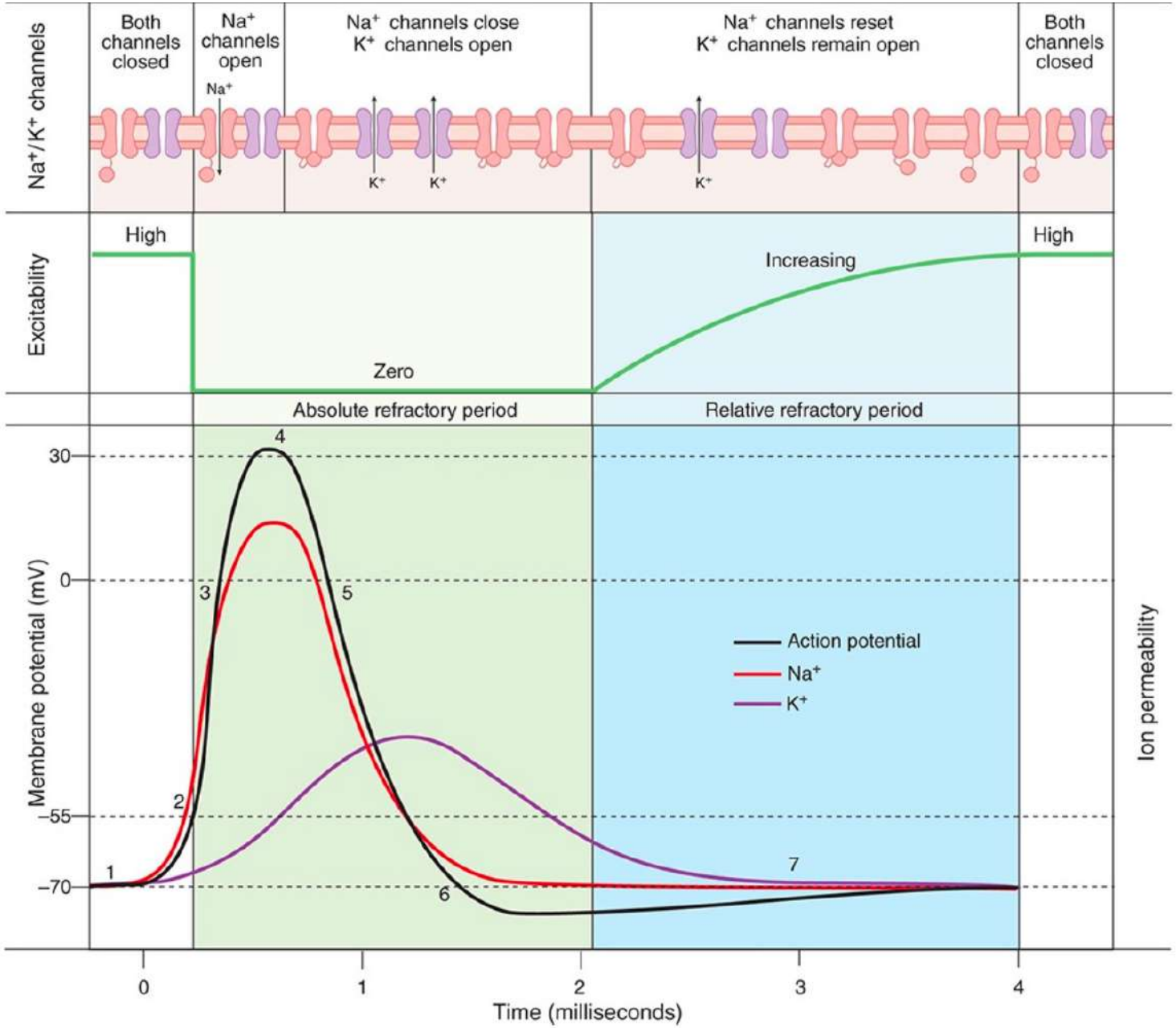
A. A

B. C

C. D

D. E




Na+/K+ channels
Both channels closed
Na+ channels open
Na+ channels close K+ channels open
Na+ channels reset K+ channels remain open
Both channels closed
Na+
K+
K+
K+
Excitability
High
Zero
Increasing
High
Absolute refractory period
Relative refractory period
Membrane potential (mV)
30
0
−55
−70
1
2
3
4
5
6
7
Action potential
Na+
K+
Ion permeability
0
1
2
3
4
Time (milliseconds)

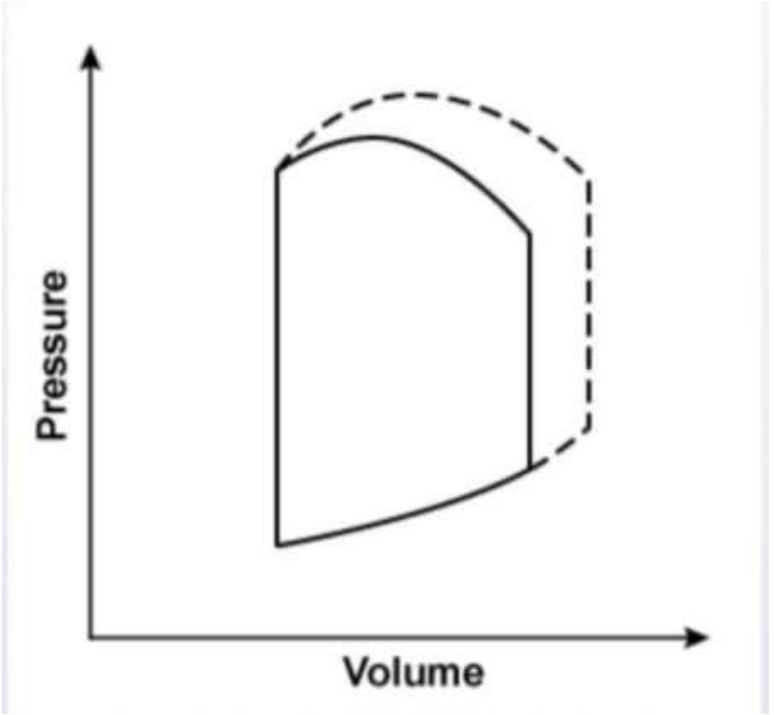
24. A 55-year-old man undergoes an elective surgery under general anesthesia. Two hours into the surgery, his left ventricular pressure-volume loop has changed from the solid line to the dashed line, as shown in the image below. Which of the following is most likely responsible for this patient's hemodynamic change?

A. Abdominal aorta clamping

B. Blood volume loss

C. Dobutamine administration

D. Normal saline infusion

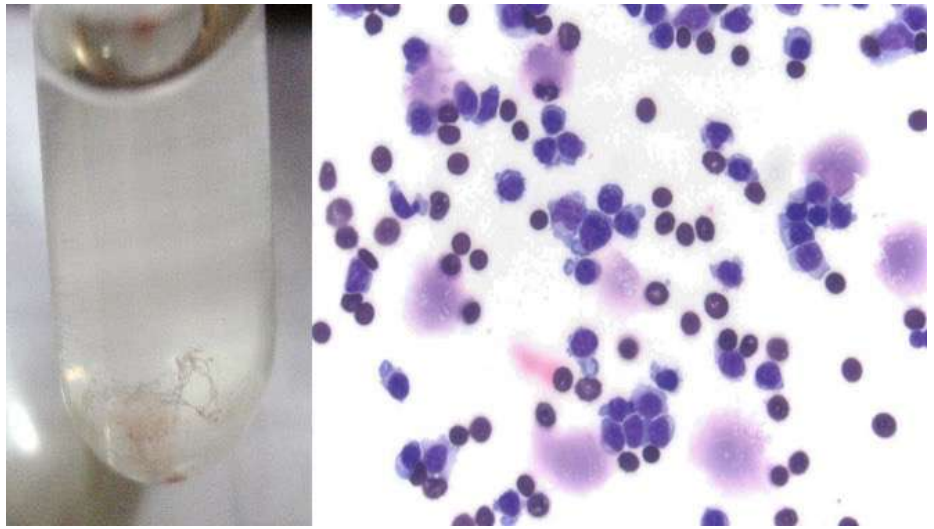


25. 60-year-old woman comes to the OPD due to difficulty climbing stairs and dyspnea on exertion over the last 6 weeks. Blood pressure is 160/90 mm Hg and pulse is 78/min. Skin examination shows scattered ecchymoses. Laboratory results show mild hyperglycemia and elevated 24-hour urinary free cortisol. Serum cortisol level is at the upper limit of normal and is not suppressed following administration of low-dose dexamethasone. Serum ACTH level is elevated. Chest x-ray reveals a right lower lobe lung mass. Which of the following changes are most likely to occur after administration of high-dose dexamethasone in this patient?

A. Low cortisol
B. High cortisol
C. No change in cortisol
D. High ACTH

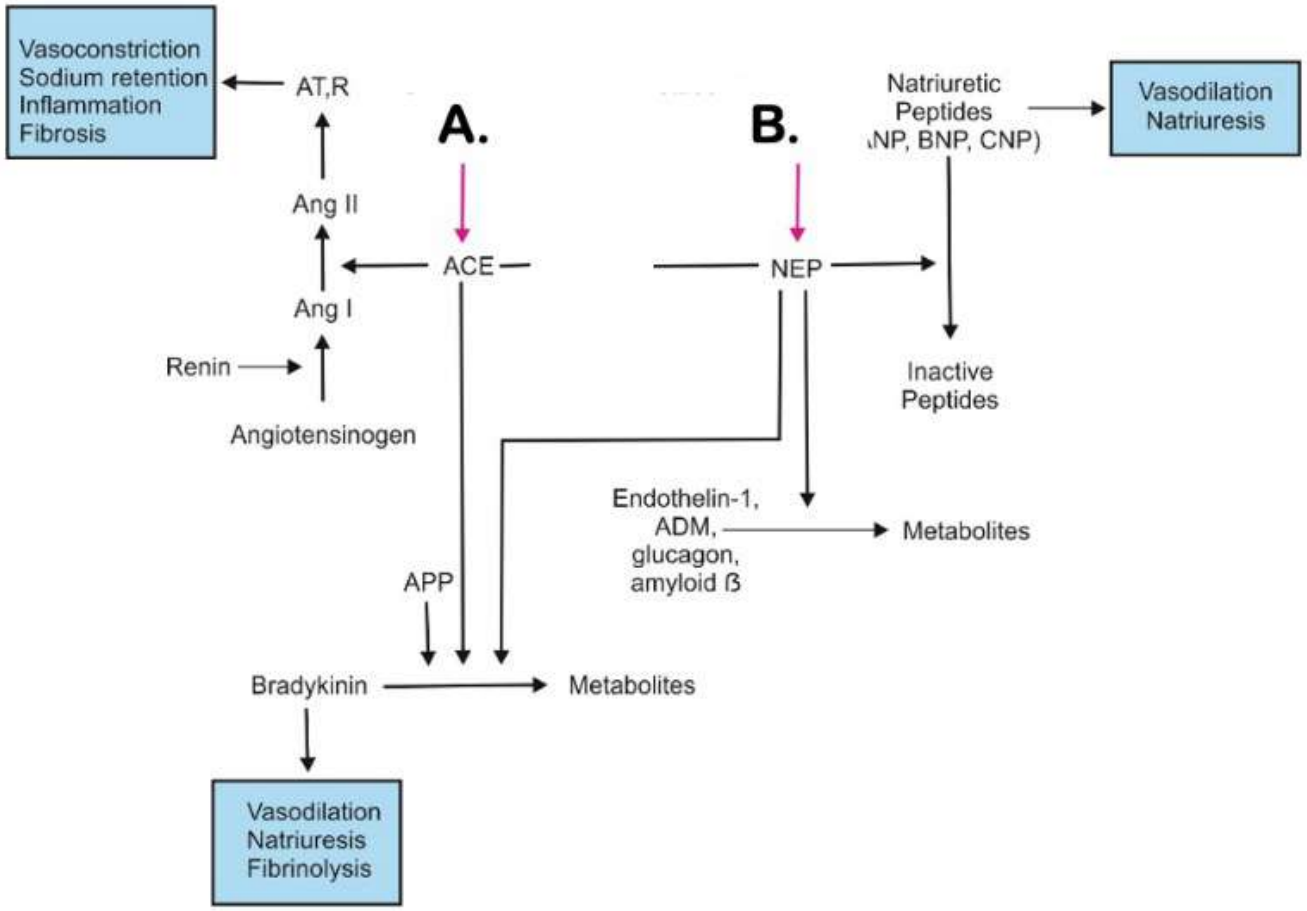
26. The cerebrospinal fluid (CSF) specimen of a patient is shown below along with the microscopy. The report shows mononuclear cytosis, elevated proteins, and low sugars. Which of the following is the likely etiology?

A. Tuberculous meningitis
B. Aseptic meningitis
C. Bacterial meningitis
D. Chemical meningitis



27. Name the drug that acts on both the marked points A and B:

A. Sacubitril
B. Omapatrilat
C. Losartan
D. Nesiritide



28. A patient with retro-positive status was started on 2nd line highly active antiretroviral therapy (HAART). Which of the following can be used to monitor treatment efficacy?

A. CD4+ T cell count

B. Viral load

C. p24 antigen

D. Viral serotype

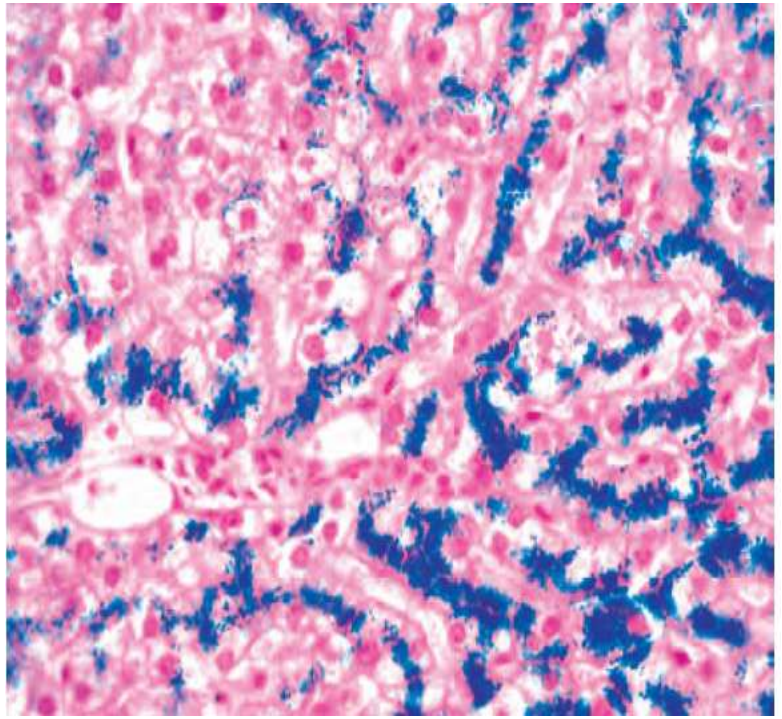
29. A liver biopsy is shown in the image. The genetic defect responsible for his condition most likely affects which of the following processes?

A. Blood iron transport

B. Hemoglobin synthesis

C. Hepatic iron excretion

D. Intestinal iron absorption



30. A young female is brought to the emergency department. Attendants inform that she has consumed 100 tablets of aspirin. What should be the next step in management?

A. N-acetyl cysteine

B. Ammonium chloride

C. Glucagon

D. Sodium bicarbonate

31. The true statement among the following is:

A. The dose of telmisartan should be reduced in renal failure but not in hepatic failure.
B. The dose of irbesartan should be reduced in case of mild-moderate hepatic failure and renal failure.
C. The dose of candesartan should be reduced in mild-moderate liver failure but not in renal failure.
D. Losartan acts as thromboxane A2 antagonist and inhibits platelet aggregation.

32. 66-year-old man with hypertension and stage IV chronic kidney disease comes to the OPD for follow-up. Laboratory results show normocytic, normochromic anemia with a low reticulocyte count. Serum iron studies are within normal limits. Treatment with a recombinant glycoprotein hormone is begun and repeat laboratory testing several weeks later shows an improvement in hemoglobin level. The effects of the hormone prescribed for this patient are most likely mediated by which of the following pathways?

A. Adenylate cyclase/cyclic AMP

B. Arachidonic acid/phospholipase A2

C. Janus kinase 2/signal transducers and activators of transcription

D. Nuclear receptors

33. A 5-year-old boy has developed persistent food-seeking behavior over the past few months. His mother initially thought that the boy was undergoing a growth spurt, but despite how much she fed him he never seemed satisfied. The patient has also started complaining of a headache and nausea in the morning. His physical examination is significant for BMI of 32 kg/m2. This patient's food-seeking behavior could be explained by a lesion causing impairment of which hypothalamic nucleus?

A. Anterior

B. Lateral

C. Supraoptic

D. Ventromedial

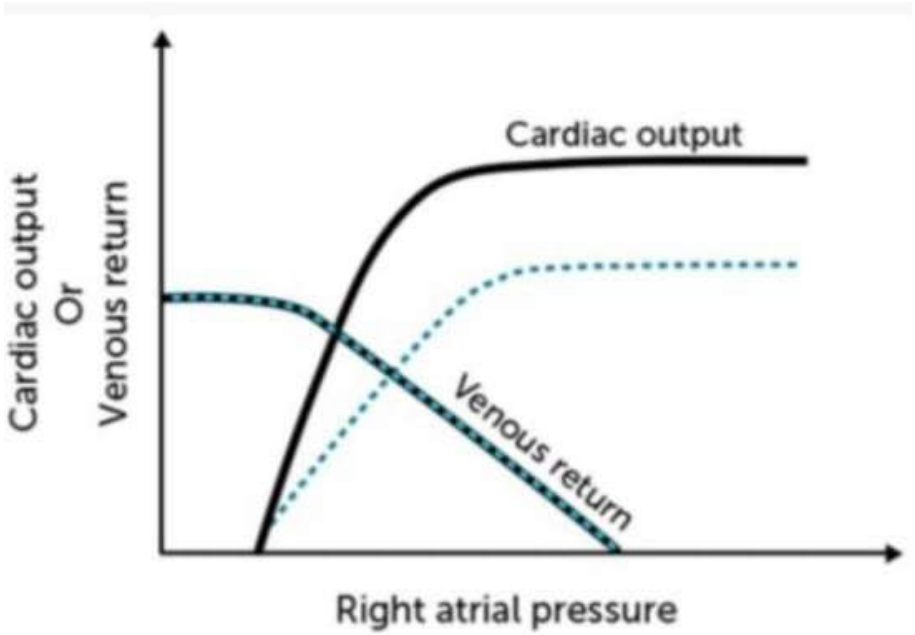
34. The cardiac output and venous return curves of a healthy person are shown below with solid lines. Which of the following is the most likely cause of the change depicted by the dashed lines?

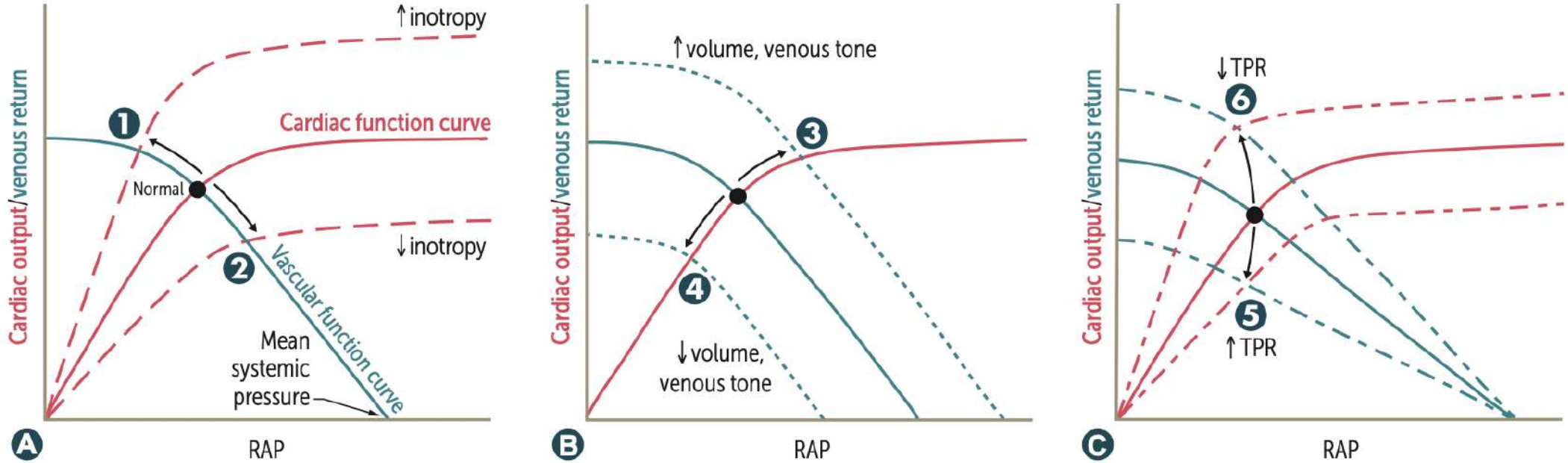
A. Excessive hydration

B. Acute hemorrhage

C. Chronic anemia

D. Myocardial infarction





Intersection of curves = operating point of heart (ie, venous return and CO are equal, as circulatory system is a closed system).

GRAPH	EFFECT	EXAMPLES
A Inotropy	Changes in contractility → altered SV → altered CO/VR and RA pressure (RAP)	❶ Catecholamines, dobutamine, milrinone, digoxin, exercise ⊕ ❷ HF with reduced EF, narcotic overdose, sympathetic inhibition ⊖
B Venous return	Changes in circulating volume → altered RAP → altered SV → change in CO	❸ Fluid infusion, sympathetic activity, arteriovenous shunt ⊕ ❹ Acute hemorrhage, spinal anesthesia ⊖
C Total peripheral resistance	Changes in TPR → altered CO Change in RAP unpredictable	❺ Vasopressors ⊕ ❻ Exercise, arteriovenous shunt ⊖

35. Propranolol is used in Graves disease. In addition to its beta-adrenergic receptor-blocking activity, this drug is likely to decrease which of the following?

A. Binding of triiodothyronine (T3) to its receptors
B. New thyroid hormone synthesis
C. Peripheral conversion of T4 to T3
D. Release of T4 by the thyroid gland

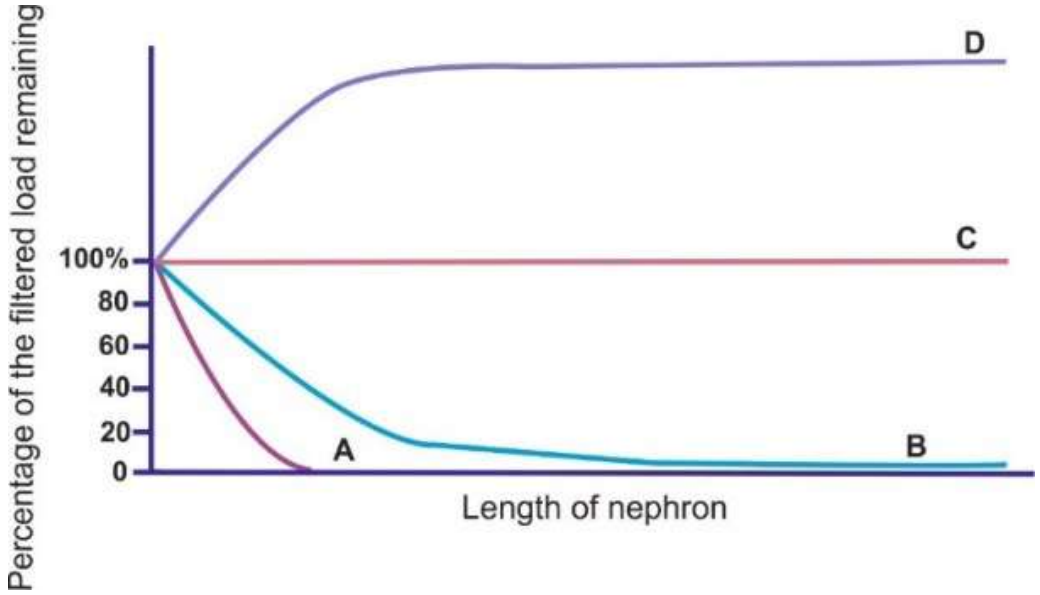
36. Identify the correctly matched pair of substances with their renal clearance from the graph given below?

A. A - Glucose, B - PAH, C - Bicarbonate and D - Inulin

B. A - Glucose, B - Bicarbonate, C - Inulin and D - PAH

C. A - PAH, B - Inulin, C - Glucose and D - Bicarbonate

D. A - Inulin, B - Glucose, C - Bicarbonate and D – PAH



37. 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	

Options:

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

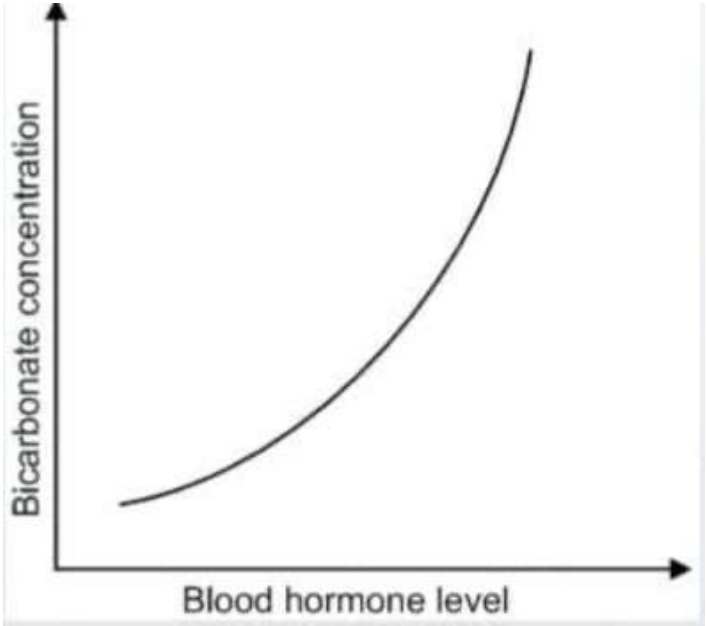
38. 50-year-old man with a remote history of alcohol dependence is evaluated in the clinic for chronic diarrhea and weight loss. The patient has had bloating with daily loose stools for the past 2 years. His stool is described as greasy and malodorous. Pancreatic insufficiency is suspected. The patient undergoes a test in which bicarbonate concentration is measured from duodenal aspirates as hormone A is infused intravenously. The data is plotted in the graph below. Hormone A is produced by?

A. Duodenal S cells

B. Gastric G cells

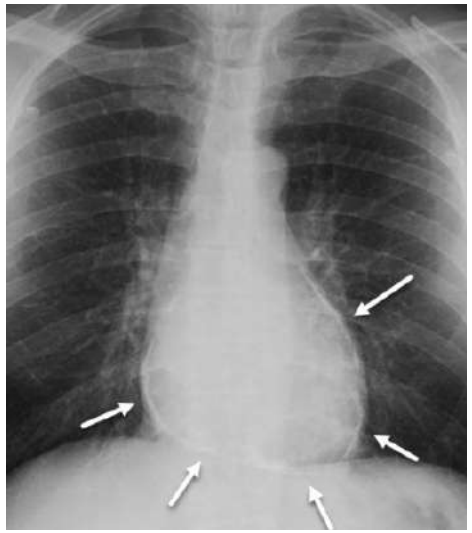
C. Pancreatic beta cells

D. Hepatocytes



HORMONE	Cells	Function	
Gastrin			PPI Atrophic gastritis Zollinger Ellison Syndrome Strongest stimulus:
Secretin			
CCK			
Somatostatin			Octreotide
GIP			Oral vs IV:
Motilin			Agonist:
Ghrelin			Prader-Wili syndrome: Post gastric bypass surgery:

39. 28-year-old man comes to the emergency department with a 3-day history of increasing chest tightness and intermittent sharp chest pains. The patient has no prior chronic medical conditions but had an upper respiratory ilness a week ago that resolved without treatment. ECG reveals sinus tachycardia and low voltage QRS complexes that vary in the amplitude from beat to beat. Which of the following is the most likely chest x-ray finding in this patient?



40. A 70-year-old woman has been enrolled in a longitudinal research study on aging for the last 30 years. Medical history is significant for osteoporosis; she has developed moderate kyphosis due to gradual loss of vertebral body height. She is otherwise active and healthy with no additional medical issues. She has never smoked. Compared to her physiology testing done years ago, which of the following changes is most consistent with normal aging in 1) lung compliance, 2) total respiratory system compliance and 3) physiologic dead space respectively?

A. Increase, decrease, increase

B. Increase, increase, increase

C. Increase, unchanged, decrease

D. Decrease, decrease, increase

41. A7-year-old boy is brought to the emergency department by his parents for arthralgias. He had a cough and runny nose last week but otherwise has been in good health. Physical examination shows raised, red-purple papules, some of which have coalesced, over the patient's buttocks and thighs. Auscultation of the lungs and heart is normal. The abdomen is soft with normal bowel sounds. The knees are tender but do not appear warm or swollen. Urinalysis results are as follows:
Protein: 2+
Blood: moderate
Leukocyte esterase: trace
White blood cells: 1-2/hpf
Red blood cells (RBCs): many/hpf
Casts: RBC casts
Which of the following mechanisms is the most likely underlying cause of this patient's renal findings?

A. Autoantibodies against podocyte antigens
B. Autoantibodies to host cell basement membranes
C. Immune complex deposition in glomerular mesangium
D. Thrombosis of glomerular capillaries

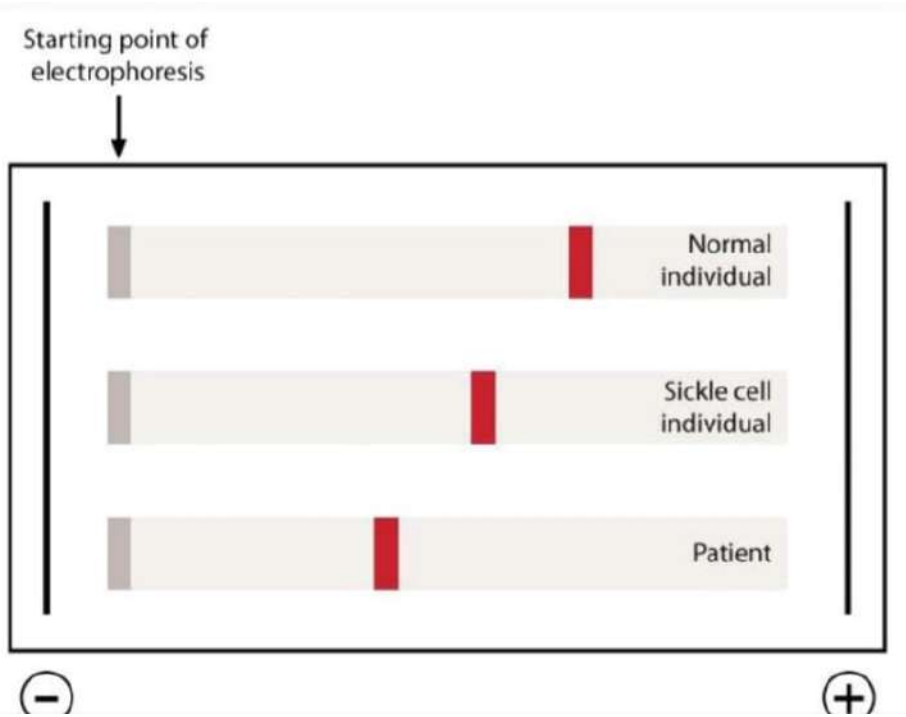
42. 6-year-old boy is brought to the physician because of easy fatigability. Physical examination reveals splenomegaly, and his complete blood count shows mild anemia . Hemoglobin electrophoresis is performed at alkaline pH on a cellulose acetate strip. Findings for the patient are shown below compared to individuals with normal hemoglobin and known sickle cell disease. Which of the following is the most likely cause of this patient's condition?

A. Sickle cell trait

B. HbC disease

C. HbSC disease

D. HbC trait



43. A 29-year-old woman comes to the OPD for treatment of anxiety that has worsened over the past year. She says, "My anxiety just comes out of the blue; one way or another, I'm anxious all the time. An anxiety disorder is diagnosed, and fluoxetine is prescribed. The patient's anxiety begins to improve over the next 4-6 weeks. The physician explains that the medication inhibits the reuptake of a neurotransmitter released by a specific set of neurons. These neurons are likely part of which of the following structures?

A. Caudate nucleus

B. Locus ceruleus

C. Nucleus basalis of Meynert

D. Raphe nuclei

44. A 68-year-old man comes to the OPD due to several weeks of progressive exertional dyspnea and lower extremity edema. Echocardiography shows biventricular dilation and a left ventricular ejection fraction of 35%. After initial stabilization, long-term use of which of the following medications will most likely improve survival in this patient?

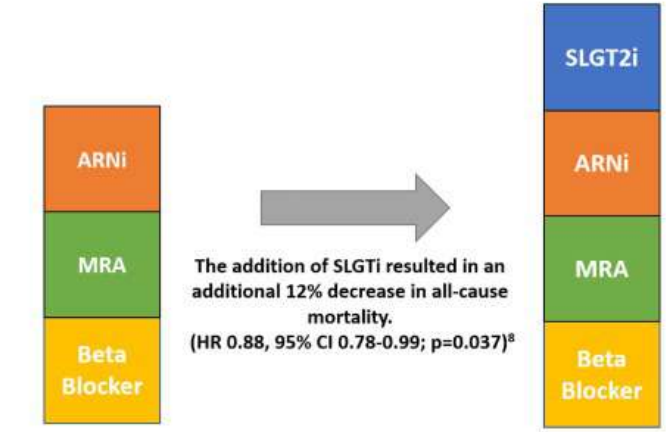
A. Furosemide

B. Amlodipine

C. Carvedilol

D. Digoxin

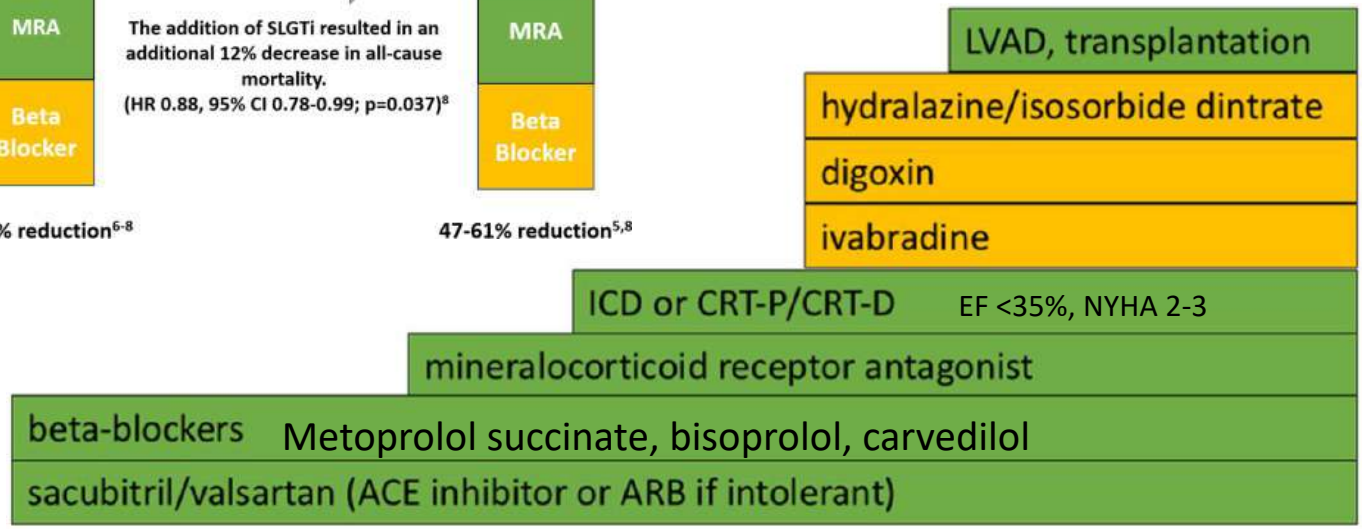
Combined Therapy Effect on All-Cause Mortality in Heart Failure with Reduced Ejection Fraction Across Meta-Analyses



56-63% reduction[6-8]

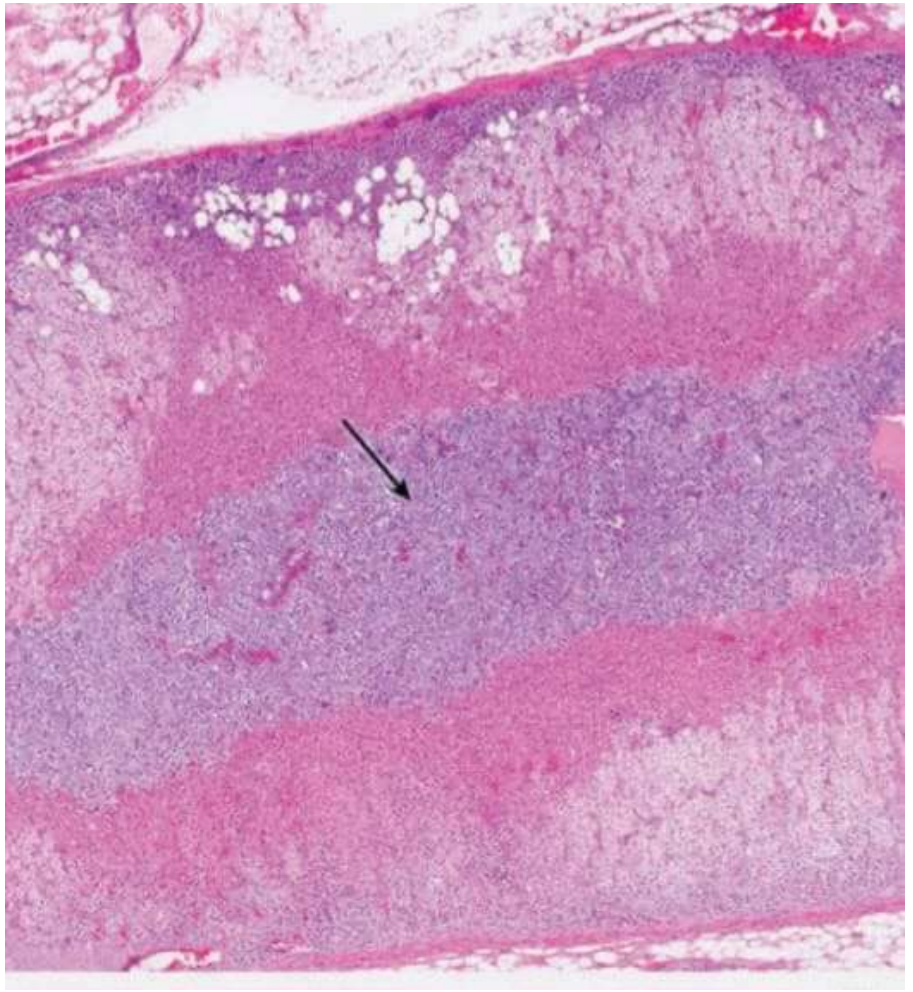
The addition of SLGTi resulted in an additional 12% decrease in all-cause mortality.
(HR 0.88, 95% CI 0.78-0.99; p=0.037)[8]

47-61% reduction[5,8]



45. The cells marked in the image of adrenal biopsy are directly activated by?

A. Acetylcholine
B. ACTH
C. Angiotensin ll
D. Epinephrine



46. Identify the true statements:

1. **TxA2 has platelet aggregating and vasoconstricting effect**
2. **Lipoxin B4 inhibits inhibit neutrophil chemotaxis and adhesion to endothelium.**
3. **Il-1, Il-18, TNF are pyrogenic cytokines**
4. **C3 can be activated is both common as well as alternative pathways**
5. **T cells with a TCR composed of a γ and δ subunit are found associated with GI mucosa**

Options.

A. 1, 2, 3, 4

B. 1, 2, 4, 5

C. 2, 3, 4, 5

D. 2, 4

1L-2, IL-12, INF-G:

IL-4, IL-5, IL-13:

IL-1, IL-6, TNF-A:

1L-10, TGF-B, Lipoxin:

IL-8, C5a, LTB4, 5HETE, Kallikrein:

C3b, IgG:

C3a, c5a

47. Identify the true statements:

1. Rolapitant is the drug of choice for cisplatin induced intractable vomiting on the third day of treatment.

2. Filgrastim is the drug of choice for chemotherapy induced thrombocytopenia

3. Cephalosporins that do not require dose adjustment in renal failure because they are secreted in bile are ceftriaxone and cefoperazone.

4. Denosumab can decrease bone resorption as well as increase bone formation

Options.

A. 1, 2, 3, 4

B. 1, 3, 4

C. 1, 3

D. 2, 4

48. Identify the true statements:

A. Flow cytometry is the IOC for CLL

B. MCL1, BCL-2, BCL-XL and PUMA are anti-apoptotic factors.

C. Long-term hemodialysis patients with renal failute have accumulation of Aβ2-microglobulin.

D. B cells express IgM and IgD antibodies at the same time due to somatic hypermutation

E. CD16, CD56 and CD94 are NK cell markers.

Option

A. 1, 2, 3, 4, 5

B. 1, 3, 5

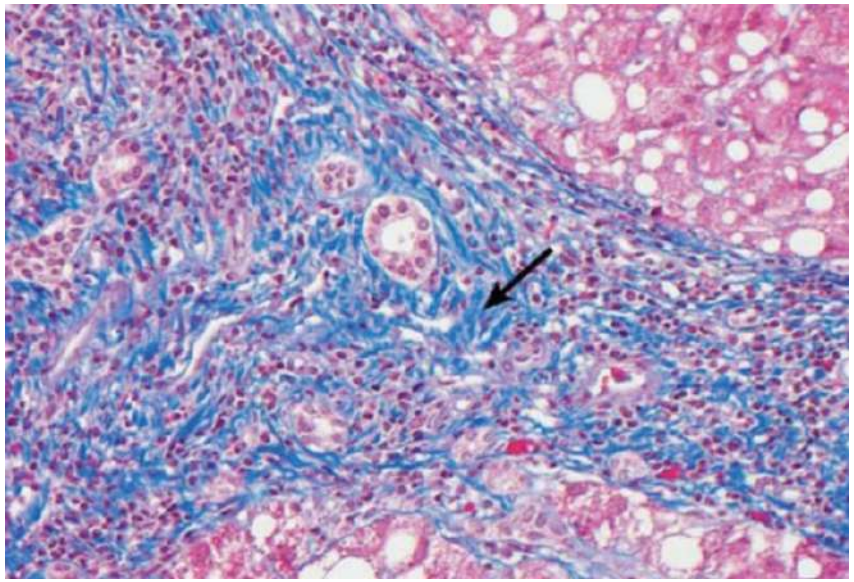
C. 1, 2, 4, 5

D. 2, 3, 5

Pro apoptotic genes (BH1-3)	Anti-apoptotic genes	Apoptosis initiators or 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 Steroids	NOXA Gene

49. 62-year-old man comes for the evaluation of jaundice. Medical history is significant for uncontrolled type 2 diabetes mellitus and morbid obesity. He does not use tobacco, alcohol, or illicit drugs. BMl is 47 kg/m2. Laboratory studies reveal elevated transaminases. A liver biopsy is obtained, and trichrome staining shows the following. Which of the following cells is directly responsible for the histologic finding indicated by the arrow?

A. Cholangiocytes
B. Hepatocytes
C. Kupffer cells
D. Stellate (Ito) cells



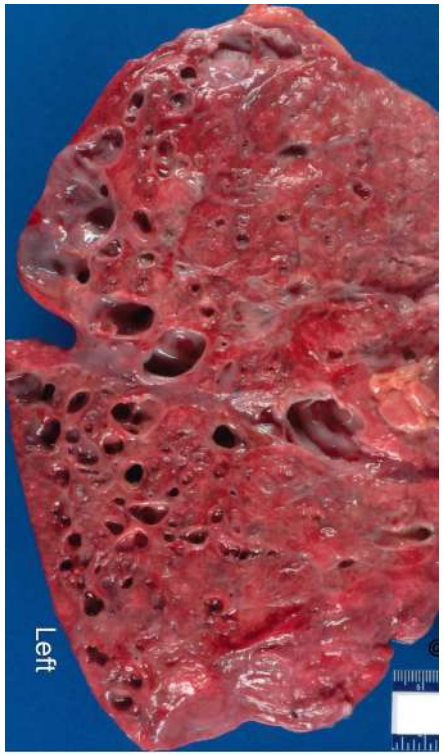
50. A 17-year-old girl is brought to the emergency department due to hemoptysis and severe respiratory distress. The patient has been on several oral antibiotics for pneumonia over the past week and has required numerous similar treatments in the past. Pulmonary examination reveals diffusely reduced air flow, rales, and intercostal retractions. Despite aggressive management, the patient ultimately expires. An autopsy is performed and a gross lung specimen is shown in the image below: Which of the following is the most likely etiology of this patient's hemoptysis?

A. Bleeding from hypertrophied bronchial arteries

B. Blood loss from hypertrophied pulmonary arteries

C. Diffuse alveolar hemorrhage due to vasculitis

D. Formation of a fistula between the tracheobronchial tree and aorta



51. 45-year-old man comes to the office for an annual medical visit. The patient has had prediabetes for the last 2 years. He feels well and takes no medications but has gained weight since his last visit a year ago. The patient has a strong family history of type 2 diabetes mellitus. Blood pressure is 124/78 mm Hg and BMI is 32 kg/m^2. Laboratory results show a fasting blood glucose of 157 mg/dL and serum creatinine of 0.7 mg/dL. Hemoglobin A1c is 7.4%. Urine assay shows no detectable albuminuria. Which of the following renal changes is most likely present in this patient at this time?

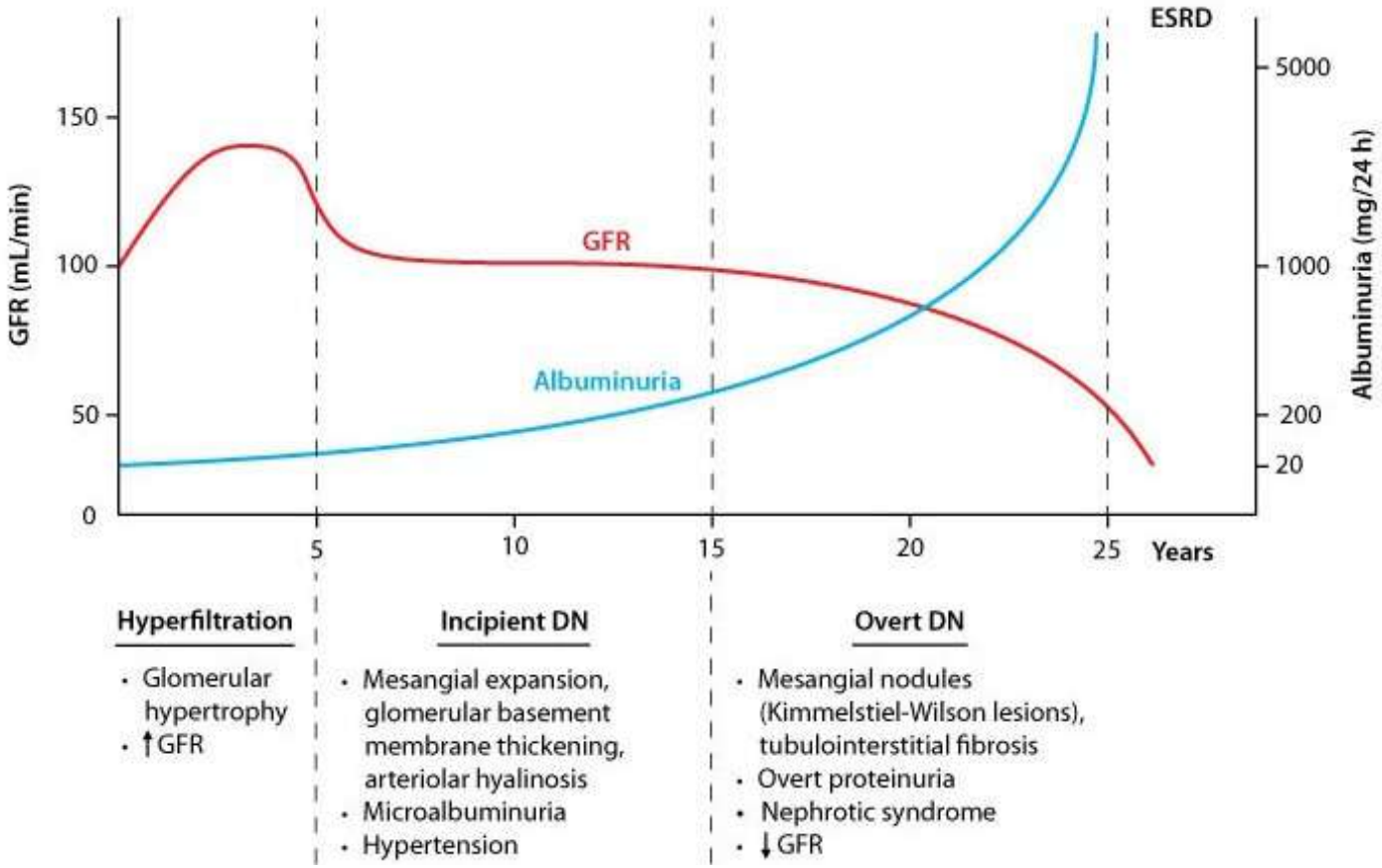
A. Decreased peritubular capillary oncotic pressure

B. Decreased intraglomerular capillary pressure

C. Glomerular atrophy

D. Increased glomerular filtration rate

Natural history of diabetic nephropathy



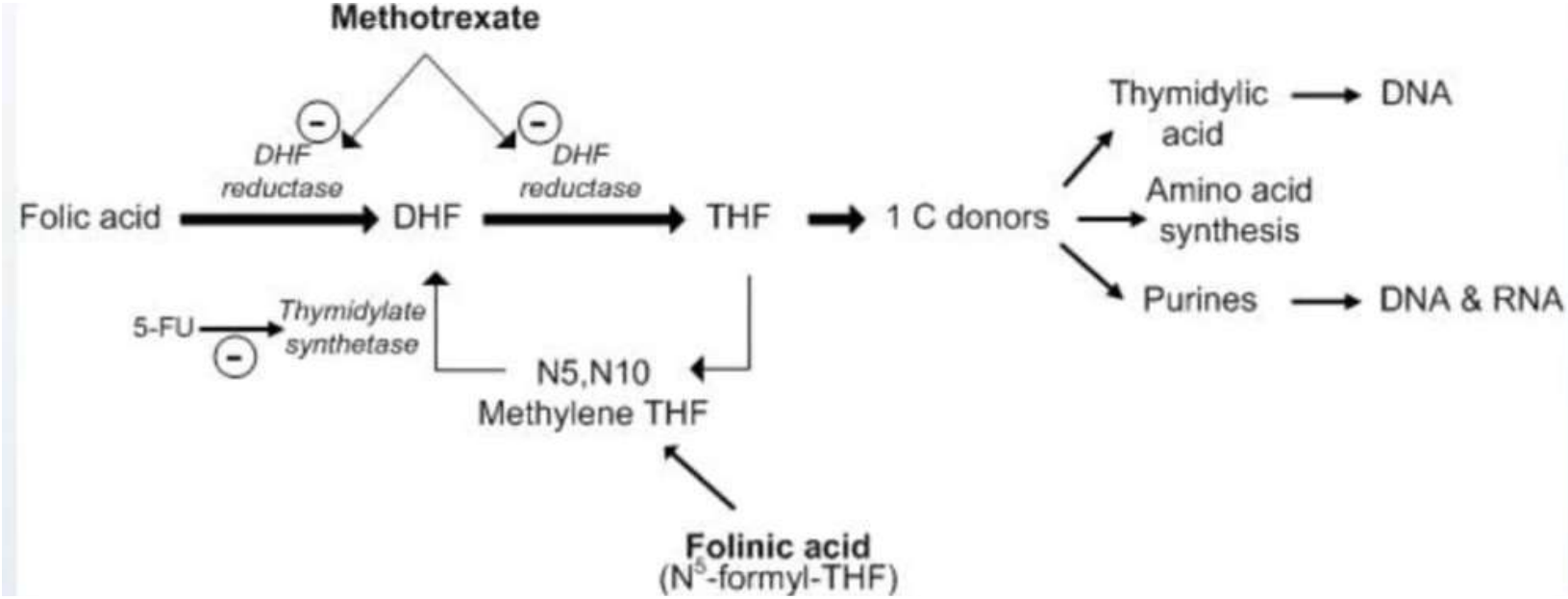
52. Two antineoplastic drugs are shown to inhibit intracellular thymidylate formation. The chemotherapeutic effect of drug X can be overcome by Ns-formyl-tetrahydrofolate supplementation, but that of drug Y is not affected. The drugs described in this scenario are most likely which of the following?

A. X: Cytarabine Y:Gemcitabine

B. X: Fluorouracil Y: Leucovorin

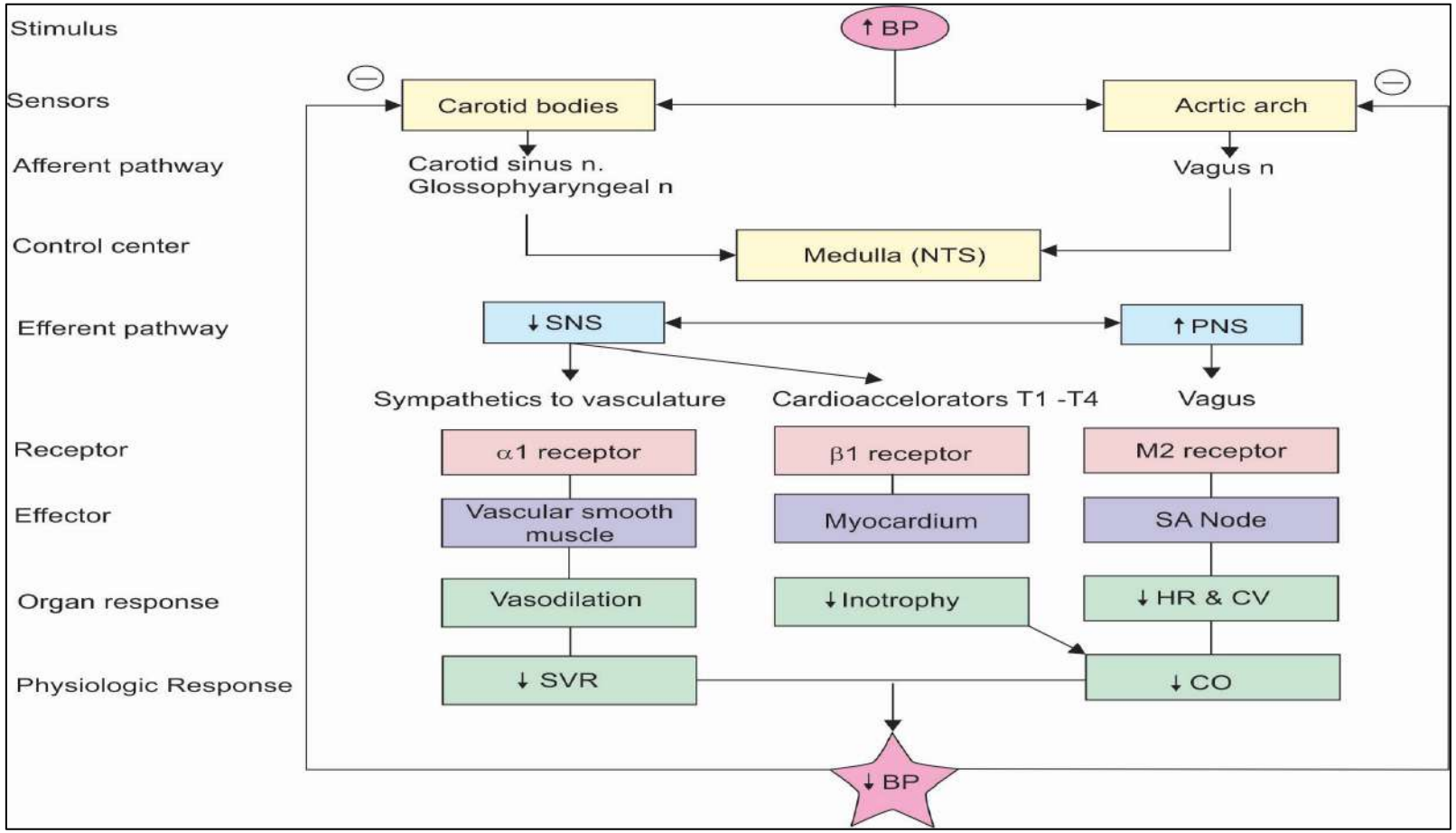
C. X: Fludarabine Y: Methotrexate

D. X: Methotrexate Y: Fluorouracil


Methotrexate
DHF reductase
DHF reductase
Folic acid
DHF
THF
1 C donors
Thymidylic acid
DNA
Amino acid synthesis
Purines
DNA & RNA
5-FU
Thymidylate synthetase
N5,N10 Methylene THF
Folinic acid
(N5-formyl-THF)

53. 20-year-old, previously healthy woman is brought to the emergency department after a motor vehicle collision. On arrival at the emergency department, blood pressure is 90/60 mm Hg and pulse is 120/min. On physical examination, the patient is alert but appearsanxious, pale, and diaphoretic. The lungs are clear bilaterally and cardiac auscultation reveals tachycardia.The abdomen is soft. Several actively bleeding lacerations are present on the lower extremities. Which of the following findings are most likely present in this patient in 1) Cardiac contractility, 2) baroreceptor firing and 3)ANP release respectively?

A. Decreases, increases, decreases
B. Decreases, increases, increases
C. Increases, increases, decreases
D. Increases, decreases, increases


Stimulus
↑ BP
Sensors
Carotid bodies
Acrtic arch
Afferent pathway
Carotid sinus n.
Glossophyaryngeal n
Vagus n
Control center
Medulla (NTS)
Efferent pathway
↓ SNS
↑ PNS
Sympathetics to vasculature
Cardioaccelorators T1 -T4
Vagus
Receptor
α1 receptor
β1 receptor
M2 receptor
Effector
Vascular smooth muscle
Myocardium
SA Node
Organ response
Vasodilation
↓ Inotrophy
↓ HR & CV
Physiologic Response
↓ SVR
↓ CO
↓ BP

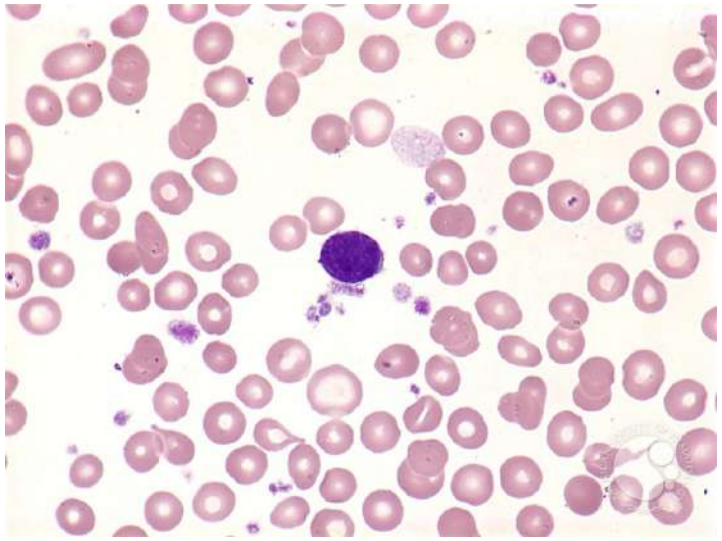
54. 68-year-old man comes to the OPD with a few months of severe fatigue and a 6.8-kg unintentional loss in weight. Abdominal examination shows mild hepatomegaly and a markedly enlarged spleen. Stool guaiac testing is negative. Laboratory results show pancytopenia, and peripheral blood smear is shown below. Bone marrow aspiration is attempted but yields no marrow, and a bone marrow biopsy is subsequently performed. Which of the following findings is most likely to be observed in this patient's bone marrow?

A. Diffusely fibrotic marrow with clusters of megakaryocytes

B. Increased staining for storage iron in marrow macrophages

C. Marrow replaced by dysplastic cells of all 3 lineages

D. Severely hypocellular marrow replaced by adipose cells



55. Identify the true statements:

1. **Aminophylline acts as an adenosine receptor antagonist leading to diuresis**
2. **Trazodone is an atypical antidepressant known to cause priapism**
3. **Trofinetide, an analog of glycine-proline-glutamate (GPE), is used to treat cerebral palsy**
4. **An orphan drug is a drug that is required for treatment or prevention of a rare disease**

Options.

A. 2, 4

B. 1, 2, 3, 4

C. 1, 2, 4

D. 3, 4

56. A woman presents with numbness of her fingertips. On examination, her face is tightened. The antinuclear antibody (ANA) is found to be positive, and immunofluorescence shows the nucleolar pattern. What is the likely diagnosis?

A. Systemic sclerosis

B. Sjogren's syndrome

C. Systemic lupus erythematosus

D. Rheumatoid arthritis

57. A 50-year-old man presents with a history of chest pain with each episode lasting for 20-30mins and partial response with sublingual nitrate. ECG shows left ventricular hypertrophy and flat T-wave. He is a known case of hypertension, diabetes mellitus, hypercholesterolemia currently on aspirin, atenolol, metformin, and lovastatin. What is the next best step in management?

A. IV glyceryl trinitrate infusion

B. Injection enoxaparin

C. Add clopidogrel

D. Increase the dose of beta blocker

The standard anticoagulant agent used in clinical practice is unfractionated heparin (UFH). The available data suggest that when UFH is added to a regimen of aspirin and a non-fibrin-specific thrombolytic agent such as streptokinase, additional mortality benefit occurs (about 5 lives saved per 1000 patients treated). The immediate administration of intravenous UFH, in addition to a regimen of aspirin and relatively fibrin-specific fibrinolytic agents (tPA, rPA, or TNK), helps to maintain patency of the infarct-related artery. This effect is achieved at the cost of a small increased risk of bleeding. The recommended dose of UFH is an initial bolus of 60 U/kg (maximum 4000 U) followed by an initial infusion of 12 U/kg per h (maximum 1000 U/h). The activated partial thromboplastin time during maintenance therapy should be 1.5–2 times the control value.

Alternatives to UFH for anticoagulation of patients with STEMI are the low-molecular-weight heparin (LMWH) preparations, a synthetic version of the critical pentasaccharide sequence (fondaparinux), and the direct antithrombin bivalirudin. Advantages of LMWHs include high bioavailability permitting administration subcutaneously, reliable anticoagulation without monitoring, and greater anti-Xa:IIa activity. Enoxaparin has been shown to reduce significantly the composite endpoints of death/nonfatal reinfarction and death/nonfatal reinfarction/urgent revascularization compared with UFH in STEMI patients who receive fibrinolysis. Treatment with enoxaparin is associated with higher rates of serious bleeding, but net clinical benefit—a composite endpoint that combines efficacy and safety—still favors enoxaparin over UFH. Interpretation of the data on fondaparinux is difficult because of the complex nature of the pivotal clinical trial evaluating

58. 62-year-old man is hospitalized with severe abdominal pain and diarhea after a recent urinary tract infection. An appropriate workup confirms C difficile colitis. The patient is placed on an oral macrocyclic antibiotic that inhibits the sigma subunit of RNA polymerase. Which of the following agents was most likely administered to this patient?

A. Doxycycline

B. Fidaxomicin

C. Metronidazole

D. Vancomycin

59. 70-year-old man is brought to the emergency department due to sudden-onset weakness in his right arm and leg. Although he can speak, he cannot pronounce words clearly. Neurologic examination shows 3/5 strength in both right upper and lower extremities. When the patient is asked to stick out his tongue, it deviates to the left. Sensory examination shows no abnormalities. Which of the following is the most likely location of this patient's brain injury?

A. Left lateral medulla

B. Left medial medulla

C. Left precentral gyrus

D. Right lateral medulla

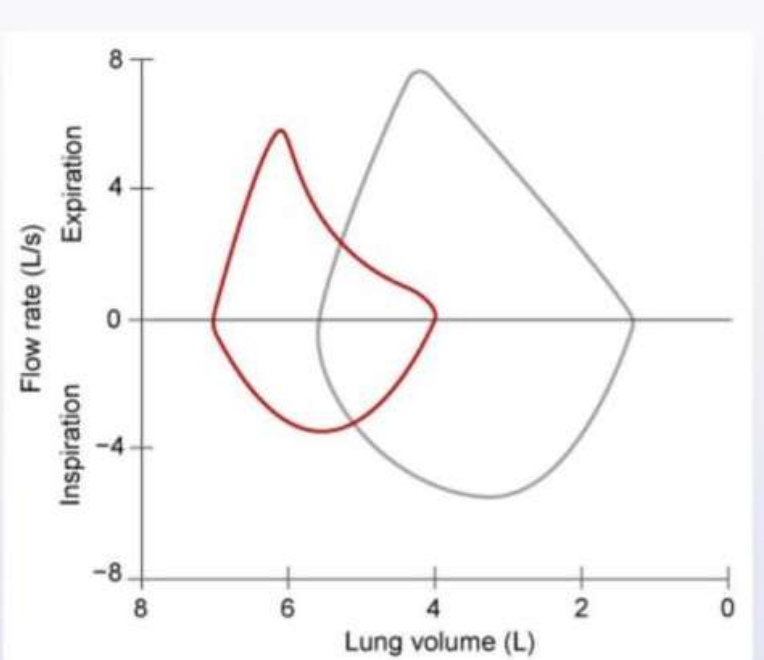
60. A 57-year-old man is being evaluated for progressive shortness of breath. His respiratory flow-volume curve is shown in red below. Which of the following pathologic findings is most likely to be present in this patient?

A. Alveolar hyaline membranes

B. Compression atelectasis

C. Interalveolar wall destruction

D. Intraalveolar hemorrhage



61. A 64-year-old man comes to the OPD due to generalized edema, fatigue, and dyspnea on exertion for 2 months. The patient has a 25-year history of poorly controlled rheumatoid arthritis. Urinalysis shows 4+ protein. A renal biopsy is performed. Which of the following histologic abnormalities is most likely to be seen in this patient's glomeruli?

A. Crescent formation

B. Deposition of amorphous material

C. Diffuse hypercellularity

D. IgA deposition

62. 35-year-old woman comes to the physician complaining of weakness, fatigue, and pallor. Physical examination is unremarkable except for conjunctival pallor. Laboratory results are as follows:
Haemoglobin: 7.2 g/dL
Mean corpuscular volume: 90 fL
Reticulocytes: 0.1%
Platelets: 280,000 /uL
Leukocyte count: 6,700 cells/uL
Iron studies and serum B12 and folic acid levels are within normal limits. Bone marrow biopsy shows absence of erythroid precursors but preserved myeloid and megakaryocytic elements. Further workup would most likely show which of the following?

A. Hepatocellular carcinoma
B. Renal cell carcinoma
C. Thymic tumor
D. Cerebellar hemangioblastoma

63. 5-year-old boy is brought to the OPD by his mother due to difficulty with movement. The patient enjoys playing high school basketball but had to leave the team this year due to his progressively worsening symptoms On examination, he is found to have significant kyphoscoliosis. Image of the patient's feet are shown below. His older brother suffered from a neurologic disorder and died of heart failure at age 25. This patient most likely has which of the following neuropathologic findings?

A. Atrophy of the caudate nucleus

B. Cerebral cortex atrophy

C. Degeneration of the spinocerebellar tracts

D. Demyelination of peripheral nerves

64. An 18-year-old woman is referred to a cardiologist after heart murmur is discovered during a routine checkup. The patient is healthy and has no symptoms. She runs daily and wants to start actively training for a half marathon. Auscultation reveals a midsystolic click followed by a short late-systolic murmur at the cardiac apex. The murmur disappears with squatting. What is the likely diagnosis?

A. Membranous VSD

B. Mitral valve prolapse

C. Mitral stenosis

D. Bicuspid aortic valve

65. 50-year-old man is brought to the emergency department due to a severe, sudden-onset headache with loss of vision in bilateral temporal fields that started an hour ago. The patient reports that he has had mild headaches and decreased libido over the past 3 months. Shortly after being admitted to the hospital, he becomes acutely hypotensive and loses consciousness. Which of the following is most likely to be found on autopsy?

A. Acute hemorrhage in the pituitary gland
B. Bleeding within the putamen
C. Dissection of the internal carotid artery
D. lschemic necrosis of the pituitary gland

66. 64-year-old man is evaluated for persistent fever and weakness. He has a history of aortic valve replacement for aortic stenosis. Physical examination reveals a new cardiac murmur with scattered petechiae, and splinter hemorrhages seen on his extremities. Echocardiogram shows a vegetation involving one of the aortic valve leaflets, and blood cultures grow enterococci. As part of the patient's treatment, 240 mg of intravenous gentamicin is started. The pharmacy calculates that, in this patient, gentamicin has a volume of distribution of 30litres, a half-life of 4 hours, and demonstrates first-order and one-compartment kinetics. Which of the following is the most likely serum drug concentration just before the next dose 8 hours later?

A. 0.5 mg/L

B. 1 mg/L

C. 1.5 mg/L

D. 2 mg/L

67. A 53-year-old woman underwent hip replacement surgery. A week after the surgery, the patient developed swelling of the legs associated with pain on palpation. Her heart rate is 70 beats per min. There is no history of hemoptysis or significant weight loss. There is no previous history of pulmonary embolism. What is the risk of developing pulmonary embolism in the patient based on Well's score?

A. Low

B. High

C. Moderate

D. Cannot comment without d-dimer values

Wells score

Criteria	Points
Clinical signs/symptoms of DVT	3
PE is most likely diagnosis	3
Tachycardia (>100 bpm)	1.5
Immobilization/surgery in previous 4 weeks	1.5
Prior DVT/PE	1.5
Hemoptysis	1
Active malignancy (trt w/in 6 month)	1

Low Risk	**Intermediate risk**	**High risk**
< 2 points	2-6 points	>6 points

PE unlikely	**PE Likely**
0-4 points	>4 points

68. 34-year-old woman comes to the OPD with recent onset of malaise. The patient works as a nurse at a local hospital and lives at home with her husband and 2-year-old son. Physical examination is notable for hepatomegaly. Laboratory results are as follows:
Anti-HAV IgM Positive
Anti-HAV IgG negative
HBsAg negative
HBeAg negative
Anti-HBs positive
Anti-HBc negative
Anti-HBe negative
Anti-HCV negative
Which of the following is most likely to be elicited on further history taking?

A. Had an accidental needlestick exposure at work
B. Had a blood transfusion
C. Had steamed oysters at a neighborhood restaurant
D. Had unprotected sexual intercourse with a new partner

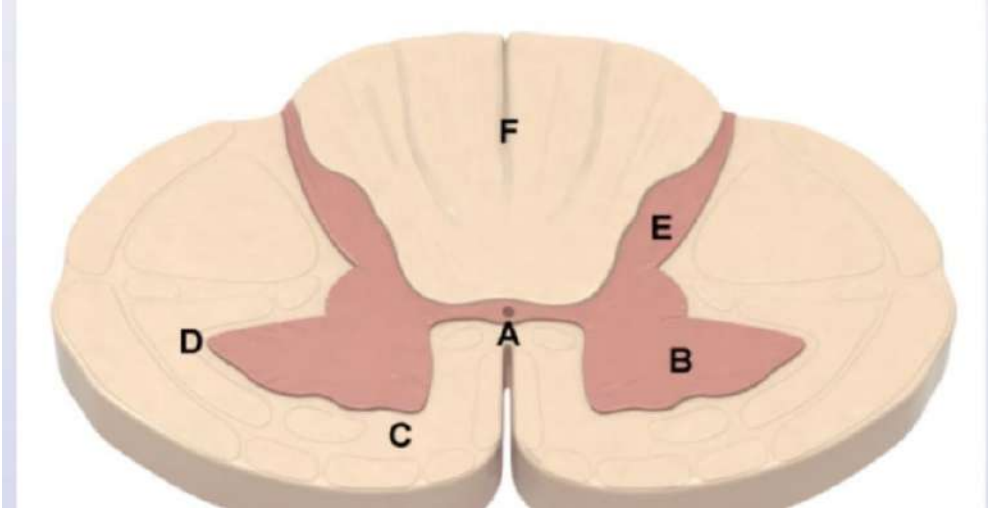
69. 20-year-old woman comes to the physician because of multiple burns on her hands. She says that she gets burned quite often when she cooks, particularly while operating the oven. She also has burned herself when picking up her morning cup of coffee and when testing the water temperature in the shower. The patient s concerned because she cannot feel when objects are "really hot" and often does not notice that she has burns until she looks at her hands. Her family history is significant for multiple sclerosis in her mother. Examination shows diminished pinprick and temperature sensation across the upper back, shoulders, and arms bilaterally. Light touch, position, and vibration sense are preserved. Examination of the lower extremities is unremarkable. Damage to which of the following spinal cord areas is most likely responsible for this patient's symptoms?

A. A

B. B

C. F

D. E



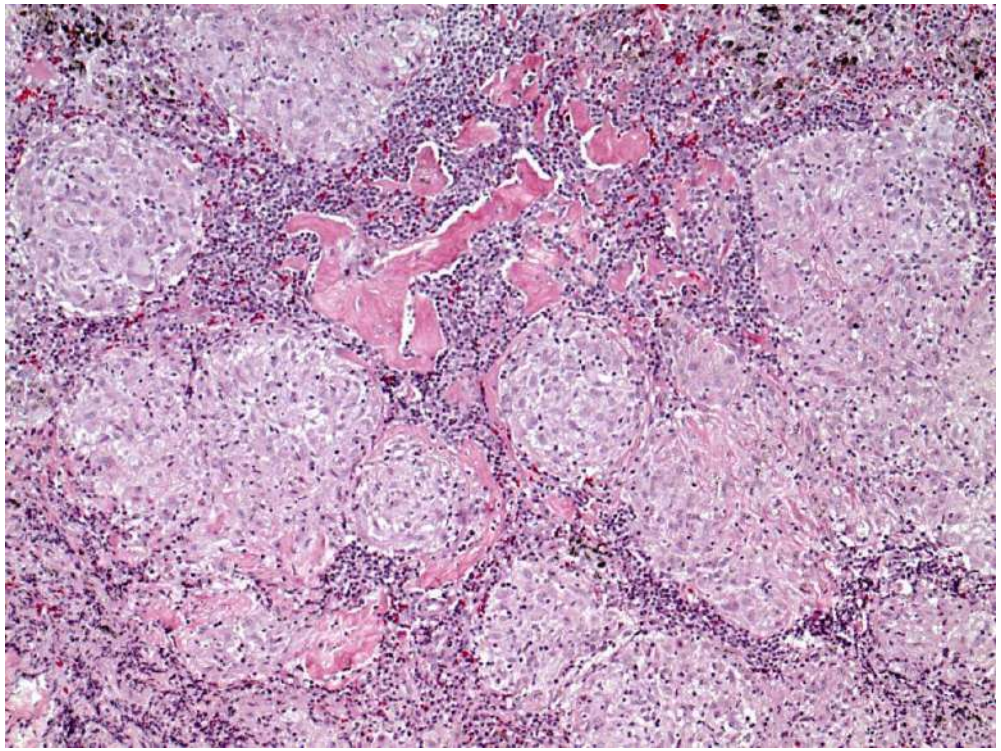
70. 37-year-old woman is evaluated for progressive shortness of breath and dry cough. The patient has seasonal allergies and takes no medications. Chest imaging studies reveal pulmonary infiltrates and hilar adenopathy. The patient undergoes lung biopsy; the findings are shown below. Which of the following sets of immune cells and cytokines is most likely responsible for the development of this patient's pathologic findings?

A. Th1, lL-2, interferon-Y

B. Th1, TGF-alpha, IL-10

C. Th2, IL-4, IL-5

D. Th2, IL-5, tumor necrosis factor-alpha



71. 21-year-old man is brought to the emergency department due to diffuse muscle aches and weakness. He has also noticed darkening of his urine. he patient recently joined the military and was participating in rigorous training exercises in hot weather earlier in the day.
Laboratory results are as follows:
Sodium: 136 mEq/L
Potassium: 5.6 mEq/L
Bicarbonate: 18 mEq/L
Creatinine: 2.0 mg/dL
CK: 22,000 U/L (normal: 30-170)
Which of the following urine microscopy is most likely present in this patient?

A. Dysmorphic red blood cells
B. Eosinophils
C. Granular casts
D. Waxy casts

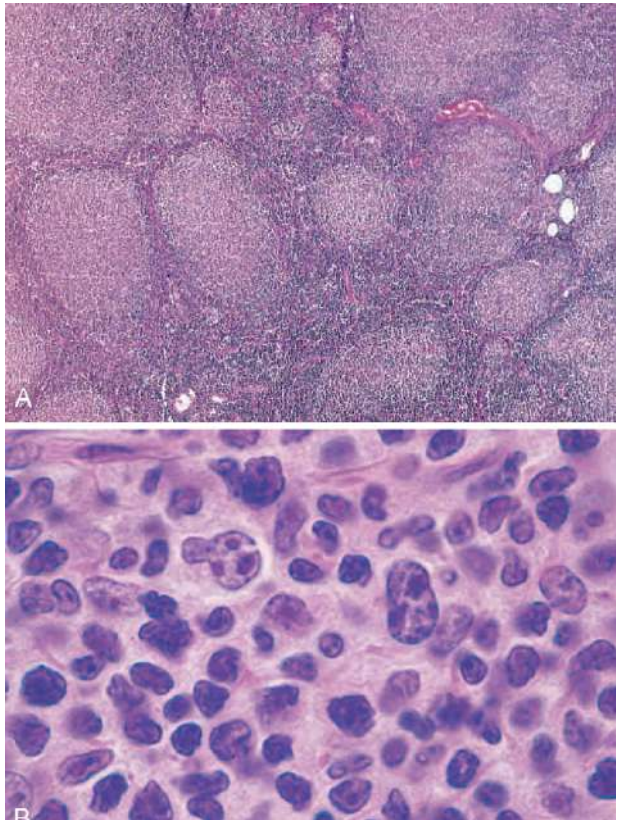
72. 35-year-old man is being evaluated for nontender cervical lymphadenopathy that he first noticed while shaving. A biopsy is performed, histology is shown below. Cytogenetic analysis would most likely demonstrate which of the following patterns?

A. BCL-2 overexpression

B. Cyclin D1 overexpression

C. C-MYC overexpression

D. Constitutive tyrosine kinase activation



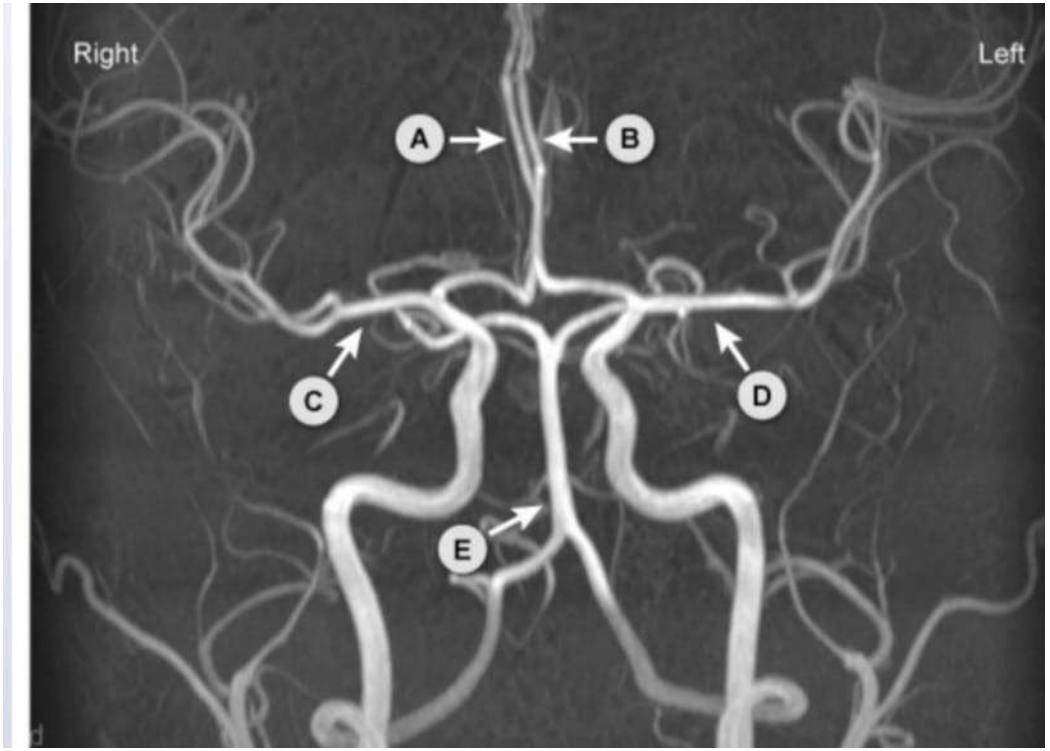
73. 54-year-old man is brought to the emergency department by his wife after he develops dificulty speaking. When asked about the onset of his symptoms, the patient slowly responds with "weak... morning..." and becomes very frustrated. On examination, he is able to state his first name but with difficulty, and correctly points to different body parts on command. This patient's speech difficulties are most likely caused by a lesion affecting which of the following vessels?

A. A

B. E

C. C

D. D



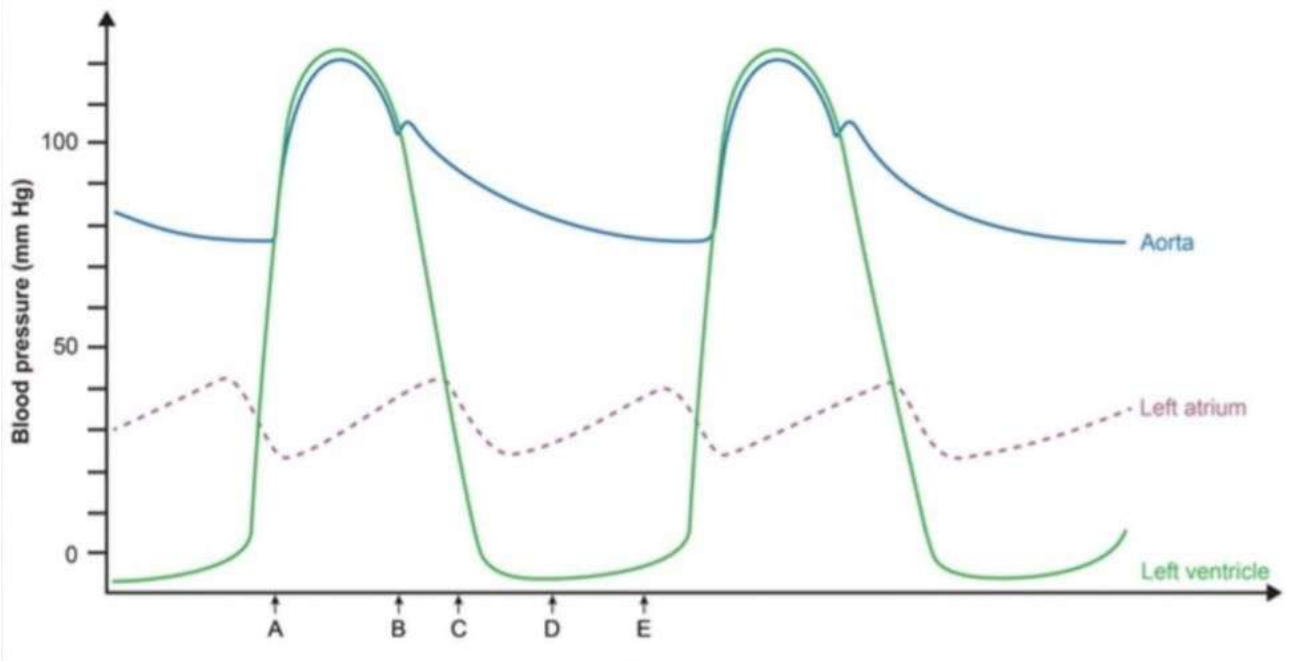
74. 32-year-old woman with a history of mitral stenosis comes to the OPD. Cardiac auscultation reveals an opening snap and a rumbling murmur heard best in the left fifth intercostal space at the midclavicular line. Timing of these sounds best corresponds to which of the following letters?

A. A

B. B

C. C

D. E



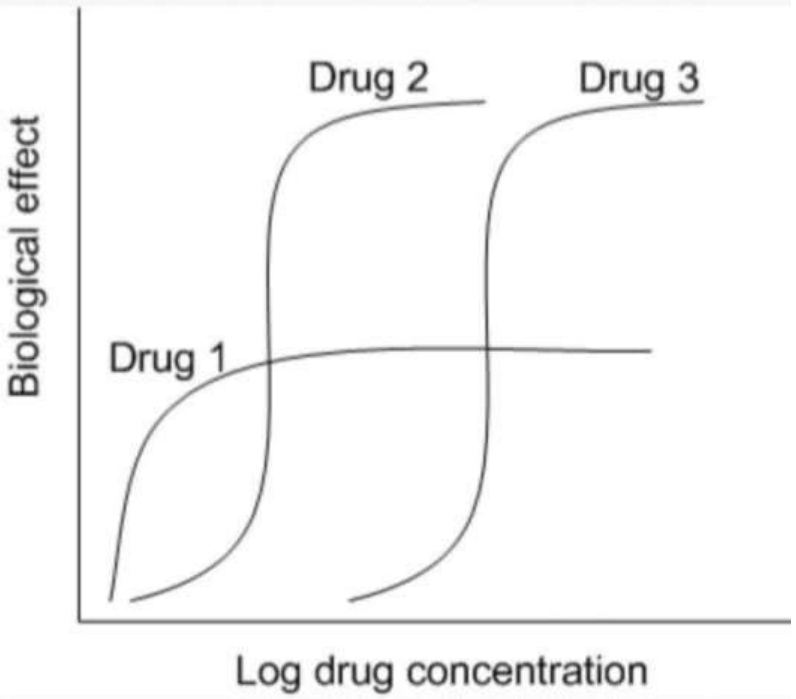
75. Three alpha-agonist drugs are tested as potential vasoconstrictors. The degree of vasoconstriction is determined by measuring the cross-sectional area of an isolated vessel after application of the drug. The following curves are obtained: Which of the following is the best statement concerning the effects of these drugs?

A. Drug 1 has lower potency than Drug 2

B. Drug 2 has higher affinity for alpha-receptors than Drug 3

C. Drug 1 demonstrates the highest efficacy

D. Drug 2 and Drug 3 bind to different loci of alpha-receptors



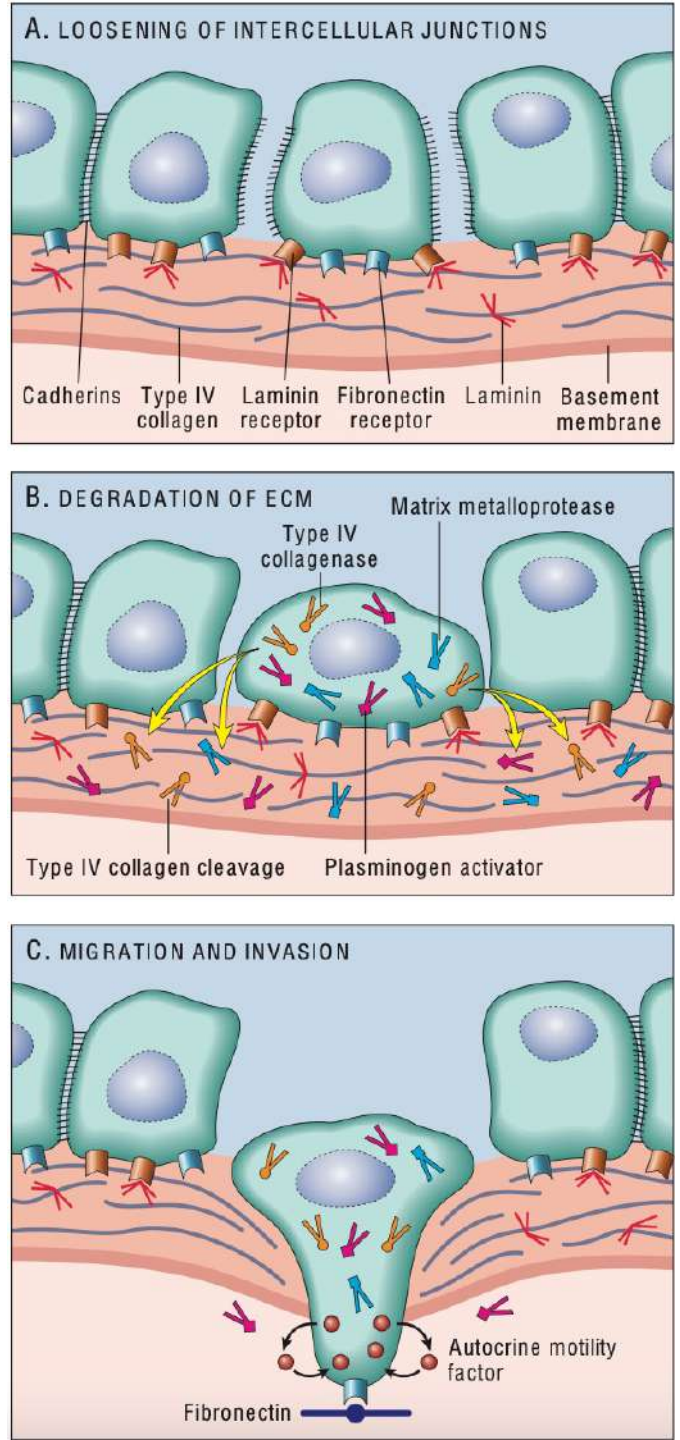
76. 44-year-old woman comes to the office due to a breast mass. Physical examination reveals a hard, fixed mass in the right breast with palpable ipsilateral axillary lymphadenopathy. The ability of the tumor to reach the draining lymph nodes is facilitated by which of the following changes at the primary tumor site?

A. Decreased density of laminin receptors

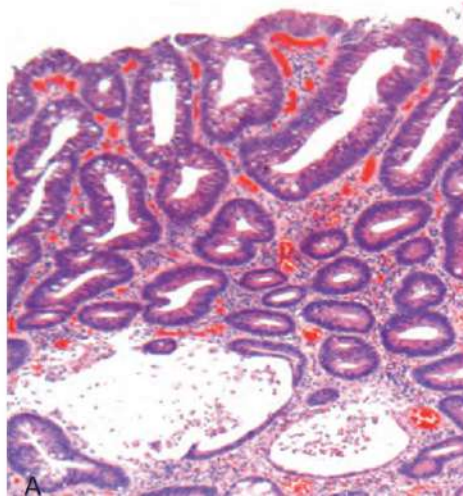
B. Increased production of matrix metalloproteinase inhibitors

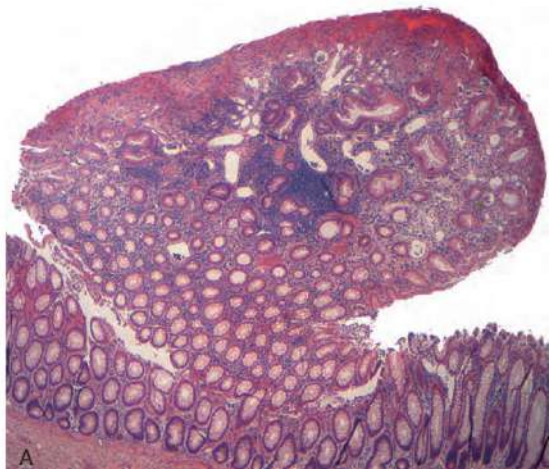
C. Increased production of type IV collagenase

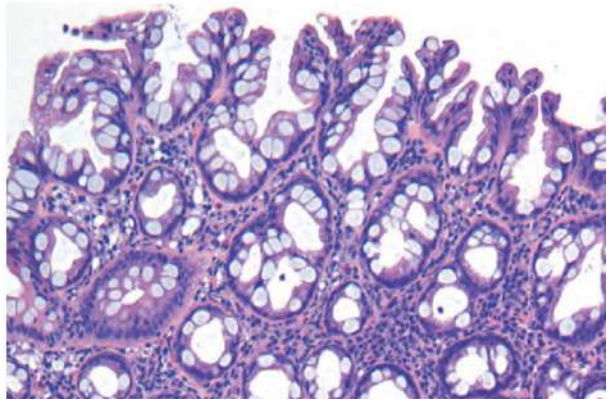
D. Upregulation of E-cadherin


A. LOOSENING OF INTERCELLULAR JUNCTIONS
Cadherins
Type IV collagen
Laminin receptor
Fibronectin receptor
Laminin
Basement membrane
B. DEGRADATION OF ECM
Matrix metalloprotease
Type IV collagenase
Type IV collagen cleavage
Plasminogen activator
C. MIGRATION AND INVASION
Autocrine motility factor
Fibronectin

77. Which of the following pathologic findings is associated with the greatest risk of malignant transformation in this patient?







78. A 4-week-old, full-term boy is brought to the emergency department due to vomiting. His parents describe the emesis as undigested formula without blood or bile. The vomiting occurs after feeds and has increased in frequency and force over the past 3 days. Examination shows a sunken anterior fontanelle and dry mucous membranes. Arterial blood gas analysis is most likely to reveal which of the following sets of values?

A. pH 7.29, PaCo2 30, HCO3 14, Anion gap Elevated.

B. pH 7.30, PaCo2 50, HCO3 28, Anion gap normal

C. pH 7.48, PaCo2 46, HCO3 34, Anion gap normal

D. pH 7.53, PaCo2 22, HCO3 22, Anion gap normal

79. 6-year-old girl is brought to the office due to intermittent abdominal cramps, bloating, and diarrhea for 2 months. Laboratory evaluation reveals elevated tissue transglutaminase antibodies. Which of the following locations should be biopsied to confirm the diagnosis in this patient?

A. Stomach

B. Duodenum

C. Distal jejunum

D. Terminal ileum

80. A 34-year-old woman comes to the office for evaluation of recurrent transient pulmonary infiltrates. The patient has a history of bronchial asthma and has had several exacerbations over the past few years, particularly during the winter months. Her medications include albuterol as needed and medium-dose inhaled glucocorticoids. Complete blood count shows eosinophilia. A chest CT scan reveals proximal bronchiectasis. This patient's condition is most likely related to colonization with which of the following?

A. Adenovirus

B. Aspergillus fumigatus

C. Strongyloides

D. Paragonimus

81. 38-year-old man is brought to the emergency department due to vomiting blood. After appropriate resuscitation measures, he undergoes upper gastrointestinal endoscopy, which reveals a bleeding duodenal ulcer. During hospital day 2, the patient develops decreased urine output. Serum creatinine rises to 3.0 mg/dL from a baseline of 1.2 mg/dL. Renal biopsy shows patchy epithelial necrosis of the tubules, intratubular casts. Supportive care is provided. Several days later, his urine output significantly increases, and serum creatinine levels decline. Over the next few days, this patient is at highest risk for which of the following complications?

A. Hyperphosphatemia

B. Hypokalemia

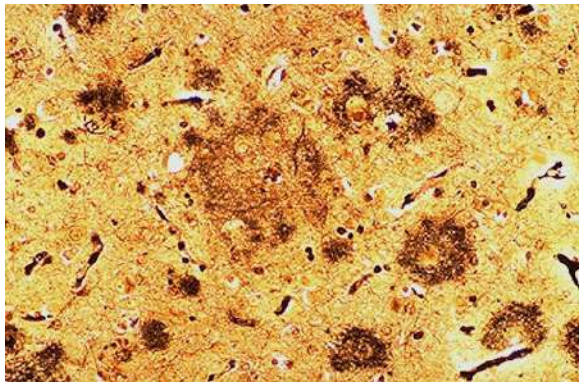
C. Metabolic acidosis

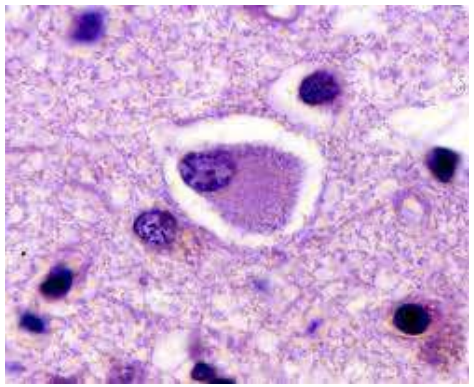
D. Volume overload

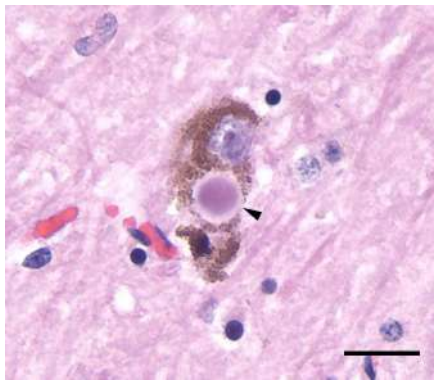
82. 26-year-old woman, gravida 2 para 1, at 8 weeks gestation comes to the OPDdue to pain and swelling of her left leg for the past day. The patient had a pulmonary embolism during her previous pregnancy, and prophylactic low-molecular-weight heparin therapy was initiated 6 days ago. Venous duplex ultrasonography reveals acute left femoral vein thrombosis. Platelet count, which was normal prior to anticoagulant therapy initiation, is now 84,000/mm3. Other blood cell counts and renal and liver function studies are within normal limits. Which of the following most likely predisposed this patient to her current condition?

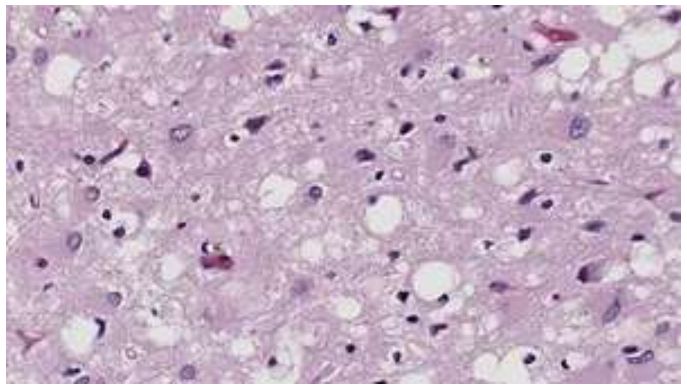
A. Acquired protein C deficiency.
B. Anti-platelet factor 4 antibodies
C. Anti-platelet glycoprotein llb/lla antibodies
D. Decreased ADAMTS13 level

83. 82-year-old woman comes to the clinic due to memory loss. She lives with her daughter, who reports that her mother has had difficulty remembering recent conversations. The patient has also forgotten recent events, such as her grandson's birthday party last month. Two years ago, she was forced to give up driving after repeatedly getting lost in her own neighborhood and being involved in a minor motor vehicle accident. Which of the following is the most likely pathological finding in this patient?









84. A 51-year-old man is brought to the emergency department due to chest tightness that started 30 minutes prior to arrival. He has 2 histories of hypertension and type 2 diabetes mellitus. Initial ECG Shows ST elevation in leads I and aVL. Cardiac enzymes are elevated. Emergent cardiac catheterization in this patient will most likely show occlusion of which of the following arteries?

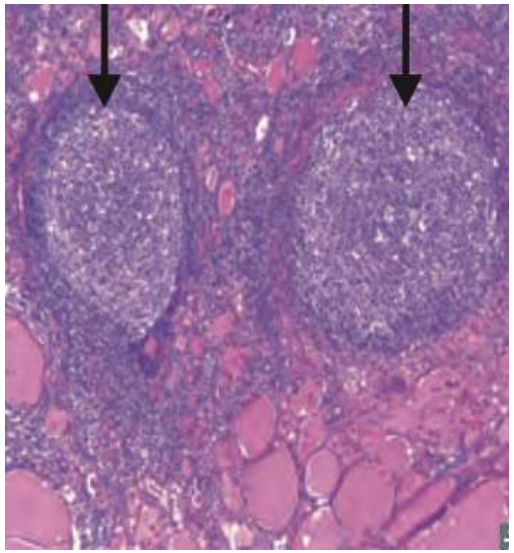
A. Distal left anterior descending artery

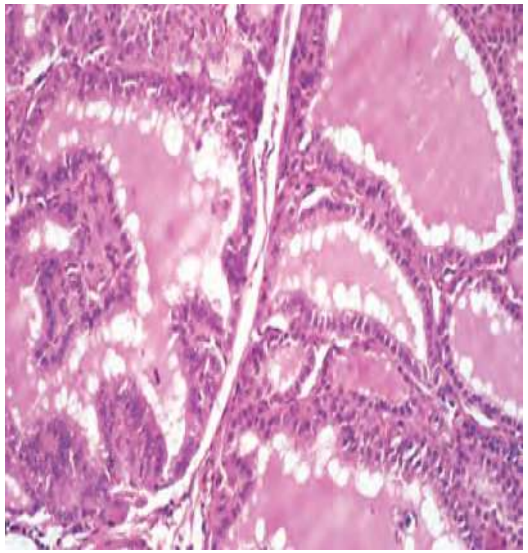
B. Left circumflex artery

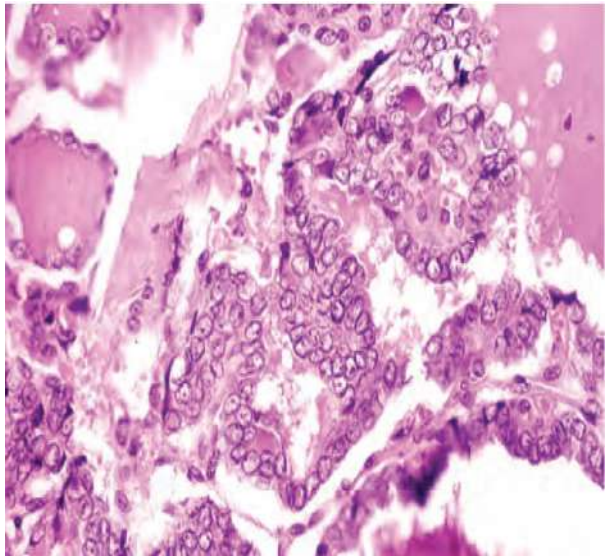
C. Left main coronary artery

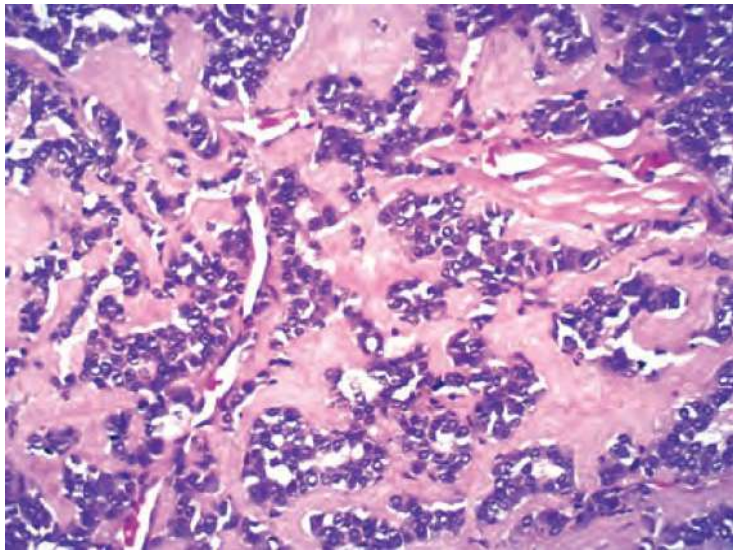
D. Right coronary artery

85. 51-year-old woman comes to the OPD due to progressively worsening fatigue, weight gain, and constipation for the past 6 months. Physical examination shows mild, diffuse enlargement of the thyroid gland. Biopsy of this patient's thyroid is most likely to show which of the following findings?









86. All of the following cause pleural fibrosis except?

A. Metformin
B. Methysergide
C. Bleomycin
D. Nitrofurantoin

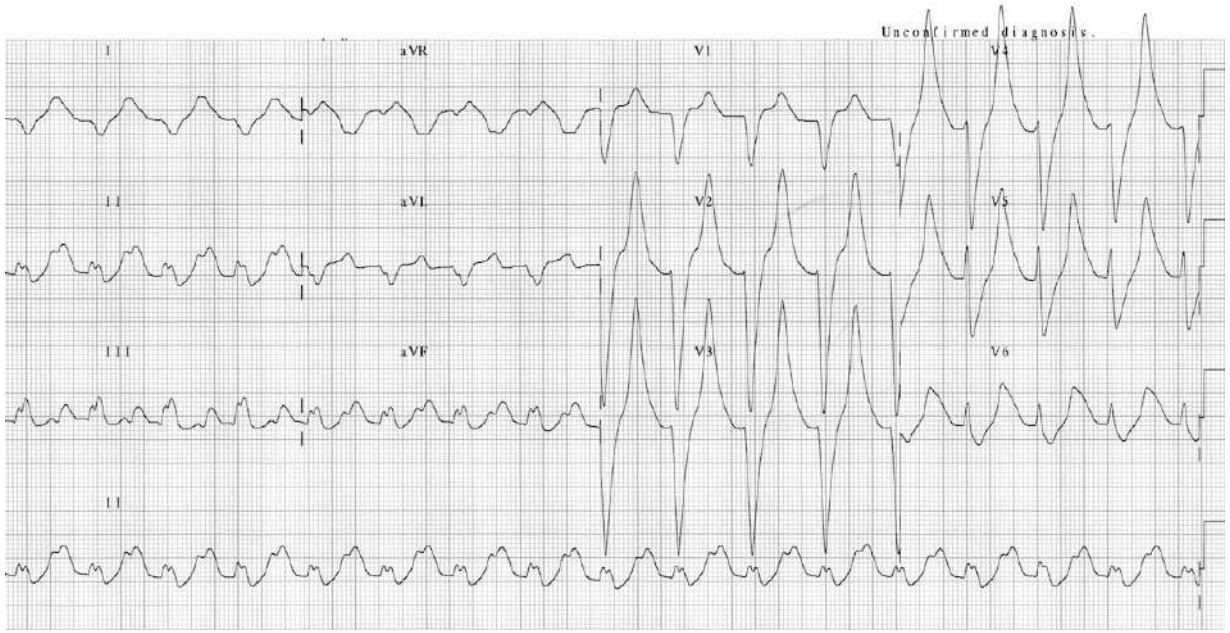
87. An elderly man with diabetic nephropathy presented to the emergency department with palpitations and chest discomfort. The ECG is shown below. What is the next step?

A. Epinephrine

B. Glucagon

C. Atropine

D. Lactic acid



88. Which of the following is a Pre-protein Convertin Subtilisin Kexin type 9 inhibitor?

A. Evolocumab
B. Ezetimibe
C. Bempedoic acid
D. Inclisiran

89. 27-year-old man comes to the OPD due to recurrent episodes of muscle weakness. His blood pressure is 190/110 mm Hg supine and 195/110 mm Hg standing. His heart rate is 70/min supine and 72/min standing. The rest of the physical examination is unremarkable. Laboratory evaluation shows very low plasma renin activity. Overactivity of which of the following structures is most likely responsible for this patient's symptoms?

A. Chromaffin cells of the adrenals

B. Extra-adrenal paraganglion cells

C. Juxtaglomerular cells of the kidney

D. Zona glomerulosa of the adrenals

90. A 66-year-old man comes to the office due to increasing shortness of breath over the past 3 weeks. He has had a nonproductive cough for several months, which he attributes to allergies, but also notes a 9-kg unintentional weight loss over this time. He has a 50-pack-year smoking history. Chest x-ray is shown below. Which of the following would be the expected physical examination finding over the right lower chest?

A. Bronchial breath sounds

B. Decreased tactile fremitus

C. Fine inspiratory crackles

D. Increased resonance on percussion

	Breath sounds Tactile fremitus	Resonance
Consolidation		
Pleural effusion		
Pneumothorax		
Collapse		

91. 56-year-old man with chronic renal insufficiency due to polycystic kidney disease is evaluated for placement of an arteriovenous fistula for dialysis access. Blood pressure is 140/90 mm Hg and pulse is 80/min. Examination shows 2+ bilateral edema of the lower extremities. Estimated glomerular filtration rate is 15 mL/min/1.73 m^2. Which of the following sets of laboratory findings is most likely in this patient?

A. Low serum calcium, high serum phosphorus, high PTH, normal 25-hydroxyvit D, normal 1,25 hydroxyVitD

B. Low serum calcium, high serum phosphorus, high PTH, normal 25-hydroxyvit D, low 1,25 hydroxyVitD

C. High serum calcium, high serum phosphorus, low PTH, normal 25-hydroxyvit D, low 1,25 hydroxyVitD

D. Low serum calcium, low serum phosphorus, high PTH, normal 25-hydroxyvit D, low 1,25 hydroxyVitD

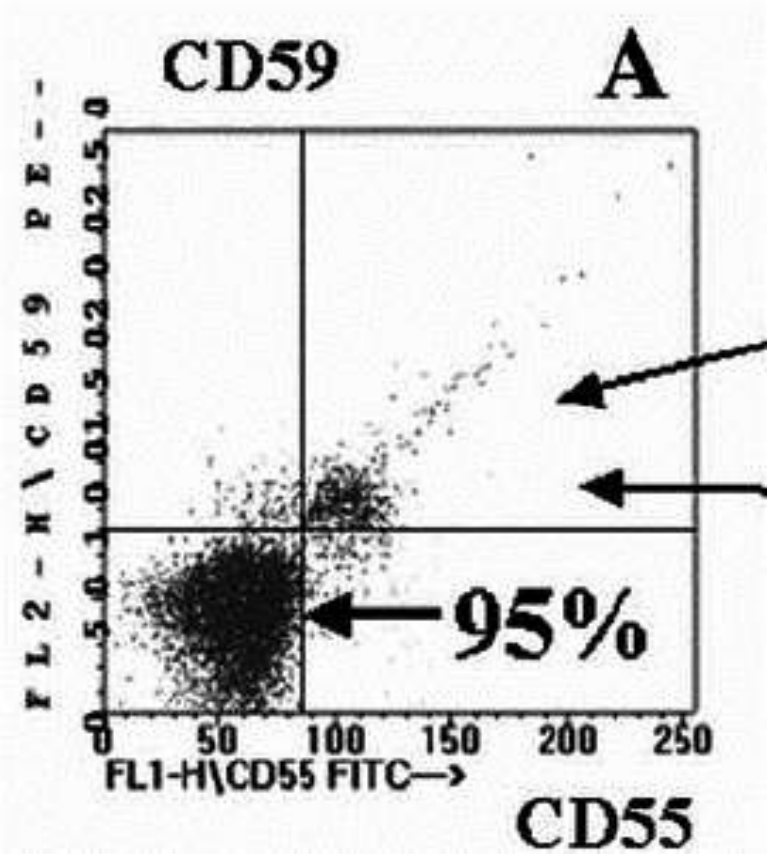
92. A 30-year-old woman comes to the emergency department with sudden-onset abdominal pain and ascites. Laboratory studies show anemia, reticulocytosis, leukopenia, and thrombocytopenia. Flow cytometry of the patient's peripheral blood cells using the appropriate monoclonal antibodies is shown. CT scan of the abdomen shows hepatic vein thrombosis. Which of the following is the most likely cause of this patient's anemia?

A. Complement activation

B. Factor V mutation

C. Intracellular dehydration

D. Mutation in beta globin chain



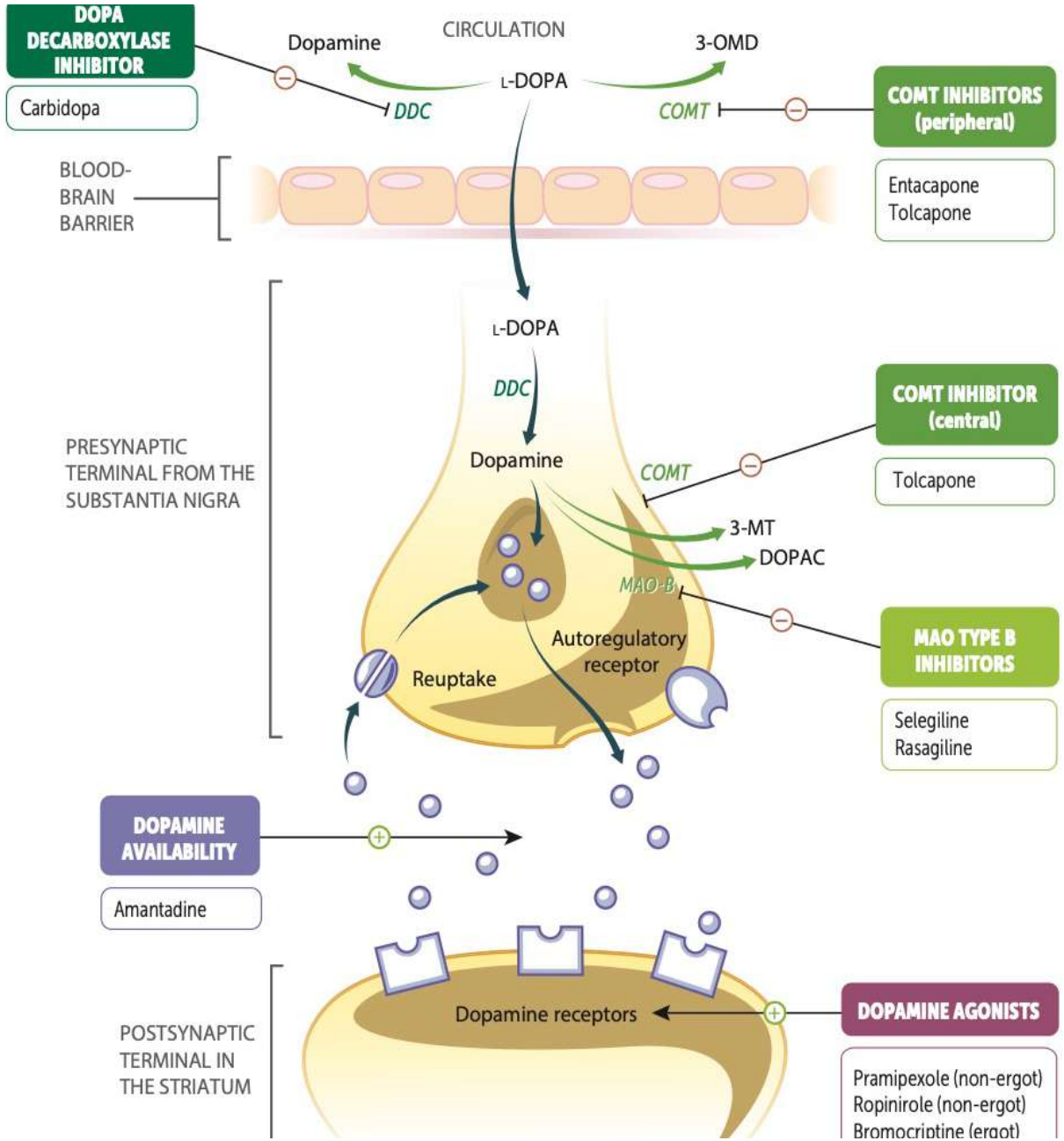
93. 72-year-old man with a history of Parkinson disease comes to the OPD for follow-up. The patient has been taking carbidopa-levodopa since being diagnosed 5 years ago and has required increasing doses to control his symptoms. He is now taking the maximum dose but reports worsening stiffness and difficulty moving between his scheduled doses; these symptoms improve after he takes the medication. Entacapone is added to his treatment regimen. This drug is most likely to improve this patient's symptoms through which of the following mechanisms?

A. A. Decreasing peripheral levodopa degradation

B. B. Directly stimulating dopamine receptors

C. C. Enhancing the effect of endogenous dopamine

D. D. Inhibiting central muscarinic receptors


DOPA DECARBOXYLASE INHIBITOR
Carbidopa
Dopamine
CIRCULATION
3-OMD
L-DOPA
DDC
COMT
COMT INHIBITORS (peripheral)
Entacapone
Tolcapone
BLOOD-BRAIN BARRIER
L-DOPA
DDC
Dopamine
COMT
COMT INHIBITOR (central)
Tolcapone
PRESYNAPTIC TERMINAL FROM THE SUBSTANTIA NIGRA
3-MT
DOPAC
MAO-B
MAO TYPE B INHIBITORS
Selegiline
Rasagiline
Autoregulatory receptor
Reuptake
DOPAMINE AVAILABILITY
Amantadine
Dopamine receptors
DOPAMINE AGONISTS
Pramipexole (non-ergot)
Ropinirole (non-ergot)
Bromocriptine (ergot)
POSTSYNAPTIC TERMINAL IN THE STRIATUM

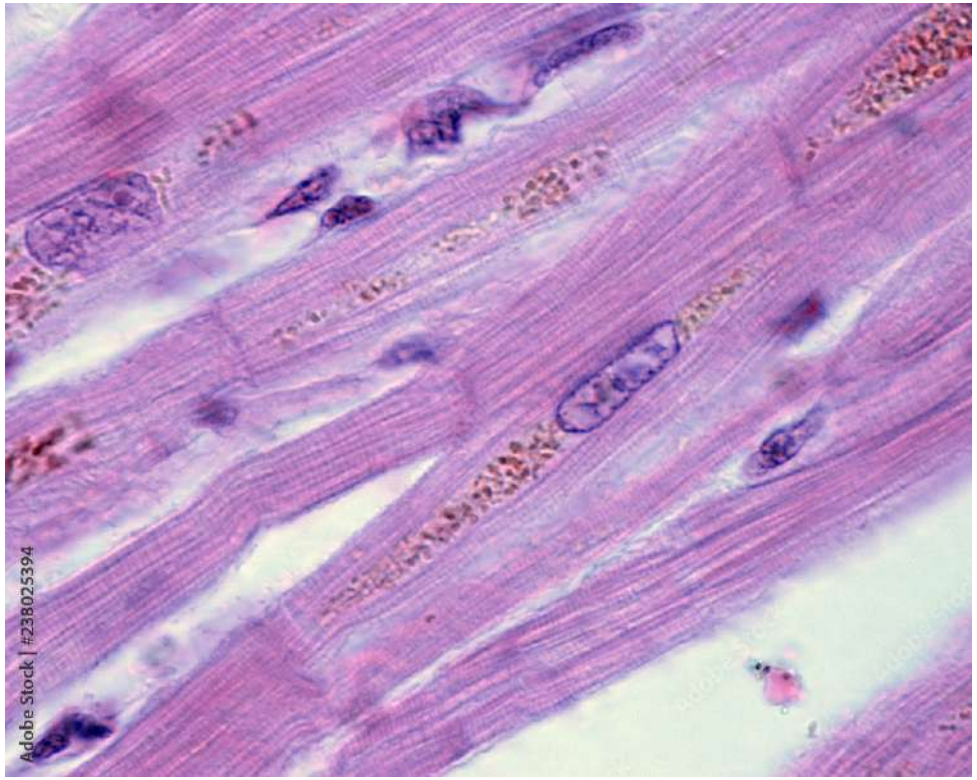
94. 78-year-old man dies of advanced esophageal cancer. On microscopic examination, myocardial cells demonstrate prominent yellow-brown intracytoplasmic granules as shown. Which of the following most likely accounts for the observed microscopic changes?

A. Exogenous pigment endocytosis

B. Glucose polymerization

C. Iron overload

D. Lipid peroxidation



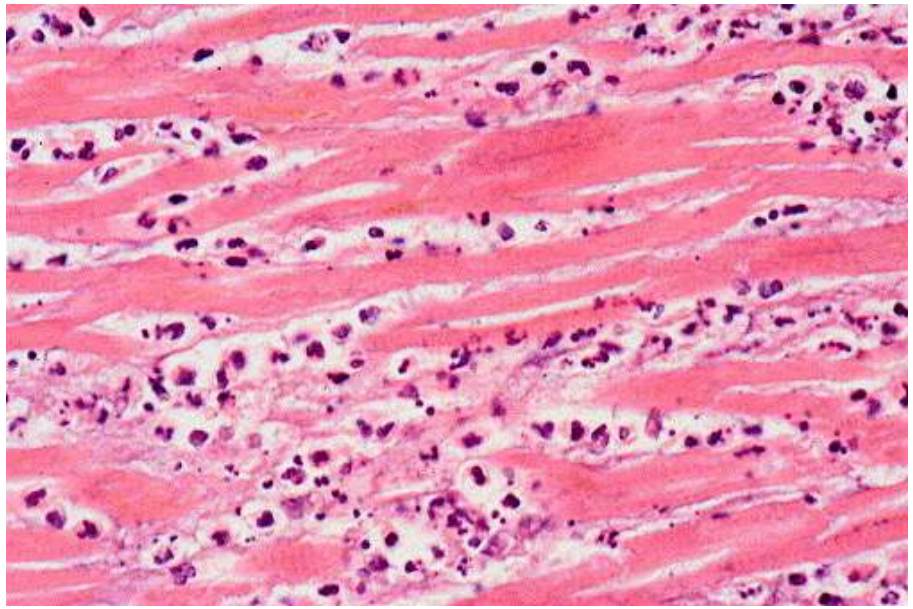
95. Autopsy is being performed on a 72-year-old man with a history of myocardial infarction. Light microscopy of a portion of the left ventricle reveals the findings shown in the image below. This patient most likely sustained the myocardial infarction during which of the following time frames prior to his death?

A. Less than 24 hours

B. 1 to 3 days

C. 7 to 10 days

D. 2 weeks to 2 months



96. A 50-year-old female patient with a history of rheumatoid arthritis has been experiencing visual changes, including blurry vision and halos around lights. She has been on medication for her rheumatoid arthritis for a couple of years now. Which of the following drugs she might be taking is known to get deposited in the cornea?

A. Leflunomide
B. Chloroquine
C. Methotrexate
D. Sulfasalazine

Table 6-4 Systemic Drugs Associated With Cornea Verticillata

- Aminoquinolines (amodiaquine, chloroquine, hydroxychloroquine)
- Amiodarone
- Antacids
- Atovaquone
- Clarithromycin
- Clofazimine
- Gentamicin (subconjunctival)
- Gold
- Ibuprofen
- Immunoglobulins
- Indomethacin
- Mepacrine
- Monobenzone (topical skin ointment)
- Naproxen
- Perhexiline maleate
- Phenothiazines (eg, chlorpromazine)
- Phenylbutazone
- Practolol
- Retinoids (isotretinoin)
- Silver
- Suramin
- Tamoxifen
- Thioxanthenes (chlorprothixene, thiothixene)

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

A. Streptococcus viridans

B. Staphylococcus aureus

C. Coagulase negative staphylococci

D. HACEK organisms

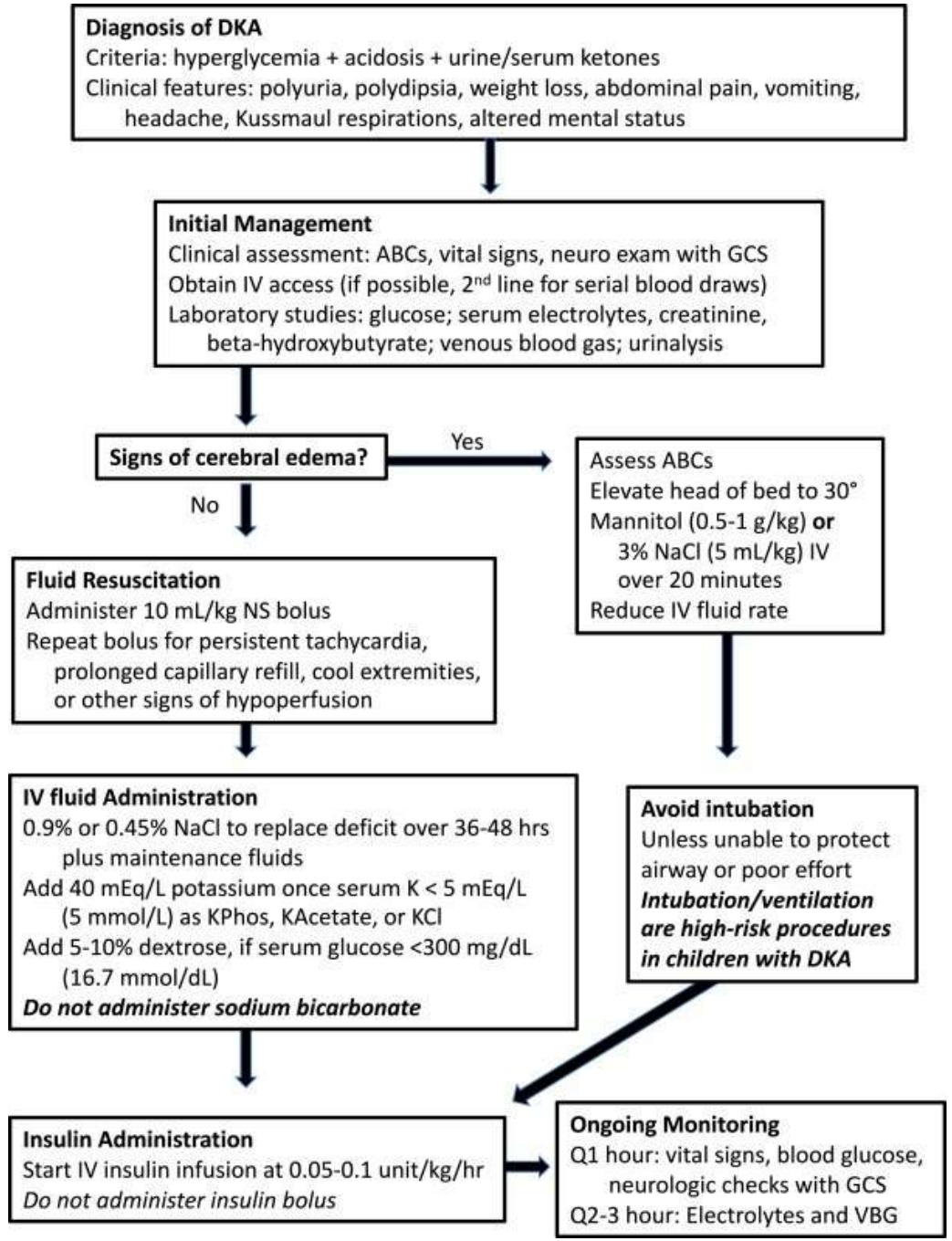
98. A 12-year-old child who is known to have type 1 diabetes mellitus presents with confusion and drowsiness. Her mother says that she seems to be breathing very fast. On examination, mucous membranes are dry and blood pressure is 70/50 mm Hg. Random blood glucose is 415 mg/dl and urine ketones are 4+. What is the next best step in management?

A. 2-3 L of normal saline over 1-3 hours

B. Insulin infusion at 0.1 units/kg/hour

C. Arterial blood gas

D. Insulin bolus of 0.1 units/kg given IV


Diagnosis of DKA
Criteria: hyperglycemia + acidosis + urine/serum ketones
Clinical features: polyuria, polydipsia, weight loss, abdominal pain, vomiting, headache, Kussmaul respirations, altered mental status
Initial Management
Clinical assessment: ABCs, vital signs, neuro exam with GCS
Obtain IV access (if possible, 2nd line for serial blood draws)
Laboratory studies: glucose; serum electrolytes, creatinine, beta-hydroxybutyrate; venous blood gas; urinalysis
Signs of cerebral edema?
Yes
No
Assess ABCs
Elevate head of bed to 30°
Mannitol (0.5-1 g/kg) or 3% NaCl (5 mL/kg) IV over 20 minutes
Reduce IV fluid rate
Fluid Resuscitation
Administer 10 mL/kg NS bolus
Repeat bolus for persistent tachycardia, prolonged capillary refill, cool extremities, or other signs of hypoperfusion
IV fluid Administration
0.9% or 0.45% NaCl to replace deficit over 36-48 hrs plus maintenance fluids
Add 40 mEq/L potassium once serum K < 5 mEq/L (5 mmol/L) as KPhos, KAcetate, or KCl
Add 5-10% dextrose, if serum glucose <300 mg/dL (16.7 mmol/dL)
Do not administer sodium bicarbonate
Avoid intubation
Unless unable to protect airway or poor effort
Intubation/ventilation are high-risk procedures in children with DKA
Insulin Administration
Start IV insulin infusion at 0.05-0.1 unit/kg/hr
Do not administer insulin bolus
Ongoing Monitoring
Q1 hour: vital signs, blood glucose, neurologic checks with GCS
Q2-3 hour: Electrolytes and VBG

99. A 52-year-old male with Autosomal Dominant Polycystic Kidney Disease (ADPKD) was started on tolvaptan therapy. A few weeks later, he presents with symptoms of dry mouth and increased thirst. What is the likely mechanism behind these symptoms?

A. Increased free water clearance

B. V2 receptor agonism

C. Increased renal cAMP levels

D. Increase in urine osmolality

100. 55-year-old woman with a history of Crohn disease is admitted to the hospital due to perforated appendicitis. The patient quickly develops respiratory difficulty, and acute respiratory distress syndrome is diagnosed. She is intubated and mechanically ventilated with positive pressure ventilation. She is intermittently placed in the prone position while mechanically ventilated. Which of the following is most likely to occur due to this position change?

A. Alveolar hyperdistention

B. Decreased cardiac output

C. Decreased functional residual capacity

D. Improved ventilation-perfusion matching

101. A 6-week-old term boy is brought to the OPD due to increased fussiness and poor weight gain. The patient has several wet diapers per day. His anterior fontanelle is flat and mucous membranes are dry. Laboratory results include the following:
Sodium: 148 mEq/L
Potassium: 3.5 mEq/L
Antidiuretic hormone: increased
Urinalysis shows a specific gravity of 1.002. Which of the following is the most appropriate treatment for this patient's condition?

A. Desmopressin

B. Hydrochlorothiazide

C. Hydrocortisone

D. Insulin

102. Supravital stain of a peripheral smear of a patient is shown. What is the likely inheritance pattern of this condition?

A. Autosomal dominant inheritance
B. Autosomal recessive inheritance
C. X-linked dominant inheritance
D. X-linked recessive inheritance

103. A 23-year-old man is brought to the emergency department after experiencing a generalized tonic-clonic seizure. His roommate says that the patient has had a fever and headache for the past 2 days and that today he was talking nonsensically. MRI of the brain shows swelling of the temporal lobes. CSF analysis is most likely to reveal which of the following patterns?

A. Glucose normal, protein increased, cells increased (RBC)

B. Glucose low, protein increased, cells increased (neutrophils)

C. Glucose normal, protein increased, cells increased (lymphocytes, RBC)

D. Glucose low, protein decreased, cells increased (lymphocytes)

104. 69-year-old man comes to the OPD due to a 6-month history of chest tightness when he walks uphill or climbs stairs. Cardiac examination reveals no murmurs or additional heart sounds. The patient is prescribed a medication that is metabolized to S-nitroso thiols in the vascular smooth muscle cells, and he reports rapid and significant symptom relief. Which of the following components of the cardiovascular system is most susceptible to the medication prescribed to this patient?

A. Cardiac muscle

B. Large arteries

C. Large veins

D. Small arteries and arterioles

105. 45-year-old woman comes to the OPD for progressive itchiness and fatigue. She also notes yellowing of the eyes and skin. Physical examination shows scleral icterus, multiple excoriations on both the upper and the lower extremities, and hepatomegaly. Liver biopsy reveals dense lymphocytic infiltration of the portal triads, as well. as granulomatous destruction of intralobular bile ducts. Which of the following is the most likely diagnosis?

A. PSC

B. PBC

C. Hepatitis B

D. Sarcoidosis

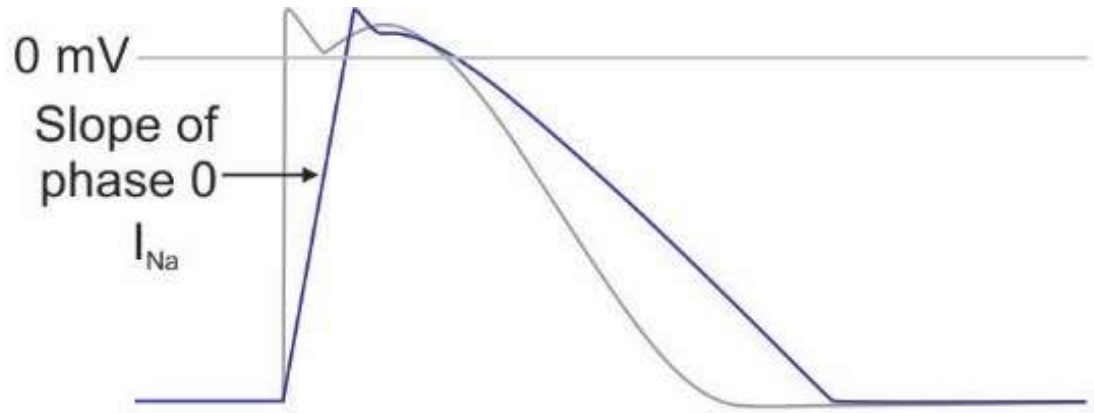
106. 44-year-old man reports exertional shortness of breath and palpitations. On examination, he has a systolic murmur at the left sternal border and cardiac apex, which gets louder when he stands up. He is diagnosed with obstructive hypertrophic cardiomyopathy and paroxysmal atrial fibrillation and is started on a medication. Changes in the action potential of ventricular muscle cells before and after administration of medication are shown in the image below. The patient is most likely being treated with which of the following medications?

A. Lignocaine

B. Digoxin

C. Diltiazem

D. Disopyramide



107. A 7-year-old child presented in OPD with recurrent respiratory infections and thickened sputum. Chest X-ray is shown. Patient also had steatorrhea since birth. What is the likely defect?

A. F508 Deletion

B. F510 deletion

C. P508 frameshift mutation

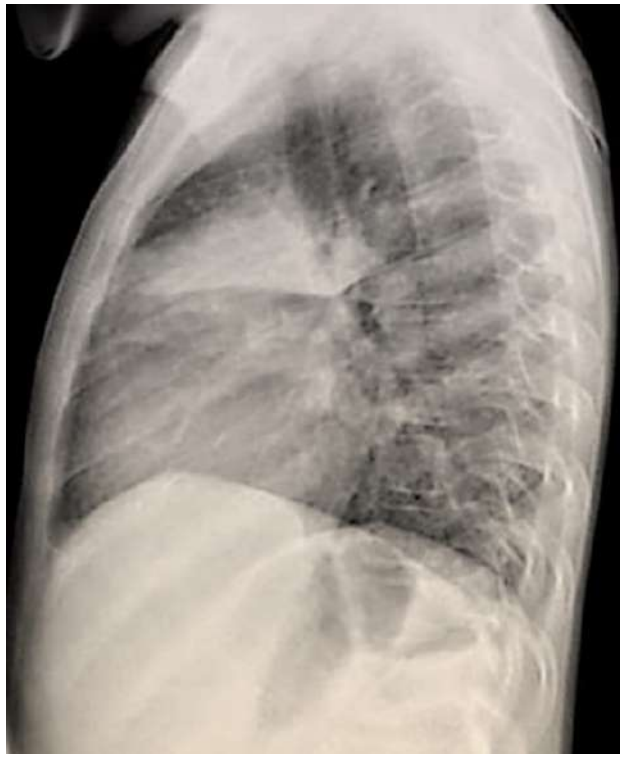
D. P510 frameshift mutation

108. Gaisböck syndrome includes all except?

A. Obesity
B. Normal leukocyte count
C. Erythrocytosis
D. Hypotension

109. A 15-year-old girl is admitted for fever, cough, and malaise for the past two days. She has no history of sick contacts, and all her immunizations are up to date. Her leukocyte count is 21,000/mm with 7% band forms. Upright chest x-ray findings are shown in the image below. Which of the following is the most likely location of the pathologic process in this patient?

A. Left lower lung lobe
B. Left pleural space
C. Right middle lung lobe
D. Right upper lobe



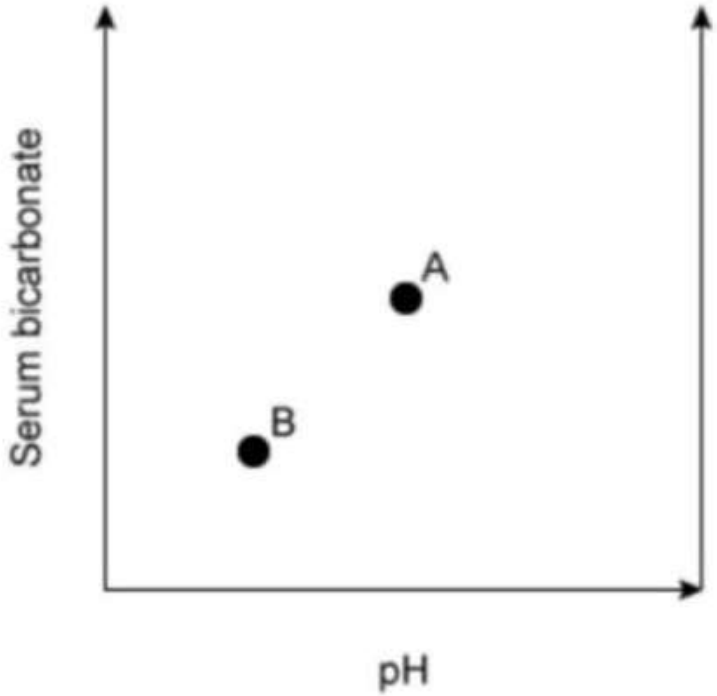
110. A 34-year-old man is brought to the emergency department with new-onset confusion and lethargy The changes in his blood gas parameters are shown in the graph below. Point A represents these parameters at the patient's physiologic baseline, and point B indicates his state on arrival in the emergency department. What is the most likely diagnosis?

A. Metabolic acidosis

B. Metabolic alkalosis

C. Respiratory acidosis

D. Respiratory alkalosis



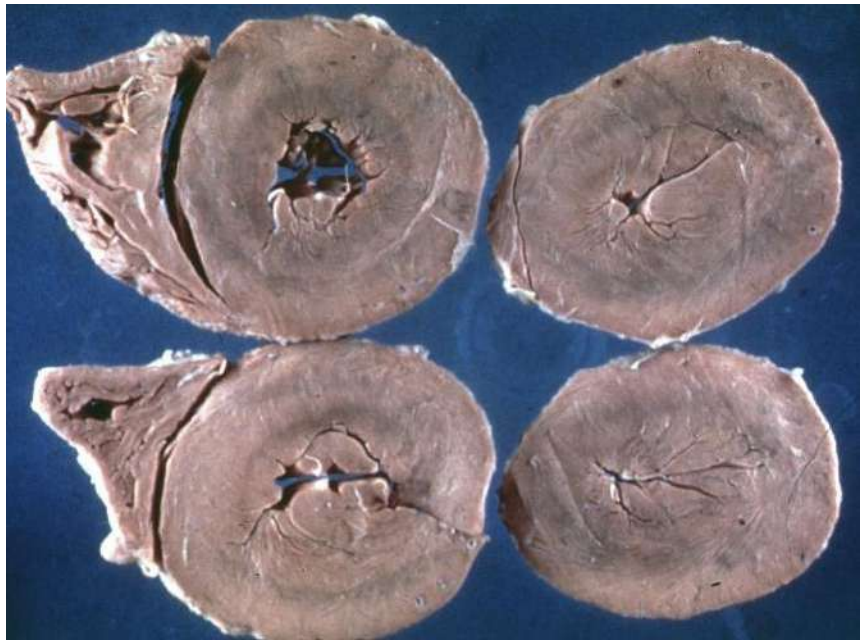
111. A 25-year-old man was playing soccer when he suddenly collapsed. Despite all attempts to save his life, he died. Autopsy is performed. Gross examination of the heart is shown in the image. If this patient had a preparticipation sports screening, cardiac auscultation would have likely revealed a murmur that increases in intensity after which of the following?

A. Passive leg raising

B. Phenylephrine infusion

C. Squatting

D. Sudden standing



Murmurs

Preload reduce (Valsalva/Standing/Nitroglycerin):

Preload increase (Passive leg raise / Squatting/Phenylephrine):

112. A 70-year-old man with a history of chronic smoking presented with fever, confusion, diarrhea and cough. Chest X-ray revealed bilateral infiltrates. Gram stain, immunofluorescence testing was done on sputum sample and came negative for organisms. Serology findings are given below. Which of the following organisms is responsible for this presentation?
Serum Na+ – 120 meq/L
AST – 62 IU/L
ALT – 56 IU/L
HIV – Positive

Options:

A. Streptococcus

B. Legionella

C. Klebsiella

D. Pneumocystis carinii pneumonia

113. A patient is receiving chemotherapy with platinum compounds. Which of the following drugs are used for treatment of chemotherapy induced nausea and vomiting?

A. Granisetron, dexamethasone and aprepitant
B. Metoclopramide, dexamethasone and domperidone
C. Prochlorperazine, granisetron and domperidone
D. Promethazine, doxylamine and metoclopramide

114. 50-year-old man comes to the emergency department due to a large, painful skin lesion. He does not remember sustaining any trauma. He was recently diagnosed with atrial fibrillation, for which warfarin was begun. The patient noticed the lesion about 36 hours after starting the medication. Which of the following is the most likely cause of this patient's skin lesion?

A. Antithrombin deficiency

B. Autoimmune phenomena

C. Protein C deficiency

D. Vitamin K deficiency

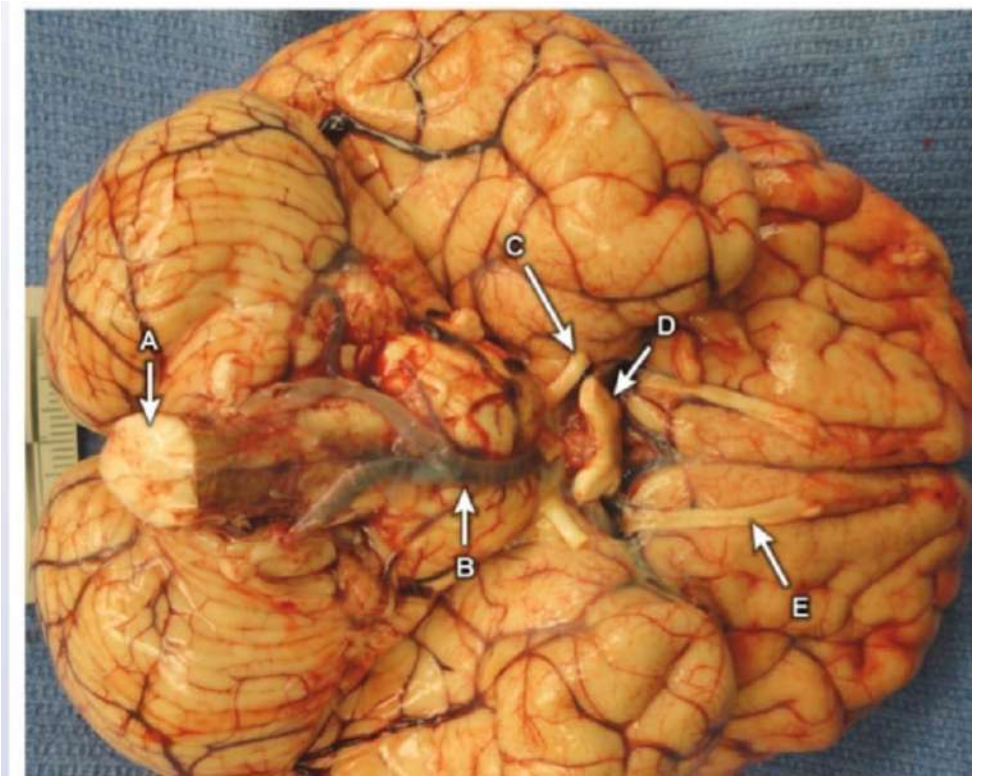
115. 24-year-old man is brought to the emergency department due to seizures. He has had 2 days of worsening fever, headache, and vomiting. Physical examination shows signs of meningeal irritation. The patient rapidly becomes comatose and dies 48 hours later despite aggressive medical care. Autopsy examination shows congested leptomeninges with fibrinopurulent exudate. Microscopy reveals numerous ameba in the exudate and brain tissue. Which of the following is the most likely portal of entry of this pathogen into the CNS?

A. A

B. B

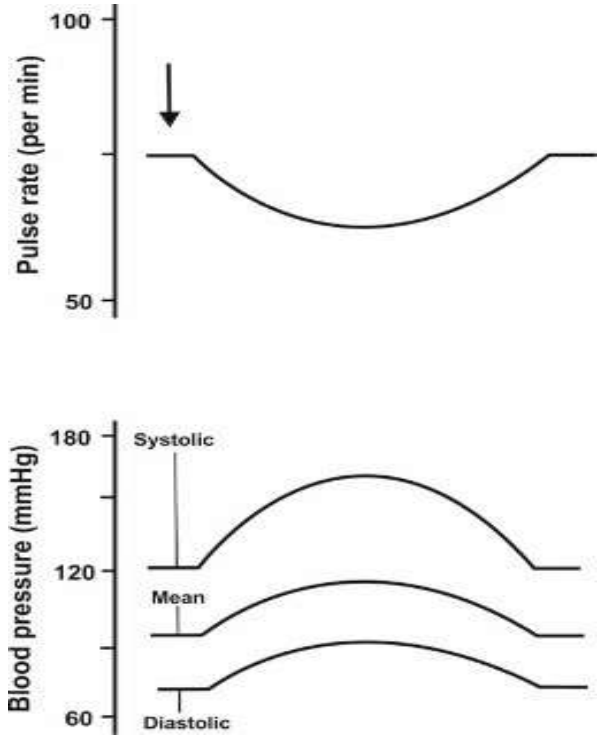
C. C

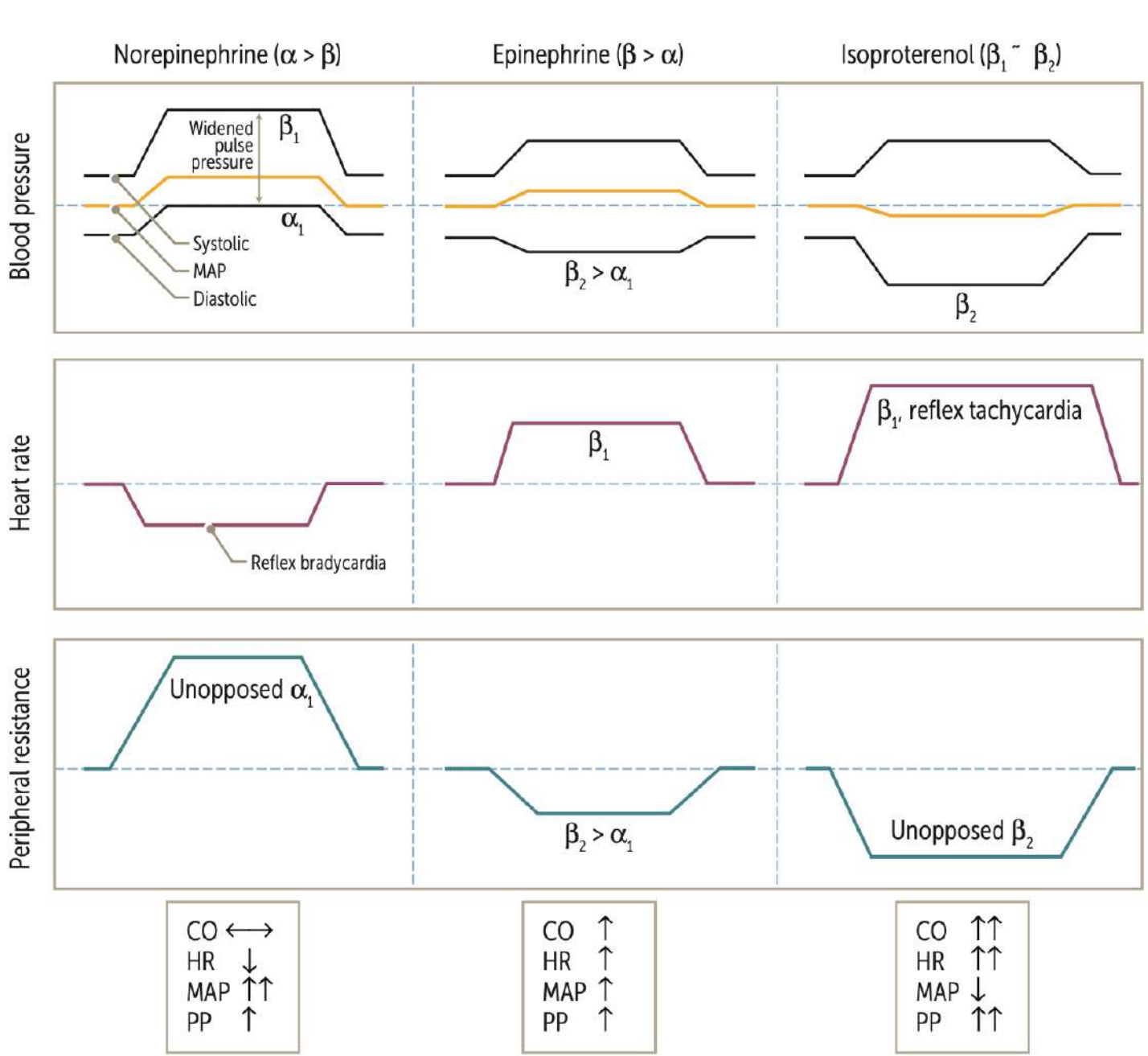
D. E



116. Following graph shows response of a drug, identify the drug?

A. Dopamine
B. Epinephrine
C. Isoproterenol
D. Norepinephrine




Norepinephrine (α > β)
Epinephrine (β > α)
Isoproterenol (β1 ~ β2)
Blood pressure
Widened pulse pressure
β1
α1
Systolic
MAP
Diastolic
β2 > α1
β2
Heart rate
β1
β1, reflex tachycardia
Reflex bradycardia
Peripheral resistance
Unopposed α1
β2 > α1
Unopposed β2
CO ⟷
HR ↓
MAP ↑↑
PP ↑
CO ↑
HR ↑
MAP ↑
PP ↑
CO ↑↑
HR ↑↑
MAP ↓
PP ↑↑

117. Which of the following is not a common feature of ABPA?

A. Distal bronchiectasis
B. Cough
C. Wheezing
D. Raised serum lgE levels

Table 2. Diagnostic criteria for ABPA by the international society for human and animal mycology (ISHAM) (2013).[7]

Baseline conditions: asthma and/or cystic fibrosis.	
Mandatory criteria:	
1. IgE specific to *A. fumigatus* (OR)	>0.35 kU/L
2. A positive skin test against *A. fumigatus* (AND)	
3. Total serum IgE	>1000 UI/mL
Other criteria (at least 2 must be present)	
1. IgG against *A. fumigatus* (OR)	>27 mg/L
2. Radiological changes typical of ABPA (OR) • Central and proximal cylindrical bronchiectasis • Alterations predominantly in the upper lobe • Nodules • Atelectasis • Air trapping	
3. Total eosinophil count	>500 cells/UL

ABPA, allergic bronchopulmonary aspergillosis.

118. Which of the following patients comes under the category III non-heart-beating donor?

A. A patient who died during transportation to the hospital
B. A patient who died after failed resuscitation after reaching the hospital
C. A patient who was brought dead to the hospital
D. A patient who is awaiting death in the hospital

Maastricht classification	Presentation of death	DCD situation	Organs procurable
I	Dead on arrival	Uncontrolled	Tissue (heart valves, cornea)
II	Unsuccessful resuscitation	Uncontrolled	Kidney
III	Anticipated cardiac arrest	Controlled	All organs except heart
IV	Cardiac arrest in brain dead donor	Controlled	All organs except heart
V	Unexpected cardiac arrest in a hospital inpatient	Uncontrolled	All organs except heart

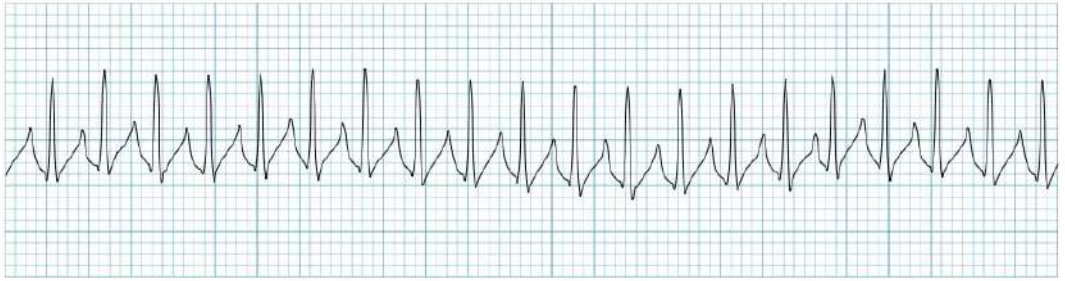
119. 54-year-old man comes to the OPD due to a neck mass that has been slowly growing over the past 3 months. He has smoked a pack of cigarettes per day for the last 30 years and has used alcohol occasionally. Physical examination reveals a 2-cm, hard, left-sided supraclavicular lymph node. Biopsy of the lymph node reveals anaplastic cells that are diffusely positive for cytokeratin immunohistochemical stain. Which of the following is the most likely origin of the cells detected on the biopsy?

A. Endothelial cells
B. Epithelial cells
C. Skeletal muscle
D. Smooth muscle

120. 56-year-old man comes to the emergency department due to chest palpitations The patient feels that his heartbeat is fast and irregular. The patient normally drinks only 2-3 times a year, but he hosted a party last night for his wife's birthday and consumed a large amount of alcohol. Pulse check confirms the presence of an irregularly irregular rhythm with a rate of 138/min. This patient's ECG strip is most likely to show which of the following?

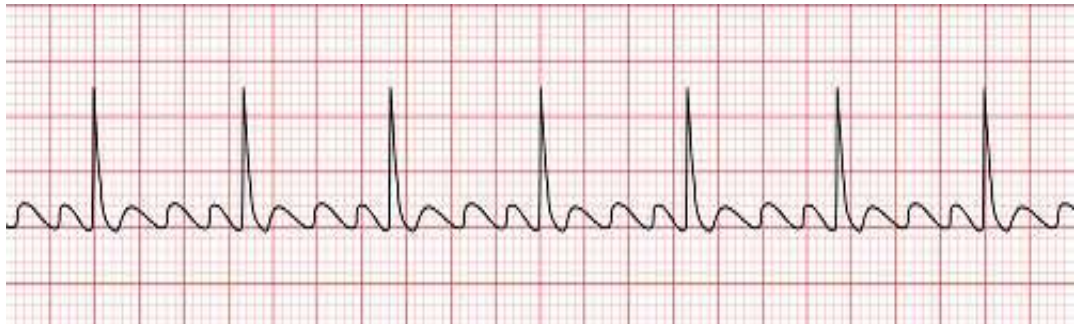
A.

B.



C.

D.

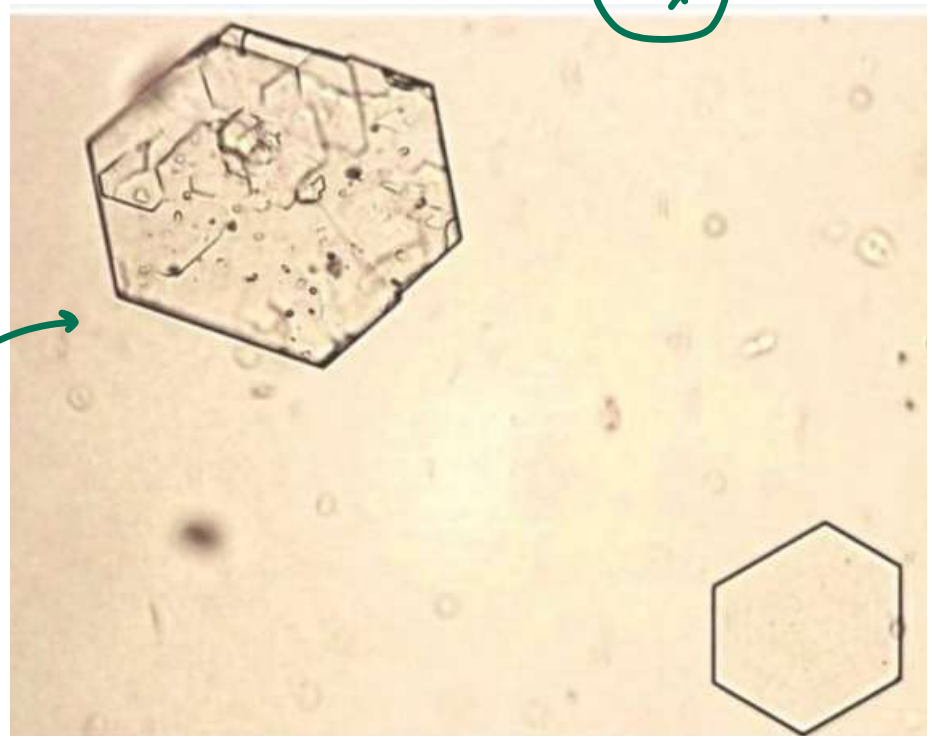


INTEGRATED SYSTEMS 2.0
BTR TEST

Dr. Zainab Vora

1. 16-year-old boy is brought to the emergency department with sudden onset of left-sided abdominal pain and blood in his urine. Physical examination shows costovertebral angle tenderness on the left side. Microscopic examination of the urine is shown below. Further laboratory evaluation is most likely to reveal which of the following abnormalities in this patient?

A. Aminoaciduria
B. Hypercalciuria
C. Hyperoxaluria
D. Hyperuricosuria



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

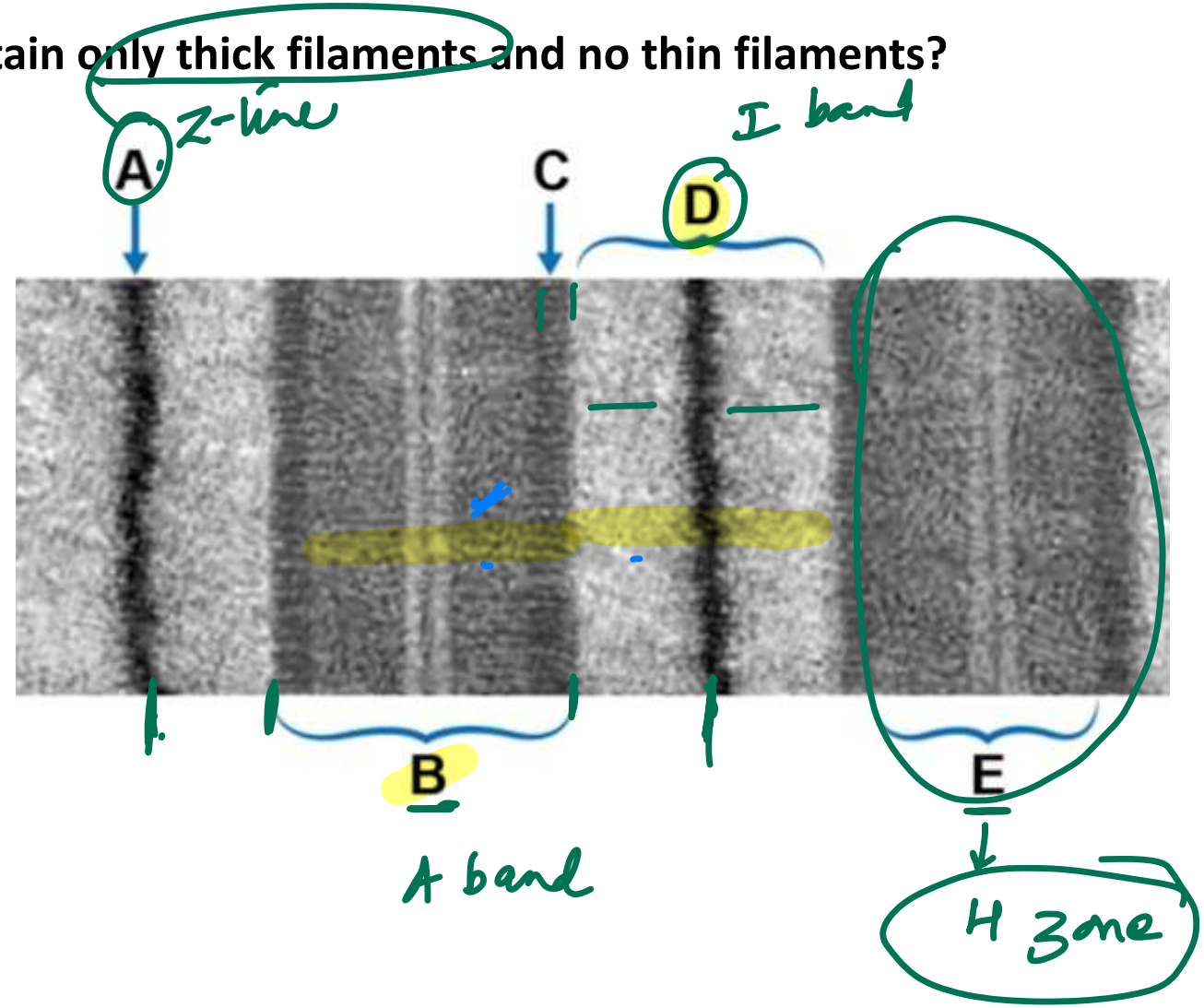
A. A

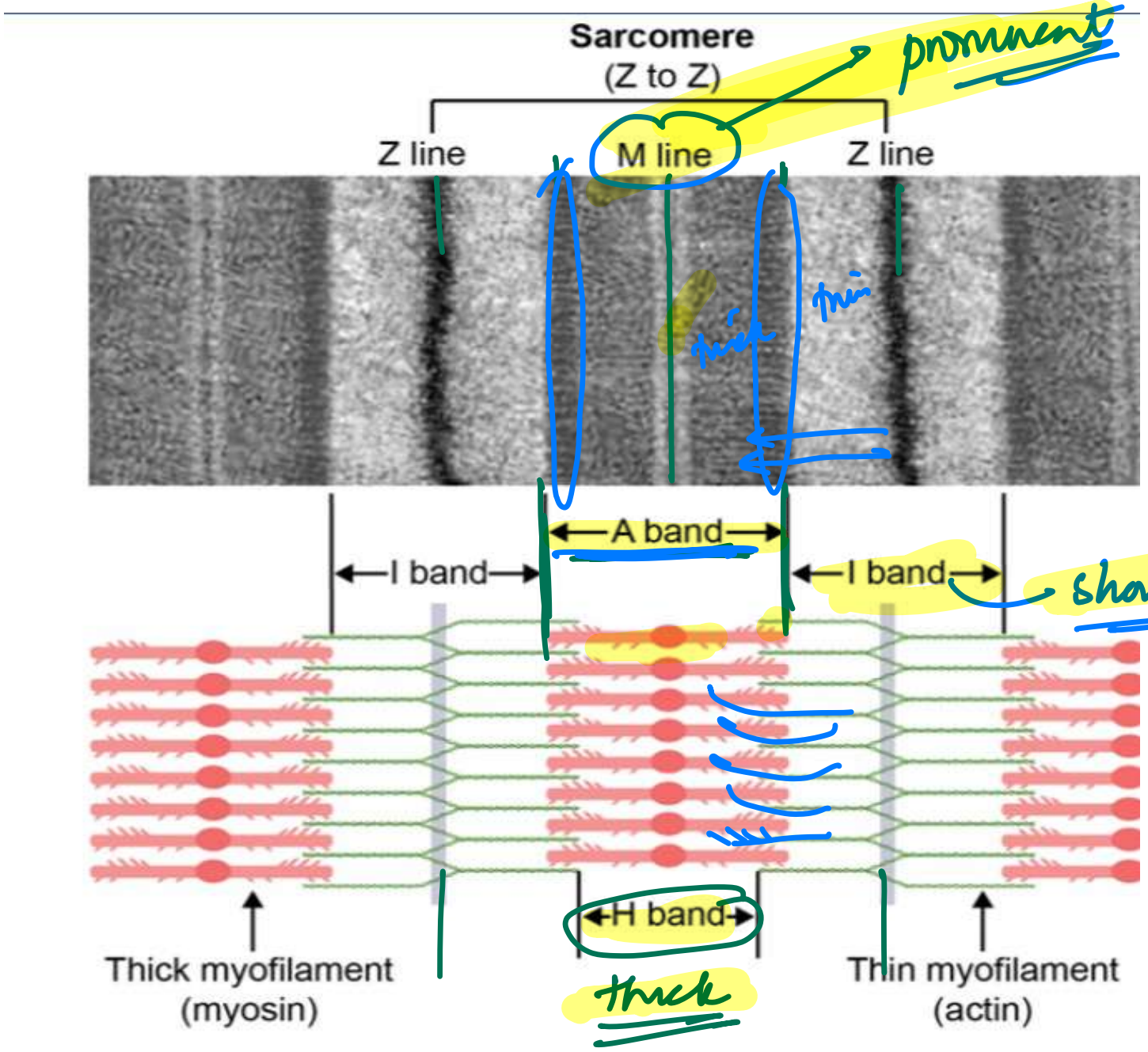
B. C

C. D

D. E

B




Sarcomere
(Z to Z)
Z line
M line
Z line
A band
I band
I band
H band
Thick myofilament
(myosin)
Thin myofilament
(actin)

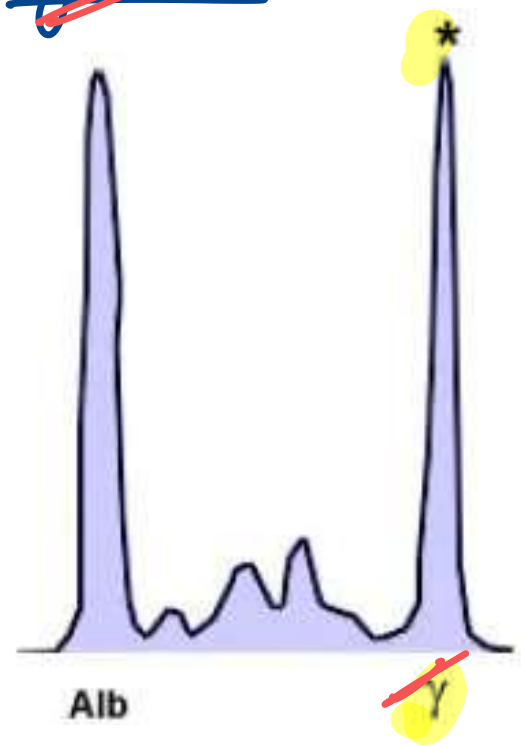
3. A 67-year-old man is evaluated for persistent lower back pain and fatigue. Laboratory testing shows anemia and renal dysfunction. Serum electrophoresis of the serum proteins is shown below. A medication that blocks cellular proteasome action is administered. This treatment is most likely to cause which of the following effects on the abnormal cells?

A. Augmented cytotoxic T-cell response

B. Decreased DNA methylation

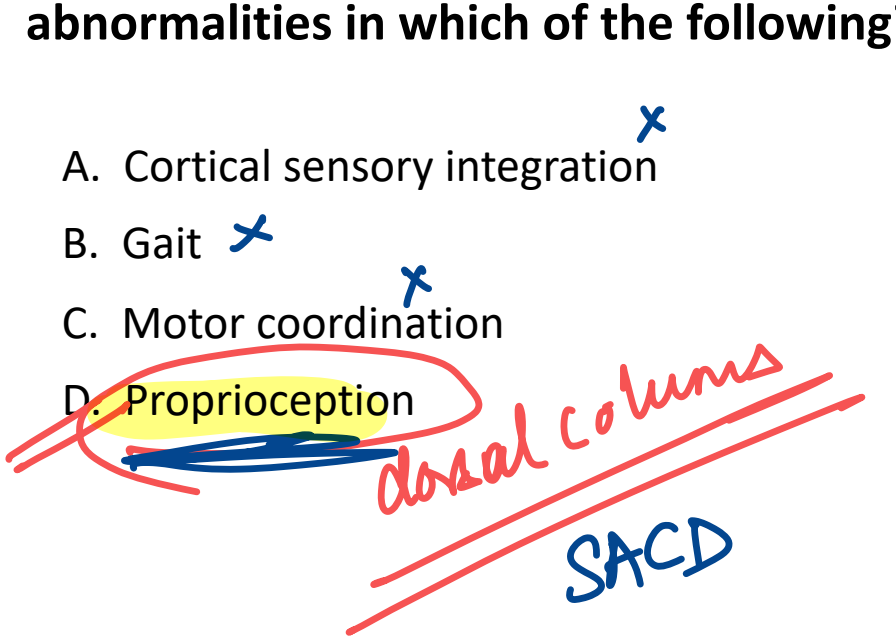
C. Impaired RNA splicing

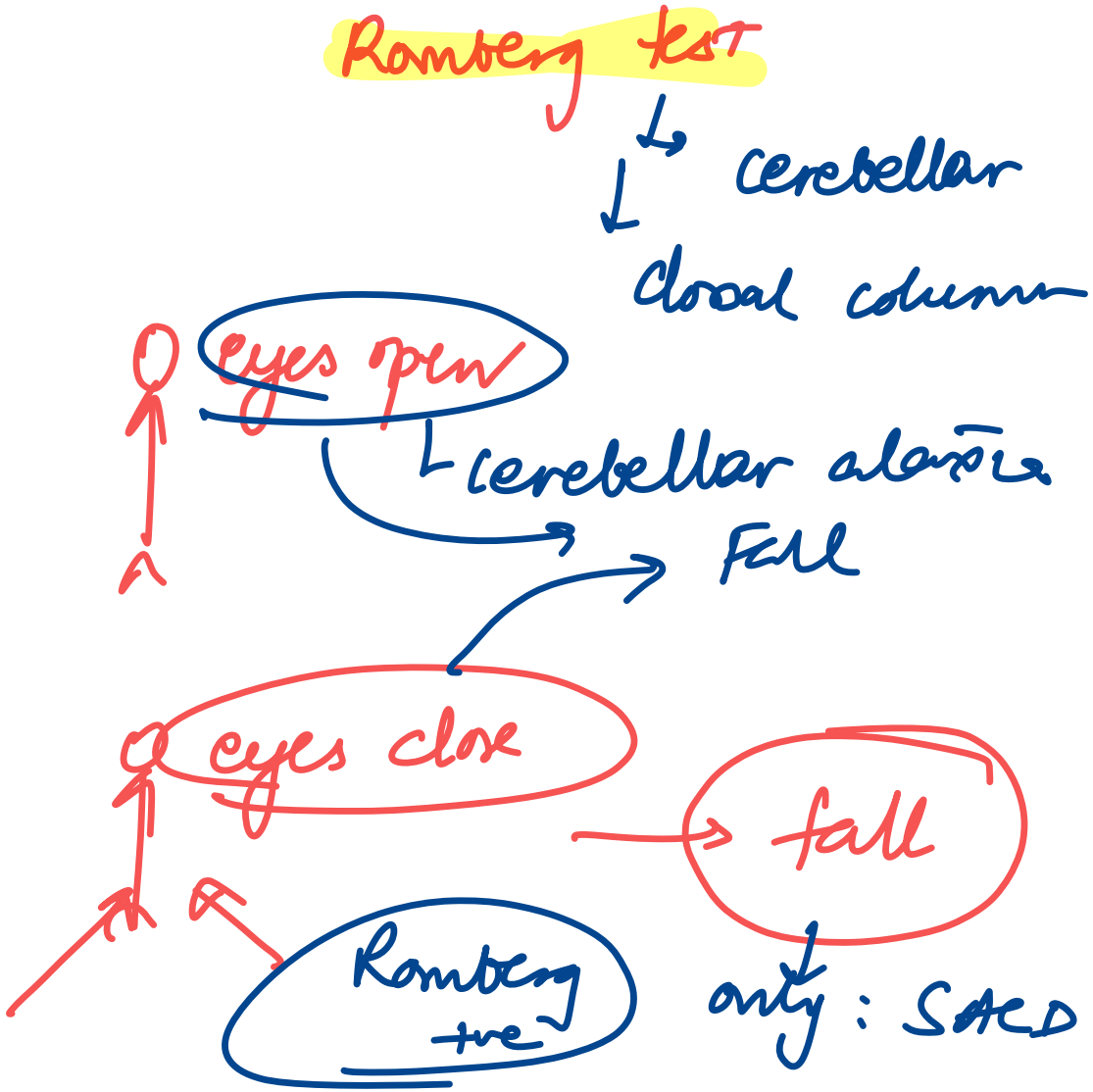
D. Increased apoptosis



4. 34-year-old man is evaluated in the clinic due to difficulty walking over the past 2 weeks. His symptoms have resulted in several recent falls. The physician asks him to stand with his feet close together, arms to the sides, and eyes closed. This maneuver most likely tests for abnormalities in which of the following?

A. Cortical sensory integration
B. Gait
C. Motor coordination
D. Proprioception





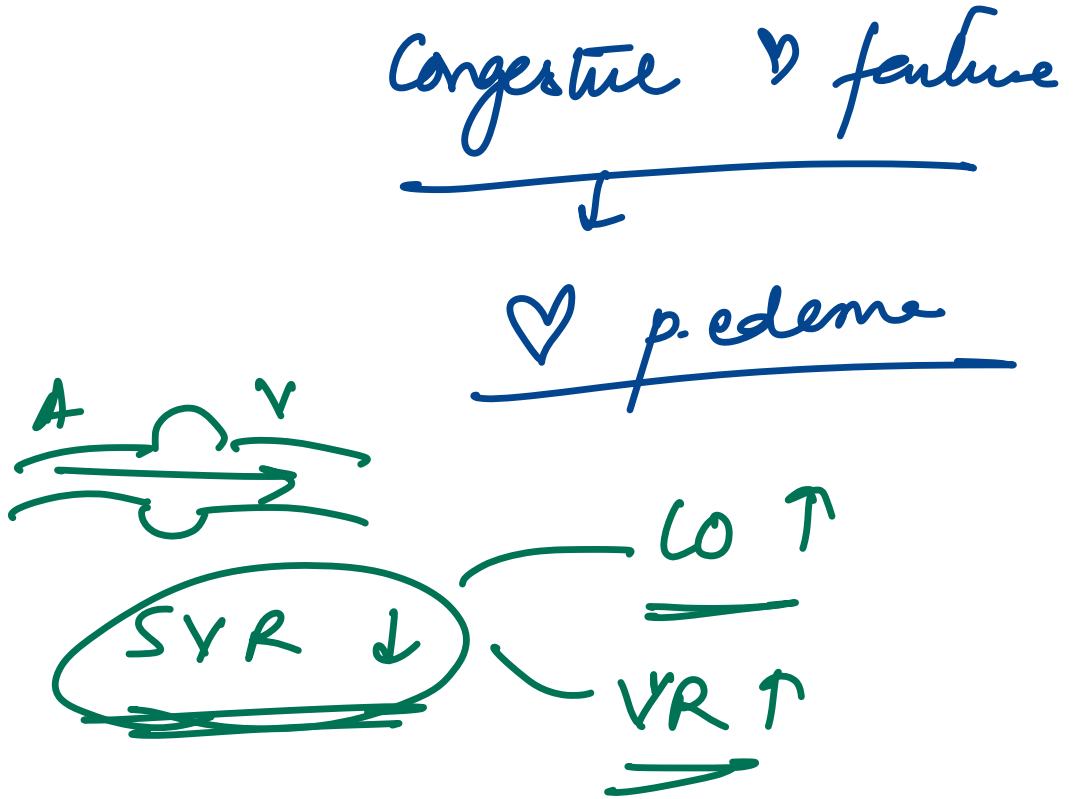
5. A 34-year-old woman comes to the office due to exertional dyspnea. The patient has a history of IgA nephropathy; she received hemodialysis for 2 years before undergoing kidney transplantation last month. Chest x-ray reveals cardiomegaly and pulmonary congestion. Further evaluation determines that her symptoms are likely due to persistence of the arteriovenous fistula that was used for hemodialysis. Which of the following physiologic changes in1) cardiac output, 2) systemic vascular resistance and 3) venous return respectively are present in this patient due to the fistula?

A. Decreases, increases, decreases

B. Decreases, increases, increases

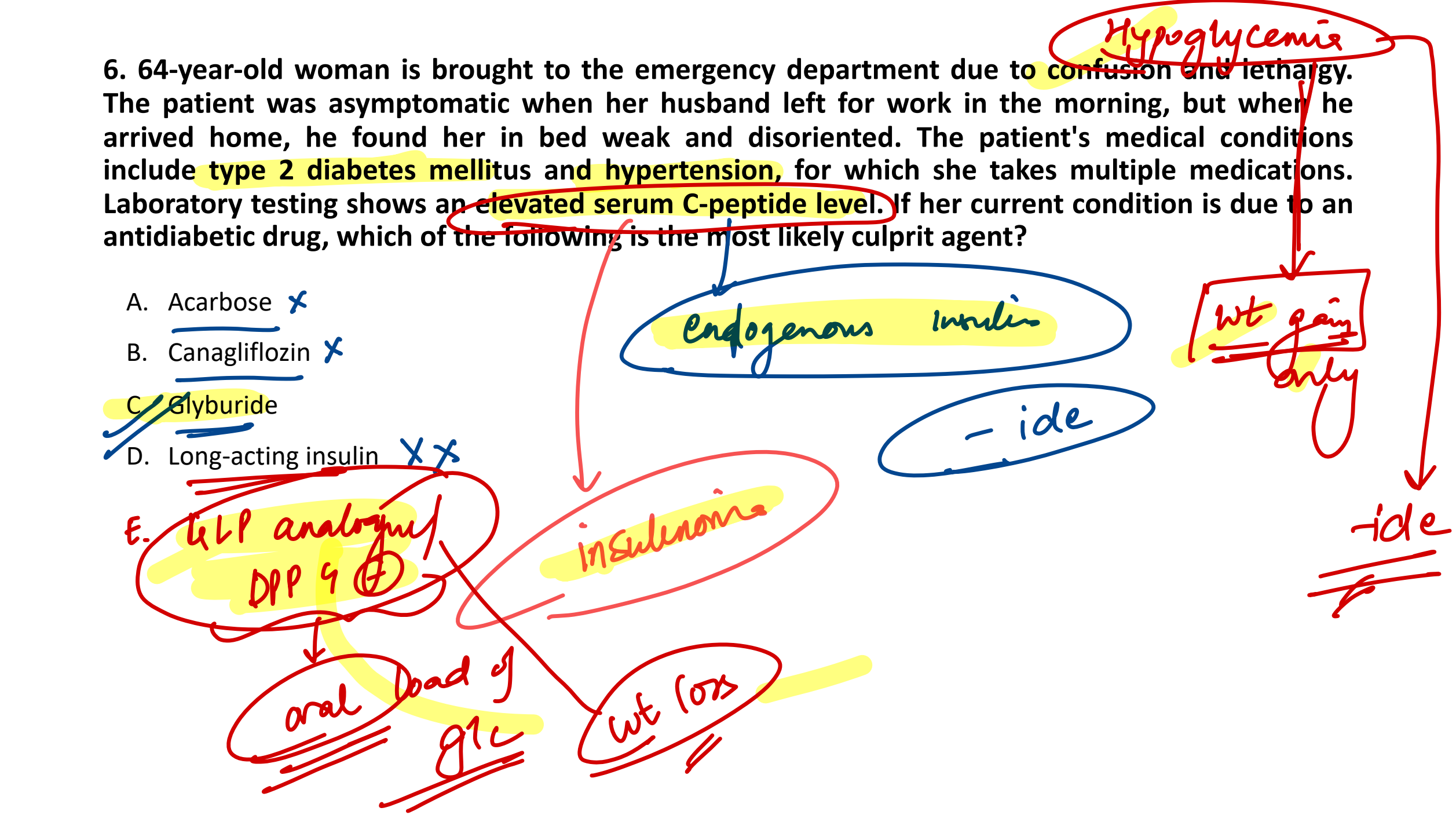
C. Increases, increases, decreases

D. Increases, decreases, increases



6. 64-year-old woman is brought to the emergency department due to confusion and lethargy. The patient was asymptomatic when her husband left for work in the morning, but when he arrived home, he found her in bed weak and disoriented. The patient's medical conditions include type 2 diabetes mellitus and hypertension, for which she takes multiple medications. Laboratory testing shows an elevated serum C-peptide level. If her current condition is due to an antidiabetic drug, which of the following is the most likely culprit agent?

A. Acarbose
B. Canagliflozin
C. Glyburide
D. Long-acting insulin
E. GLP analogue/ DPP 4 ⊖



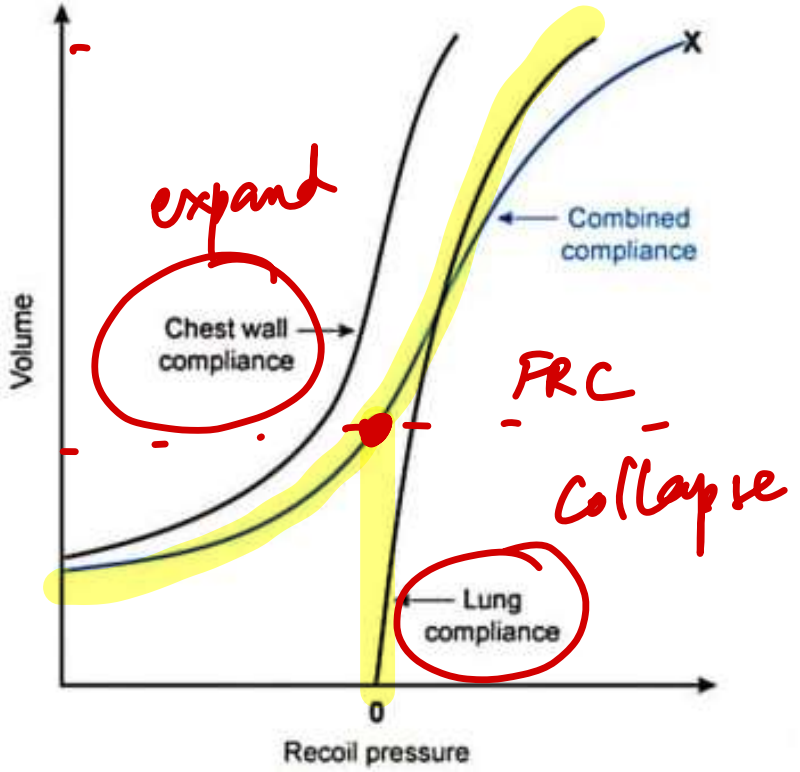
7. The combined compliance of the lung and chest wall of a healthy individual is measured and plotted as shown below. It is noted that the intrapleural pressure at the end of maximal inspiration is -8 cm H20 (marked x). Which of the following is the best estimate of the intrapleural pressure at the point marked by the black dot?

A. +10 cm H2O

B. + 5 cm H2O

C. -5cm H20

D. 0cm H20



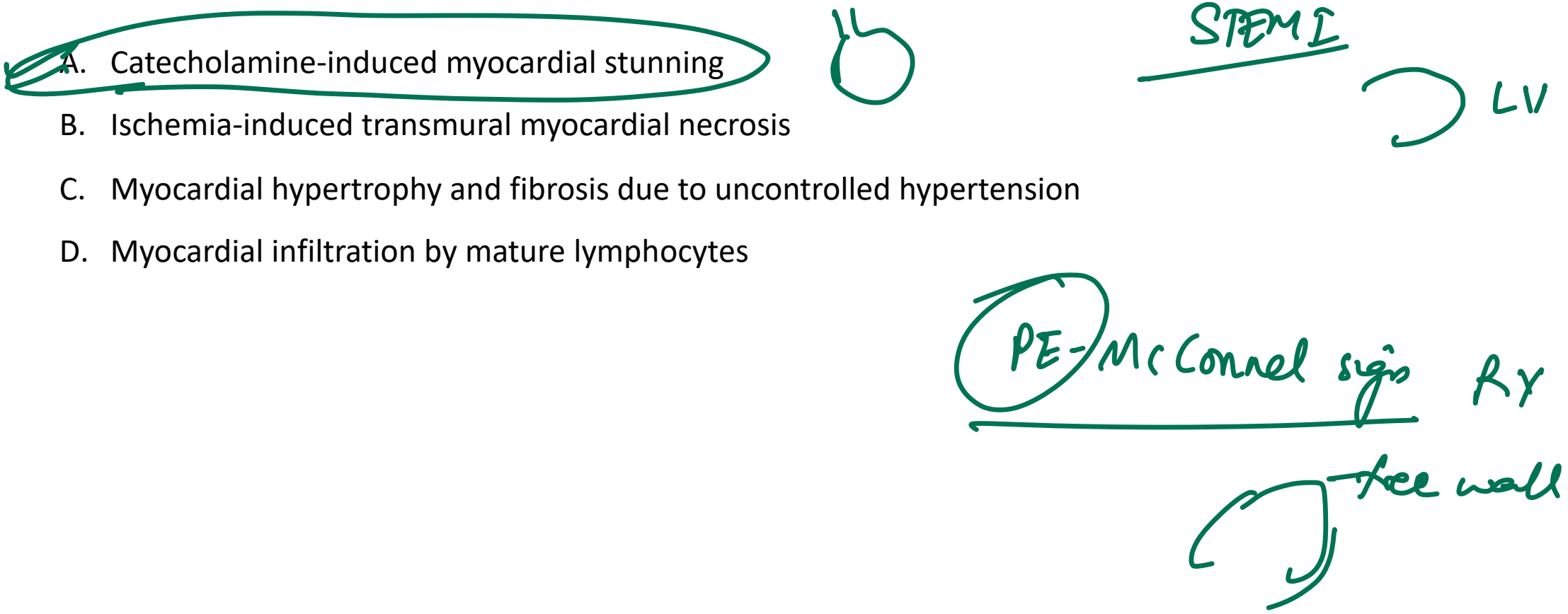
8. A 61-year-old woman is hospitalized due to chest pressure and shortness of breath. Two days ago her husband died in a car accident. ECG shows normal sinus rhythm with T-wave inversions in the anterior leads. Echocardiogram shows hypokinesis of the apical wall with decreased left ventricular ejection fraction. Diagnostic coronary angiography shows no evidence of obstructive coronary artery disease. Which of the following is the likely cause of this patient's initial presentation?

A. Catecholamine-induced myocardial stunning

B. Ischemia-induced transmural myocardial necrosis

C. Myocardial hypertrophy and fibrosis due to uncontrolled hypertension

D. Myocardial infiltration by mature lymphocytes



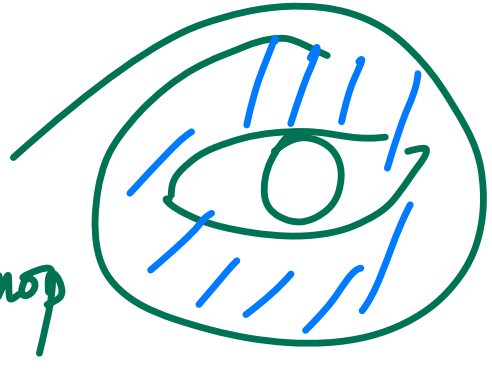
9. A 34-year-old man comes to the emergency department due to severe headache. The patient describes unbearable, throbbing pain around his right eye that awakened him. Over the past week, he has had several similar episodes, which spontaneously resolved after 20-30 minutes. On physical examination, he appears restless and paces in the room. There is mild conjunctival injection and miosis of the right eye. Neurologic examination shows no abnormalities. Which of the following is the most likely cause of this patient's current symptoms?

A. Cavernous sinus thrombosis

B. Cluster headache

C. Migraine without aura

D. Trigeminal neuralgia



N/V

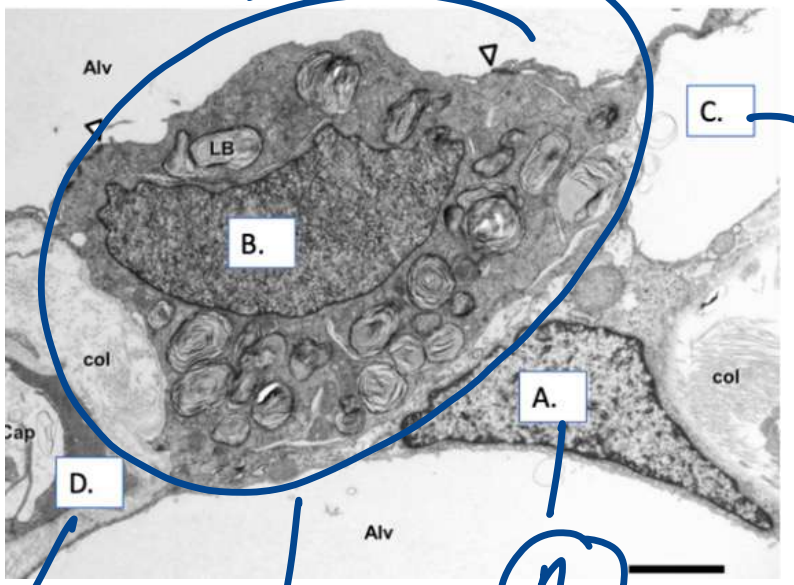
10. Physicians conduct a series of animal experiments to determine pulmonary tissue regeneration capacity. During one of the experiments, lung alveoli are exposed to NO2 and massive necrosis of the epithelial lining ensues. Histologic examination of the injured tissues a month later shows partial recovery of the alveolar epithelial lining. This regenerated tissue is most likely derived from which of the following cells?

A. A

B. B

C. C

D. D



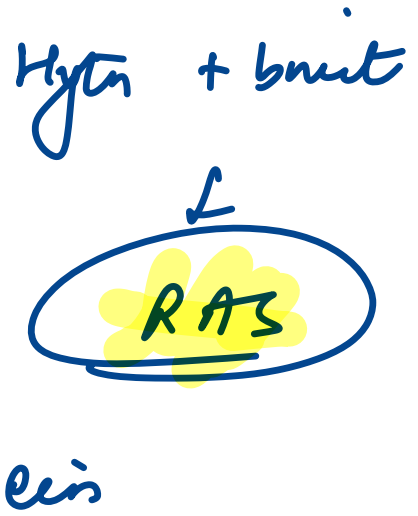
11. A 70-year-old man comes to the OPD due to increasing headaches, nausea, and vomiting. Medical history is significant for a transient ischemic attack that led to a right carotid endarterectomy 5 years ago. Blood pressure is 220/120 mm Hg and pulse is 70/min. Bilateral abdominal bruits are present. Blood testing in this patient would most likely show which of the following?

A. Low renin, low aldosterone, high angiotensin II, low potassium

B. High renin, high aldosterone, high angiotensin II, low potassium

C. Low renin, high aldosterone, high angiotensin II, low potassium

D. Low renin, low aldosterone, low angiotensin II, high potassium



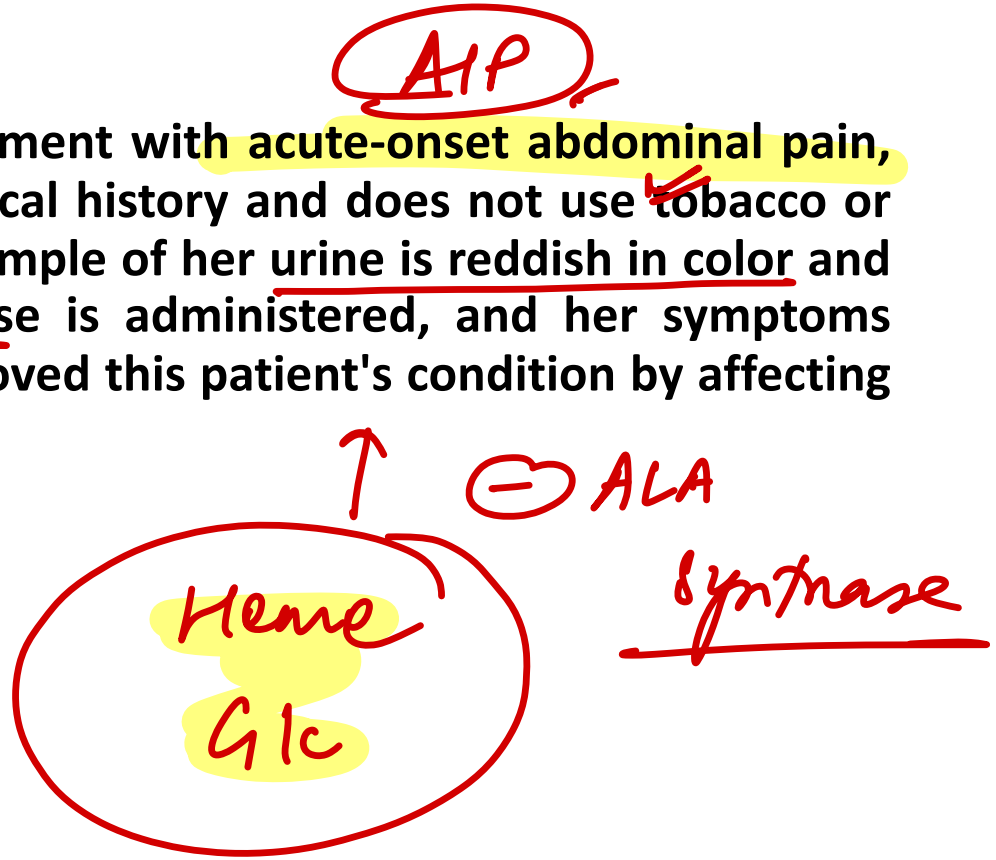
12. 28-year-old woman comes to the emergency department with acute-onset abdominal pain, nausea, and confusion. She has no significant past medical history and does not use tobacco or alcohol as they have made her feel sick in the past. A sample of her urine is reddish in color and darkens on standing for 24 hours. Intravenous dextrose is administered, and her symptoms improve significantly. Dextrose infusion most likely improved this patient's condition by affecting which of the following pathways?

A. Gluconeogenesis

B. Fatty-acid-synthesis

C. Ketone-body formation

D. Porphyrin synthesis



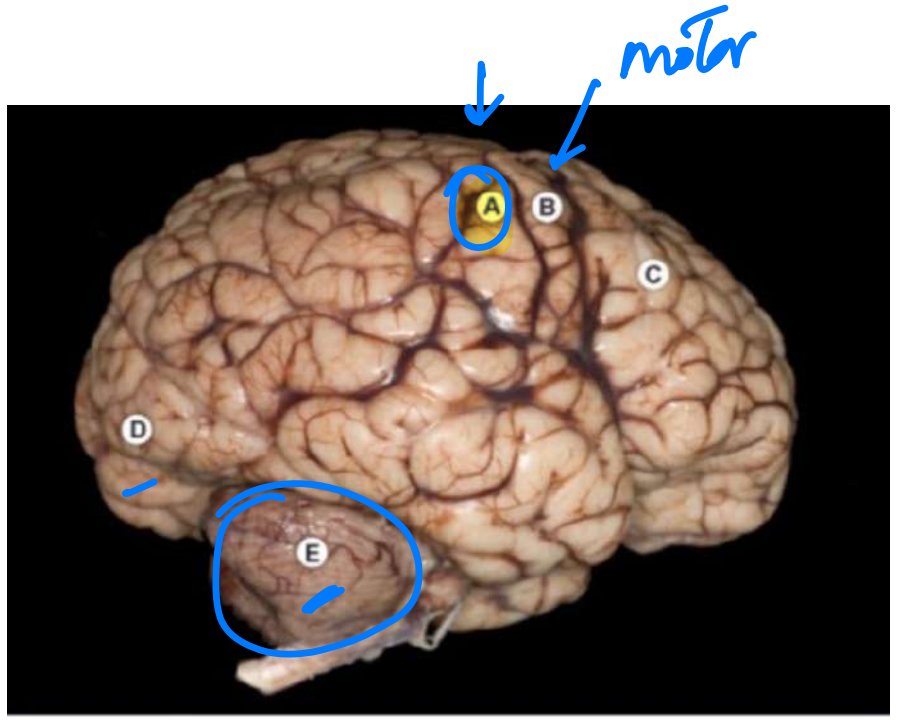
13. 65-year-old man with a history of atrial fibrillation comes to the office due to numbness of his left hand for the past 3 weeks. When the eyes are closed, he is unable to recognize the letters written on his left hand with a stylus. Muscle strength is normal in all extremities. Deep tendon reflexes are 2+. Gait is normal. This patient most likely has a lesion in which of the following locations of the brain?

A. A

B. B

C. C

D. D



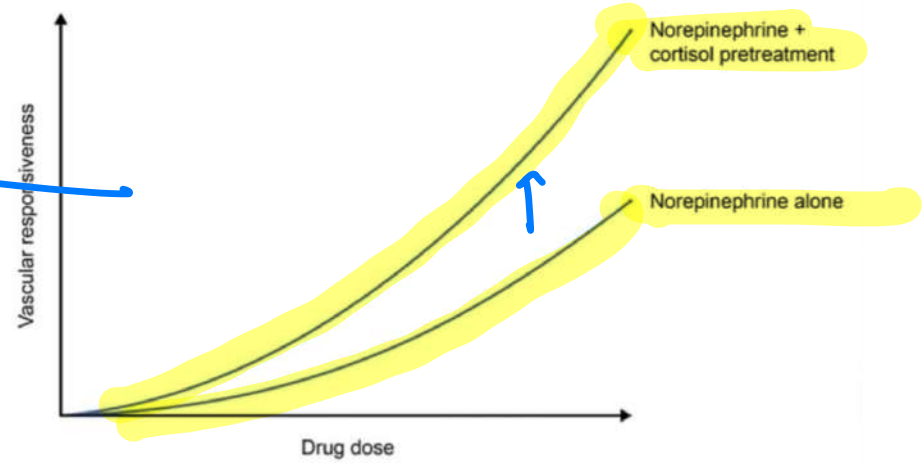
14. Physiologists conduct a series of experiments on hypophysectomized animals to investigate the effects of cortisol on vascular reactivity. Their initial tests show that administration of cortisol alone does not elicit a vascular response. Next, the researchers measure vascular reactivity to an infusion 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?

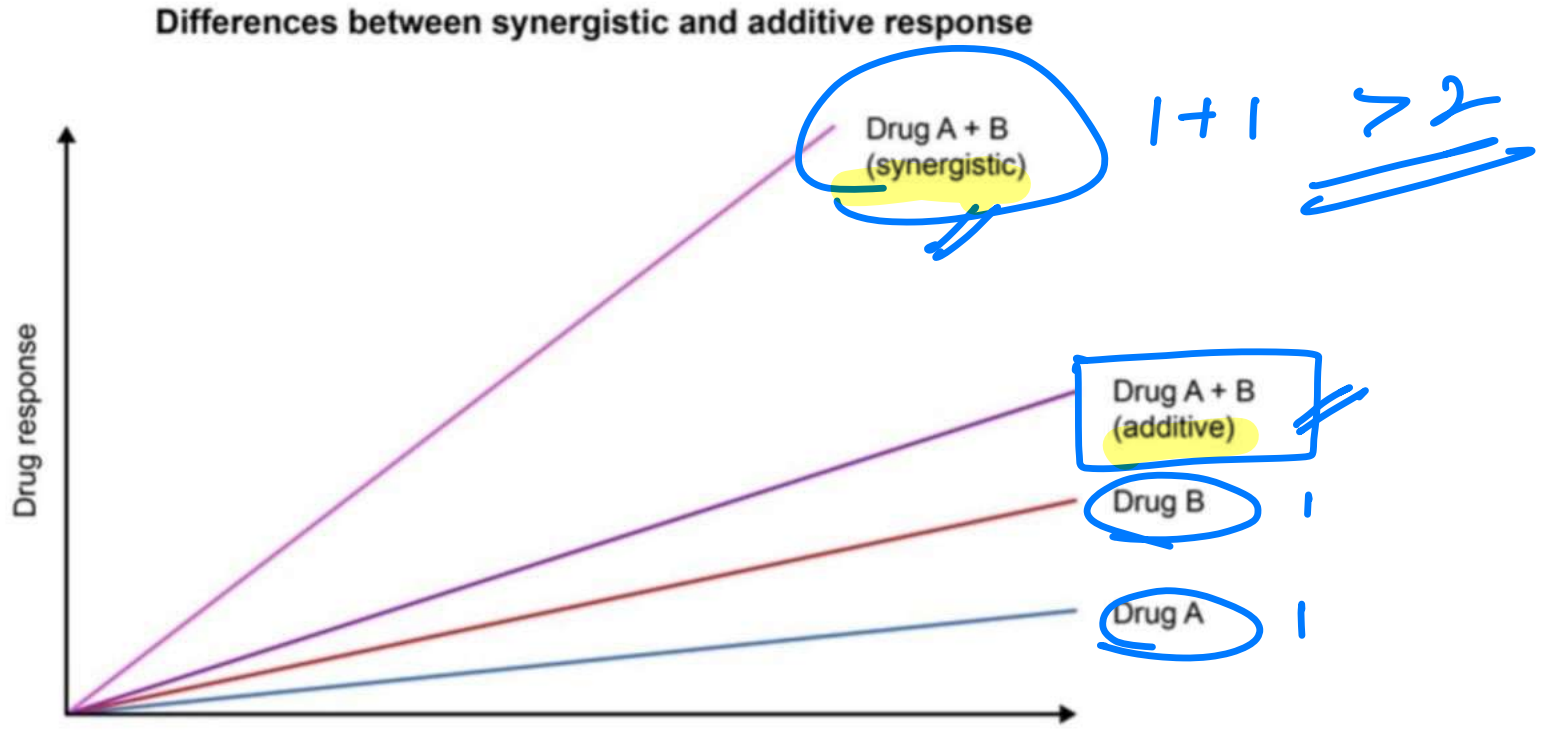
A. Additive effect

B. Synergistic effect

C. Permisiveness

D. Tachyphylaxis

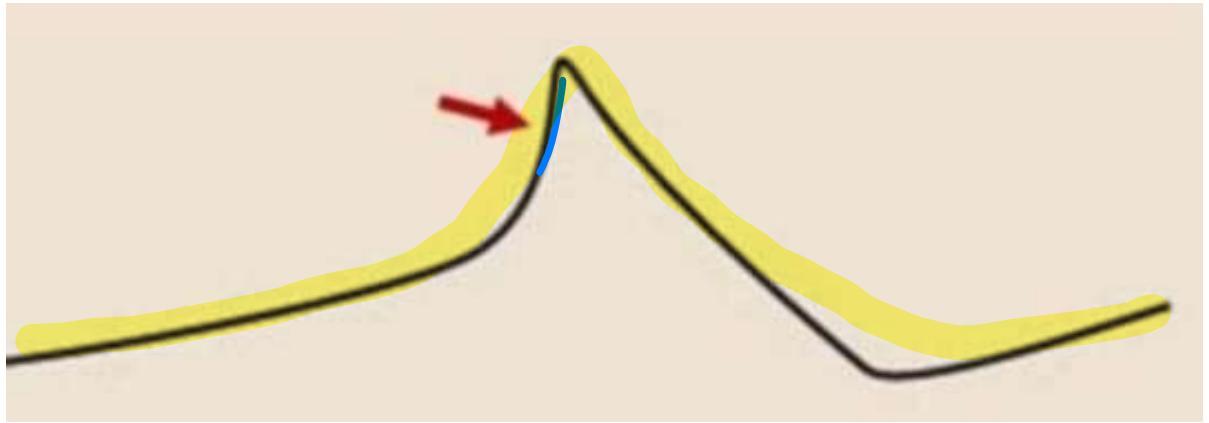


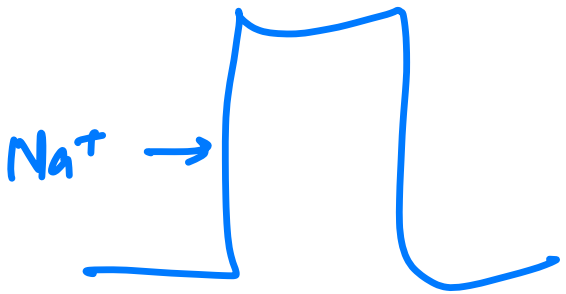

Differences between synergistic and additive response
Drug response
Drug A + B
(synergistic)
Drug A + B
(additive)
Drug B
Drug A

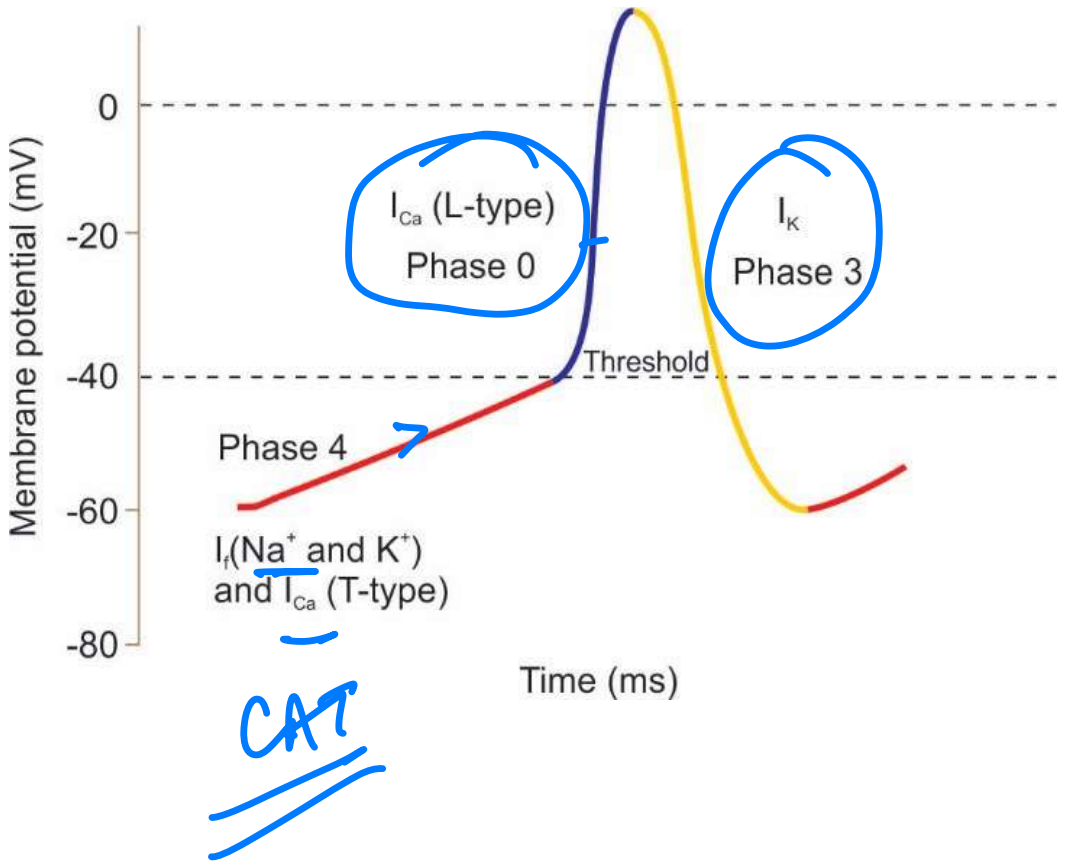
15. Special electrodes are used to detect the change in membrane potential of a specific type of cardiac cell. These changes are recorded on the graph below. The deflection indicated by the arrow is most likely caused by movement of which of the following ions?

A. Sodium
B. Potassium
C. Calcium
D. Chloride

L type






Membrane potential (mV)
0
-20
-40
-60
-80
I_{Ca} (L-type)
Phase 0
I_K
Phase 3
Threshold
Phase 4
I_f(Na$^+$ and K$^+$)
and I_{Ca} (T-type)
Time (ms)
CAT

16. 29-year-old nulligravid woman comes to the office due to a 2-month history of worsening bilateral nipple discharge. Her last menstrual period was 3 months ago, and home pregnancy tests have been negative. On physical examination, visual fields are intact. Brain imaging shows a 0.6-cm pituitary mass. Pharmacotherapeutic treatment is begun, and on a follow-up visit the patient reports that her symptoms are improving. Which of the following is the most likely mechanism of action of this medication?

DOC - Cabergoline

Pregn - Bromocriptine

D(+)

A. Increased estrogen effect on the pituitary

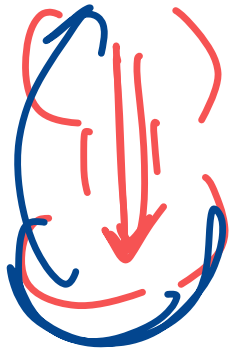
B. Inhibition of gonadotropin-releasing hormone secretion

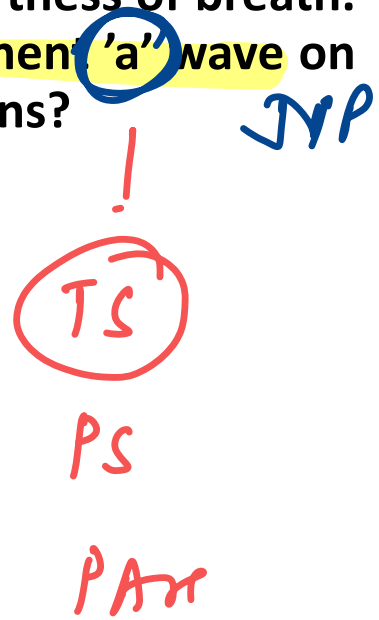
C. Inhibition of hypothalamic dopaminergic neurons

D. Stimulation of pituitary dopamine receptors

17. A 40-year-old female came with complaints of chest pain, palpitation and shortness of breath. On auscultation, a mid-diastolic murmur was heard and on examination, a prominent 'a' wave on JVP was found. What is the most appropriate diagnosis among the following options?

A. Mitral Stenosis
B. Tricuspid Stenosis
C. Tricuspid Regurgitation
D. Mitral Regurgitation





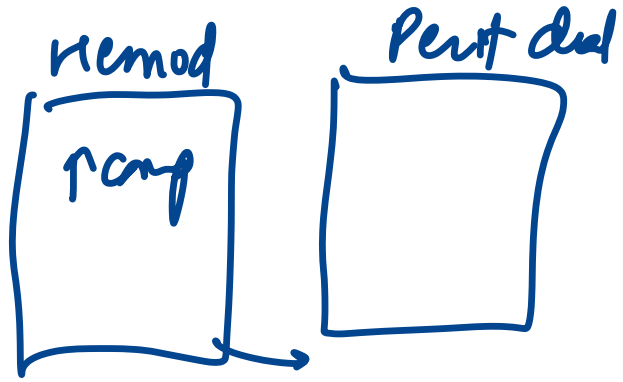
18. A patient has hyperkalemia, raised uric acid levels and is going through hemodialysis. While this, patient develops drowsiness, had a seizure and got hypotensive. What can be given in treatment for this condition?

A. Mannitol

B. Nesiritide

C. Ethacrynic Acid

D. Bumetanide



19. 42-year-old man is hospitalized with fever and persistent sore throat. On physical examination, his temperature is 38.3 C (101 F), blood pressure is 120/80 mm Hg, pulse is 94/min, and respirations are 16/min. There are several bruises on his trunk, and blood is oozing from his intravenous catheter venipuncture sites. His blood fibrinogen level is 110 mg/dL (normal 150-400 mg/dL). Bone marrow biopsy is shown here. Chromosomal analysis of these immature cells is most likely to show which of the following abnormalities?

A. t (8;14) → Burkett

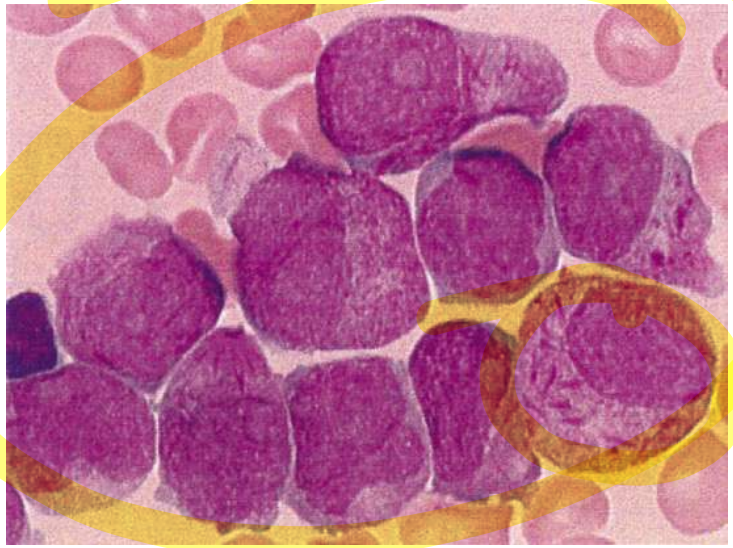
B. t (9;22) → CML

C. t (14;18) → Follicular

D. t (15;17)

DIC

AML M3



t(11;14) – Mantle

inv 16 → M4

t(8;21) – M2

t(11;14) – Marginal

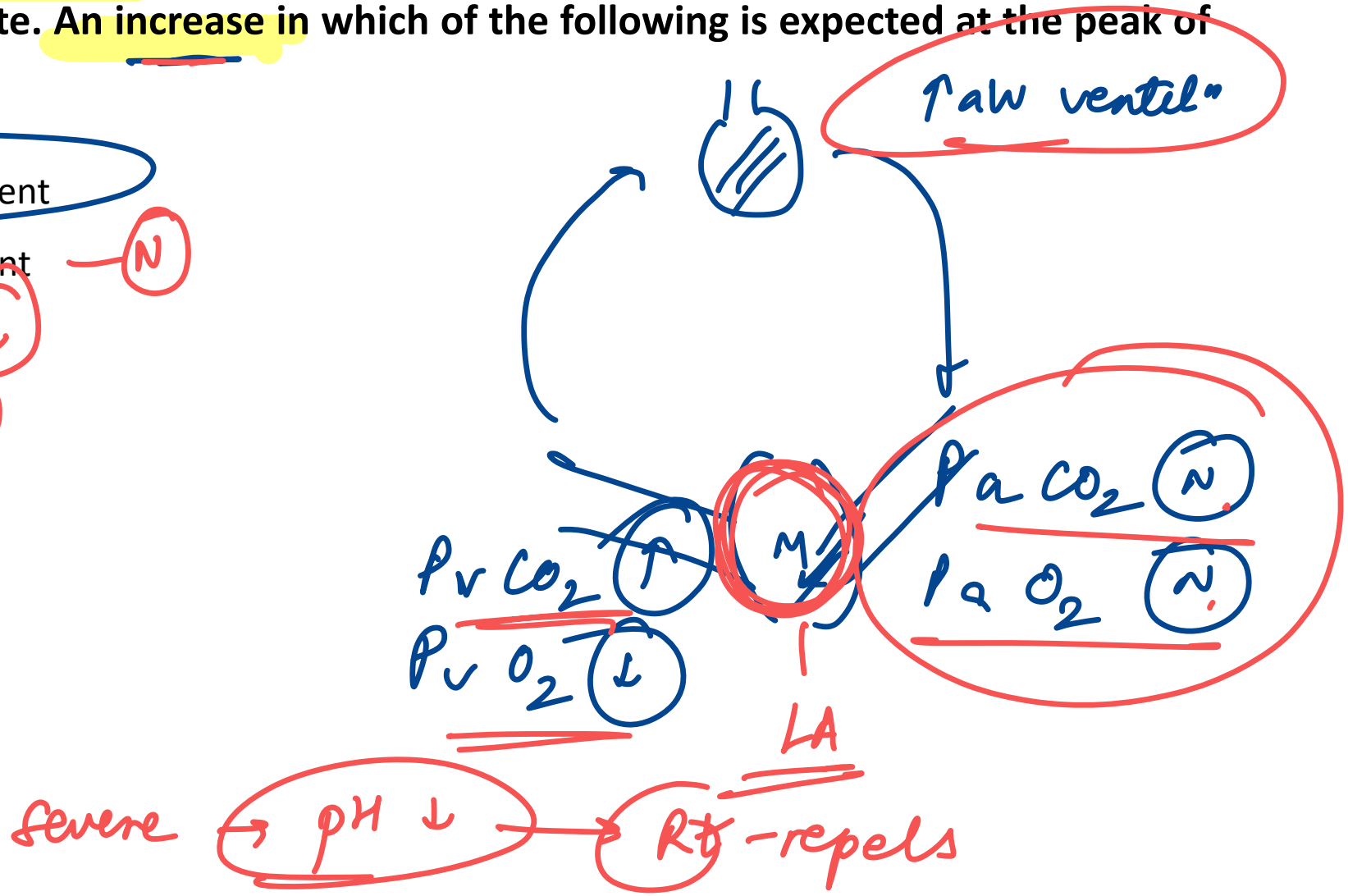
20. 23-year-old man undergoes exercise physiology testing. He jogs on a treadmill to achieve a moderate-intensity physical activity level based on a target heart rate of 50%-70% of his estimated maximum heart rate. An increase in which of the following is expected at the peak of his exertion?

A. Venous blood mean CO2 content

B. Arterial blood mean O2 content

C. Hemoglobin affinity for O2

D. pH of the arterial blood



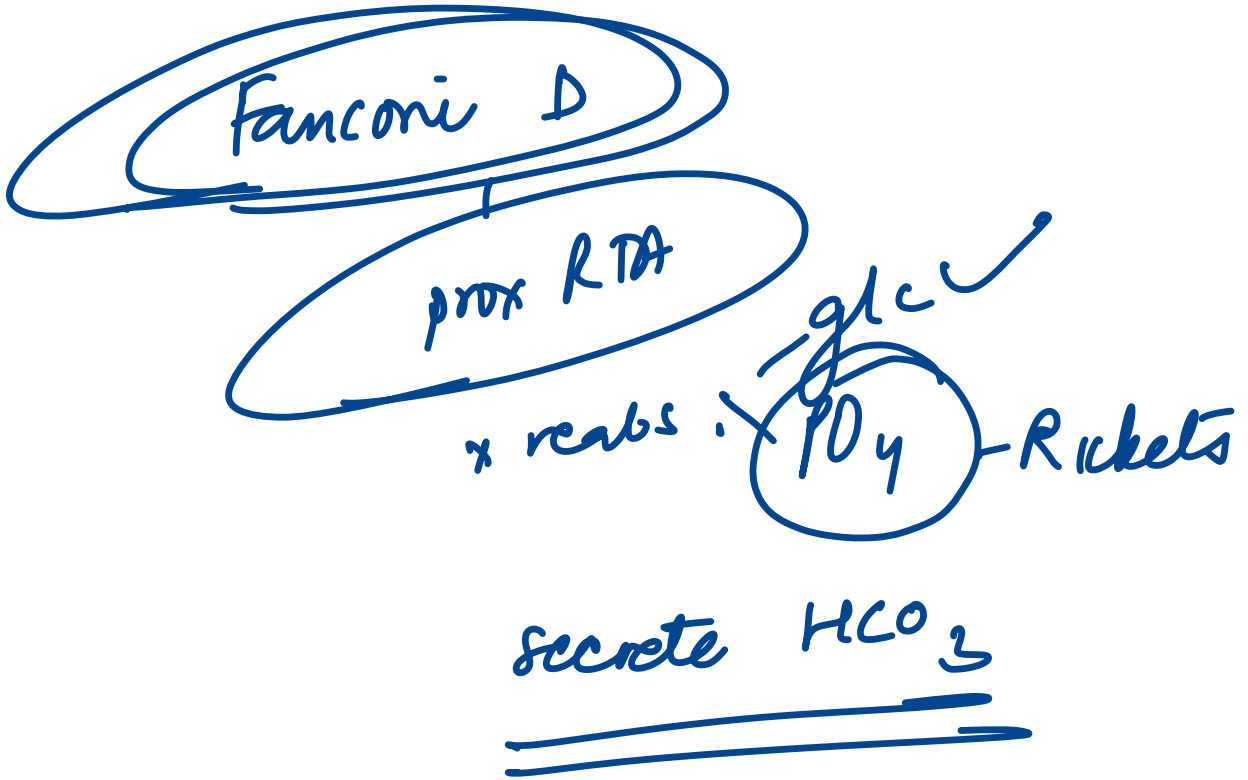
21. A 2-year-old boy is brought to the OPD due to poor weight gain and frequent urination. His weight percentile has decreased from 60th percentile to 10th percentile, consistent with failure to thrive. Physical examination reveals frontal bossing. He is found to have glucosuria on urinalysis, although his serum glucose is within normal limits. Additional serum laboratory studies reveal hypophosphatemia, hypokalemia, and a normal anion gap metabolic acidosis. Which of the following structure/function combinations is most likely defective in this patient?

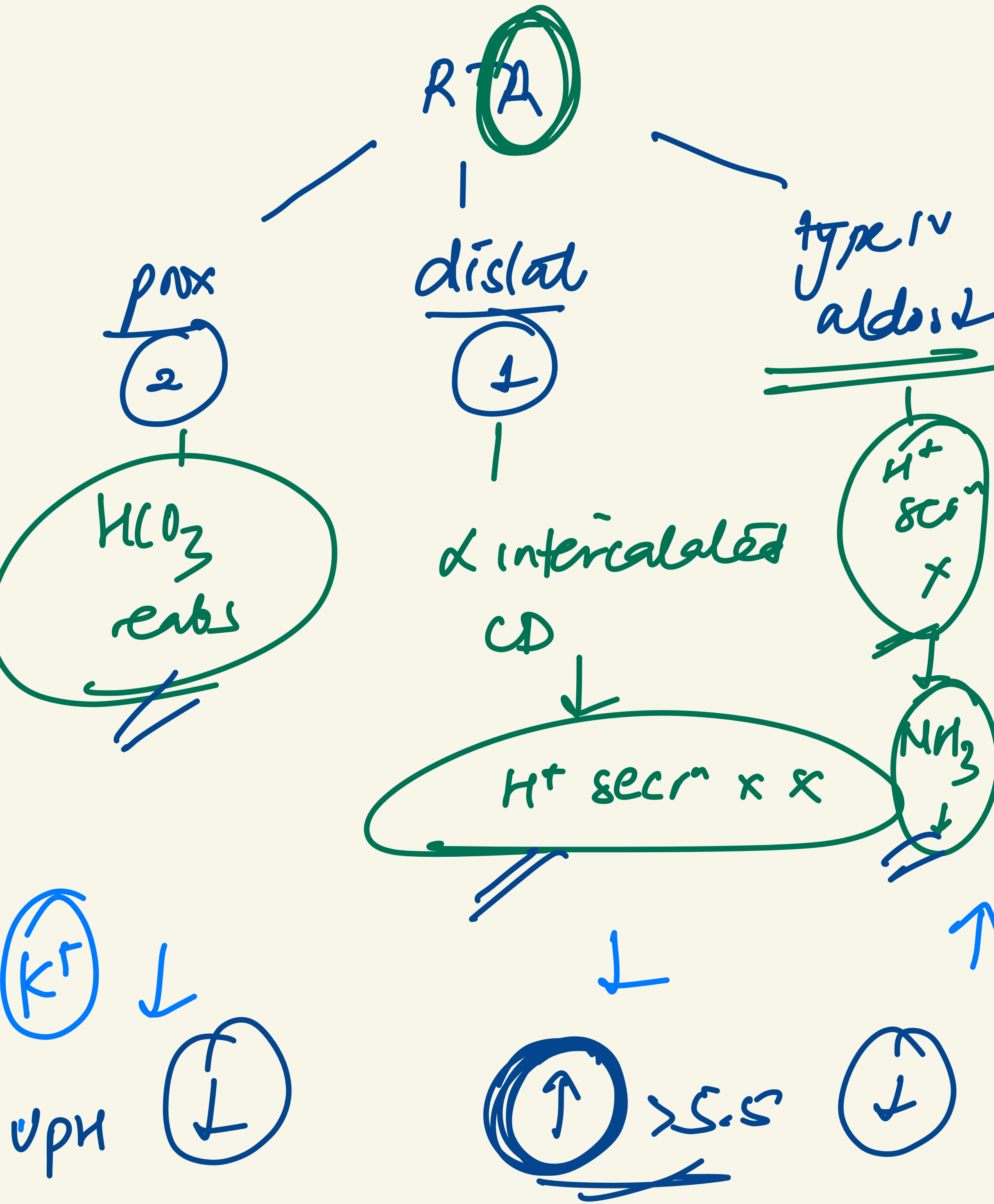
A. DCT, secretion of hydrogen ions

B. PCT, reabsorption of bicarbonate

C. Collecting duct, secretion of hydrogen ions

D. PCT, generation of ammonia




RTA
prox
2
HCO3 reabs
distal
1
α intercalated CD
H+ secrn × ×
type IV aldos↓
H+ secrn ×
NH3 ↓
K+ ↓ ↓ ↑
UpH ↓ ↑ >5.5 ↓

22. A 20-year-old woman comes to the emergency department due to bloody stools. For the past month, she has also had decreased energy. Skin examination shows pallor and scattered bruises in various stages of healing throughout the trunk. The abdomen is soft without organomegaly. Complete blood count results are as follows:

Hemoglobin: 7.2 g/dL
Mean corpuscular volume 90 um^3
Platelets: 10,000/mm^2
Leukocytes: 1050/mm^3
Neutrophils 5%
Lymphocytes 95%

Which of the following is the most likely cause of this patients condition?

A. Autoimmune-induced loss of self-renewing hematopoietic stem cells
B. Bone marrow replacement by constitutively active tyrosine kinase-stimulated cells
C. Splenic hyperactivity with cell trapping by the reticuloendothelial system
D. Ineffective hematopoiesis secondary to micronutrient deficiency

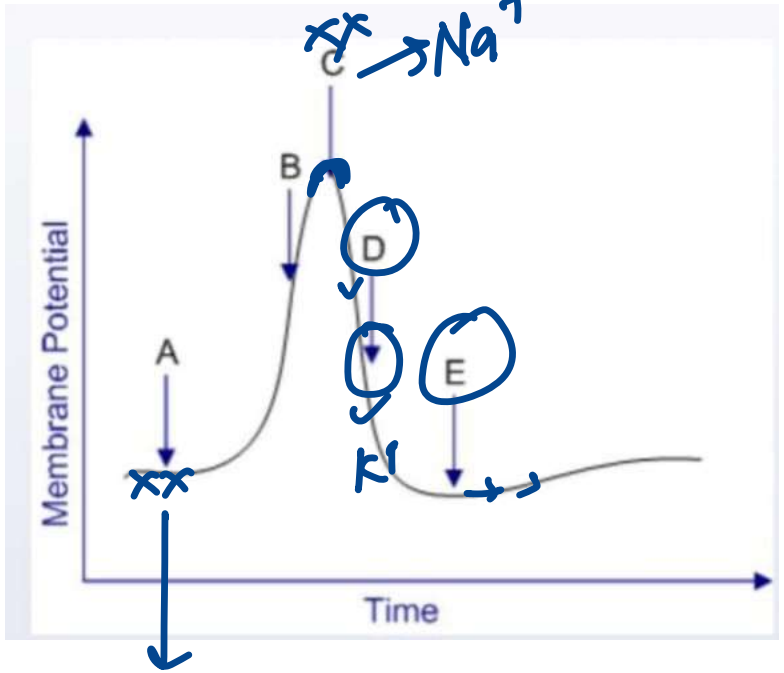
23. Neurophysiologists are studying recordings of the membrane potential from a giant squid axon. A portion of their recordings is shown on the slide below. The membrane is most permeable to potassium ions at which of the following points?

A. A

B. C

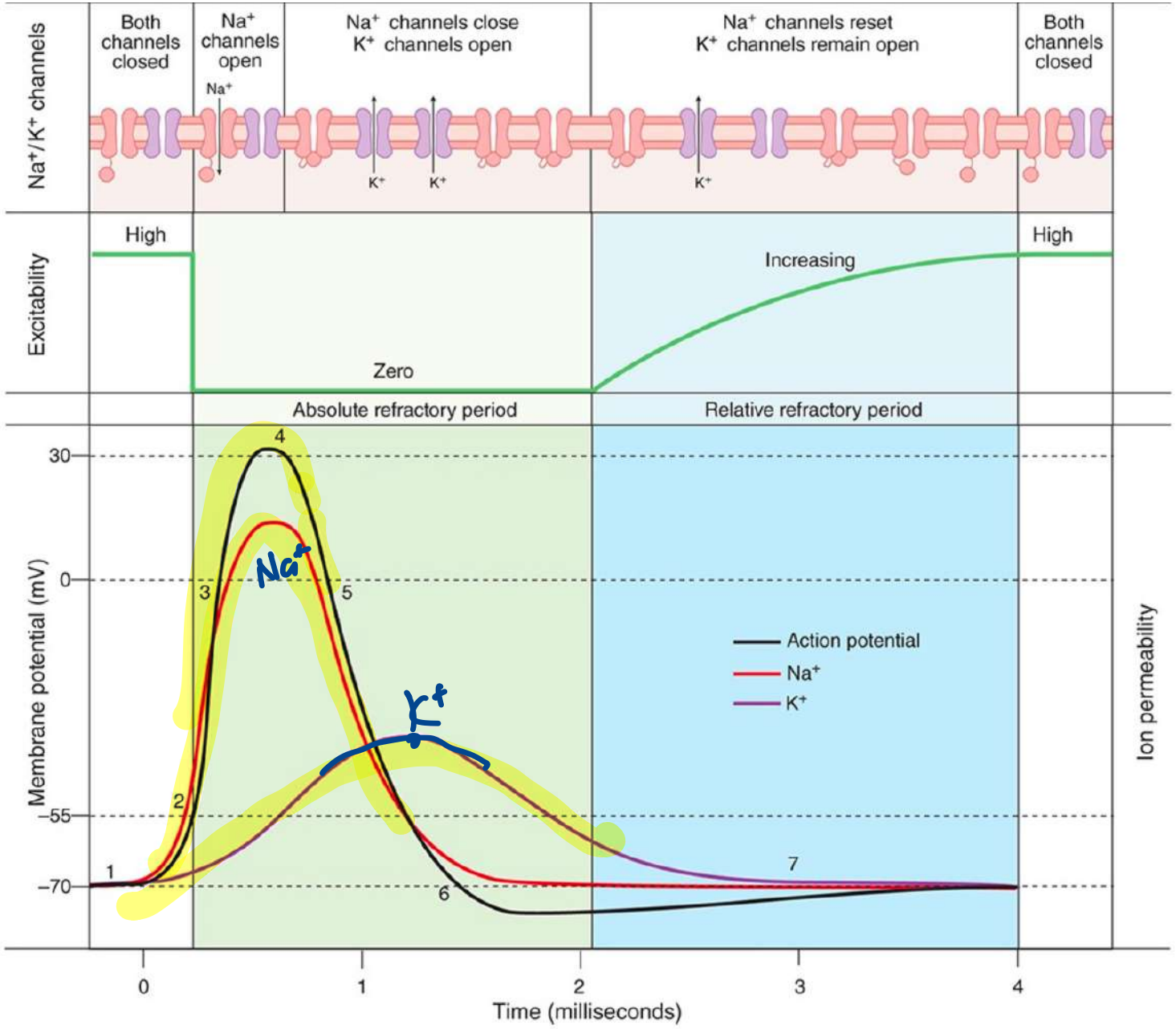
C. D

D. E



Leaky Channels

K^+


Na+/K+ channels
Both channels closed
Na+ channels open
Na+ channels close K+ channels open
Na+ channels reset K+ channels remain open
Both channels closed
Na+
K+
K+
K+
Excitability
High
Zero
Increasing
High
Absolute refractory period
Relative refractory period
Membrane potential (mV)
30
0
–55
–70
1
2
3
4
5
6
7
Na+
K+
Action potential
Na+
K+
Ion permeability
0
1
2
3
4
Time (milliseconds)

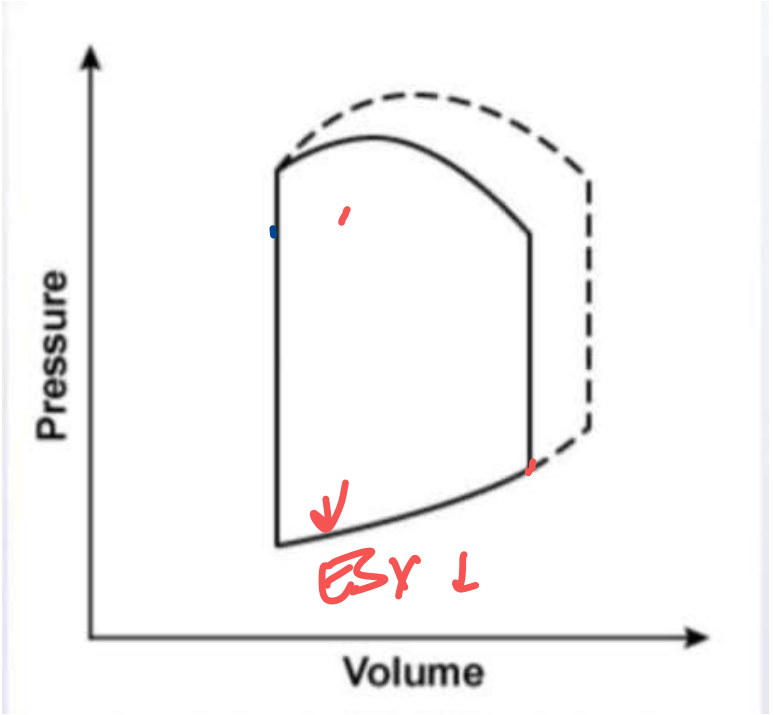
24. A 55-year-old man undergoes an elective surgery under general anesthesia. Two hours into the surgery, his left ventricular pressure-volume loop has changed from the solid line to the dashed line, as shown in the image below. Which of the following is most likely responsible for this patient's hemodynamic change?

A. Abdominal aorta clamping

B. Blood volume loss

C. Dobutamine administration

D. Normal saline infusion



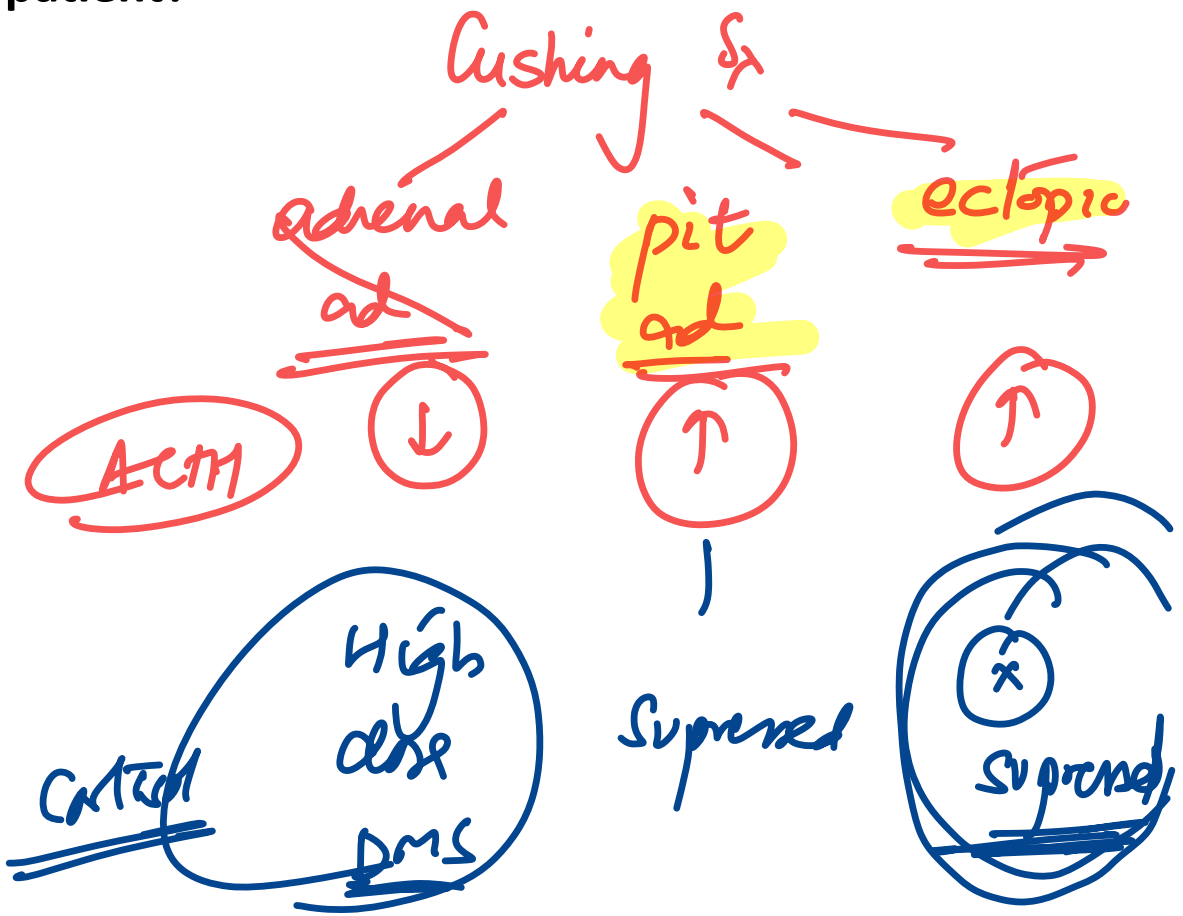
25. 60-year-old woman comes to the OPD due to difficulty climbing stairs and dyspnea on exertion over the last 6 weeks. Blood pressure is 160/90 mm Hg and pulse is 78/min. Skin examination shows scattered ecchymoses. Laboratory results show mild hyperglycemia and elevated 24-hour urinary free cortisol. Serum cortisol level is at the upper limit of normal and is not suppressed following administration of low-dose dexamethasone. Serum ACTH level is elevated. Chest x-ray reveals a right lower lobe lung mass. Which of the following changes are most likely to occur after administration of high-dose dexamethasone in this patient?

A. Low cortisol ← pit adenoma

B. High cortisol ✗✗

C. No change in cortisol

D. High ACTH ✗✗



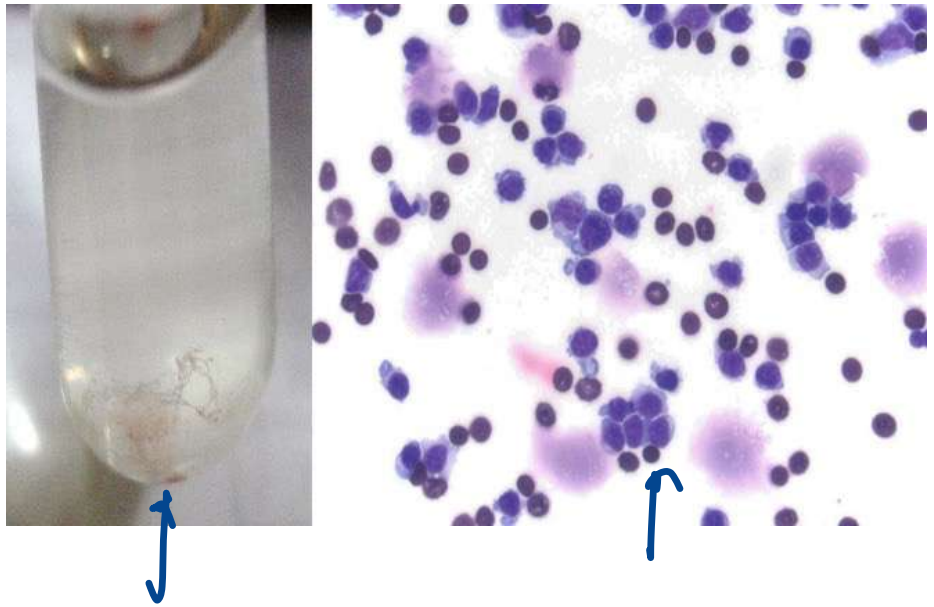
26. The cerebrospinal fluid (CSF) specimen of a patient is shown below along with the microscopy. The report shows mononuclear cytosis, elevated proteins, and low sugars. Which of the following is the likely etiology?

A. Tuberculous meningitis

B. Aseptic meningitis

C. Bacterial meningitis

D. Chemical meningitis



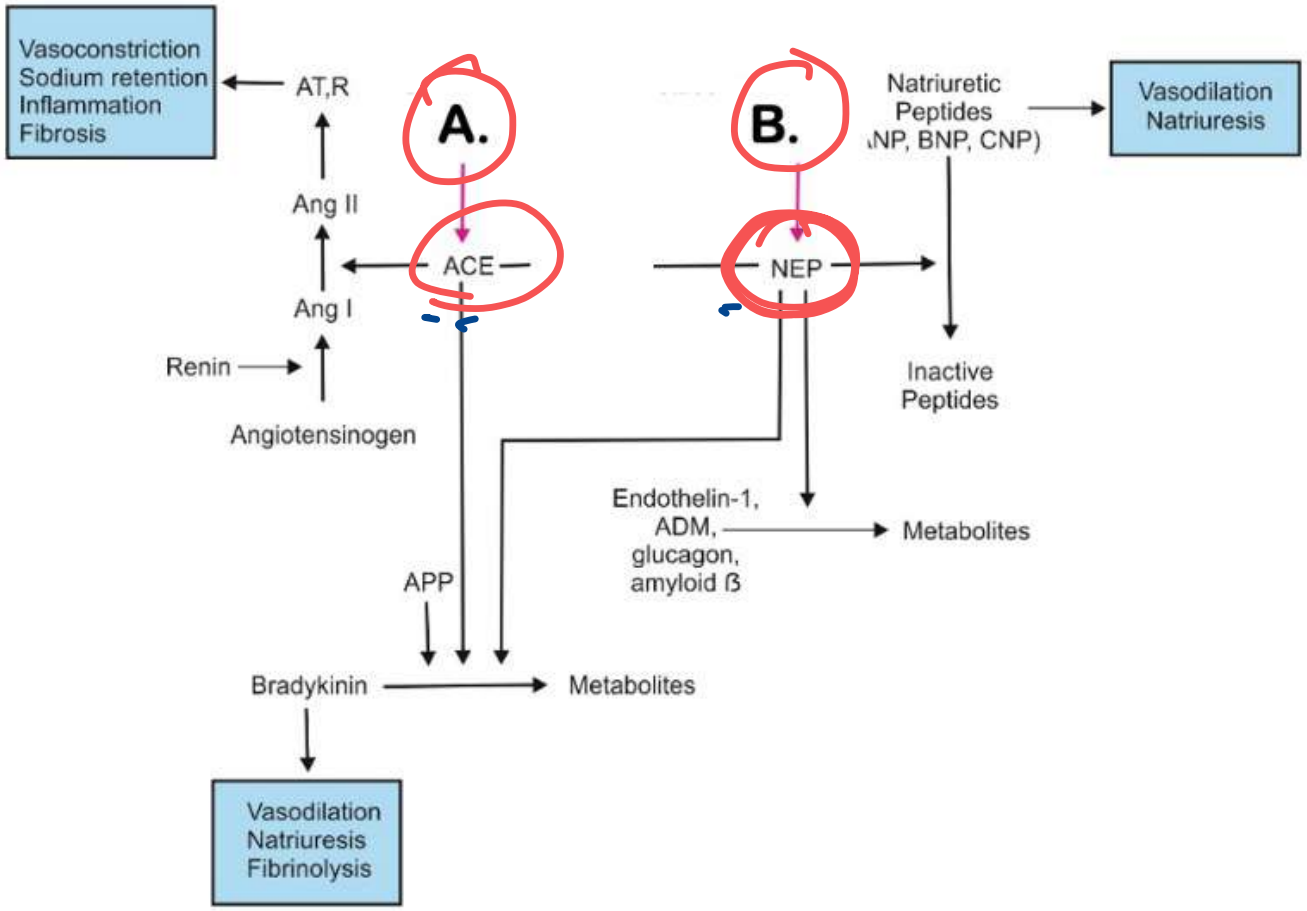
27. Name the drug that acts on both the marked points A and B:

A. Sacubitril

B. Omapatrilat

C. Losartan

D. Nesiritide



28. A patient with retro-positive status was started on 2nd line highly active antiretroviral therapy (HAART). Which of the following can be used to monitor treatment efficacy?

A. CD4+ T cell count

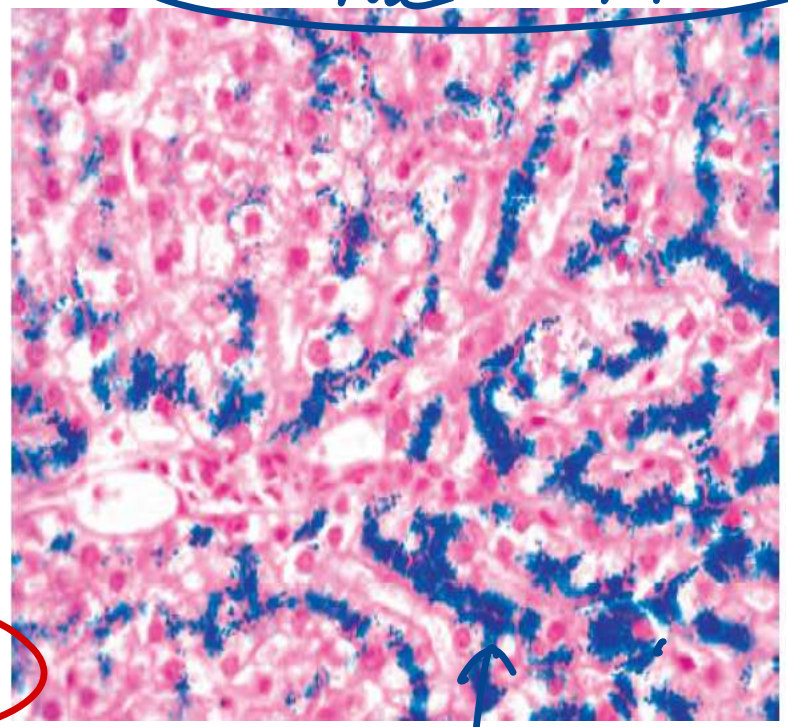
B. Viral load

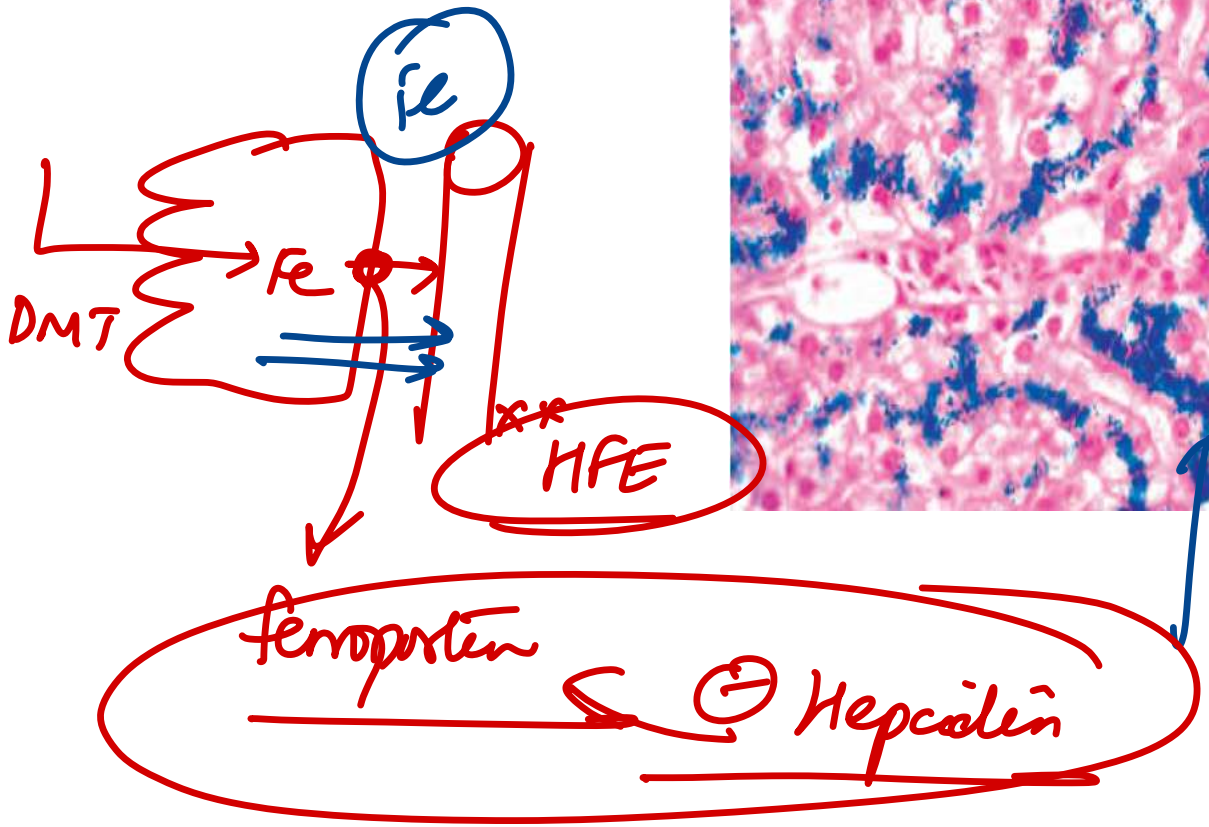
C. p24 antigen

D. Viral serotype

29. A liver biopsy is shown in the image. The genetic defect responsible for his condition most likely affects which of the following processes?

A. Blood iron transport
B. Hemoglobin synthesis
C. Hepatic iron excretion
D. Intestinal iron absorption





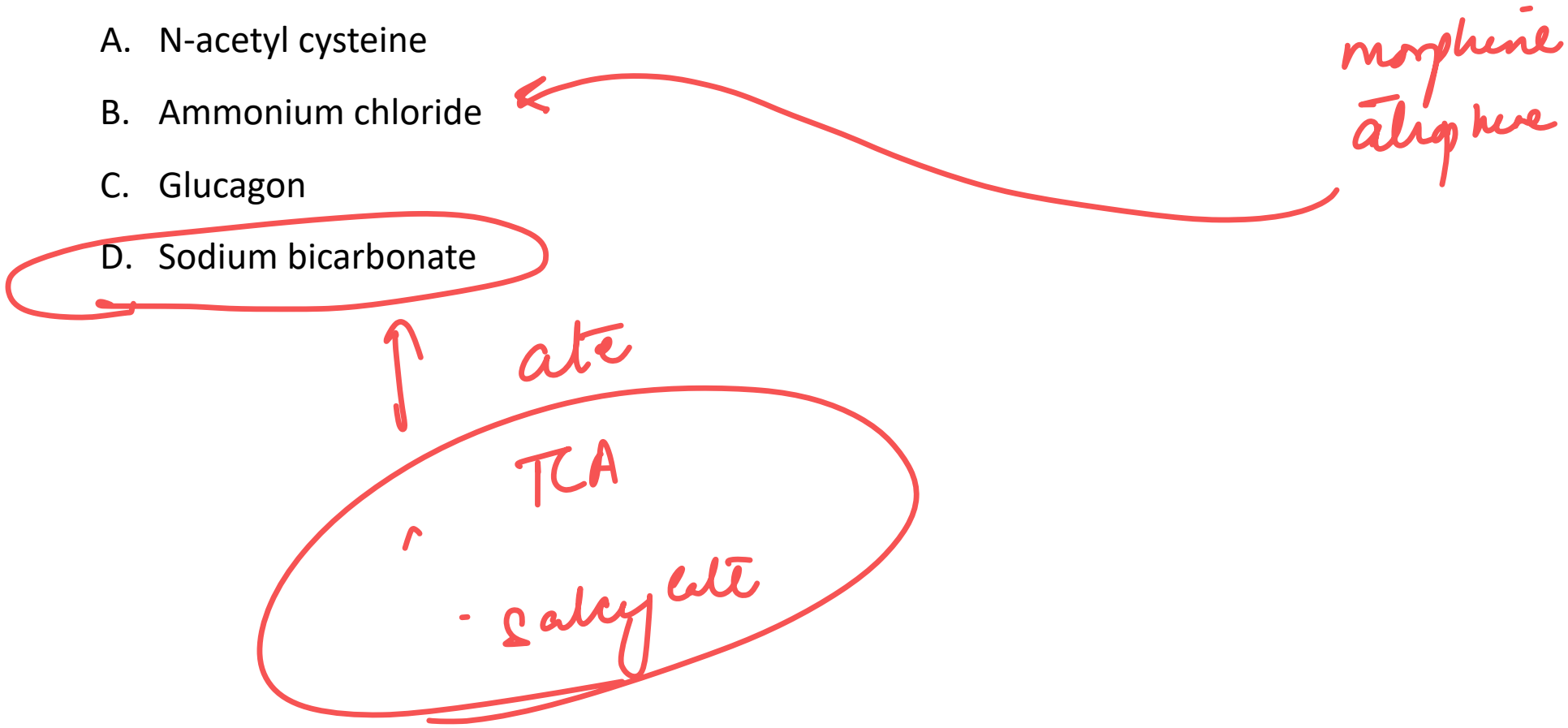
30. A young female is brought to the emergency department. Attendants inform that she has consumed 100 tablets of aspirin. What should be the next step in management?

A. N-acetyl cysteine

B. Ammonium chloride

C. Glucagon

D. Sodium bicarbonate



31. The true statement among the following is:

A. The dose of telmisartan should be reduced in renal failure but not in hepatic failure.

B. The dose of irbesartan should be reduced in case of mild-moderate hepatic failure and renal failure.

C. The dose of candesartan should be reduced in mild-moderate liver failure but not in renal failure.

D. Losartan acts as thromboxane A2 antagonist and inhibits platelet aggregation.

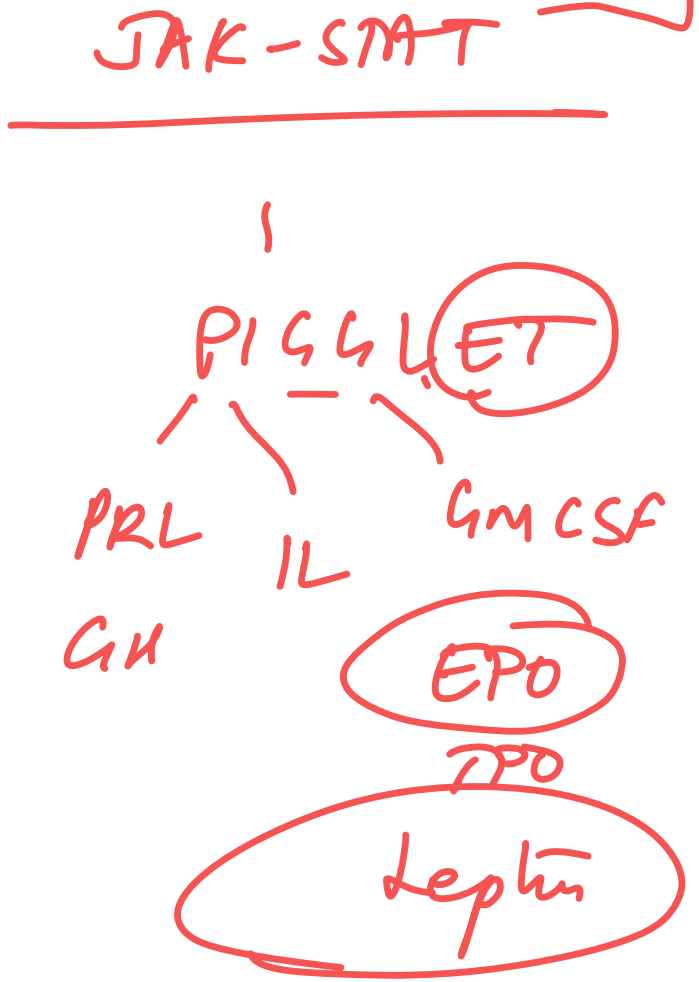
32. 66-year-old man with hypertension and stage IV chronic kidney disease comes to the OPD for follow-up. Laboratory results show normocytic, normochromic anemia with a low reticulocyte count. Serum iron studies are within normal limits. Treatment with a recombinant glycoprotein hormone is begun and repeat laboratory testing several weeks later shows an improvement in hemoglobin level. The effects of the hormone prescribed for this patient are most likely mediated by which of the following pathways?

A. Adenylate cyclase/cyclic AMP

B. Arachidonic acid/phospholipase A2

C. Janus kinase 2/signal transducers and activators of transcription

D. Nuclear receptors



33. A 5-year-old boy has developed persistent food-seeking behavior over the past few months. His mother initially thought that the boy was undergoing a growth spurt, but despite how much she fed him he never seemed satisfied. The patient has also started complaining of a headache and nausea in the morning. His physical examination is significant for BMI of 32 kg/m2. This patient's food-seeking behavior could be explained by a lesion causing impairment of which hypothalamic nucleus?

A. Anterior

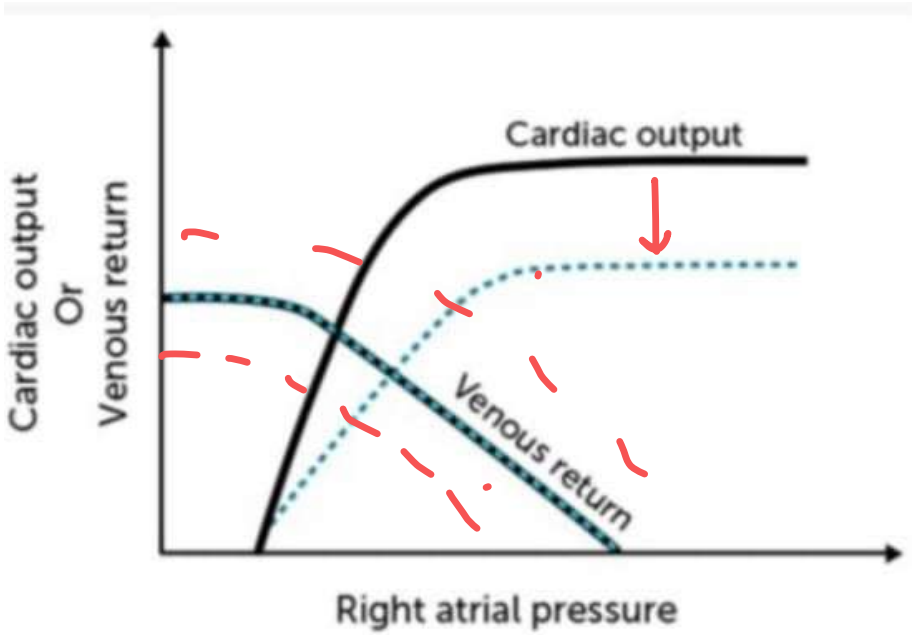
B. Lateral

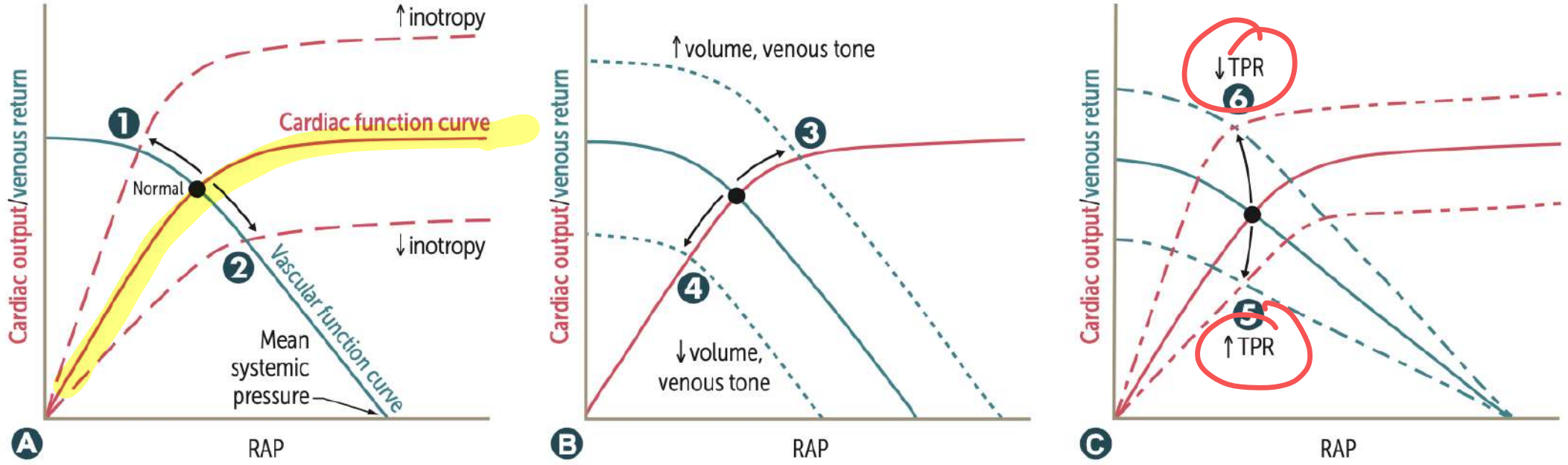
C. Supraoptic

D. Ventromedial

34. The cardiac output and venous return curves of a healthy person are shown below with solid lines. Which of the following is the most likely cause of the change depicted by the dashed lines?

A. Excessive hydration – preload ↑
B. Acute hemorrhage – preload ↓
C. Chronic anemia ××
D. Myocardial infarction





Intersection of curves = operating point of heart (ie, venous return and CO are equal, as circulatory system is a closed system).

GRAPH	EFFECT	EXAMPLES
A Inotropy	Changes in contractility → altered SV → altered CO/VR and RA pressure (RAP)	1 Catecholamines, dobutamine, milrinone, digoxin, exercise ⊕ 2 HF with reduced EF, narcotic overdose, sympathetic inhibition ⊖
B Venous return	Changes in circulating volume → altered RAP → altered SV → change in CO	3 Fluid infusion, sympathetic activity, arteriovenous shunt ⊕ 4 Acute hemorrhage, spinal anesthesia ⊖
C Total peripheral resistance	Changes in TPR → altered CO Change in RAP unpredictable	5 Vasopressors ⊕ 6 Exercise, arteriovenous shunt ⊖

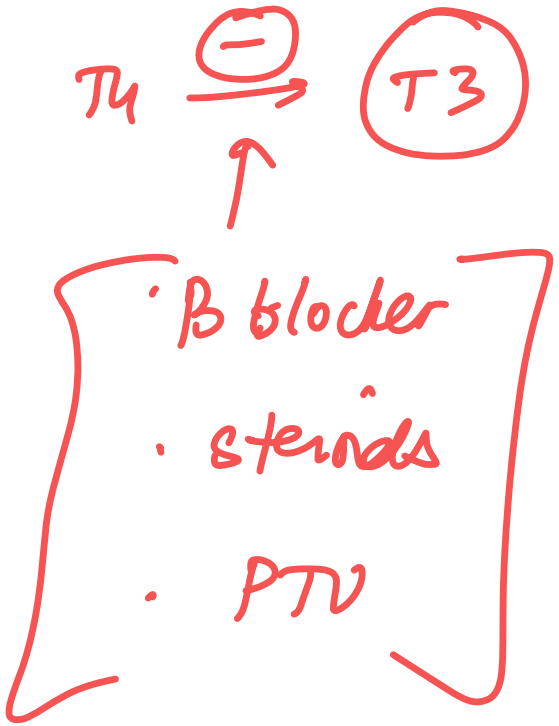
35. Propranolol is used in Graves disease. In addition to its beta-adrenergic receptor-blocking activity, this drug is likely to decrease which of the following?

A. Binding of triiodothyronine (T3) to its receptors

B. New thyroid hormone synthesis

C. Peripheral conversion of T4 to T3

D. Release of T4 by the thyroid gland



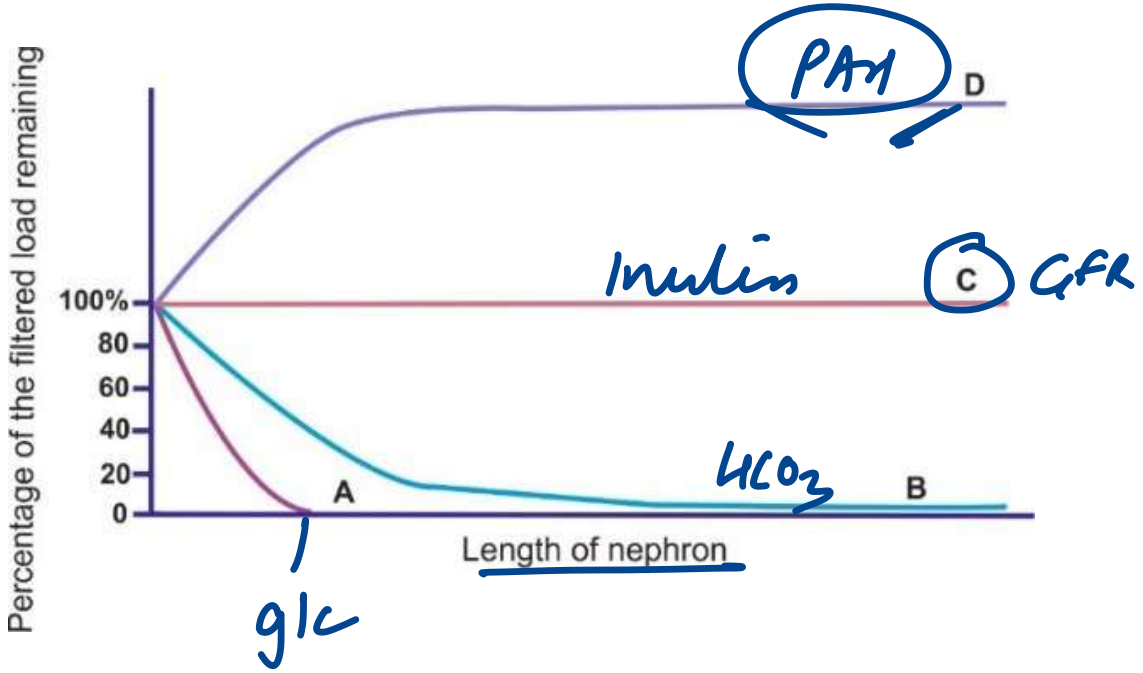
36. Identify the correctly matched pair of substances with their renal clearance from the graph given below?

A. A - Glucose, B - PAH, C - Bicarbonate and D - Inulin

B. A - Glucose, B - Bicarbonate, C - Inulin and D - PAH

C. A - PAH, B - Inulin, C - Glucose and D - Bicarbonate

D. A - Inulin, B - Glucose, C - Bicarbonate and D – PAH



37. 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	

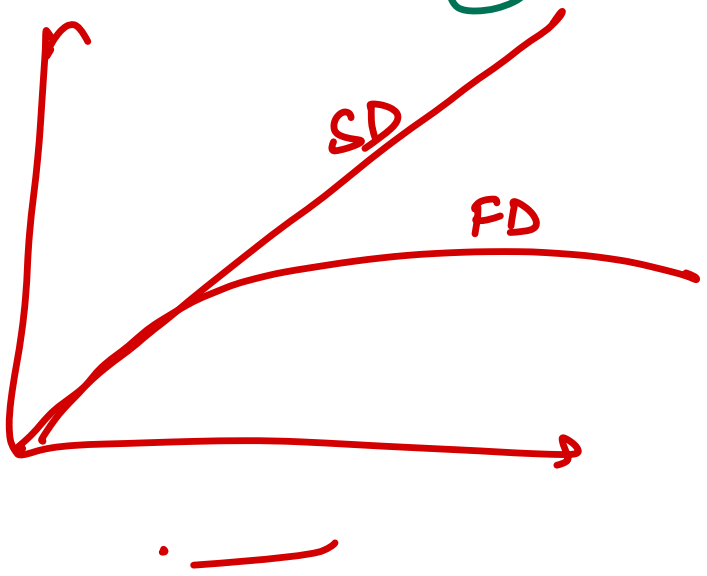
Options:

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



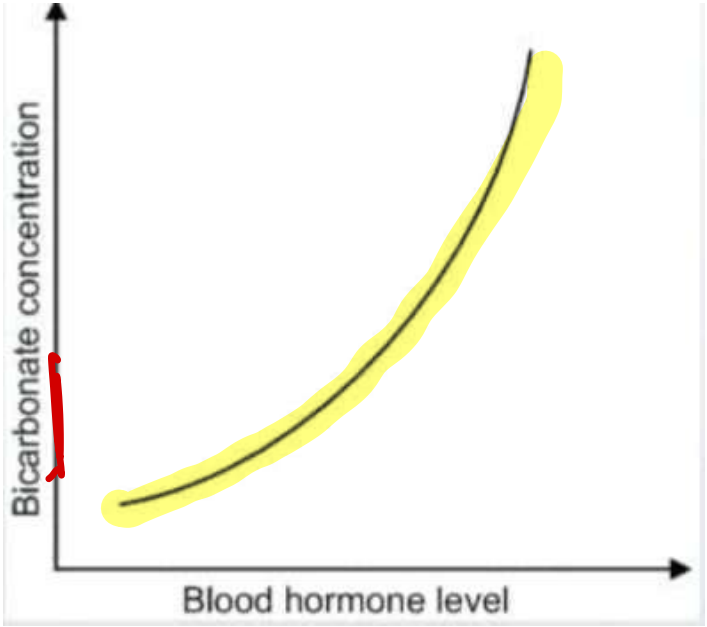
38. 50-year-old man with a remote history of alcohol dependence is evaluated in the clinic for chronic diarrhea and weight loss. The patient has had bloating with daily loose stools for the past 2 years. His stool is described as greasy and malodorous. Pancreatic insufficiency is suspected. The patient undergoes a test in which bicarbonate concentration is measured from duodenal aspirates as hormone A is infused intravenously. The data is plotted in the graph below. Hormone A is produced by?

A. Duodenal S cells

B. Gastric G cells

C. Pancreatic beta cells

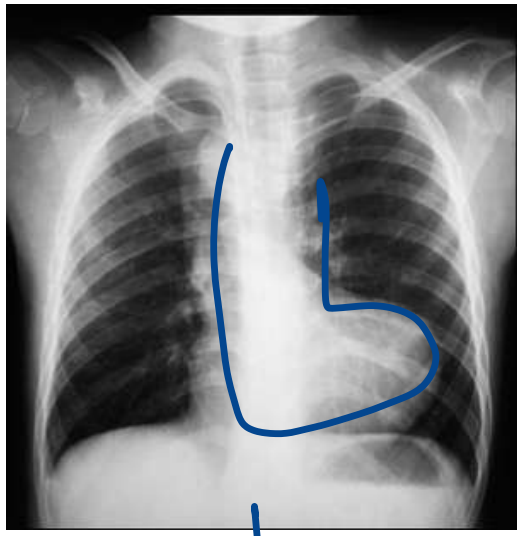
D. Hepatocytes



HORMONE	Cells	Function	
Gastrin	G cells	↑ HT secn	PPI ↑ Atrophic gastritis ↑ Zollinger Ellison Syndrome ↑↑ Strongest stimulus: peptides
Secretin	S cells	↑ HCO_3 – panc	–
CCK	I cells	↑ panc enzyme / GB ↑ contr	–
Somatostatin	D cells	↓↓ HCO_3^- / H^+	Octreotide – Portal hyts – variceal VIPoma · acromegaly · carcinoid Sx
GIP	K cell	↓ HT / ↑ insulin ↓ glucagon ↑ satiety	Oral vs IV: oral x hypoglycem
Motilin	Mo cells	MMC – hunger	Agonist: macrolides
Ghrelin	Stomach	↑ apetite	Prader-Wili syndrome: ↑ Post gastric bypass surgery: ↓

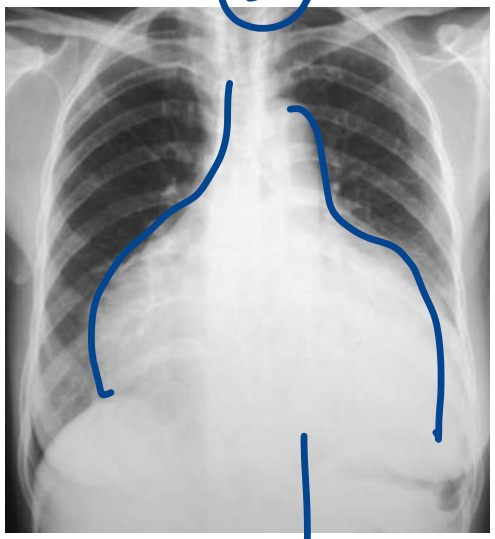
VIP → VIPoma – WDHA – QQ

39. 28-year-old man comes to the emergency department with a 3-day history of increasing chest tightness and intermittent sharp chest pains. The patient has no prior chronic medical conditions but had an upper respiratory ilness a week ago that resolved without treatment. ECG reveals sinus tachycardia and low voltage QRS complexes that vary in the amplitude from beat to beat. Which of the following is the most likely chest x-ray finding in this patient?



TDF

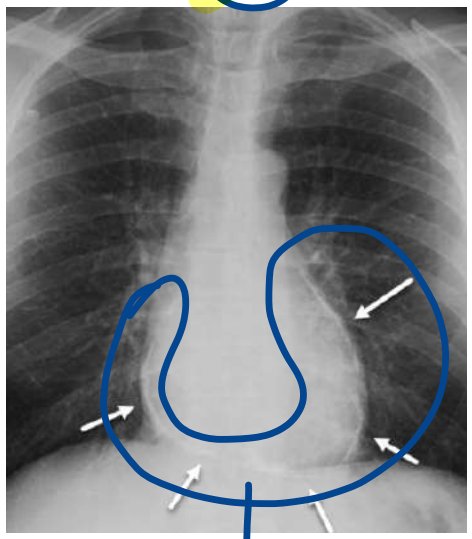
b



CT

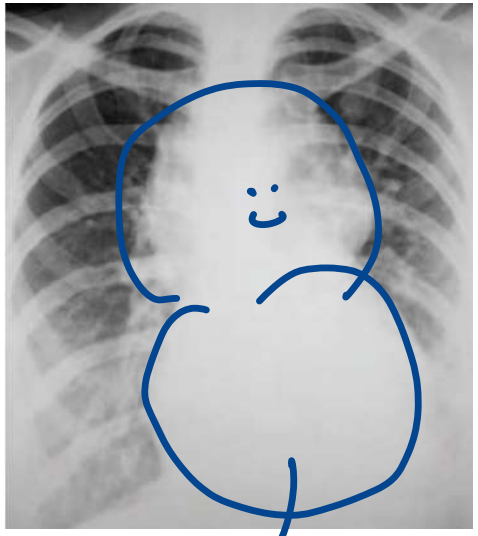
water bottle

c



CP

egg in cup



DAPVC

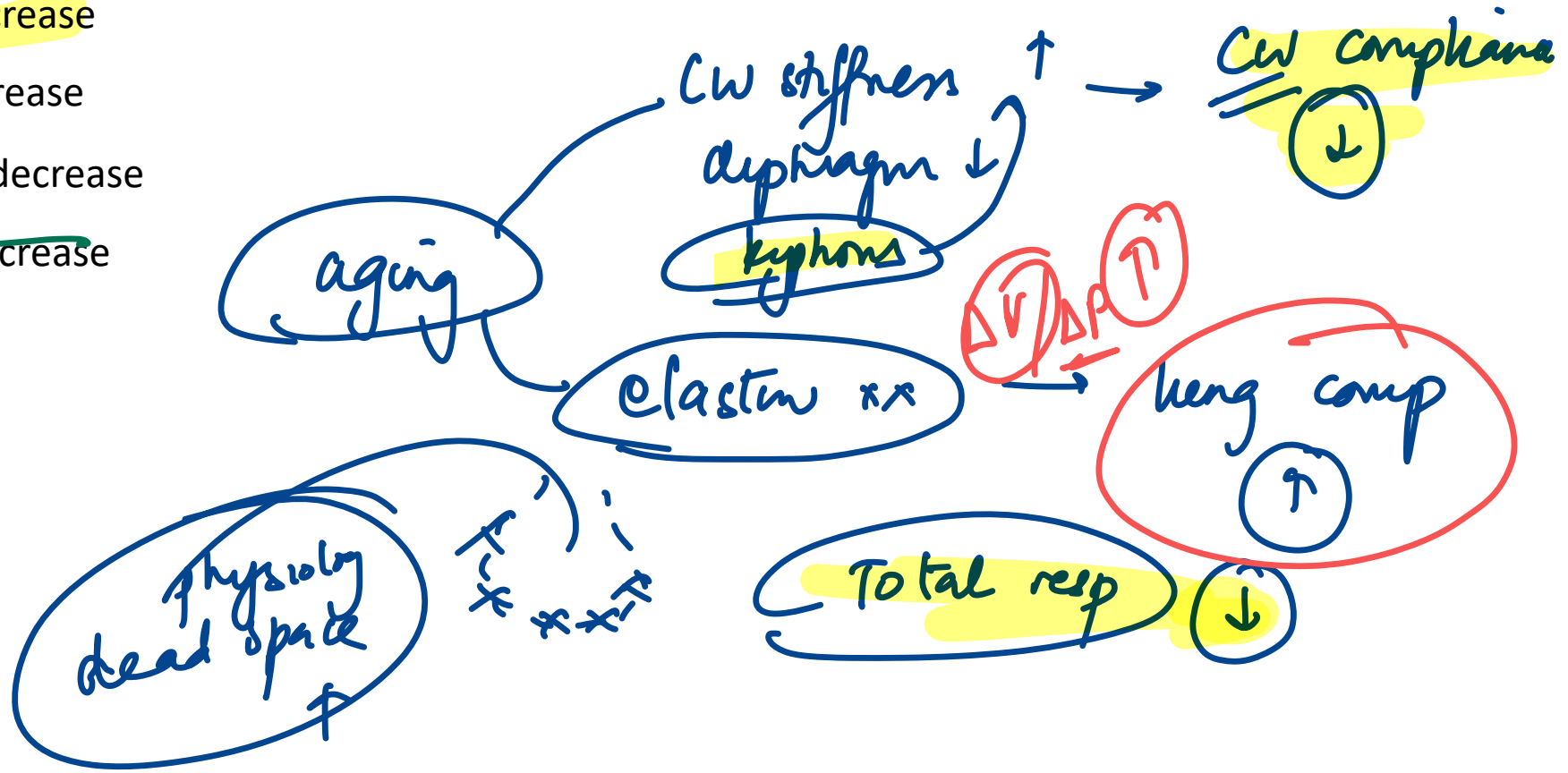
40. A 70-year-old woman has been enrolled in a longitudinal research study on aging for the last 30 years. Medical history is significant for osteoporosis; she has developed moderate kyphosis due to gradual loss of vertebral body height. She is otherwise active and healthy with no additional medical issues. She has never smoked. Compared to her physiology testing done years ago, which of the following changes is most consistent with normal aging in 1) lung compliance, 2) total respiratory system compliance and 3) physiologic dead space respectively?

A. Increase, decrease, increase

B. Increase, increase, increase

C. Increase, unchanged, decrease

D. Decrease, decrease, increase



41. A7-year-old boy is brought to the emergency department by his parents for arthralgias. He had a cough and runny nose last week but otherwise has been in good health. Physical examination shows raised, red-purple papules, some of which have coalesced, over the patient's buttocks and thighs. Auscultation of the lungs and heart is normal. The abdomen is soft with normal bowel sounds. The knees are tender but do not appear warm or swollen. Urinalysis results are as follows:

Protein: 2+
Blood: moderate
Leukocyte esterase: trace
White blood cells: 1-2/hpf
Red blood cells (RBCs): many/hpf
Casts: RBC casts

Which of the following mechanisms is the most likely underlying cause of this patient's renal findings?

A. Autoantibodies against podocyte antigens

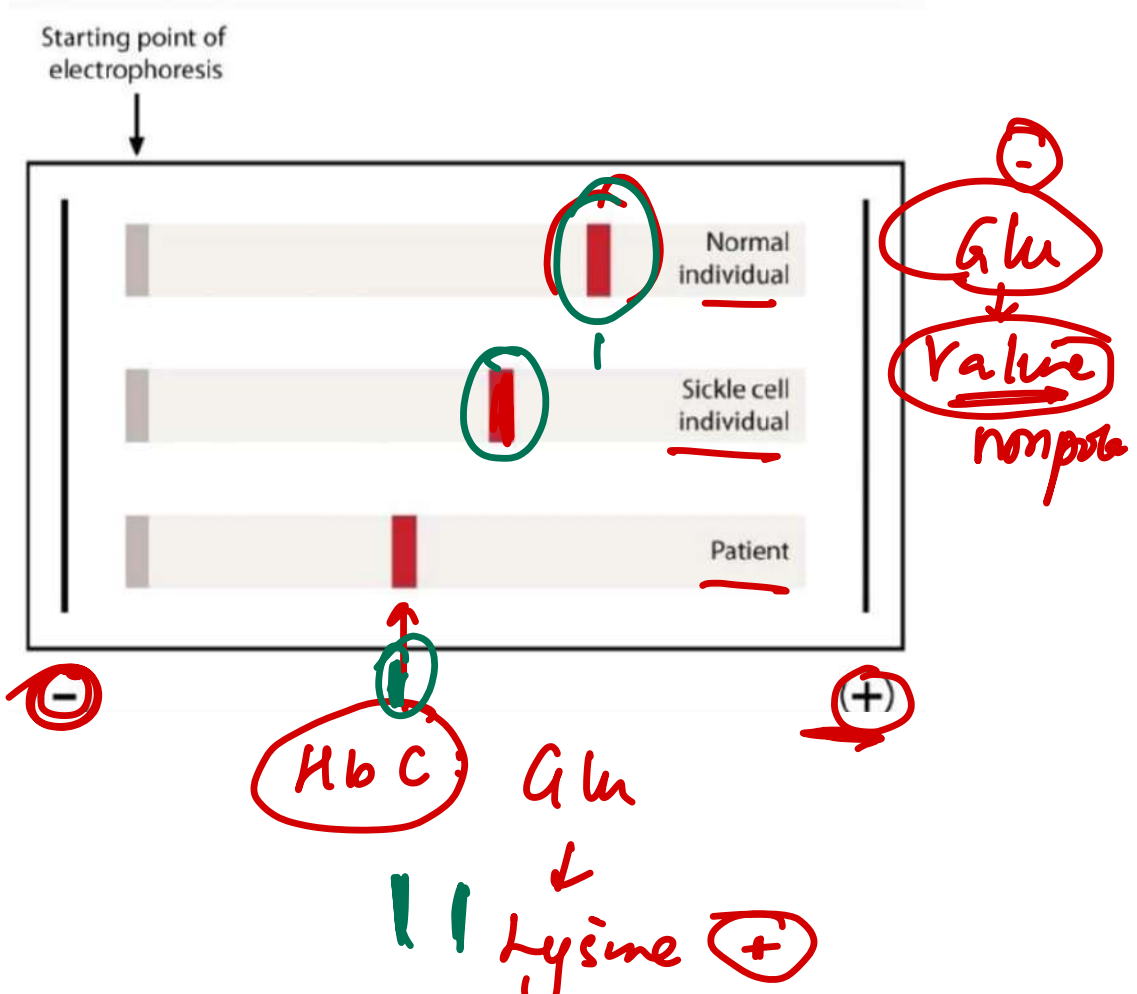
B. Autoantibodies to host cell basement membranes

C. Immune complex deposition in glomerular mesangium

D. Thrombosis of glomerular capillaries

42. 6-year-old boy is brought to the physician because of easy fatigability. Physical examination reveals splenomegaly, and his complete blood count shows mild anemia . Hemoglobin electrophoresis is performed at alkaline pH on a cellulose acetate strip. Findings for the patient are shown below compared to individuals with normal hemoglobin and known sickle cell disease. Which of the following is the most likely cause of this patient's condition?

A. Sickle cell trait
B. HbC disease
C. HbSC disease
D. HbC trait

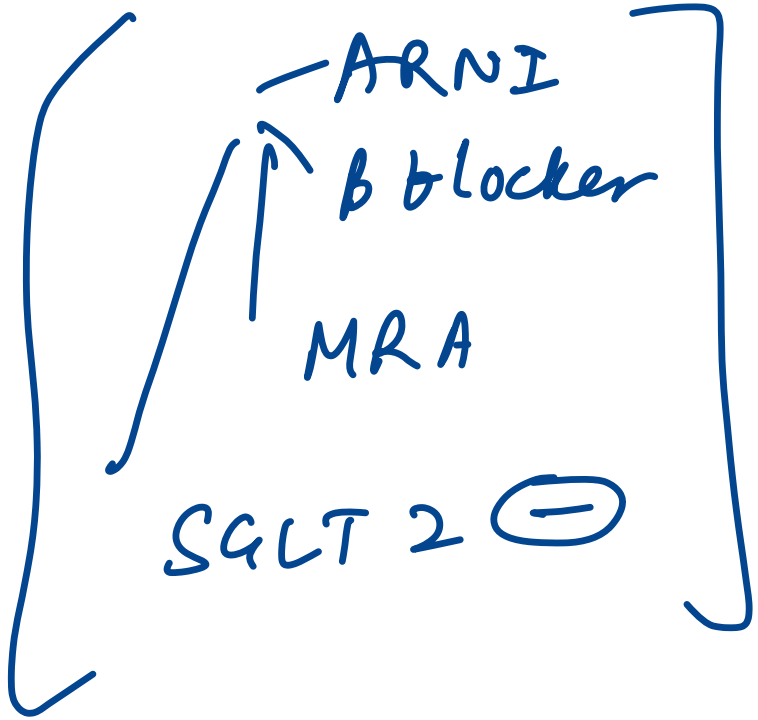


43. A 29-year-old woman comes to the OPD for treatment of anxiety that has worsened over the past year. She says, "My anxiety just comes out of the blue; one way or another, I'm anxious all the time. An anxiety disorder is diagnosed, and fluoxetine is prescribed. The patient's anxiety begins to improve over the next 4-6 weeks. The physician explains that the medication inhibits the reuptake of a neurotransmitter released by a specific set of neurons. These neurons are likely part of which of the following structures?

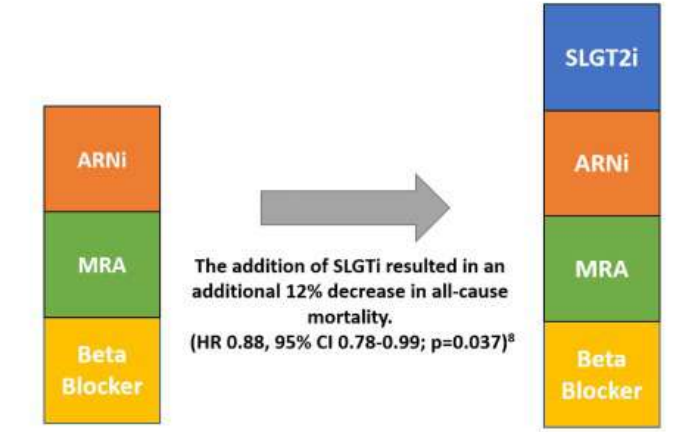
A. Caudate nucleus
B. Locus ceruleus
C. Nucleus basalis of Meynert
D. Raphe nuclei

44. A 68-year-old man comes to the OPD due to several weeks of progressive exertional dyspnea and lower extremity edema. Echocardiography shows biventricular dilation and a left ventricular ejection fraction of 35%. After initial stabilization, long-term use of which of the following medications will most likely improve survival in this patient?

A. Furosemide
B. Amlodipine
C. Carvedilol
D. Digoxin



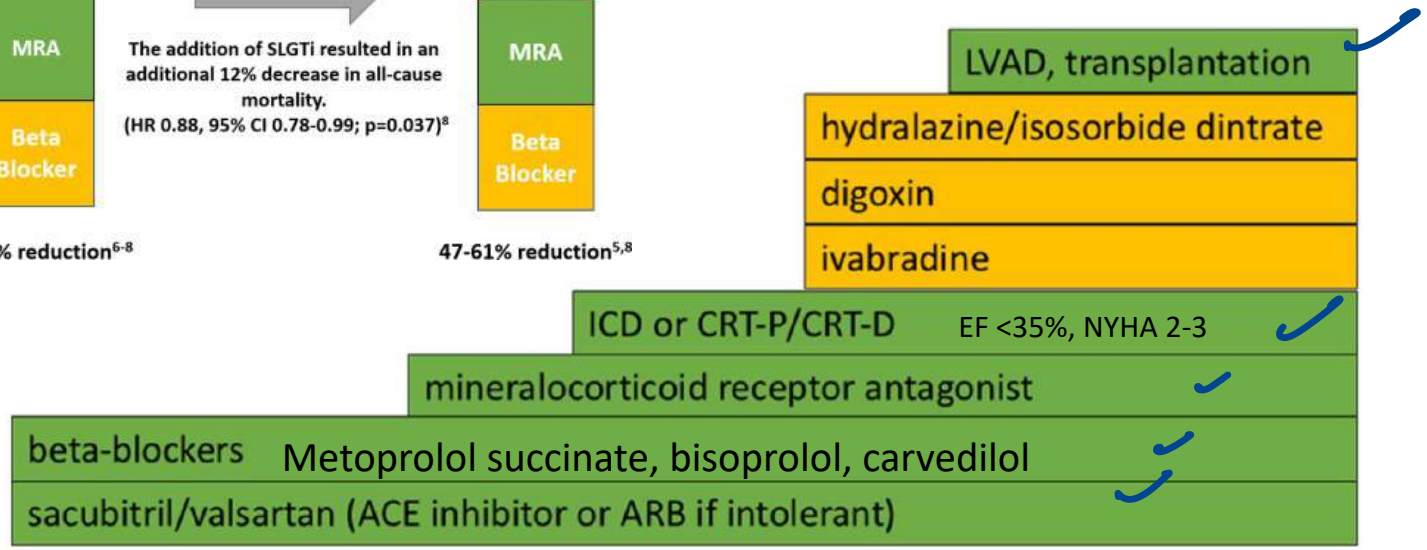
Combined Therapy Effect on All-Cause Mortality in Heart Failure with Reduced Ejection Fraction Across Meta-Analyses



56-63% reduction[6-8]

The addition of SLGTi resulted in an additional 12% decrease in all-cause mortality.
(HR 0.88, 95% CI 0.78-0.99; p=0.037)[8]

47-61% reduction[5,8]



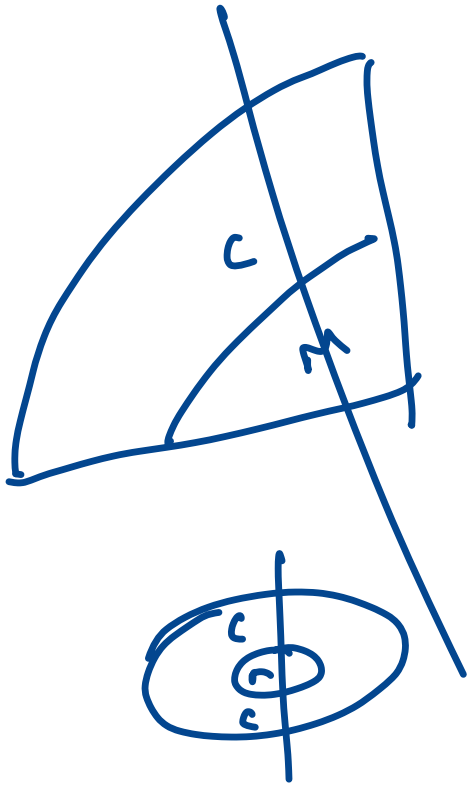
45. The cells marked in the image of adrenal biopsy are directly activated by?

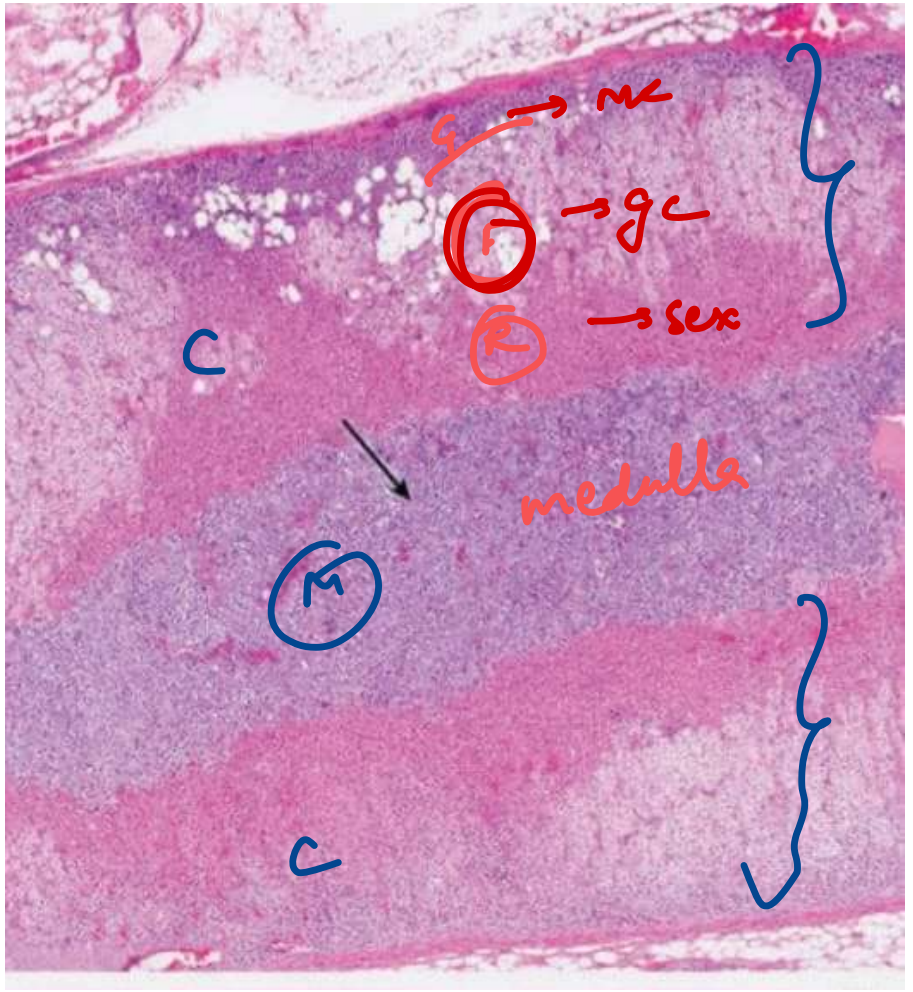
A. Acetylcholine

B. ACTH

C. Angiotensin II

D. Epinephrine





46. Identify the true statements:

1. **TxA2 has platelet aggregating and vasoconstricting effect**
2. **Lipoxin B4 inhibits inhibit neutrophil chemotaxis and adhesion to endothelium.**
3. **Il-1, Il-18, TNF are pyrogenic cytokines**
4. **C3 can be activated is both common as well as alternative pathways**
5. **T cells with a TCR composed of a γ and δ subunit are found associated with GI mucosa**

Options.

A. 1, 2, 3, 4

B. 1, 2, 4, 5

C. 2, 3, 4, 5

D. 2, 4

1L-2, IL-12, INF-G: TH1

IL-4, IL-5, IL-13: TH2

IL-1, IL-6, TNF-A: pyrogene

1L-10, TGF-B, Lipoxin: antiinflammatory

IL-8, C5a, LTB4, 5HETE, Kallikrein: Chemokines

C3b, IgG: opsonins

C3a, c5a - anaphylaxins

5 + 4 > 8

47. Identify the true statements:

1. **Rolapitant is the drug of choice for cisplatin induced intractable vomiting on the third day of treatment.**
2. **Filgrastim is the drug of choice for chemotherapy induced thrombocytopenia**
3. **Cephalosporins that do not require dose adjustment in renal failure because they are secreted in bile are ceftriaxone and cefoperazone.**
4. **Denosumab can decrease bone resorption as well as increase bone formation**

Options.

A. 1, 2, 3, 4

B. 1, 3, 4

C. 1, 3

D. 2, 4

CML-FISH

48. Identify the true statements:

A. Flow cytometry is the IOC for CLL T

B. MCL1, BCL-2, BCL-XL and PUMA are anti-apoptotic factors.

C. Long-term hemodialysis patients with renal failute have accumulation of Aβ2-microglobulin. T

D. B cells express IgM and IgD antibodies at the same time due to somatic hypermutation F

E. CD16, CD56 and CD94 are NK cell markers. T

alt RNA splicing

Option

A. 1, 2, 3, 4, 5

B. 1, 3, 5

C. 1, 2, 4, 5

D. 2, 3, 5

affinity maturation

Pro apoptotic genes (BH1-3)	Anti-apoptotic genes	Apoptosis initiators or 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 Steroids	NOXA Gene

L anti

NASH

49. 62-year-old man comes for the evaluation of jaundice. Medical history is significant for uncontrolled type 2 diabetes mellitus and morbid obesity. He does not use tobacco, alcohol, or illicit drugs. BMI is 47 kg/m2. Laboratory studies reveal elevated transaminases. A liver biopsy is obtained, and trichrome staining shows the following. Which of the following cells is directly responsible for the histologic finding indicated by the arrow?

A. Cholangiocytes ×

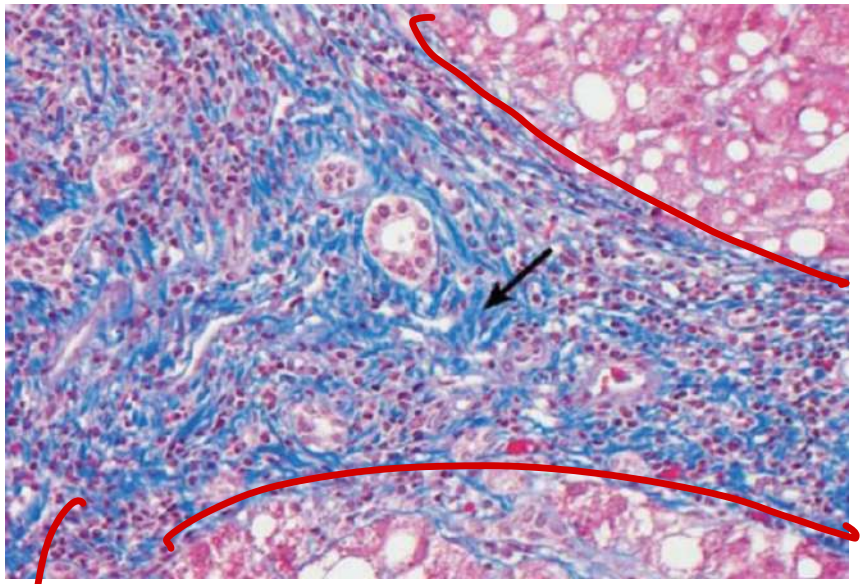
B. Hepatocytes ×

C. Kupffer cells – Macrophage

D. Stellate (Ito) cells

vit A

fibrosis



Collagen

50. A 17-year-old girl is brought to the emergency department due to hemoptysis and severe respiratory distress. The patient has been on several oral antibiotics for pneumonia over the past week and has required numerous similar treatments in the past. Pulmonary examination reveals diffusely reduced air flow, rales, and intercostal retractions. Despite aggressive management, the patient ultimately expires. An autopsy is performed and a gross lung specimen is shown in the image below: Which of the following is the most likely etiology of this patient's hemoptysis?

A. Bleeding from hypertrophied bronchial arteries

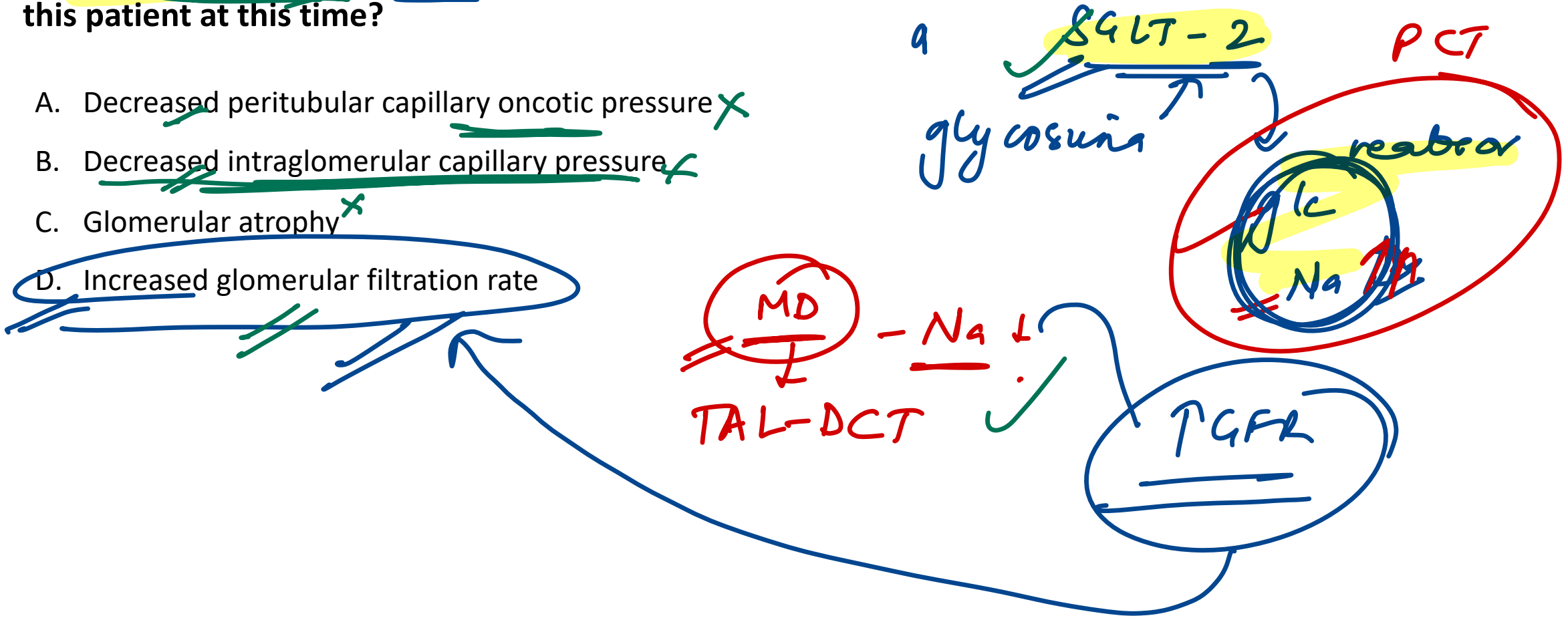
B. Blood loss from hypertrophied pulmonary arteries

C. Diffuse alveolar hemorrhage due to vasculitis

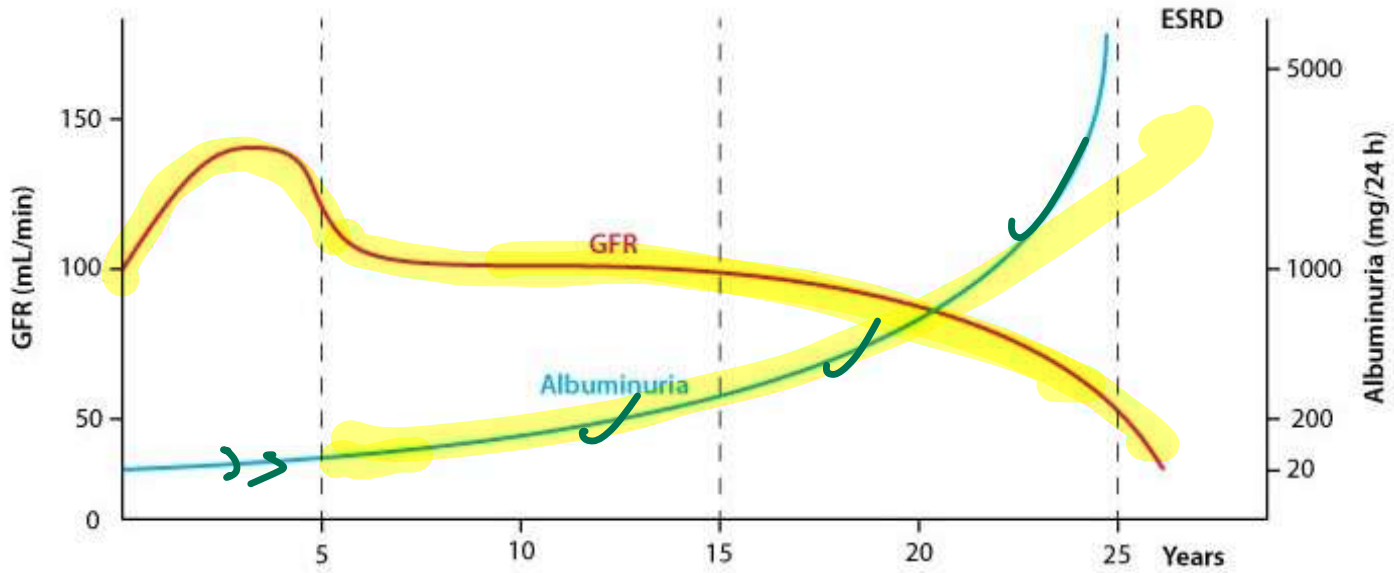
D. Formation of a fistula between the tracheobronchial tree and aorta

51. 45-year-old man comes to the office for an annual medical visit. The patient has had prediabetes for the last 2 years. He feels well and takes no medications but has gained weight since his last visit a year ago. The patient has a strong family history of type 2 diabetes mellitus. Blood pressure is 124/78 mm Hg and BMI is 32 kg/m². Laboratory results show a fasting blood glucose of 157 mg/dL and serum creatinine of 0.7 mg/dL. Hemoglobin A1c is 7.4%. Urine assay shows no detectable albuminuria. Which of the following renal changes is most likely present in this patient at this time?

A. Decreased peritubular capillary oncotic pressure
B. Decreased intraglomerular capillary pressure
C. Glomerular atrophy
D. Increased glomerular filtration rate



Natural history of diabetic nephropathy



Hyperfiltration
- Glomerular hypertrophy
- ↑GFR

Incipient DN
- Mesangial expansion, glomerular basement membrane thickening, arteriolar hyalinosis
- Microalbuminuria
- Hypertension

Overt DN
- Mesangial nodules (Kimmelstiel-Wilson lesions), tubulointerstitial fibrosis
- Overt proteinuria
- Nephrotic syndrome
- ↓GFR

albumin
30-300 mg/d

52. Two antineoplastic drugs are shown to inhibit intracellular thymidylate formation. The chemotherapeutic effect of drug X can be overcome by N5-formyl-tetrahydrofolate supplementation, but that of drug Y is not affected. The drugs described in this scenario are most likely which of the following?

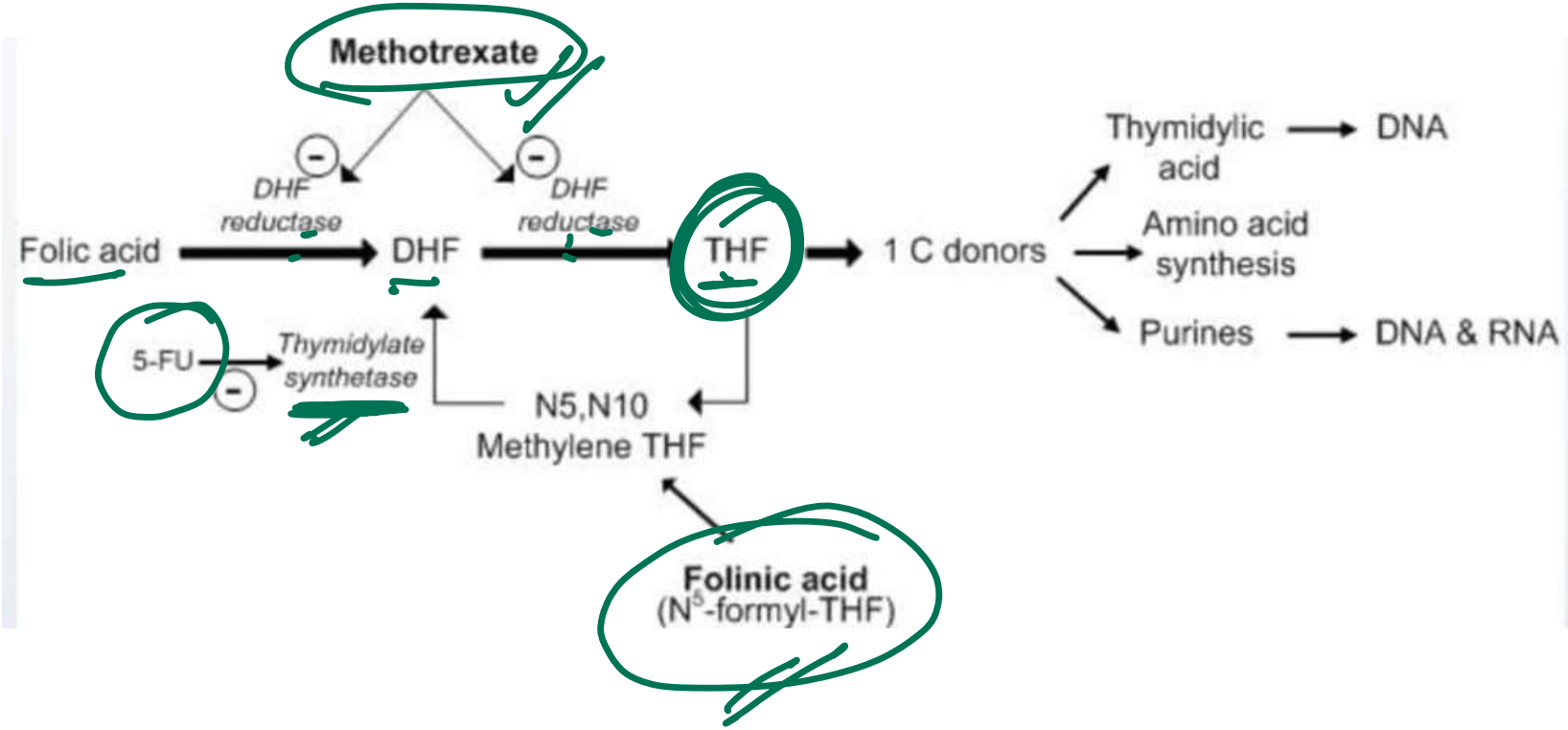
Leucovorin

A. X: Cytarabine Y:Gemcitabine

B. X: Fluorouracil Y: Leucovorin

C. X: Fludarabine Y: Methotrexate

D. X: Methotrexate Y: Fluorouracil


Methotrexate
DHF reductase
DHF reductase
Folic acid
DHF
THF
1 C donors
Thymidylic acid
DNA
Amino acid synthesis
Purines
DNA & RNA
5-FU
Thymidylate synthetase
N5,N10 Methylene THF
Folinic acid
(N5-formyl-THF)

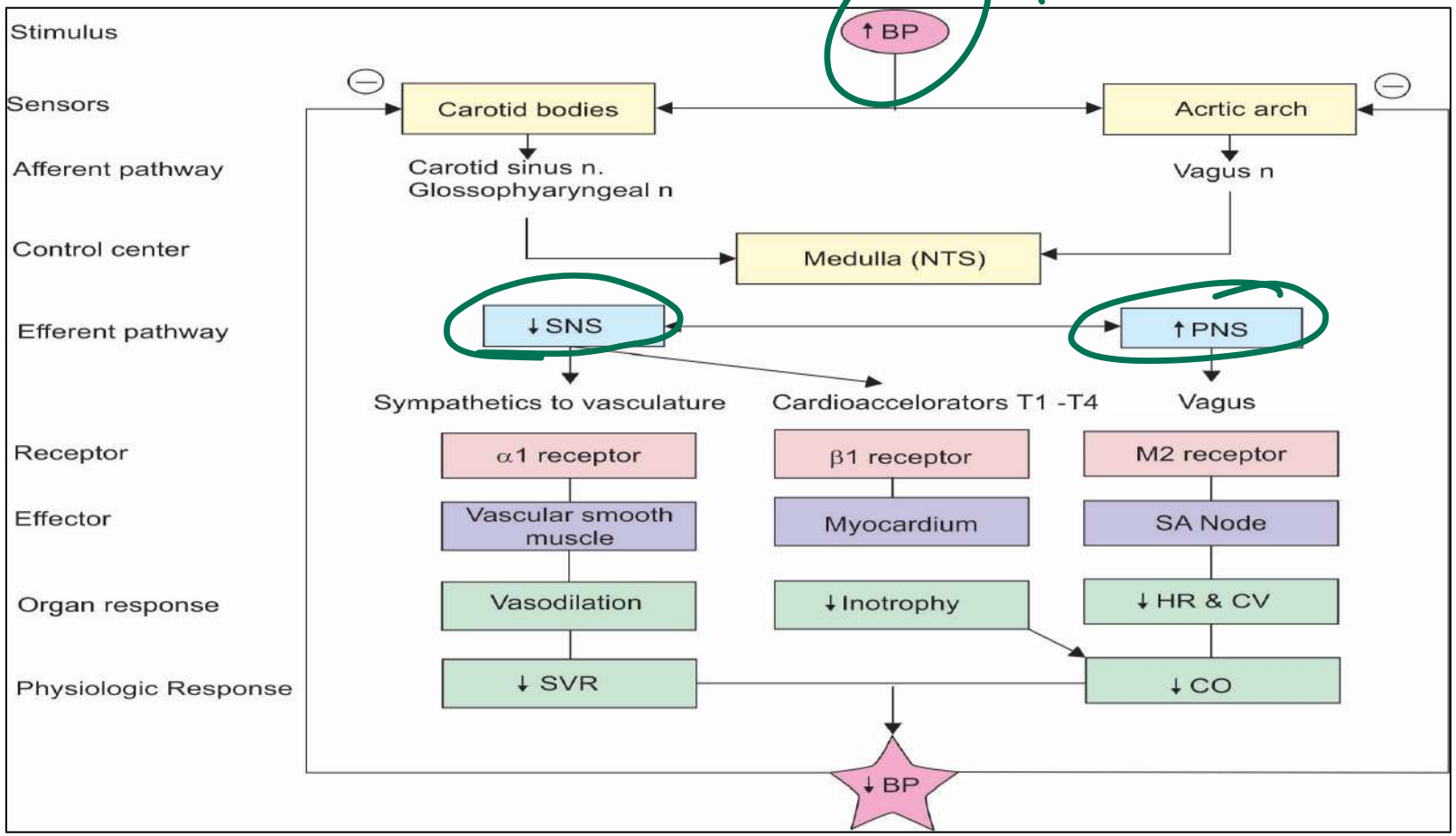
53. 20-year-old, previously healthy woman is brought to the emergency department after a motor vehicle collision. On arrival at the emergency department, blood pressure is 90/60 mm Hg and pulse is 120/min. On physical examination, the patient is alert but appearsanxious, pale, and diaphoretic. The lungs are clear bilaterally and cardiac auscultation reveals tachycardia.The abdomen is soft. Several actively bleeding lacerations are present on the lower extremities. Which of the following findings are most likely present in this patient in 1) Cardiac contractility, 2) baroreceptor firing and 3)ANP release respectively?

A. Decreases, increases, decreases

B. Decreases, increases, increases

C. Increases, increases, decreases

D. Increases, decreases, increases



↓ Baroreceptor

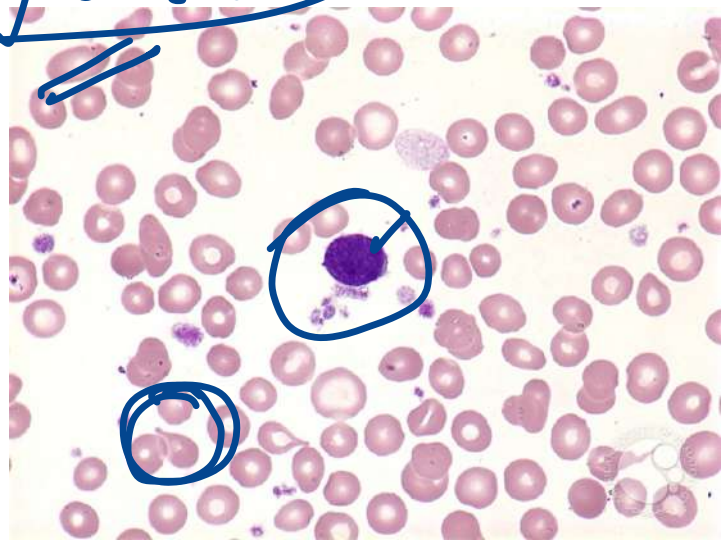
54. 68-year-old man comes to the OPD with a few months of severe fatigue and a 6.8-kg unintentional loss in weight. Abdominal examination shows mild hepatomegaly and a markedly enlarged spleen. Stool guaiac testing is negative. Laboratory results show pancytopenia, and peripheral blood smear is shown below. Bone marrow aspiration is attempted but yields no marrow, and a bone marrow biopsy is subsequently performed. Which of the following findings is most likely to be observed in this patient's bone marrow?

A. Diffusely fibrotic marrow with clusters of megakaryocytes

B. Increased staining for storage iron in marrow macrophages

C. Marrow replaced by dysplastic cells of all 3 lineages

D. Severely hypocellular marrow replaced by adipose cells



55. Identify the true statements:

1. **Aminophylline acts as an adenosine receptor antagonist leading to diuresis**
2. **Trazodone is an atypical antidepressant known to cause priapism**
3. **Trofinetide, an analog of glycine-proline-glutamate (GPE), is used to treat cerebral palsy**
4. **An orphan drug is a drug that is required for treatment or prevention of a rare disease**

Options.

A. 2, 4

B. 1, 2, 3, 4

C. 1, 2, 4

D. 3, 4

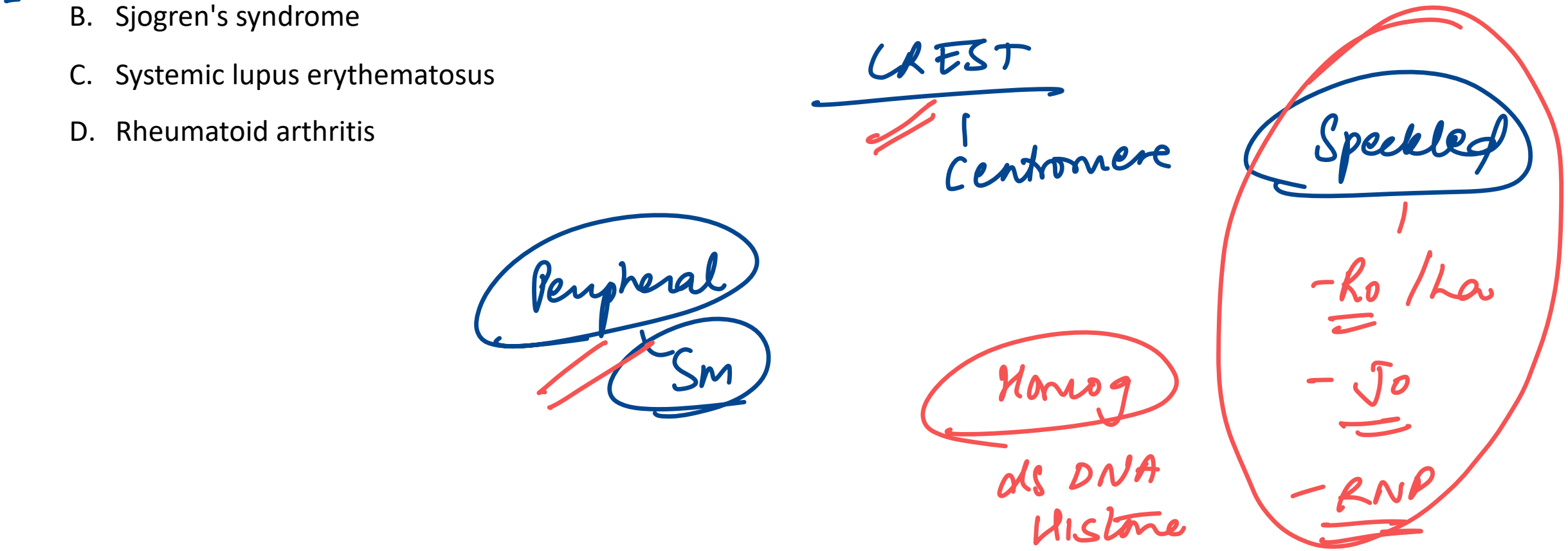
56. A woman presents with numbness of her fingertips. On examination, her face is tightened. The antinuclear antibody (ANA) is found to be positive, and immunofluorescence shows the nucleolar pattern. What is the likely diagnosis?

A. Systemic sclerosis

B. Sjogren's syndrome

C. Systemic lupus erythematosus

D. Rheumatoid arthritis



57. A 50-year-old man presents with a history of chest pain with each episode lasting for 20-30mins and partial response with sublingual nitrate. ECG shows left ventricular hypertrophy and flat T-wave. He is a known case of hypertension, diabetes mellitus, hypercholesterolemia currently on aspirin, atenolol, metformin, and lovastatin. What is the next best step in management?

A. IV glyceryl trinitrate infusion
B. Injection enoxaparin
C. Add clopidogrel
D. Increase the dose of beta blocker

The standard anticoagulant agent used in clinical practice is unfractionated heparin (UFH). The available data suggest that when UFH is added to a regimen of aspirin and a non-fibrin-specific thrombolytic agent such as streptokinase, additional mortality benefit occurs (about 5 lives saved per 1000 patients treated). The immediate administration of intravenous UFH, in addition to a regimen of aspirin and relatively fibrin-specific fibrinolytic agents (tPA, rPA, or TNK), helps to maintain patency of the infarct-related artery. This effect is achieved at the cost of a small increased risk of bleeding. The recommended dose of UFH is an initial bolus of 60 U/kg (maximum 4000 U) followed by an initial infusion of 12 U/kg per h (maximum 1000 U/h). The activated partial thromboplastin time during maintenance therapy should be 1.5–2 times the control value.

Alternatives to UFH for anticoagulation of patients with STEMI are the low-molecular-weight heparin (LMWH) preparations, a synthetic version of the critical pentasaccharide sequence (fondaparinux), and the direct antithrombin bivalirudin. Advantages of LMWHs include high bioavailability permitting administration subcutaneously, reliable anticoagulation without monitoring, and greater anti-Xa:IIa activity. Enoxaparin has been shown to reduce significantly the composite endpoints of death/nonfatal reinfarction and death/nonfatal reinfarction/urgent revascularization compared with UFH in STEMI patients who receive fibrinolysis. Treatment with enoxaparin is associated with higher rates of serious bleeding, but net clinical benefit—a composite endpoint that combines efficacy and safety—still favors enoxaparin over UFH. Interpretation of the data on fondaparinux is difficult because of the complex nature of the pivotal clinical trial evaluating

58. 62-year-old man is hospitalized with severe abdominal pain and diarhea after a recent urinary tract infection. An appropriate workup confirms C difficile colitis. The patient is placed on an oral macrocyclic antibiotic that inhibits the sigma subunit of RNA polymerase. Which of the following agents was most likely administered to this patient?

A. Doxycycline

B. Fidaxomicin

C. Metronidazole

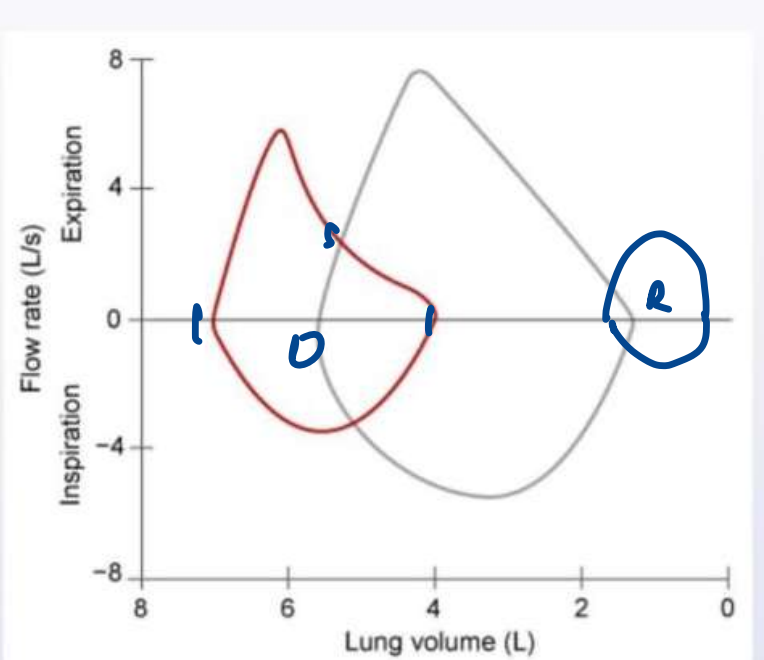
D. Vancomycin

59. 70-year-old man is brought to the emergency department due to sudden-onset weakness in his right arm and leg. Although he can speak, he cannot pronounce words clearly. Neurologic examination shows 3/5 strength in both right upper and lower extremities. When the patient is asked to stick out his tongue, it deviates to the left. Sensory examination shows no abnormalities. Which of the following is the most likely location of this patient's brain injury?

A. Left lateral medulla
B. Left medial medulla
C. Left precentral gyrus
D. Right lateral medulla

60. A 57-year-old man is being evaluated for progressive shortness of breath. His respiratory flow-volume curve is shown in red below. Which of the following pathologic findings is most likely to be present in this patient?

A. Alveolar hyaline membranes
B. Compression atelectasis
C. Interalveolar wall destruction
D. Intraalveolar hemorrhage



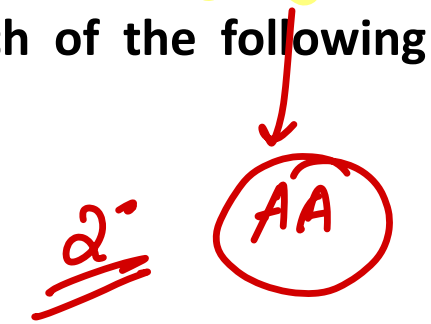
61. A 64-year-old man comes to the OPD due to generalized edema, fatigue, and dyspnea on exertion for 2 months. The patient has a 25-year history of poorly controlled rheumatoid arthritis. Urinalysis shows 4+ protein. A renal biopsy is performed. Which of the following histologic abnormalities is most likely to be seen in this patient's glomeruli?

A. Crescent formation

B. Deposition of amorphous material

C. Diffuse hypercellularity

D. IgA deposition



62. 35-year-old woman comes to the physician complaining of weakness, fatigue, and pallor. Physical examination is unremarkable except for conjunctival pallor. Laboratory results are as follows:

Haemoglobin: 7.2 g/dL

Mean corpuscular volume: 90 fL

Reticulocytes: 0.1%

Platelets: 280,000 /uL

Leukocyte count: 6,700 cells/uL

Iron studies and serum B12 and folic acid levels are within normal limits. Bone marrow biopsy shows absence of erythroid precursors but preserved myeloid and megakaryocytic elements. Further workup would most likely show which of the following?

A. Hepatocellular carcinoma

B. Renal cell carcinoma

C. Thymic tumor

D. Cerebellar hemangioblastoma

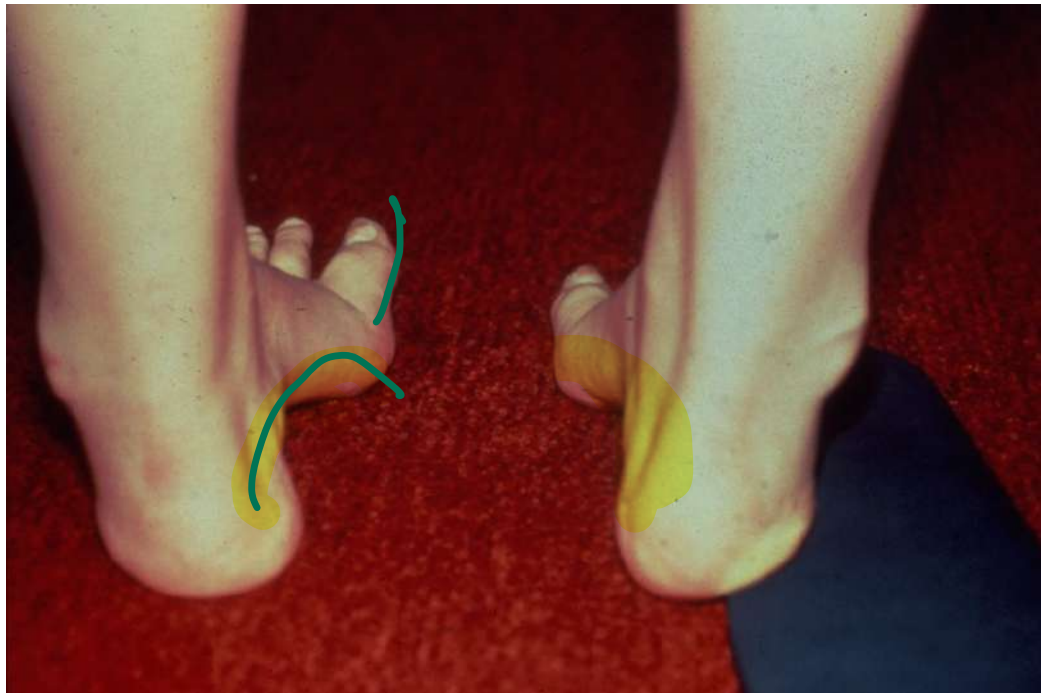
63. 15-year-old boy is brought to the OPD by his mother due to difficulty with movement. The patient enjoys playing high school basketball but had to leave the team this year due to his progressively worsening symptoms On examination, he is found to have significant kyphoscoliosis. Image of the patient's feet are shown below. His older brother suffered from a neurologic disorder and died of heart failure at age 25. This patient most likely has which of the following neuropathologic findings?

A. Atrophy of the caudate nucleus

B. Cerebral cortex atrophy

C. Degeneration of the spinocerebellar tracts

D. Demyelination of peripheral nerves



64. An 18-year-old woman is referred to a cardiologist after heart murmur is discovered during a routine checkup. The patient is healthy and has no symptoms. She runs daily and wants to start actively training for a half marathon. Auscultation reveals a midsystolic click followed by a short late-systolic murmur at the cardiac apex. The murmur disappears with squatting. What is the likely diagnosis?

A. Membranous VSD

B. Mitral valve prolapse

C. Mitral stenosis

D. Bicuspid aortic valve

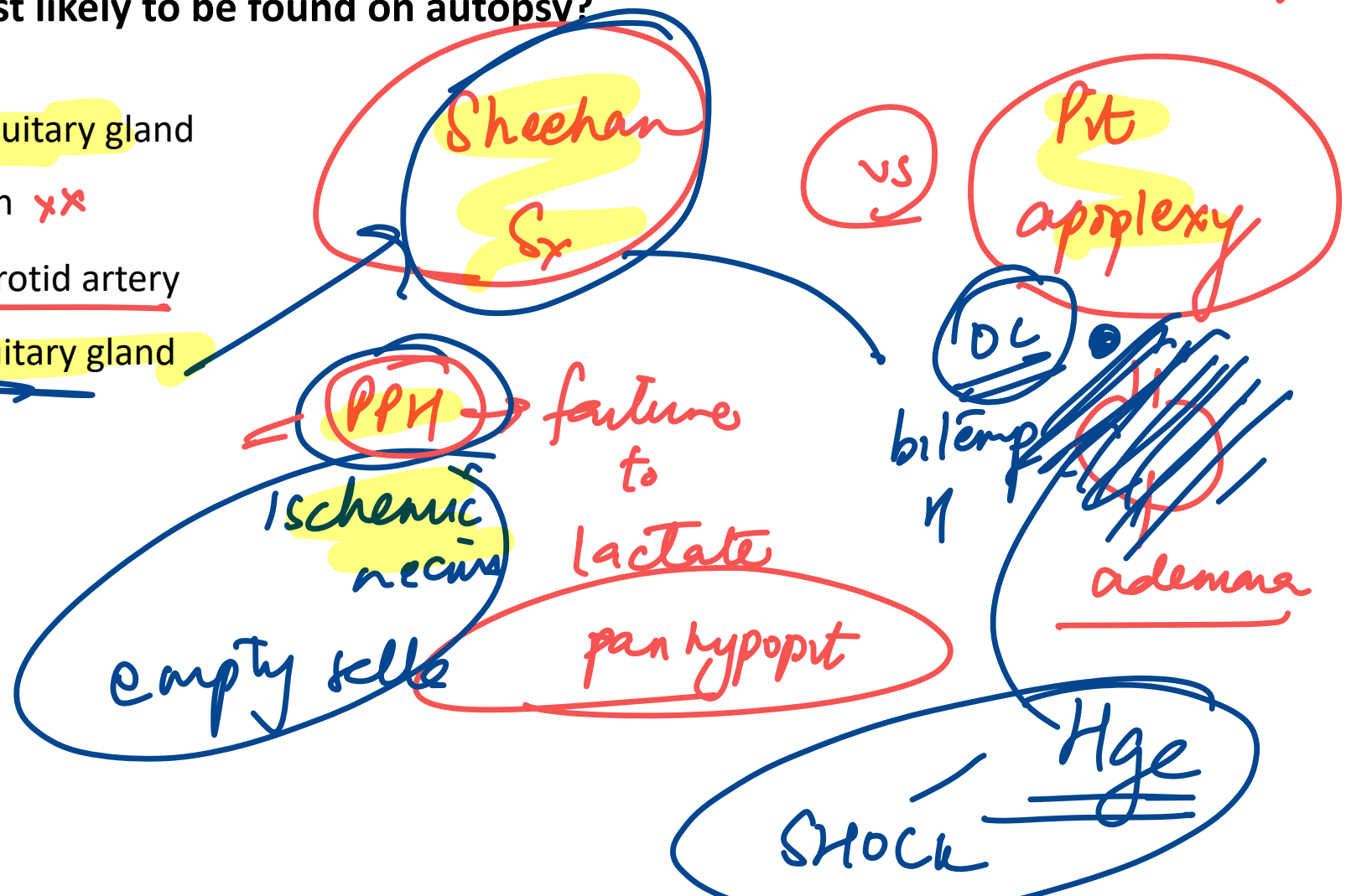
65. 50-year-old man is brought to the emergency department due to a severe, sudden-onset headache with loss of vision in bilateral temporal fields that started an hour ago. The patient reports that he has had mild headaches and decreased libido over the past 3 months. Shortly after being admitted to the hospital, he becomes acutely hypotensive and loses consciousness. Which of the following is most likely to be found on autopsy?

A. Acute hemorrhage in the pituitary gland

B. Bleeding within the putamen

C. Dissection of the internal carotid artery

D. Ischemic necrosis of the pituitary gland



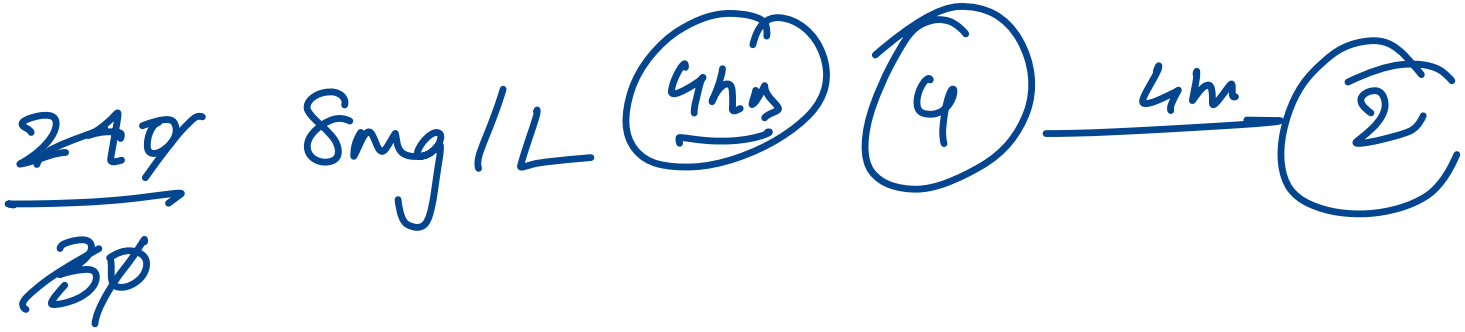
66. 64-year-old man is evaluated for persistent fever and weakness. He has a history of aortic valve replacement for aortic stenosis. Physical examination reveals a new cardiac murmur with scattered petechiae, and splinter hemorrhages seen on his extremities. Echocardiogram shows a vegetation involving one of the aortic valve leaflets, and blood cultures grow enterococci. As part of the patient's treatment, 240 mg of intravenous gentamicin is started. The pharmacy calculates that, in this patient, gentamicin has a volume of distribution of 30litres, a half-life of 4 hours, and demonstrates first-order and one-compartment kinetics. Which of the following is the most likely serum drug concentration just before the next dose 8 hours later?

A. 0.5 mg/L

B. 1 mg/L

C. 1.5 mg/L

D. 2 mg/L



67. A 53-year-old woman underwent hip replacement surgery. A week after the surgery, the patient developed swelling of the legs associated with pain on palpation. Her heart rate is 70 beats per min. There is no history of hemoptysis or significant weight loss. There is no previous history of pulmonary embolism. What is the risk of developing pulmonary embolism in the patient based on Well's score?

A. Low

B. High

C. Moderate

D. Cannot comment without d-dimer values

Wells score

Criteria	Points
Clinical signs/symptoms of DVT	3
PE is most likely diagnosis	3
Tachycardia (>100 bpm)	1.5
Immobilization/surgery in previous 4 weeks	1.5
Prior DVT/PE	1.5
Hemoptysis	1
Active malignancy (trt w/in 6 month)	1

Low Risk
< 2 points

Intermediate risk
2-6 points

High risk
>6 points

PE unlikely
0-4 points

PE Likely
>4 points

68. 34-year-old woman comes to the OPD with recent onset of malaise. The patient works as a nurse at a local hospital and lives at home with her husband and 2-year-old son. Physical examination is notable for hepatomegaly. Laboratory results are as follows:

Anti-HAV IgM Positive
Anti-HAV IgG negative
HBsAg negative
HBeAg negative
Anti-HBs positive
Anti-HBc negative
Anti-HBe negative
Anti-HCV negative

Which of the following is most likely to be elicited on further history taking?

A. Had an accidental needlestick exposure at work
B. Had a blood transfusion
C. Had steamed oysters at a neighborhood restaurant
D. Had unprotected sexual intercourse with a new partner

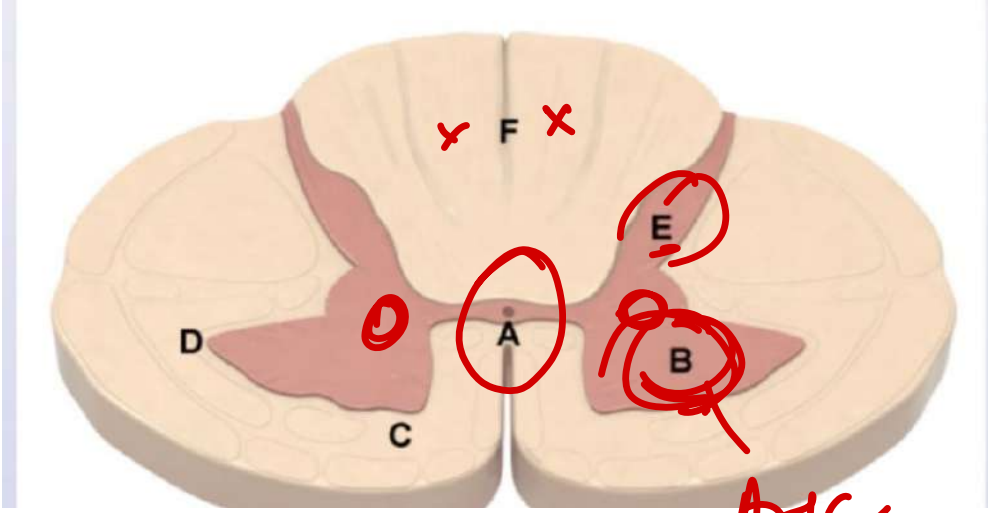
69. 20-year-old woman comes to the physician because of multiple burns on her hands. She says that she gets burned quite often when she cooks, particularly while operating the oven. She also has burned herself when picking up her morning cup of coffee and when testing the water temperature in the shower. The patient s concerned because she cannot feel when objects are "really hot" and often does not notice that she has burns until she looks at her hands. Her family history is significant for multiple sclerosis in her mother. Examination shows diminished pinprick and temperature sensation across the upper back, shoulders, and arms bilaterally. Light touch, position, and vibration sense are preserved. Examination of the lower extremities is unremarkable. Damage to which of the following spinal cord areas is most likely responsible for this patient's symptoms?

A. A

B. B

C. F

D. E



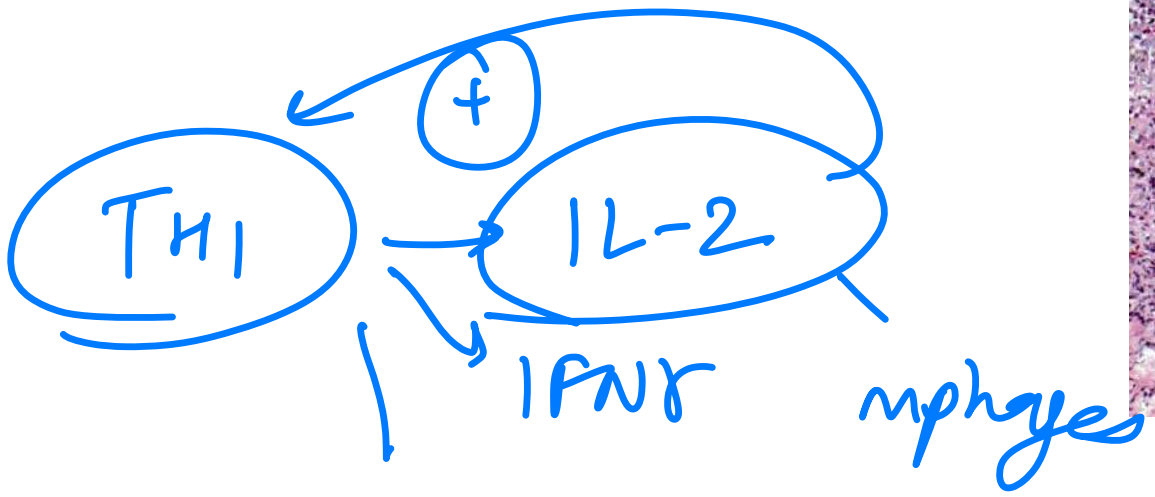
70. 37-year-old woman is evaluated for progressive shortness of breath and dry cough. The patient has seasonal allergies and takes no medications. Chest imaging studies reveal pulmonary infiltrates and hilar adenopathy. The patient undergoes lung biopsy; the findings are shown below. Which of the following sets of immune cells and cytokines is most likely responsible for the development of this patient's pathologic findings?

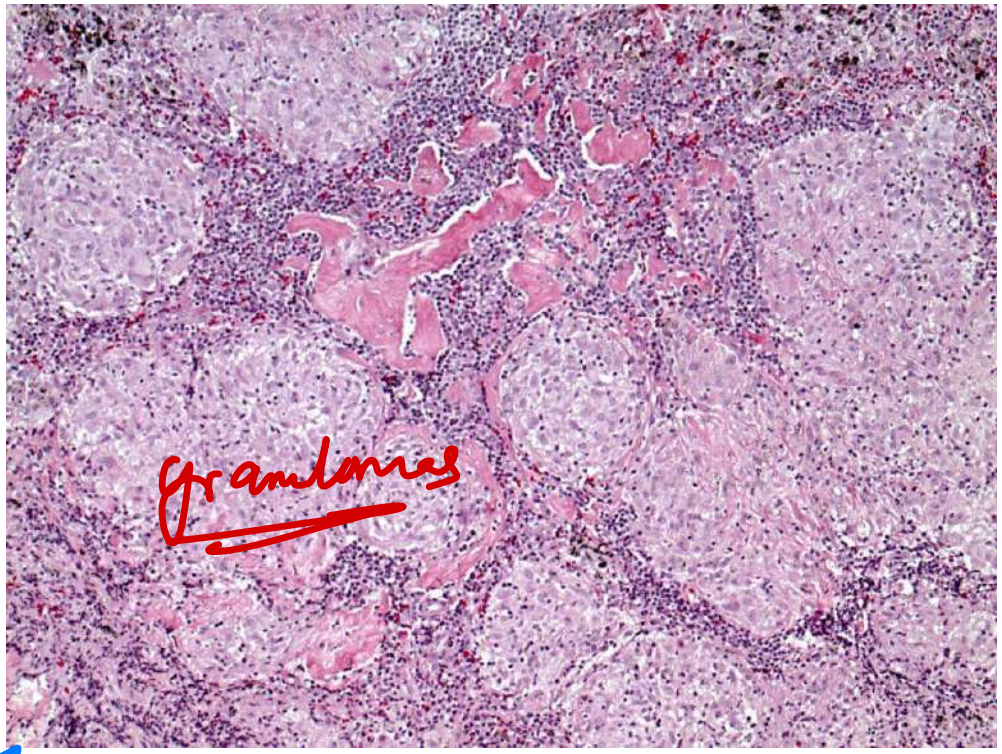
A. Th1, IL-2, interferon-Y

B. Th1, TGF-alpha, IL-10

C. Th2, IL-4, IL-5

D. Th2, IL-5, tumor necrosis factor-alpha





71. 21-year-old man is brought to the emergency department due to diffuse muscle aches and weakness. He has also noticed darkening of his urine. he patient recently joined the military and was participating in rigorous training exercises in hot weather earlier in the day.
Laboratory results are as follows:
Sodium: 136 mEq/L
Potassium: 5.6 mEq/L
Bicarbonate: 18 mEq/L
Creatinine: 2.0 mg/dL
CK: 22,000 U/L (normal: 30-170)
Which of the following urine microscopy is most likely present in this patient?

A. Dysmorphic red blood cells
B. Eosinophils
C. Granular casts
D. Waxy casts

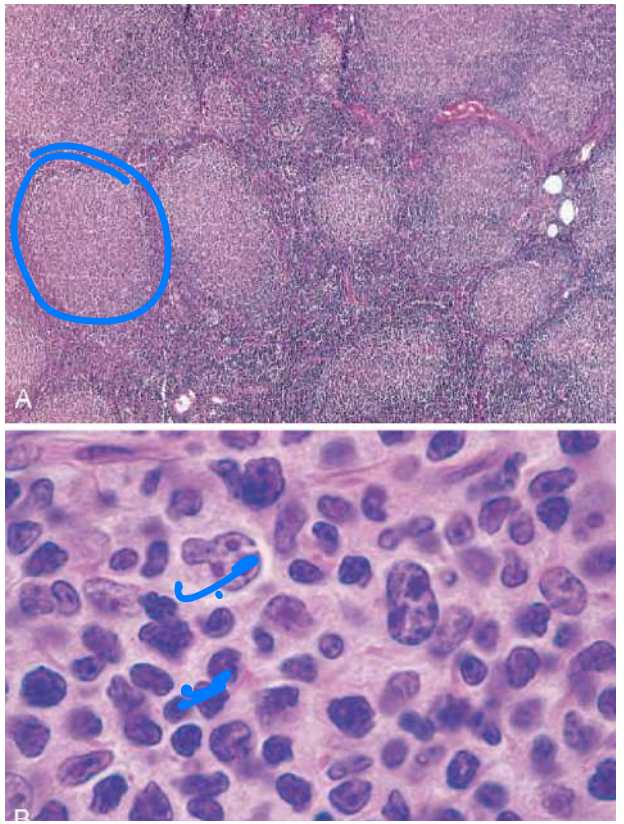
72. 35-year-old man is being evaluated for nontender cervical lymphadenopathy that he first noticed while shaving. A biopsy is performed, histology is shown below. Cytogenetic analysis would most likely demonstrate which of the following patterns?

A. BCL-2 overexpression

B. Cyclin D1 overexpression

C. C-MYC overexpression

D. Constitutive tyrosine kinase activation



73. 54-year-old man is brought to the emergency department by his wife after he develops dificulty speaking. When asked about the onset of his symptoms, the patient slowly responds with "weak... morning..." and becomes very frustrated. On examination, he is able to state his first name but with difficulty, and correctly points to different body parts on command. This patient's speech difficulties are most likely caused by a lesion affecting which of the following vessels?

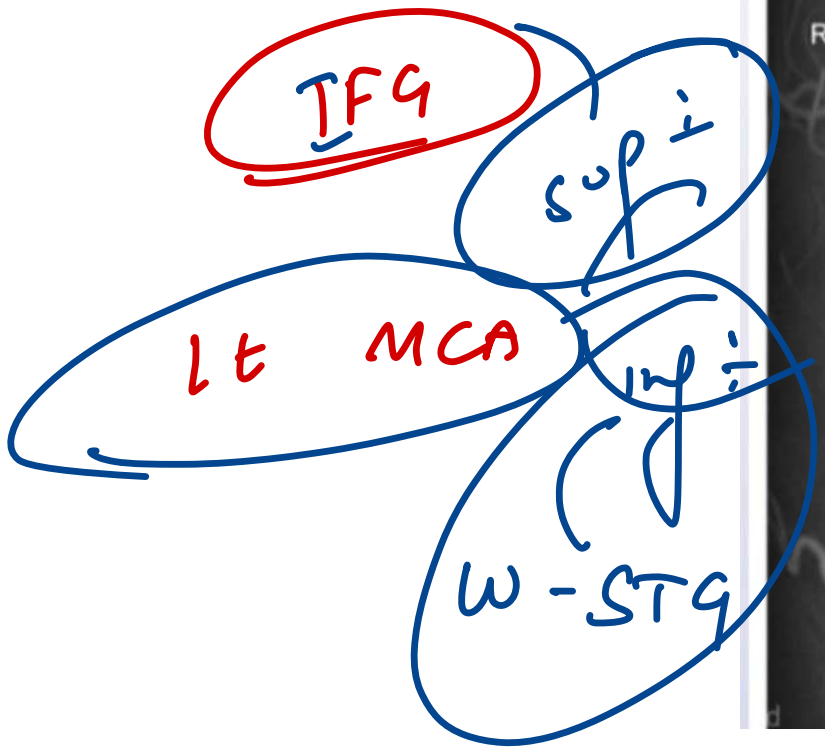
A. A

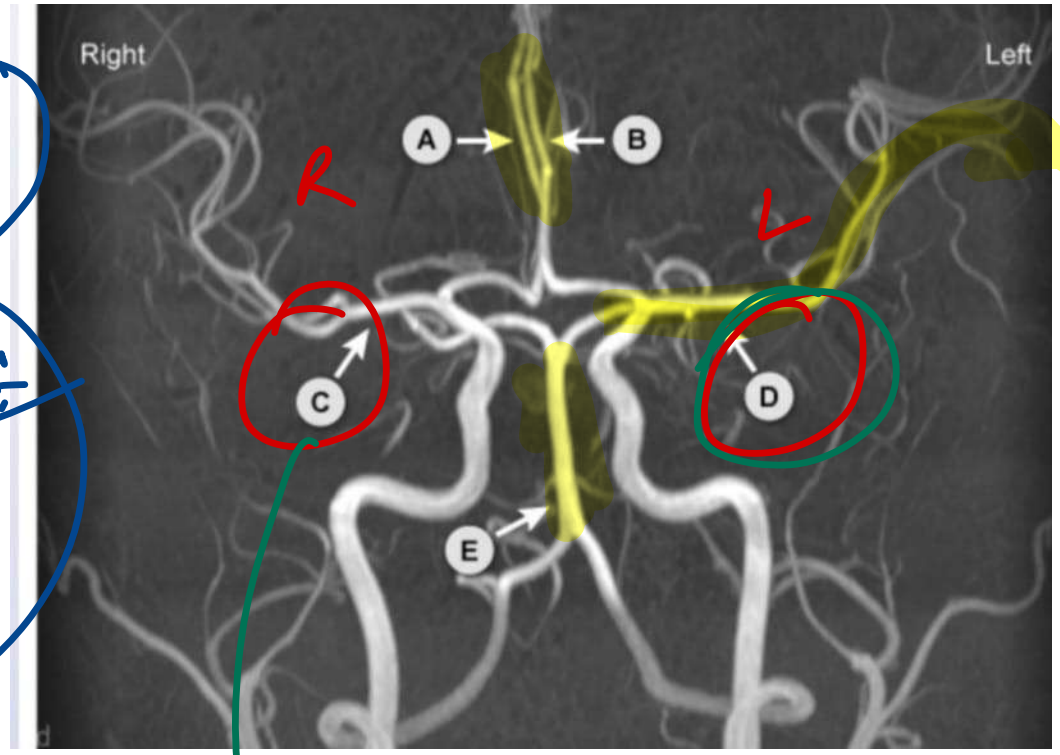
B. E

C. C

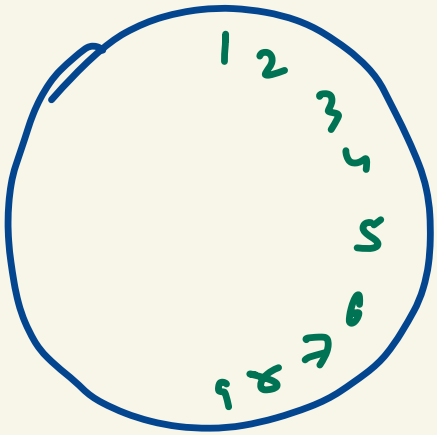
D. B

Sup ÷





Rt MCA Hemineg


1
2
3
4
5
6
7
8
9

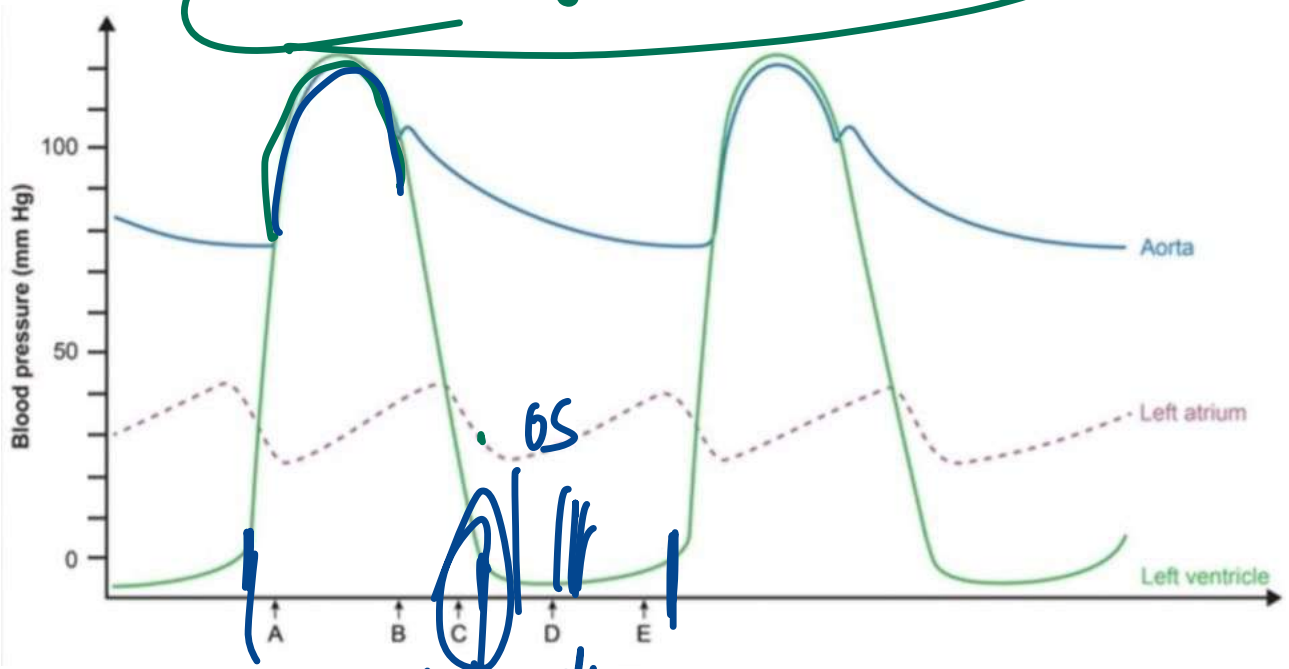
74. 32-year-old woman with a history of mitral stenosis comes to the OPD. Cardiac auscultation reveals an opening snap and a rumbling murmur heard best in the left fifth intercostal space at the midclavicular line. Timing of these sounds best corresponds to which of the following letters?

A. A

B. B

C. C

D. E



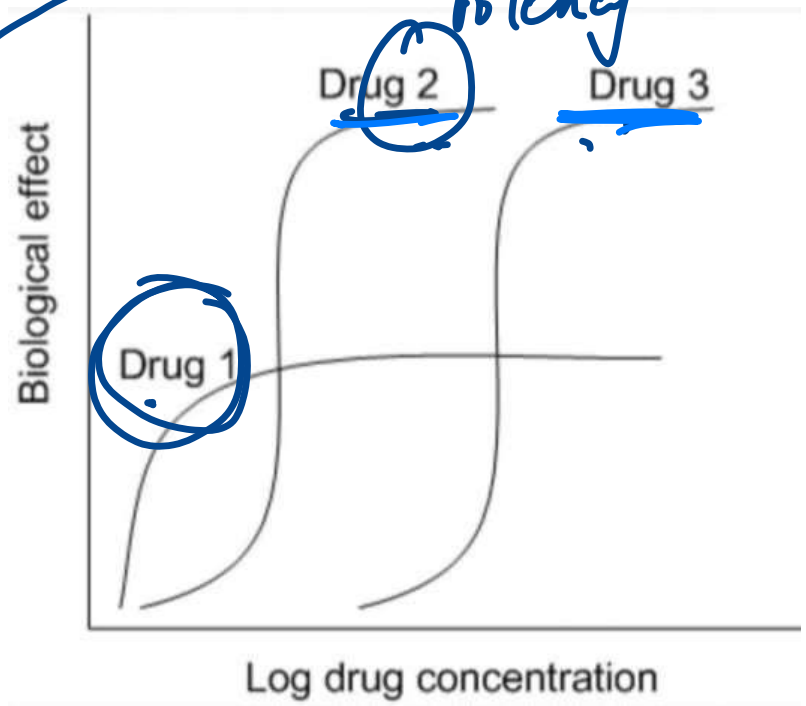
75. Three alpha-agonist drugs are tested as potential vasoconstrictors. The degree of vasoconstriction is determined by measuring the cross-sectional area of an isolated vessel after application of the drug. The following curves are obtained: Which of the following is the best statement concerning the effects of these drugs?

A. Drug 1 has lower potency than Drug 2

B. Drug 2 has higher affinity for alpha-receptors than Drug 3

C. Drug 1 demonstrates the highest efficacy

D. Drug 2 and Drug 3 bind to different loci of alpha-receptors



Comp — potency

NC — efficacy

HELP

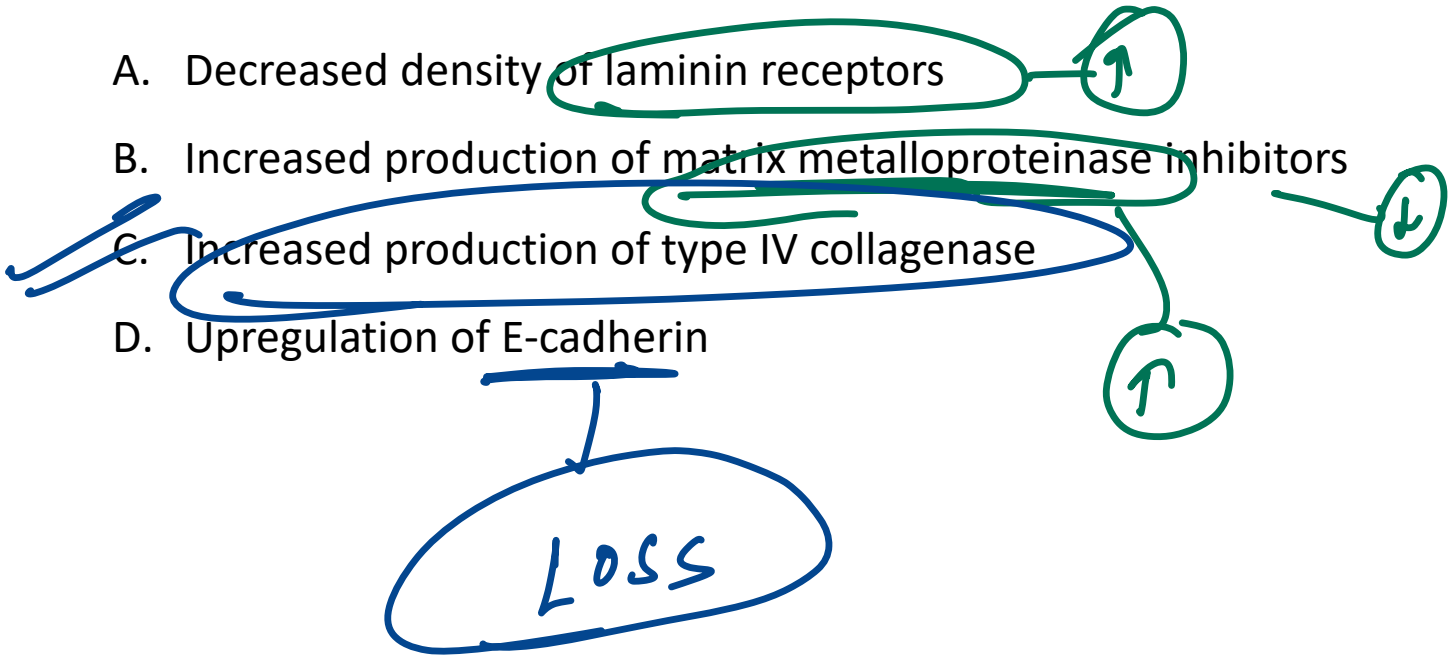
76. 44-year-old woman comes to the office due to a breast mass. Physical examination reveals a hard, fixed mass in the right breast with palpable ipsilateral axillary lymphadenopathy. The ability of the tumor to reach the draining lymph nodes is facilitated by which of the following changes at the primary tumor site?

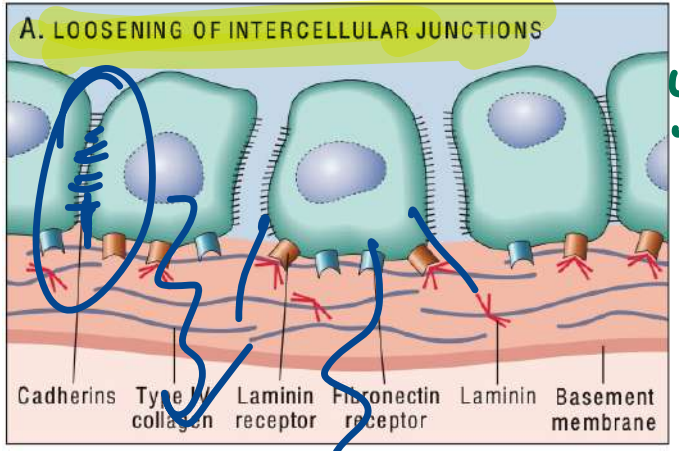
A. Decreased density of laminin receptors

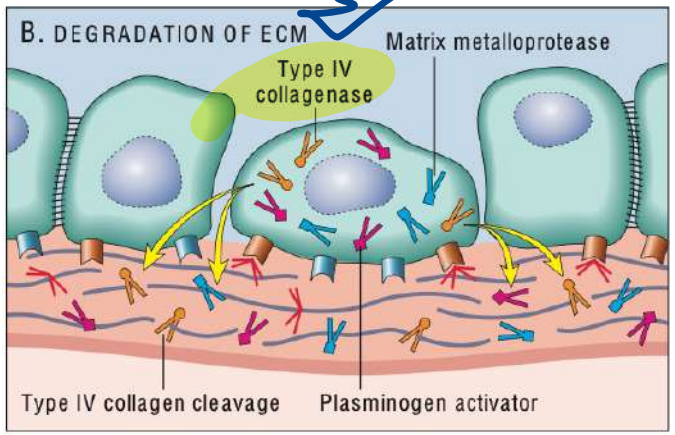
B. Increased production of matrix metalloproteinase inhibitors

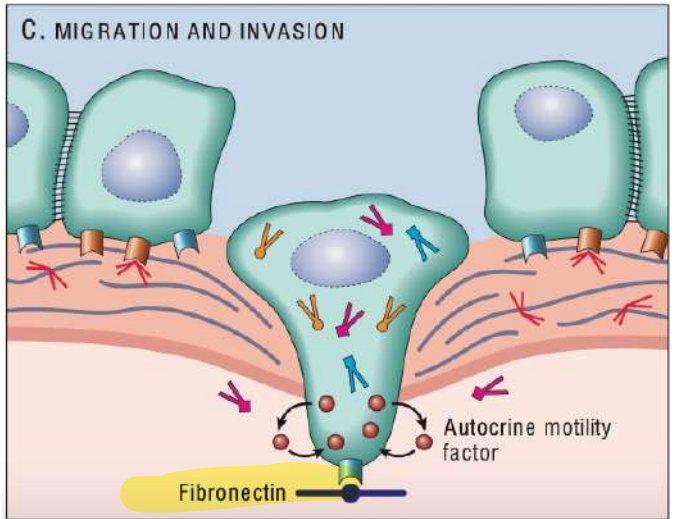
C. Increased production of type IV collagenase

D. Upregulation of E-cadherin

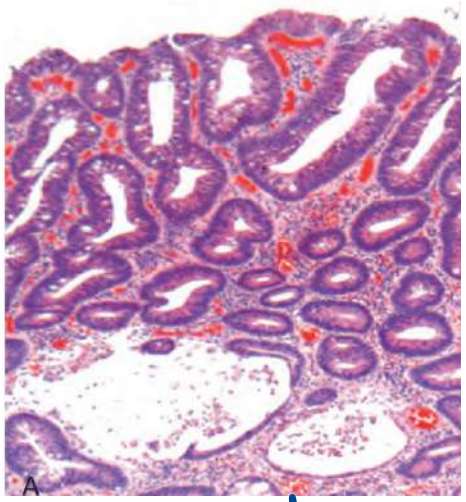



A. LOOSENING OF INTERCELLULAR JUNCTIONS
Cadherins
Type IV collagen
Laminin receptor
Fibronectin receptor
Laminin
Basement membrane

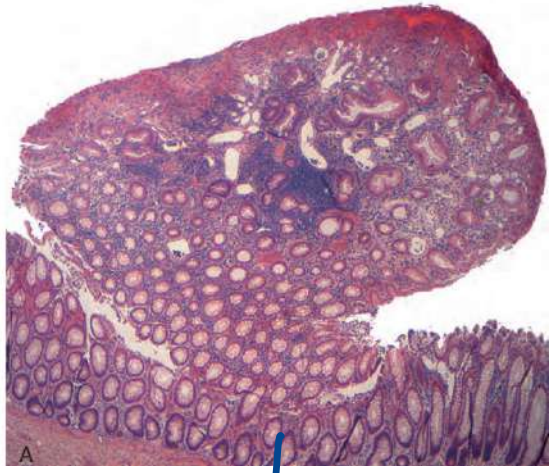

B. DEGRADATION OF ECM
Matrix metalloprotease
Type IV collagenase
Type IV collagen cleavage
Plasminogen activator


C. MIGRATION AND INVASION
Autocrine motility factor
Fibronectin

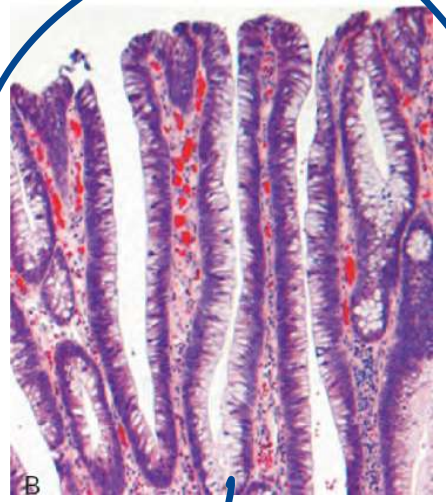
77. Which of the following pathologic findings is associated with the greatest risk of malignant transformation in this patient?



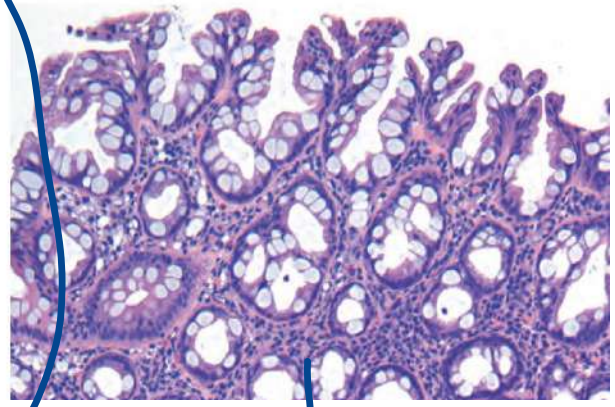
tubular



Juvenile



villious



Hyperplastic

78. A 4-week-old, full-term boy is brought to the emergency department due to vomiting. His parents describe the emesis as undigested formula without blood or bile. The vomiting occurs after feeds and has increased in frequency and force over the past 3 days. Examination shows a sunken anterior fontanelle and dry mucous membranes. Arterial blood gas analysis is most likely to reveal which of the following sets of values?

metab alkalosis

A. pH 7.29, PaCo2 30, HCO3 14, Anion gap Elevated.

B. pH 7.30, PaCo2 50, HCO3 28, Anion gap normal

C. pH 7.48, PaCo2 46, HCO3 34, Anion gap normal

D. pH 7.53, PaCo2 22, HCO3 22, Anion gap normal

79. 6-year-old girl is brought to the office due to intermittent abdominal cramps, bloating, and diarrhea for 2 months. Laboratory evaluation reveals elevated tissue transglutaminase antibodies. Which of the following locations should be biopsied to confirm the diagnosis in this patient?

A. Stomach

B. Duodenum

C. Distal jejunum

D. Terminal ileum

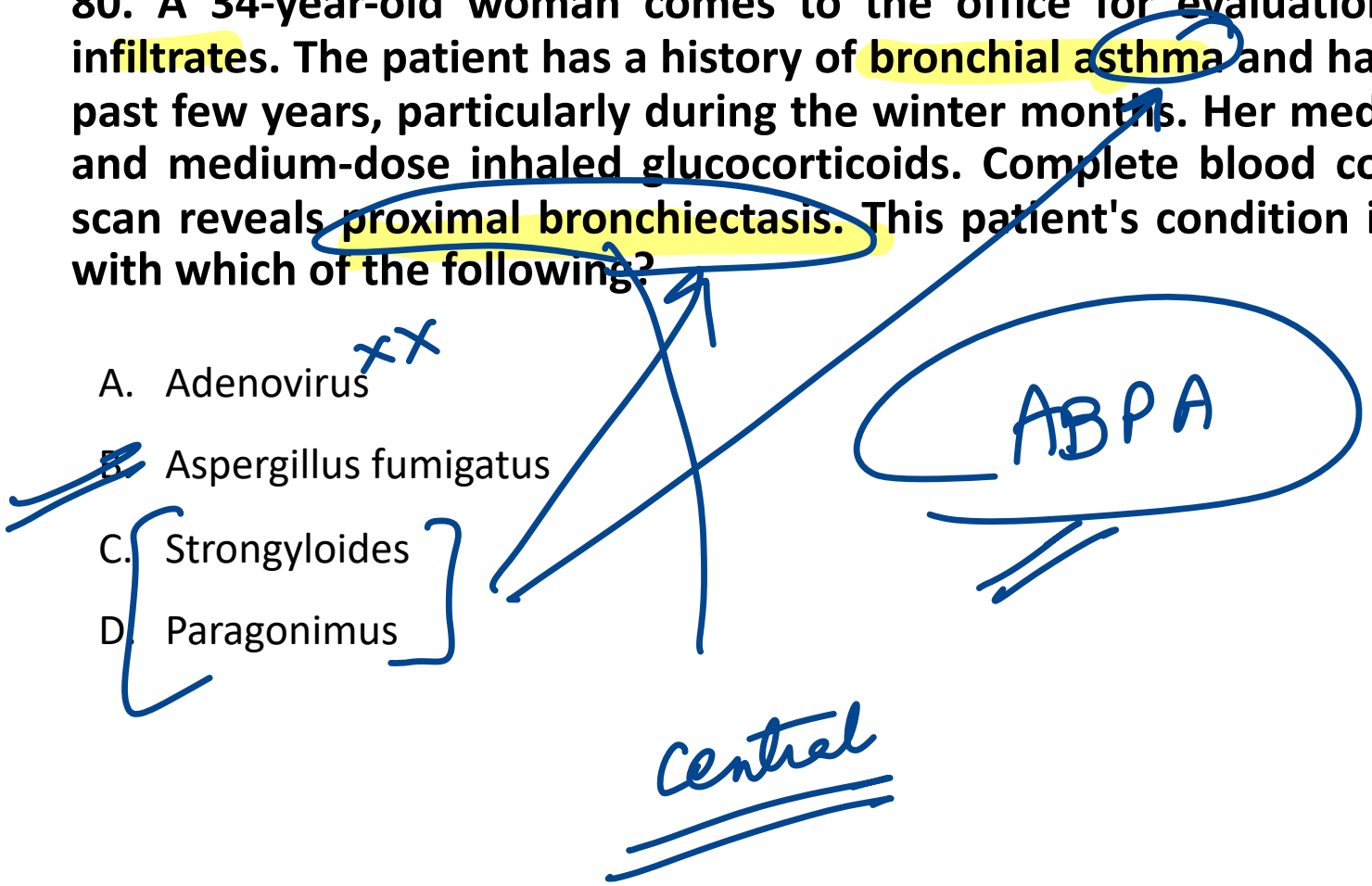
80. A 34-year-old woman comes to the office for evaluation of recurrent transient pulmonary infiltrates. The patient has a history of bronchial asthma and has had several exacerbations over the past few years, particularly during the winter months. Her medications include albuterol as needed and medium-dose inhaled glucocorticoids. Complete blood count shows eosinophilia. A chest CT scan reveals proximal bronchiectasis. This patient's condition is most likely related to colonization with which of the following?

A. Adenovirus

B. Aspergillus fumigatus

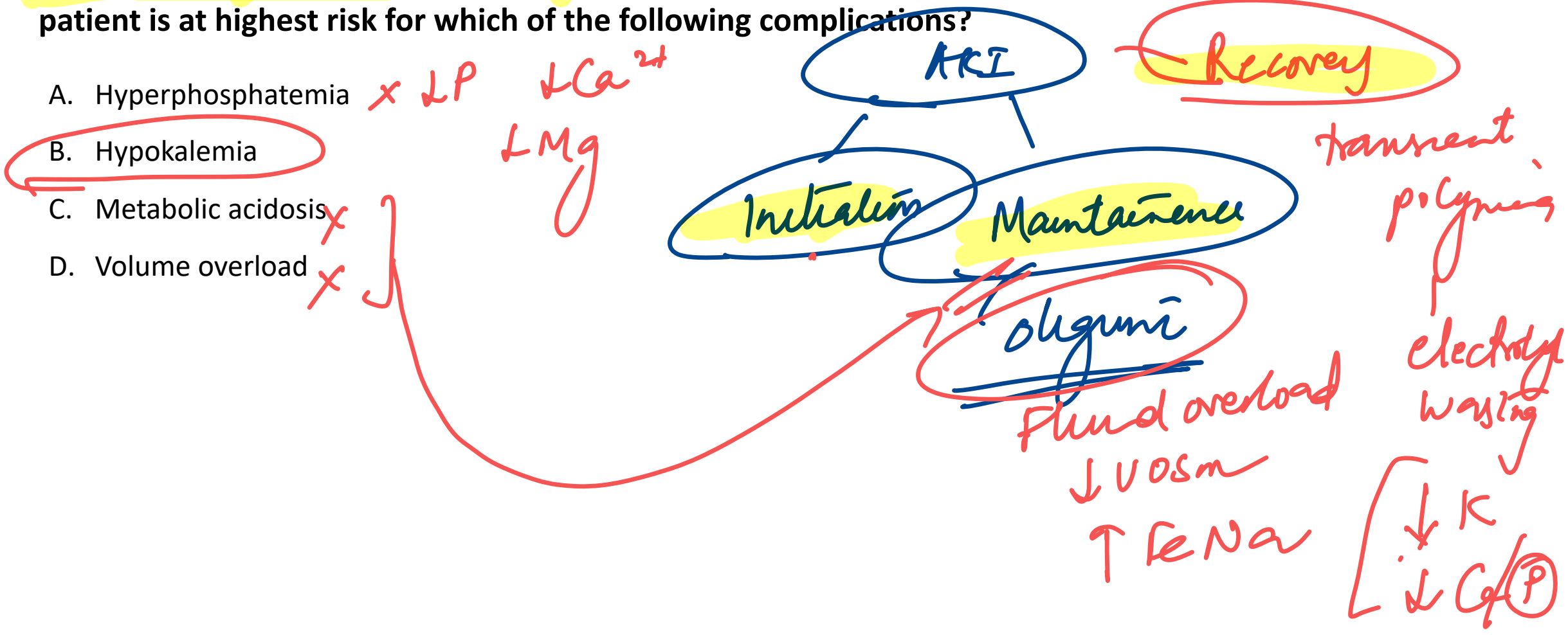
C. Strongyloides

D. Paragonimus



81. 38-year-old man is brought to the emergency department due to vomiting blood. After appropriate resuscitation measures, he undergoes upper gastrointestinal endoscopy, which reveals a bleeding duodenal ulcer. During hospital day 2, the patient develops decreased urine output. Serum creatinine rises to 3.0 mg/dL from a baseline of 1.2 mg/dL. Renal biopsy shows patchy epithelial necrosis of the tubules, intratubular casts. Supportive care is provided. Several days later, his urine output significantly increases, and serum creatinine levels decline. Over the next few days, this patient is at highest risk for which of the following complications?

A. Hyperphosphatemia
B. Hypokalemia
C. Metabolic acidosis
D. Volume overload



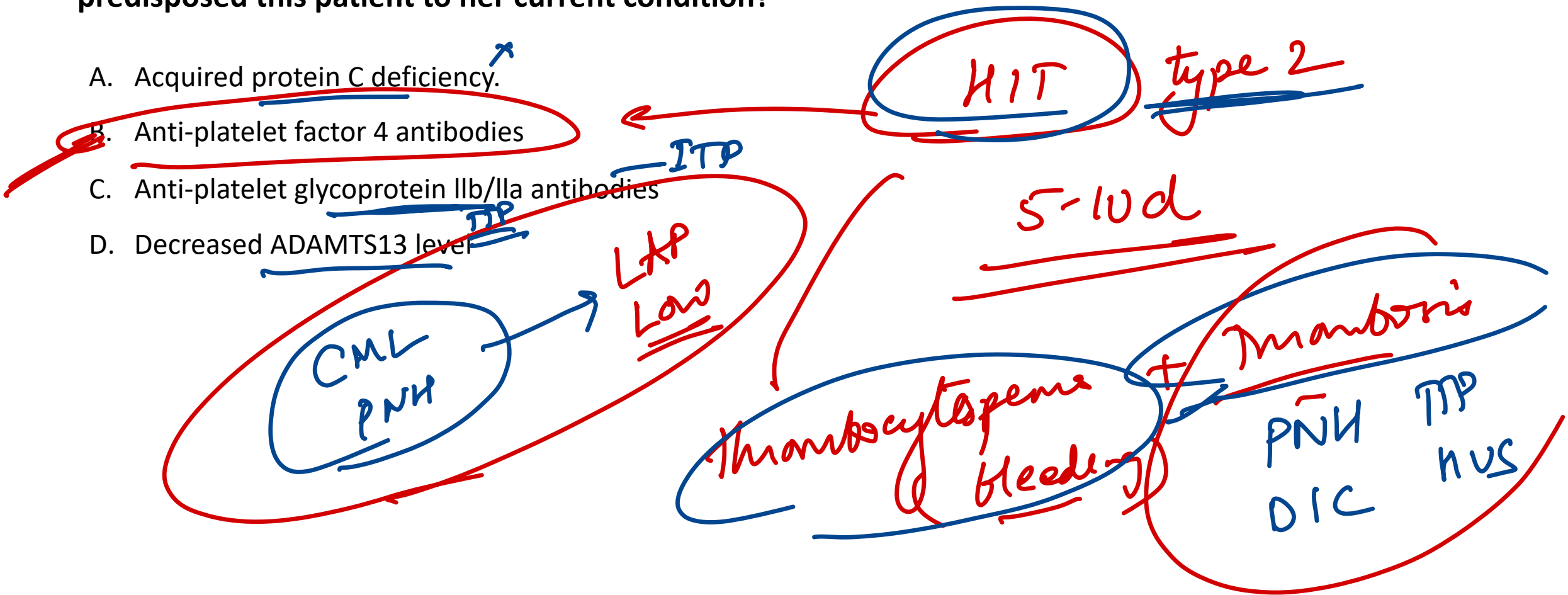
82. 26-year-old woman, gravida 2 para 1, at 8 weeks gestation comes to the OPDdue to pain and swelling of her left leg for the past day. The patient had a pulmonary embolism during her previous pregnancy, and prophylactic low-molecular-weight heparin therapy was initiated 6 days ago. Venous duplex ultrasonography reveals acute left femoral vein thrombosis. Platelet count, which was normal prior to anticoagulant therapy initiation, is now 84,000/mm3. Other blood cell counts and renal and liver function studies are within normal limits. Which of the following most likely predisposed this patient to her current condition?

A. Acquired protein C deficiency.

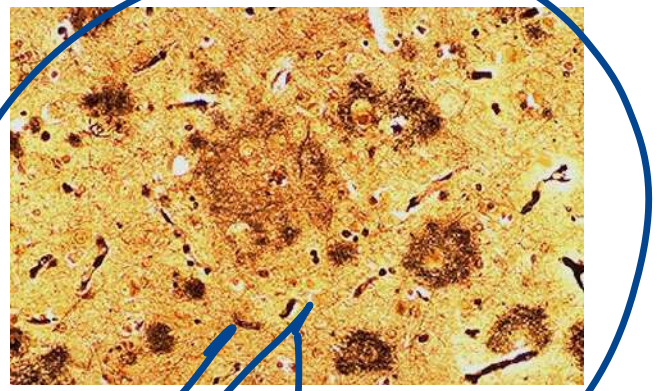
B. Anti-platelet factor 4 antibodies

C. Anti-platelet glycoprotein llb/lla antibodies

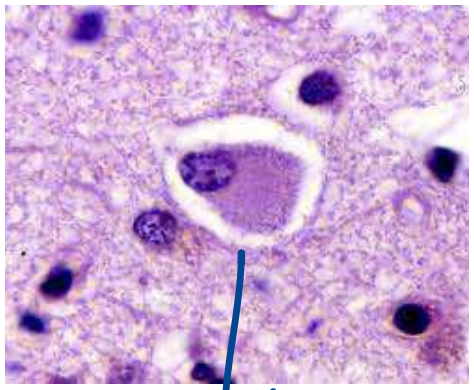
D. Decreased ADAMTS13 level



83. 82-year-old woman comes to the clinic due to memory loss. She lives with her daughter, who reports that her mother has had difficulty remembering recent conversations. The patient has also forgotten recent events, such as her grandson's birthday party last month. Two years ago, she was forced to give up driving after repeatedly getting lost in her own neighborhood and being involved in a minor motor vehicle accident. Which of the following is the most likely pathological finding in this patient?

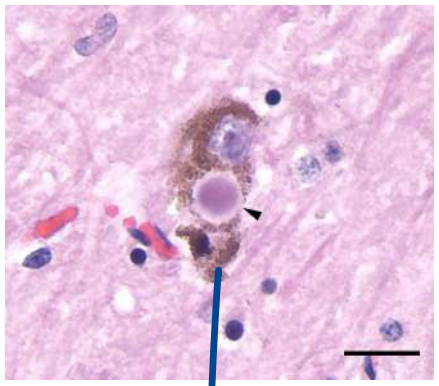


NP

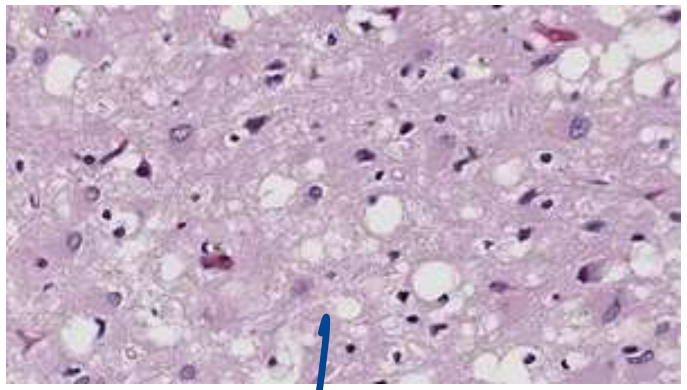


Pick

FTD



Lewy



Prion

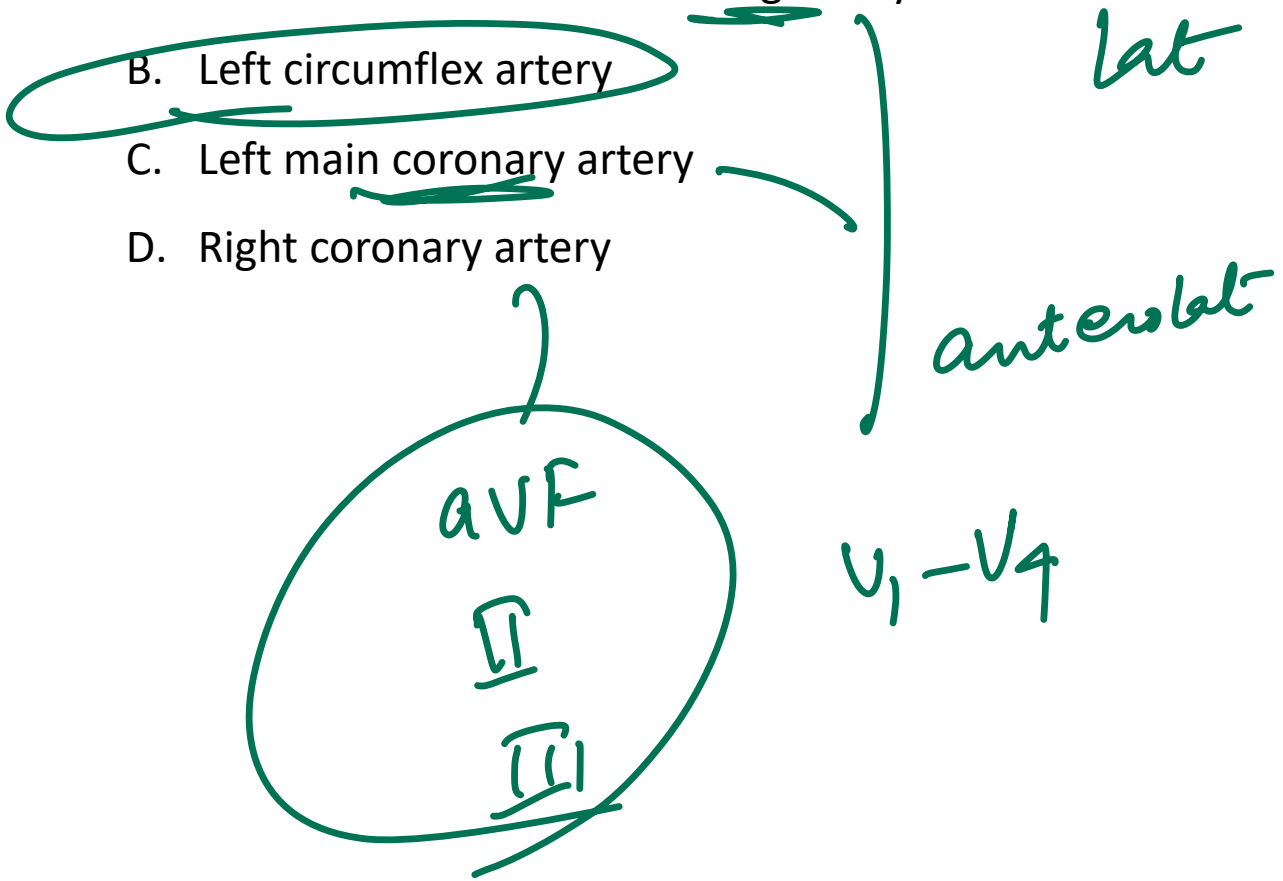
84. A 51-year-old man is brought to the emergency department due to chest tightness that started 30 minutes prior to arrival. He has 2 histories of hypertension and type 2 diabetes mellitus. Initial ECG Shows ST elevation in leads I and aVL. Cardiac enzymes are elevated. Emergent cardiac catheterization in this patient will most likely show occlusion of which of the following arteries?

A. Distal left anterior descending artery

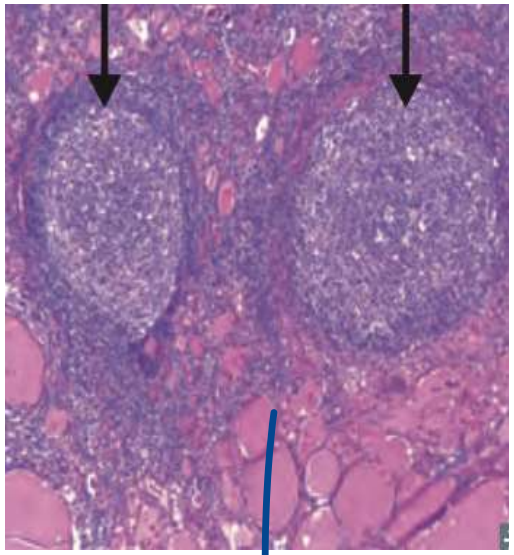
B. Left circumflex artery

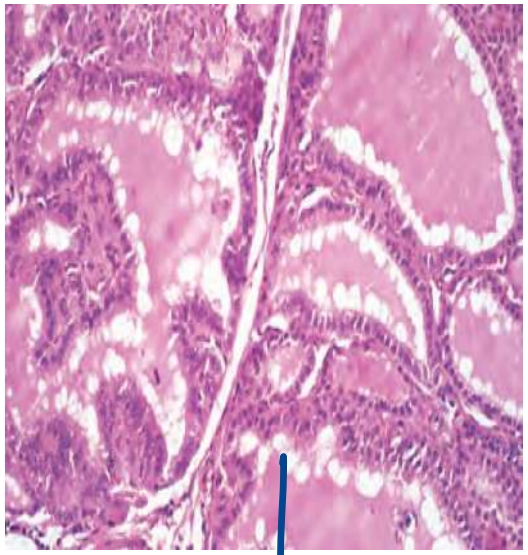
C. Left main coronary artery

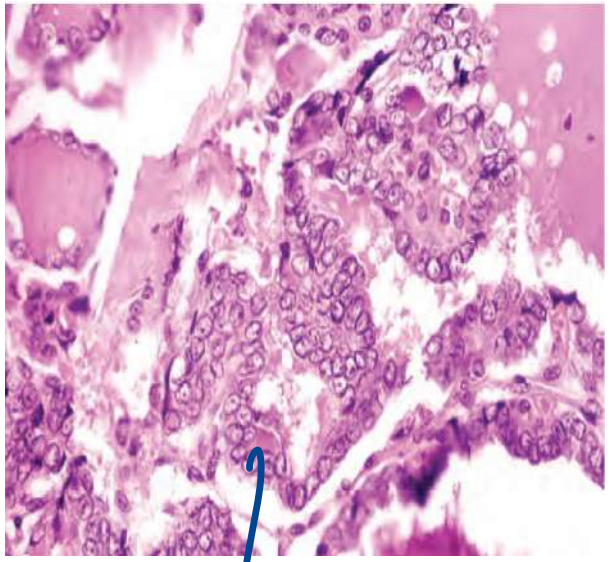
D. Right coronary artery

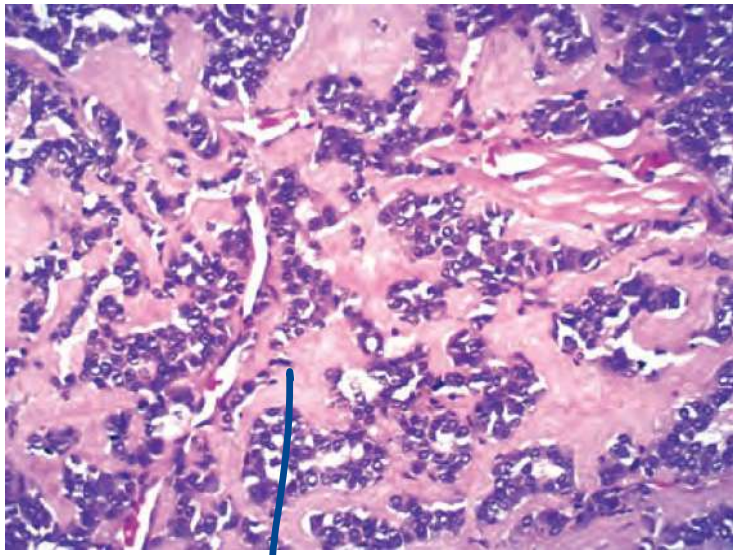


85. 51-year-old woman comes to the OPD due to progressively worsening fatigue, weight gain, and constipation for the past 6 months. Physical examination shows mild, diffuse enlargement of the thyroid gland. Biopsy of this patient's thyroid is most likely to show which of the following findings?









a) Hashimoto

Graves

PTC Ca

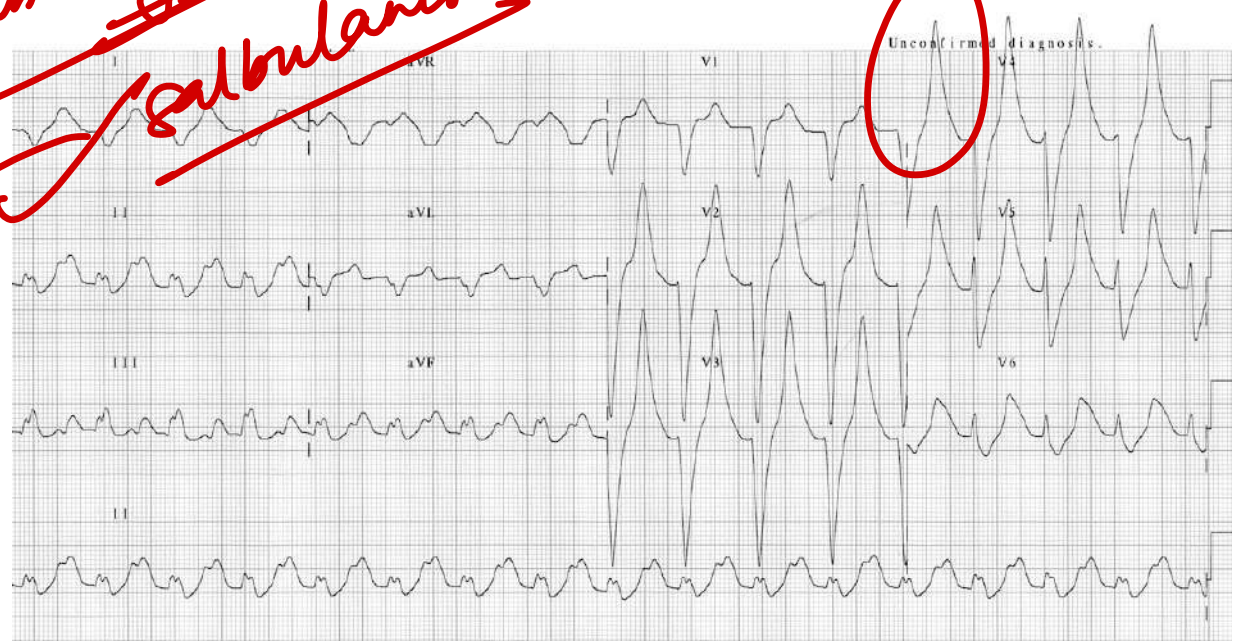
MTC

86. All of the following cause pleural fibrosis except?

A. Metformin
B. Methysergide
C. Bleomycin
D. Nitrofurantoin

87. An elderly man with diabetic nephropathy presented to the emergency department with palpitations and chest discomfort. The ECG is shown below. What is the next step?

A. Epinephrine
B. Glucagon
C. Atropine
D. Lactic acid



88. Which of the following is a Pre-protein Convertin Subtilisin Kexin type 9 inhibitor?

A. Evolocumab
B. Ezetimibe
C. Bempedoic acid
D. Inclisiran

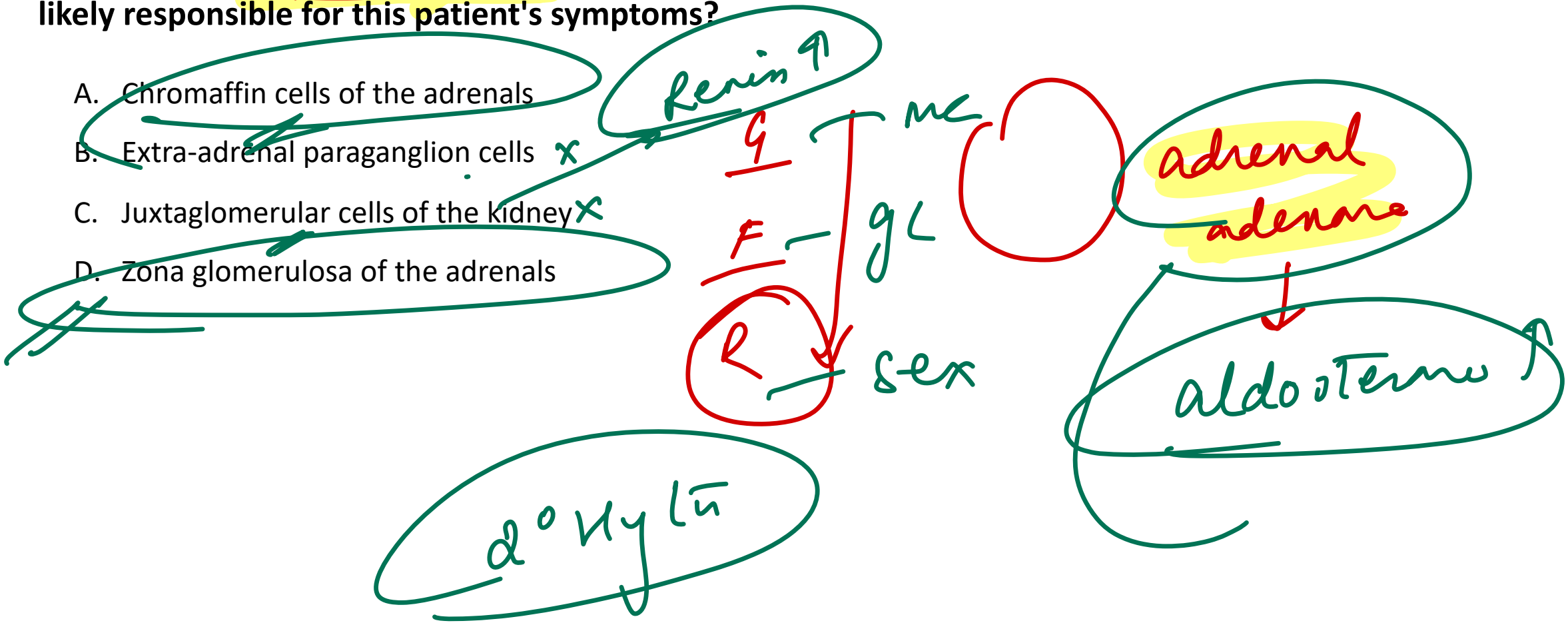
89. 27-year-old man comes to the OPD due to recurrent episodes of muscle weakness. His blood pressure is 190/110 mm Hg supine and 195/110 mm Hg standing. His heart rate is 70/min supine and 72/min standing. The rest of the physical examination is unremarkable. Laboratory evaluation shows very low plasma renin activity. Overactivity of which of the following structures is most likely responsible for this patient's symptoms?

A. Chromaffin cells of the adrenals

B. Extra-adrenal paraganglion cells

C. Juxtaglomerular cells of the kidney

D. Zona glomerulosa of the adrenals



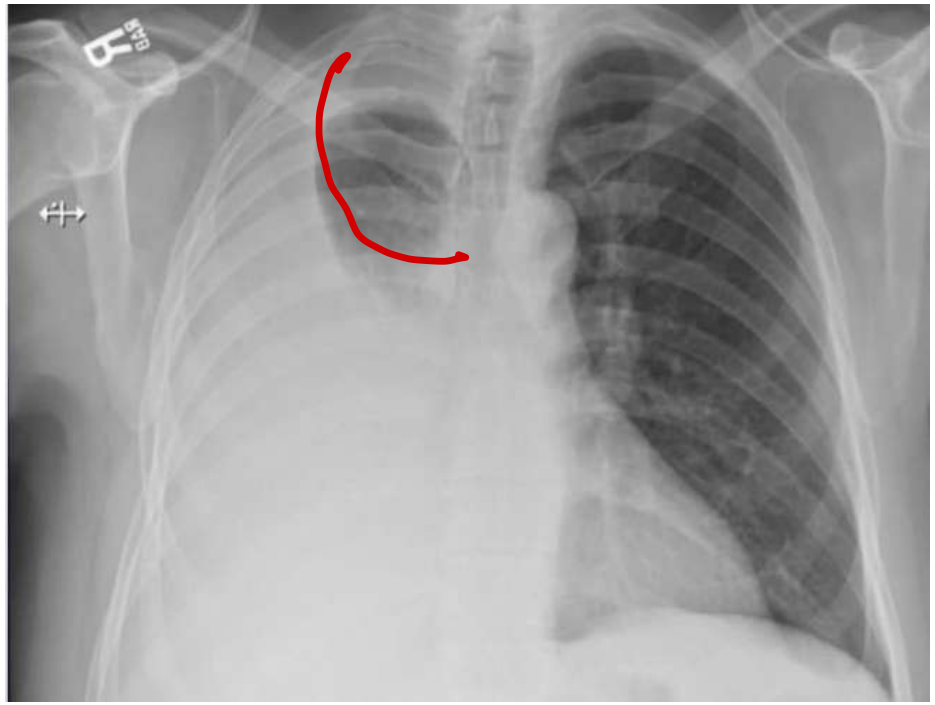
90. A 66-year-old man comes to the office due to increasing shortness of breath over the past 3 weeks. He has had a nonproductive cough for several months, which he attributes to allergies, but also notes a 9-kg unintentional weight loss over this time. He has a 50-pack-year smoking history. Chest x-ray is shown below. Which of the following would be the expected physical examination finding over the right lower chest?

A. Bronchial breath sounds

B. Decreased tactile fremitus

C. Fine inspiratory crackles

D. Increased resonance on percussion



	Breath sounds Tactile fremitus	Resonance
Consolidation	↑	dull
Pleural effusion	↓	dull
Pneumothorax	↓	↑ resonant
Collapse	↓	dull

91. 56-year-old man with chronic renal insufficiency due to polycystic kidney disease is evaluated for placement of an arteriovenous fistula for dialysis access. Blood pressure is 140/90 mm Hg and pulse is 80/min. Examination shows 2+ bilateral edema of the lower extremities. Estimated glomerular filtration rate is 15 mL/min/1.73 m². Which of the following sets of laboratory findings is most likely in this patient?

2° HPT

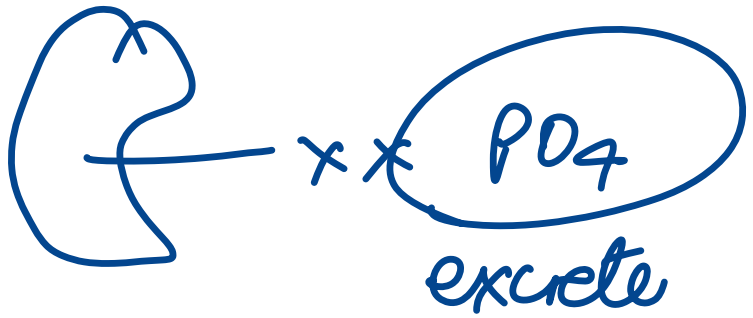
↓ 1,25 OH

A. Low serum calcium, high serum phosphorus, high PTH, normal 25-hydroxyvit D, normal 1,25 hydroxyVitD

B. Low serum calcium, high serum phosphorus, high PTH, normal 25-hydroxyvit D, low 1,25 hydroxyVitD

C. High serum calcium, high serum phosphorus, low PTH, normal 25-hydroxyvit D, low 1,25 hydroxyVitD

D. Low serum calcium, low serum phosphorus, high PTH, normal 25-hydroxyvit D, low 1,25 hydroxyVitD



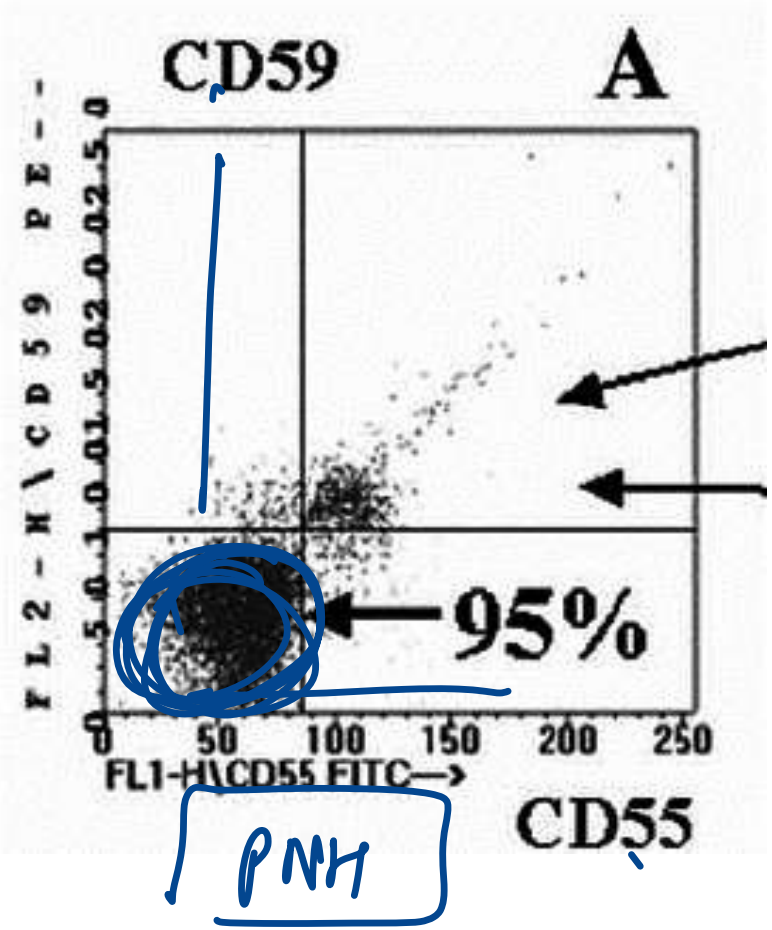
92. A 30-year-old woman comes to the emergency department with sudden-onset abdominal pain and ascites. Laboratory studies show anemia, reticulocytosis, leukopenia, and thrombocytopenia. Flow cytometry of the patient's peripheral blood cells using the appropriate monoclonal antibodies is shown. CT scan of the abdomen shows hepatic vein thrombosis. Which of the following is the most likely cause of this patient's anemia?

A. Complement activation

B. Factor V mutation

C. Intracellular dehydration

D. Mutation in beta globin chain



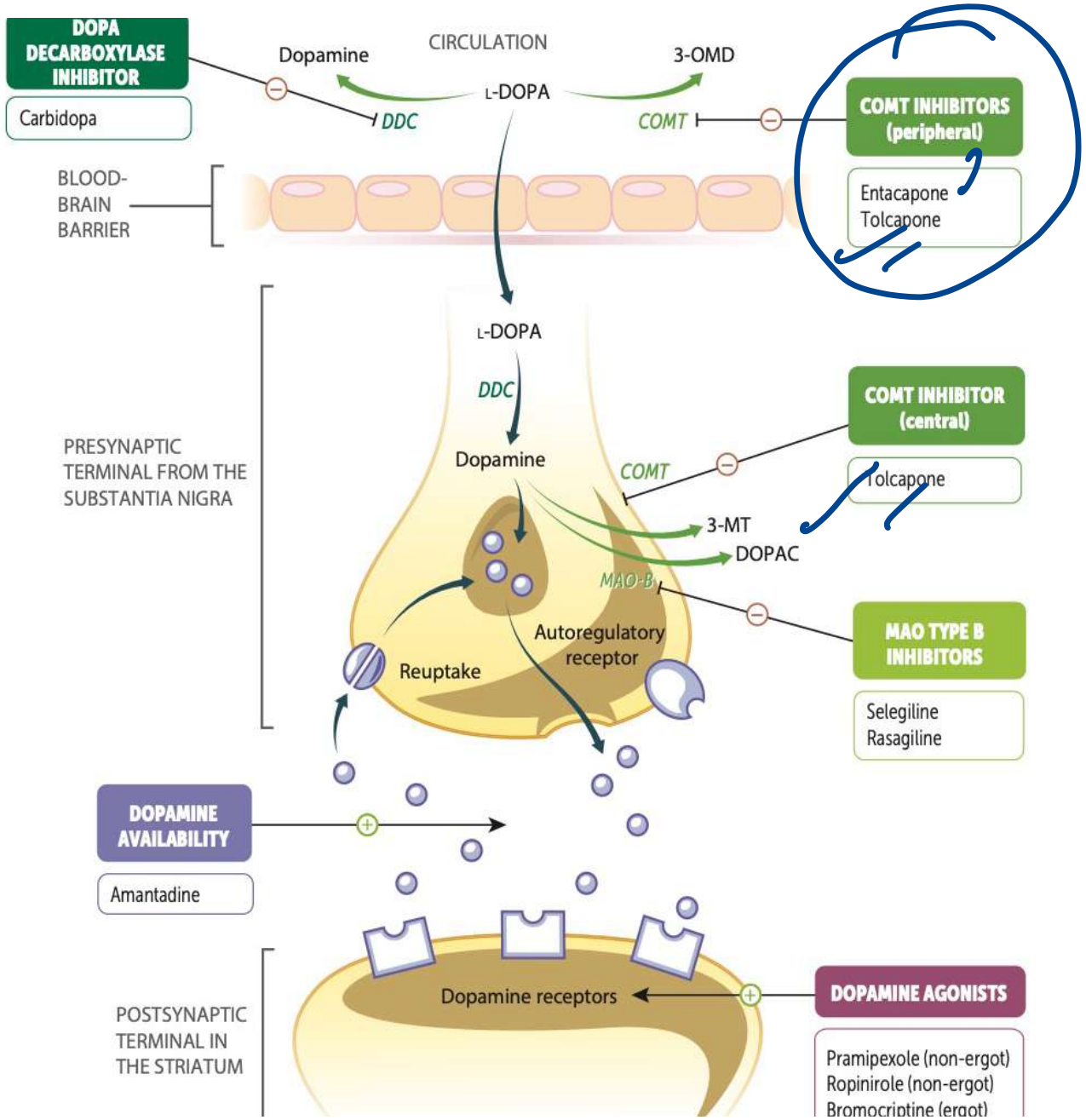
93. 72-year-old man with a history of Parkinson disease comes to the OPD for follow-up. The patient has been taking carbidopa-levodopa since being diagnosed 5 years ago and has required increasing doses to control his symptoms. He is now taking the maximum dose but reports worsening stiffness and difficulty moving between his scheduled doses; these symptoms improve after he takes the medication. Entacapone is added to his treatment regimen. This drug is most likely to improve this patient's symptoms through which of the following mechanisms?

A. A. Decreasing peripheral levodopa degradation

B. B. Directly stimulating dopamine receptors

C. C. Enhancing the effect of endogenous dopamine

D. D. Inhibiting central muscarinic receptors


DOPA DECARBOXYLASE INHIBITOR
Carbidopa
Dopamine
CIRCULATION
3-OMD
L-DOPA
DDC
COMT
COMT INHIBITORS (peripheral)
Entacapone
Tolcapone
BLOOD-BRAIN BARRIER
L-DOPA
DDC
Dopamine
COMT
COMT INHIBITOR (central)
Tolcapone
3-MT
DOPAC
PRESYNAPTIC TERMINAL FROM THE SUBSTANTIA NIGRA
MAO-B
MAO TYPE B INHIBITORS
Selegiline
Rasagiline
Autoregulatory receptor
Reuptake
DOPAMINE AVAILABILITY
Amantadine
Dopamine receptors
DOPAMINE AGONISTS
Pramipexole (non-ergot)
Ropinirole (non-ergot)
Bromocriptine (ergot)
POSTSYNAPTIC TERMINAL IN THE STRIATUM

94. 78-year-old man dies of advanced esophageal cancer. On microscopic examination, myocardial cells demonstrate prominent yellow-brown intracytoplasmic granules as shown. Which of the following most likely accounts for the observed microscopic changes?

A. Exogenous pigment endocytosis

B. Glucose polymerization

C. Iron overload

D. Lipid peroxidation

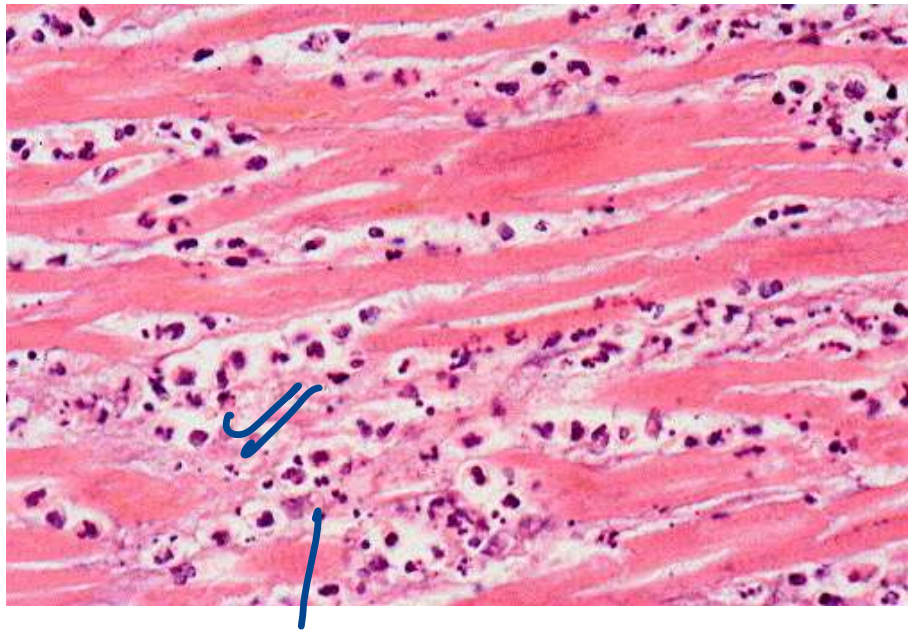
Lipofuscin

perinuclear

intralysosomal

95. Autopsy is being performed on a 72-year-old man with a history of myocardial infarction. Light microscopy of a portion of the left ventricle reveals the findings shown in the image below. This patient most likely sustained the myocardial infarction during which of the following time frames prior to his death?

A. Less than 24 hours
B. 1 to 3 days
C. 7 to 10 days
D. 2 weeks to 2 months



1-3d

96. A 50-year-old female patient with a history of rheumatoid arthritis has been experiencing visual changes, including blurry vision and halos around lights. She has been on medication for her rheumatoid arthritis for a couple of years now. Which of the following drugs she might be taking is known to get deposited in the cornea?

A. Leflunomide
B. Chloroquine
C. Methotrexate
D. Sulfasalazine

Table 6-4 Systemic Drugs Associated With Cornea Verticillata

- Aminoquinolines (amodiaquine, chloroquine, hydroxychloroquine)
- Amiodarone
- Antacids
- Atovaquone
- Clarithromycin
- Clofazimine
- Gentamicin (subconjunctival)
- Gold
- Ibuprofen
- Immunoglobulins
- Indomethacin
- Mepacrine
- Monobenzone (topical skin ointment)
- Naproxen
- Perhexiline maleate
- Phenothiazines (eg, chlorpromazine)
- Phenylbutazone
- Practolol
- Retinoids (isotretinoin)
- Silver
- Suramin
- Tamoxifen
- Thioxanthenes (chlorprothixene, thiothixene)

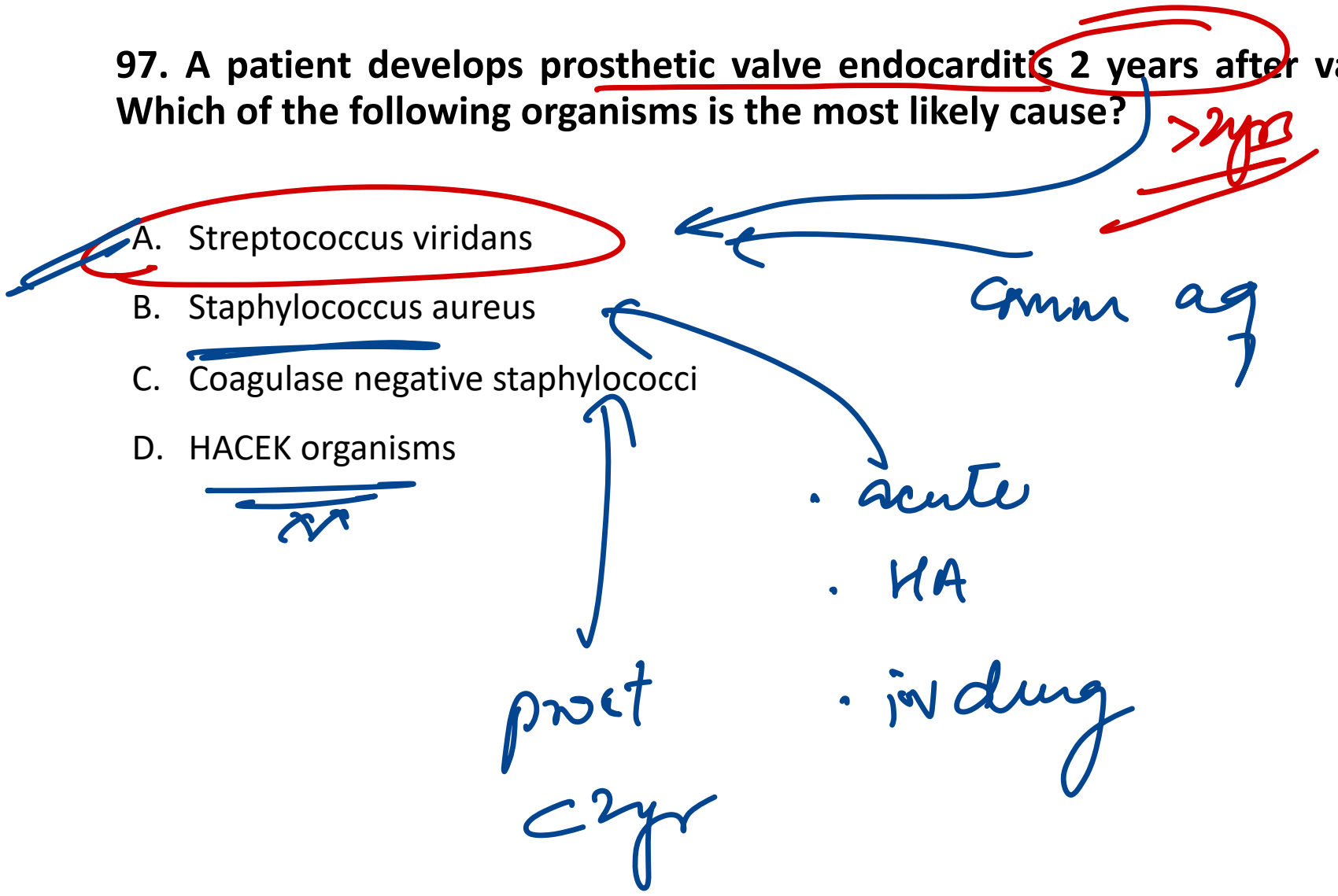
97. A patient develops prosthetic valve endocarditis 2 years after valve replacement surgery. Which of the following organisms is the most likely cause?

A. Streptococcus viridans

B. Staphylococcus aureus

C. Coagulase negative staphylococci

D. HACEK organisms



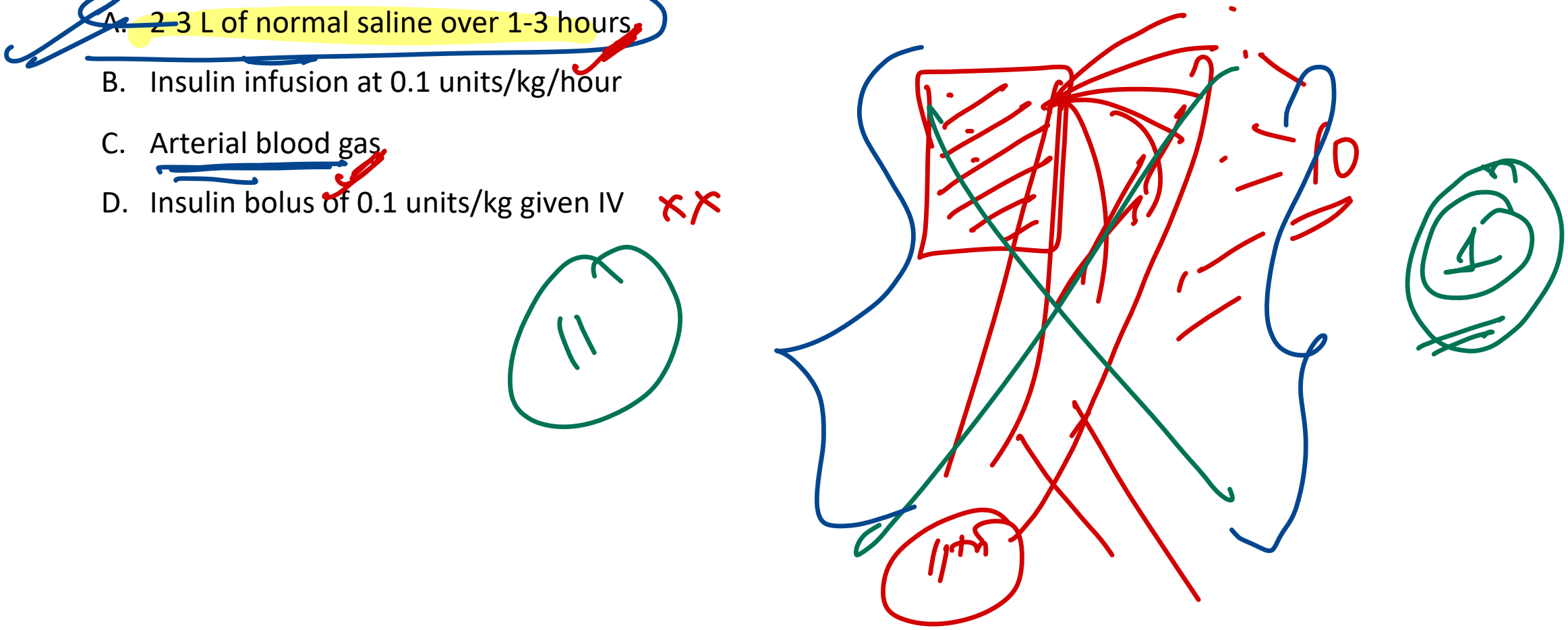
98. A 12-year-old child who is known to have type 1 diabetes mellitus presents with confusion and drowsiness. Her mother says that she seems to be breathing very fast. On examination, mucous membranes are dry and blood pressure is 70/50 mm Hg. Random blood glucose is 415 mg/dl and urine ketones are 4+. What is the next best step in management?

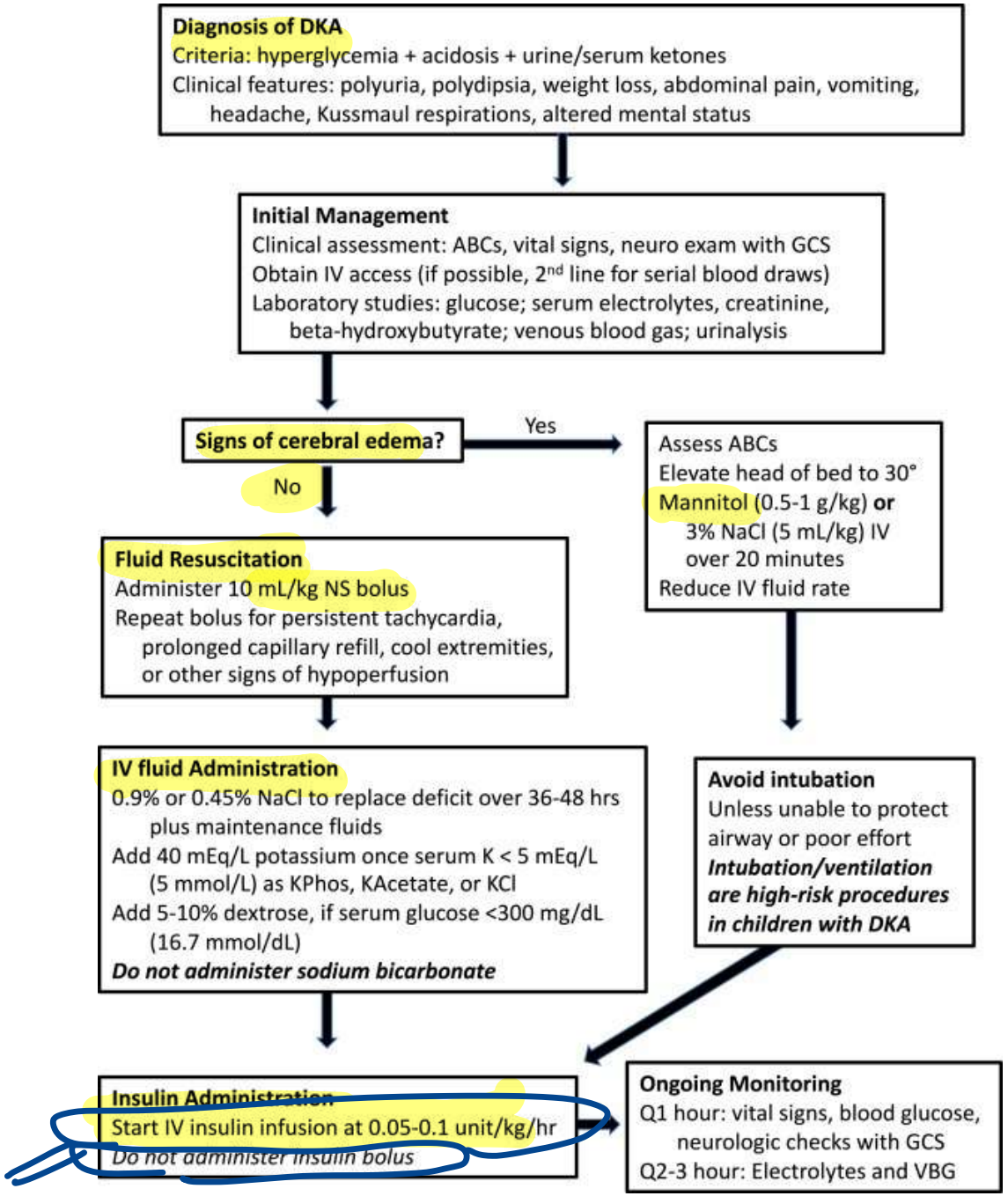
A. 2-3 L of normal saline over 1-3 hours

B. Insulin infusion at 0.1 units/kg/hour

C. Arterial blood gas

D. Insulin bolus of 0.1 units/kg given IV




Diagnosis of DKA
Criteria: hyperglycemia + acidosis + urine/serum ketones
Clinical features: polyuria, polydipsia, weight loss, abdominal pain, vomiting, headache, Kussmaul respirations, altered mental status
Initial Management
Clinical assessment: ABCs, vital signs, neuro exam with GCS
Obtain IV access (if possible, 2nd line for serial blood draws)
Laboratory studies: glucose; serum electrolytes, creatinine, beta-hydroxybutyrate; venous blood gas; urinalysis
Signs of cerebral edema?
Yes
Assess ABCs
Elevate head of bed to 30°
Mannitol (0.5-1 g/kg) or 3% NaCl (5 mL/kg) IV over 20 minutes
Reduce IV fluid rate
No
Fluid Resuscitation
Administer 10 mL/kg NS bolus
Repeat bolus for persistent tachycardia, prolonged capillary refill, cool extremities, or other signs of hypoperfusion
IV fluid Administration
0.9% or 0.45% NaCl to replace deficit over 36-48 hrs plus maintenance fluids
Add 40 mEq/L potassium once serum K < 5 mEq/L (5 mmol/L) as KPhos, KAcetate, or KCl
Add 5-10% dextrose, if serum glucose <300 mg/dL (16.7 mmol/dL)
Do not administer sodium bicarbonate
Avoid intubation
Unless unable to protect airway or poor effort
Intubation/ventilation are high-risk procedures in children with DKA
Insulin Administration
Start IV insulin infusion at 0.05-0.1 unit/kg/hr
Do not administer insulin bolus
Ongoing Monitoring
Q1 hour: vital signs, blood glucose, neurologic checks with GCS
Q2-3 hour: Electrolytes and VBG

99. A 52-year-old male with Autosomal Dominant Polycystic Kidney Disease (ADPKD) was started on tolvaptan therapy. A few weeks later, he presents with symptoms of dry mouth and increased thirst. What is the likely mechanism behind these symptoms?

A. Increased free water clearance

B. V2 receptor agonism

C. Increased renal cAMP levels

D. Increase in urine osmolality

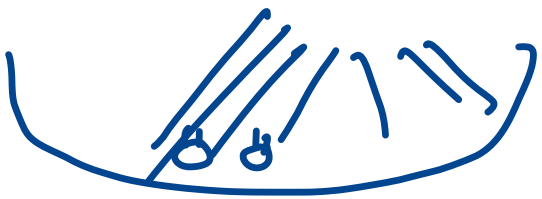
100. 55-year-old woman with a history of Crohn disease is admitted to the hospital due to perforated appendicitis. The patient quickly develops respiratory difficulty, and acute respiratory distress syndrome is diagnosed. She is intubated and mechanically ventilated with positive pressure ventilation. She is intermittently placed in the prone position while mechanically ventilated. Which of the following is most likely to occur due to this position change?

A. Alveolar hyperdistention

B. Decreased cardiac output

C. Decreased functional residual capacity

D. Improved ventilation-perfusion matching



alv distension → post alveoli

101. A 6-week-old term boy is brought to the OPD due to increased fussiness and poor weight gain. The patient has several wet diapers per day. His anterior fontanelle is flat and mucous membranes are dry. Laboratory results include the following:

Sodium: 148 mEq/L

Potassium: 3.5 mEq/L

Antidiuretic hormone: increased

Urinalysis shows a specific gravity of 1.002. Which of the following is the most appropriate treatment for this patient's condition?

A. Desmopressin

B. Hydrochlorothiazide

C. Hydrocortisone

D. Insulin

102. Supravital stain of a peripheral smear of a patient is shown. What is the likely inheritance pattern of this condition?

A. Autosomal dominant inheritance

B. Autosomal recessive inheritance

C. X-linked dominant inheritance

D. X-linked recessive inheritance

G6PD

103. A 23-year-old man is brought to the emergency department after experiencing a generalized tonic-clonic seizure. His roommate says that the patient has had a fever and headache for the past 2 days and that today he was talking nonsensically. MRI of the brain shows swelling of the temporal lobes. CSF analysis is most likely to reveal which of the following patterns?

A. Glucose normal, protein increased, cells increased (RBC)

B. Glucose low, protein increased, cells increased (neutrophils)

C. Glucose normal, protein increased, cells increased (lymphocytes, RBC)

D. Glucose low, protein decreased, cells increased (lymphocytes)

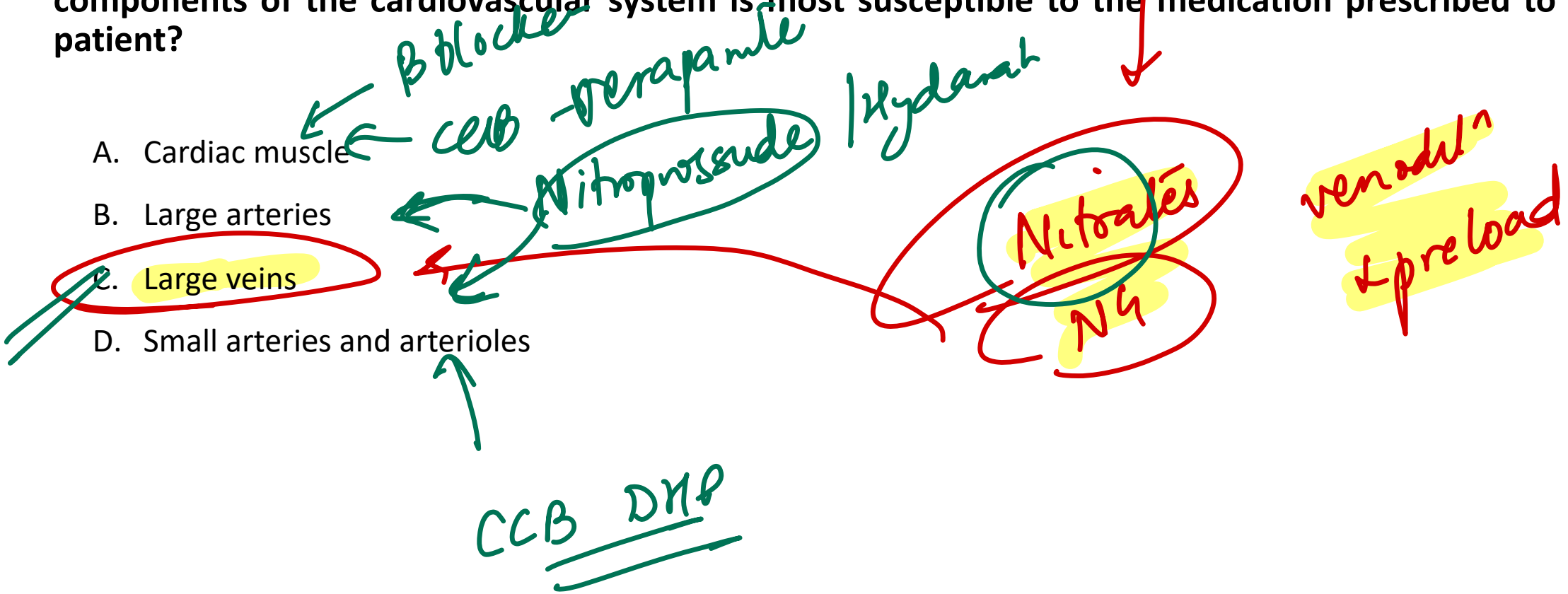
104. 69-year-old man comes to the OPD due to a 6-month history of chest tightness when he walks uphill or climbs stairs. Cardiac examination reveals no murmurs or additional heart sounds. The patient is prescribed a medication that is metabolized to S-nitroso thiols in the vascular smooth muscle cells, and he reports rapid and significant symptom relief. Which of the following components of the cardiovascular system is most susceptible to the medication prescribed to this patient?

A. Cardiac muscle

B. Large arteries

C. Large veins

D. Small arteries and arterioles



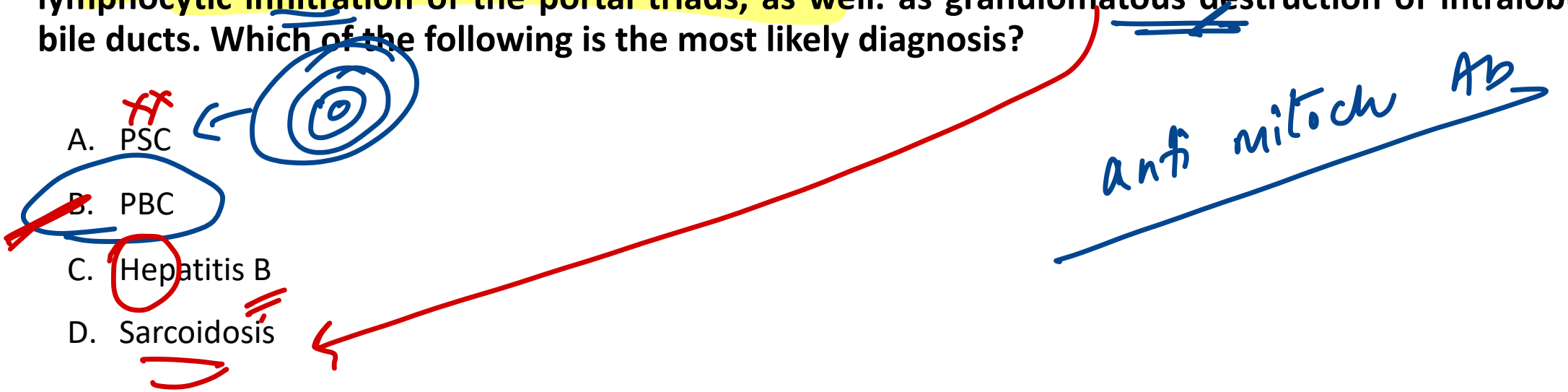
105. 45-year-old woman comes to the OPD for progressive itchiness and fatigue. She also notes yellowing of the eyes and skin. Physical examination shows scleral icterus, multiple excoriations on both the upper and the lower extremities, and hepatomegaly. Liver biopsy reveals dense lymphocytic infiltration of the portal triads, as well. as granulomatous destruction of intralobular bile ducts. Which of the following is the most likely diagnosis?

A. PSC

B. PBC

C. Hepatitis B

D. Sarcoidosis



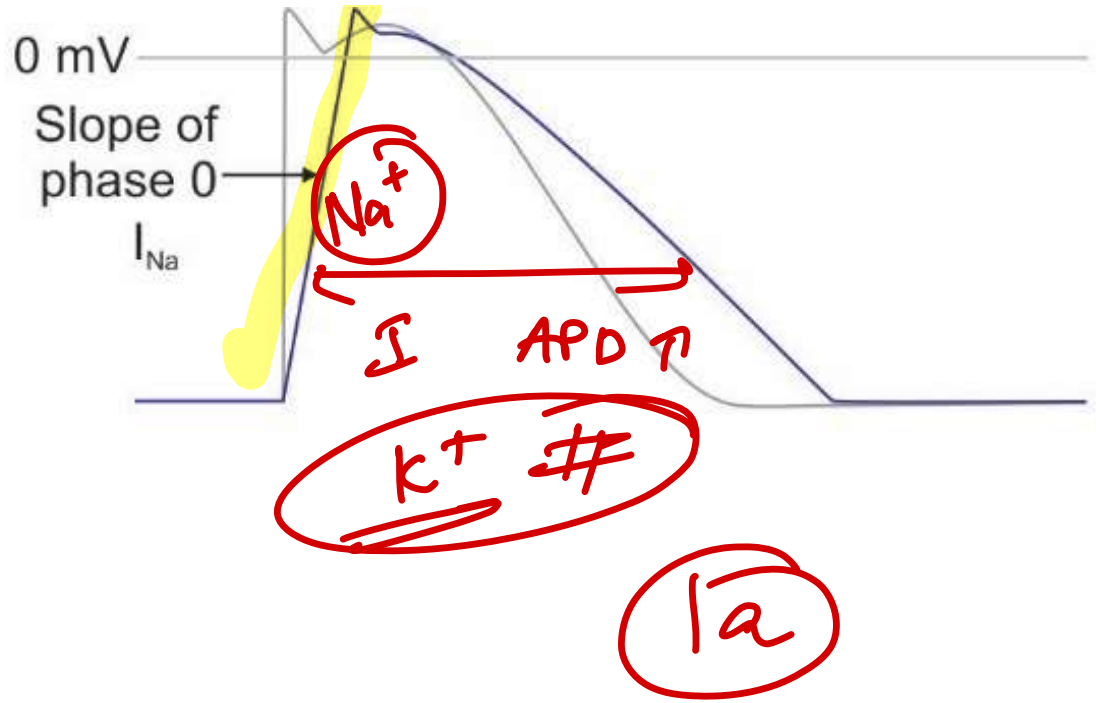
106. 44-year-old man reports exertional shortness of breath and palpitations. On examination, he has a systolic murmur at the left sternal border and cardiac apex, which gets louder when he stands up. He is diagnosed with obstructive hypertrophic cardiomyopathy and paroxysmal atrial fibrillation and is started on a medication. Changes in the action potential of ventricular muscle cells before and after administration of medication are shown in the image below. The patient is most likely being treated with which of the following medications?

A. Lignocaine

B. Digoxin

C. Diltiazem

D. Disopyramide



107. A 7-year-old child presented in OPD with recurrent respiratory infections and thickened sputum. Chest X-ray is shown. Patient also had steatorrhea since birth. What is the likely defect?

A. F508 Deletion

B. F510 deletion

C. P508 frameshift mutation

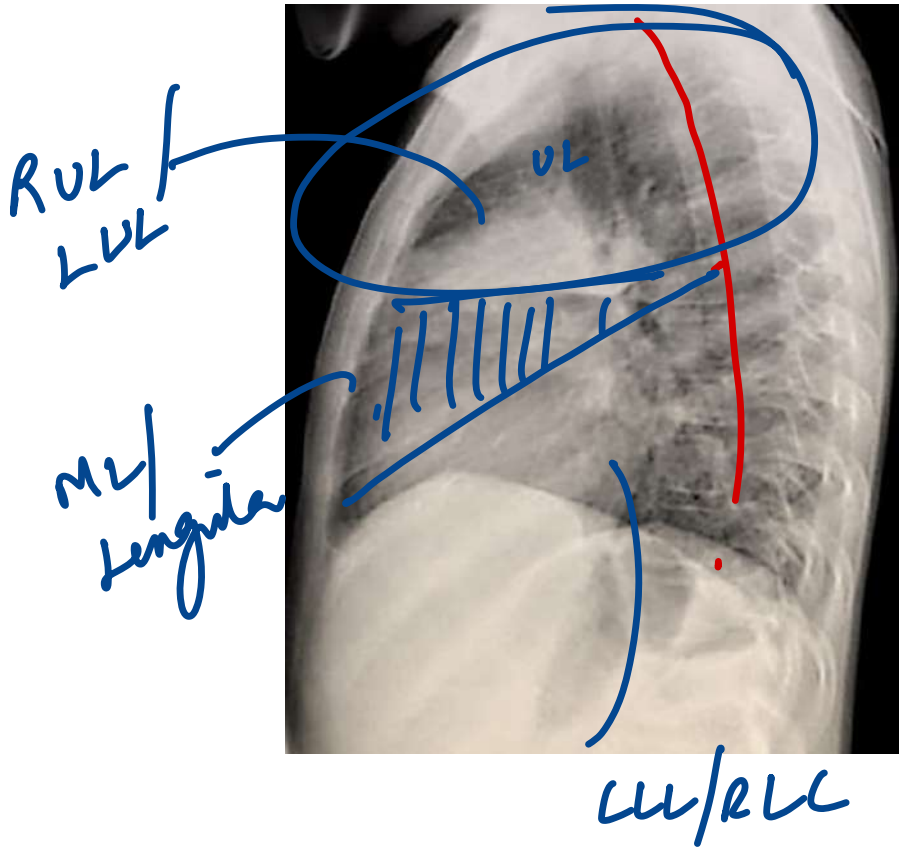
D. P510 frameshift mutation

108. Gaisböck syndrome includes all except?

A. Obesity
B. Normal leukocyte count
C. Erythrocytosis
D. Hypotension

109. A 15-year-old girl is admitted for fever, cough, and malaise for the past two days. She has no history of sick contacts, and all her immunizations are up to date. Her leukocyte count is 21,000/mm with 7% band forms. Upright chest x-ray findings are shown in the image below. Which of the following is the most likely location of the pathologic process in this patient?

A. Left lower lung lobe
B. Left pleural space
C. Right middle lung lobe
D. Right upper lobe



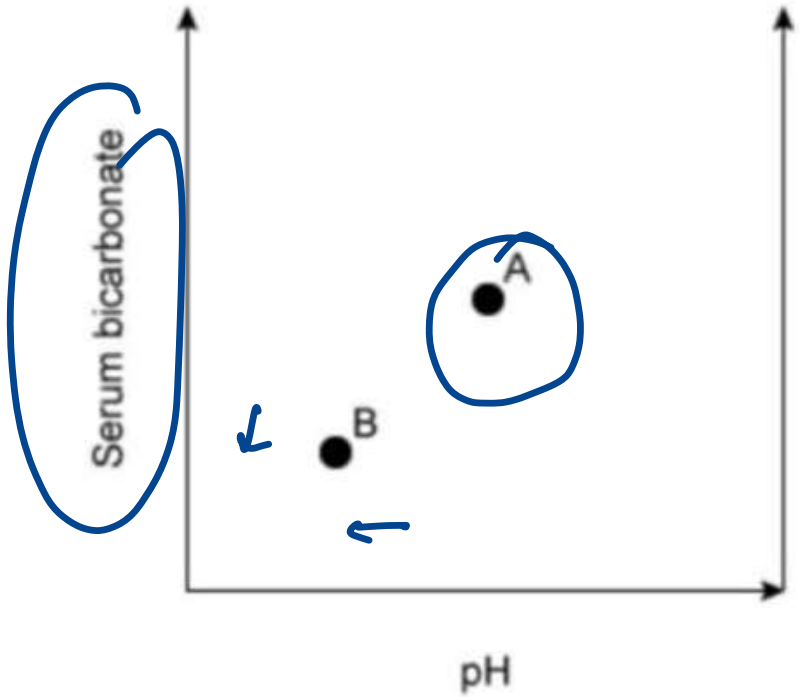
110. A 34-year-old man is brought to the emergency department with new-onset confusion and lethargy The changes in his blood gas parameters are shown in the graph below. Point A represents these parameters at the patient's physiologic baseline, and point B indicates his state on arrival in the emergency department. What is the most likely diagnosis?

A. Metabolic acidosis

B. Metabolic alkalosis

C. Respiratory acidosis

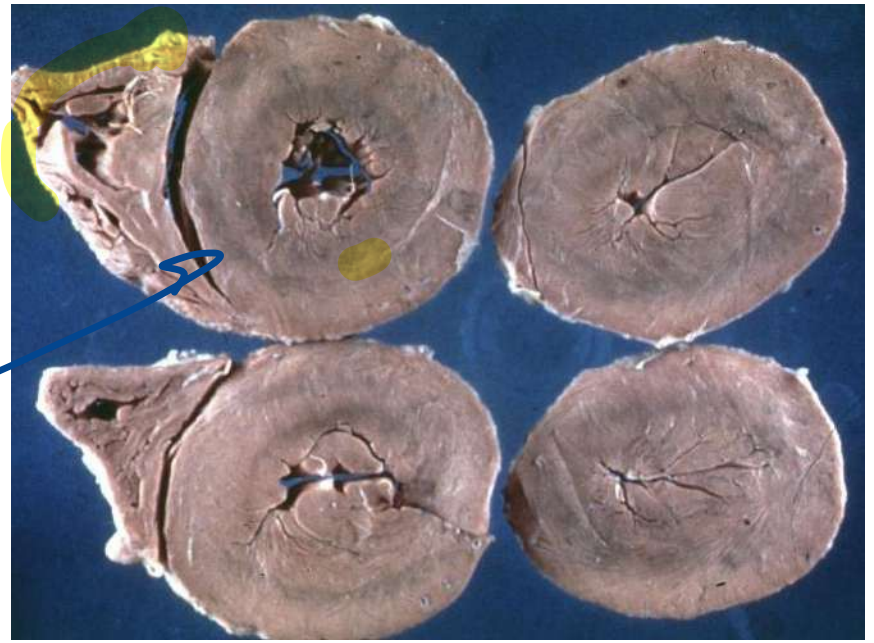
D. Respiratory alkalosis



111. A 25-year-old man was playing soccer when he suddenly collapsed. Despite all attempts to save his life, he died. Autopsy is performed. Gross examination of the heart is shown in the image. If this patient had a preparticipation sports screening, cardiac auscultation would have likely revealed a murmur that increases in intensity after which of the following?

HOCM

A. Passive leg raising
B. Phenylephrine infusion
C. Squatting
D. Sudden standing

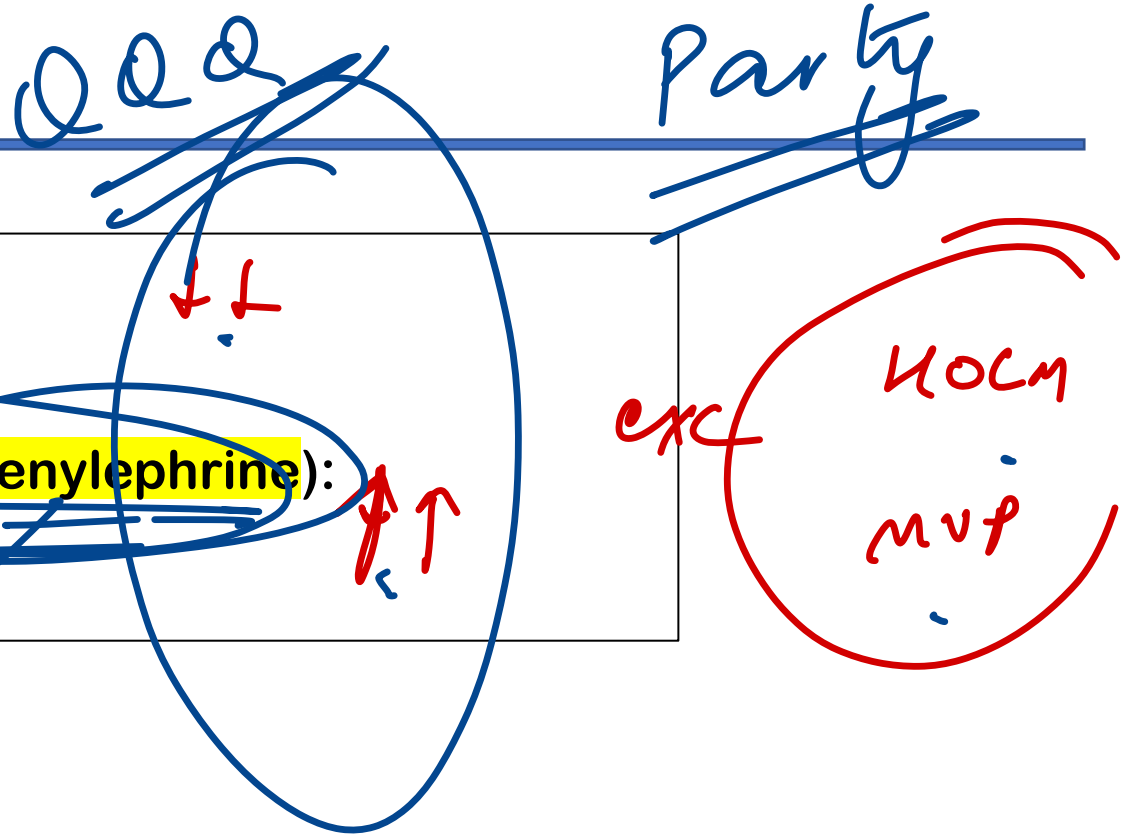


HOCM

Murmurs

Preload reduce (Valsalva/Standing/Nitroglycerin):

Preload increase (Passive leg raise / Squatting/Phenylephrine):



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

Serum Na+ – 120 meq/L
AST – 62 IU/L
ALT – 56 IU/L
HIV – Positive

Options:

A. Streptococcus
B. Legionella
C. Klebsiella
D. Pneumocystis carinii pneumonia

113. A patient is receiving chemotherapy with platinum compounds. Which of the following drugs are used for treatment of chemotherapy induced nausea and vomiting?

A. Granisetron, dexamethasone and aprepitant
B. Metoclopramide, dexamethasone and domperidone
C. Prochlorperazine, granisetron and domperidone
D. Promethazine, doxylamine and metoclopramide

114. 50-year-old man comes to the emergency department due to a large, painful skin lesion. He does not remember sustaining any trauma. He was recently diagnosed with atrial fibrillation, for which warfarin was begun. The patient noticed the lesion about 36 hours after starting the medication. Which of the following is the most likely cause of this patient's skin lesion?

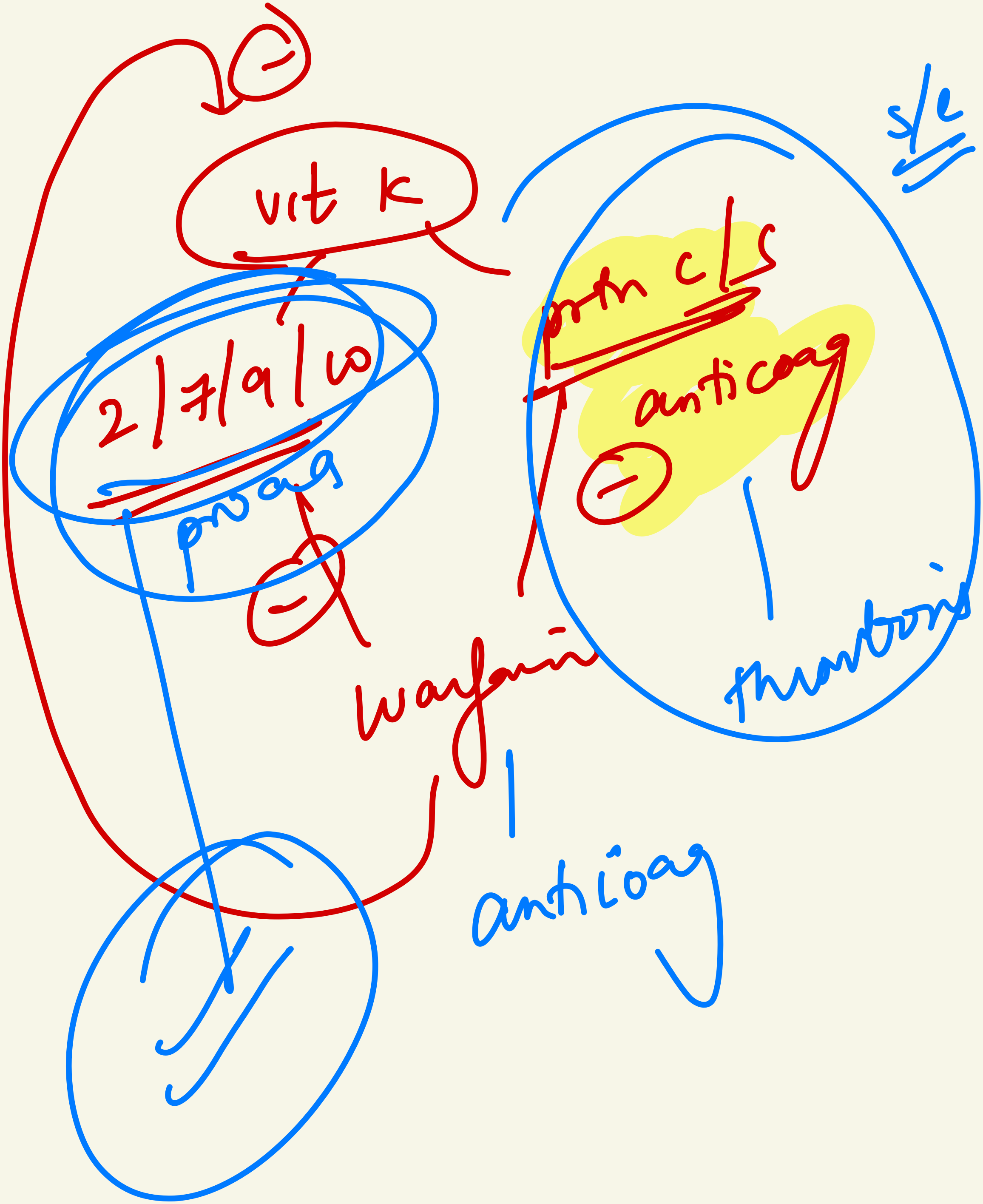
A. Antithrombin deficiency

B. Autoimmune phenomena

C. Protein C deficiency

D. Vitamin K deficiency

dermal skin necrosis


vit K
2/7/9/10
procoag
warfarin
prtn C/S
anticoag
thrombosis
anticoag
s/e

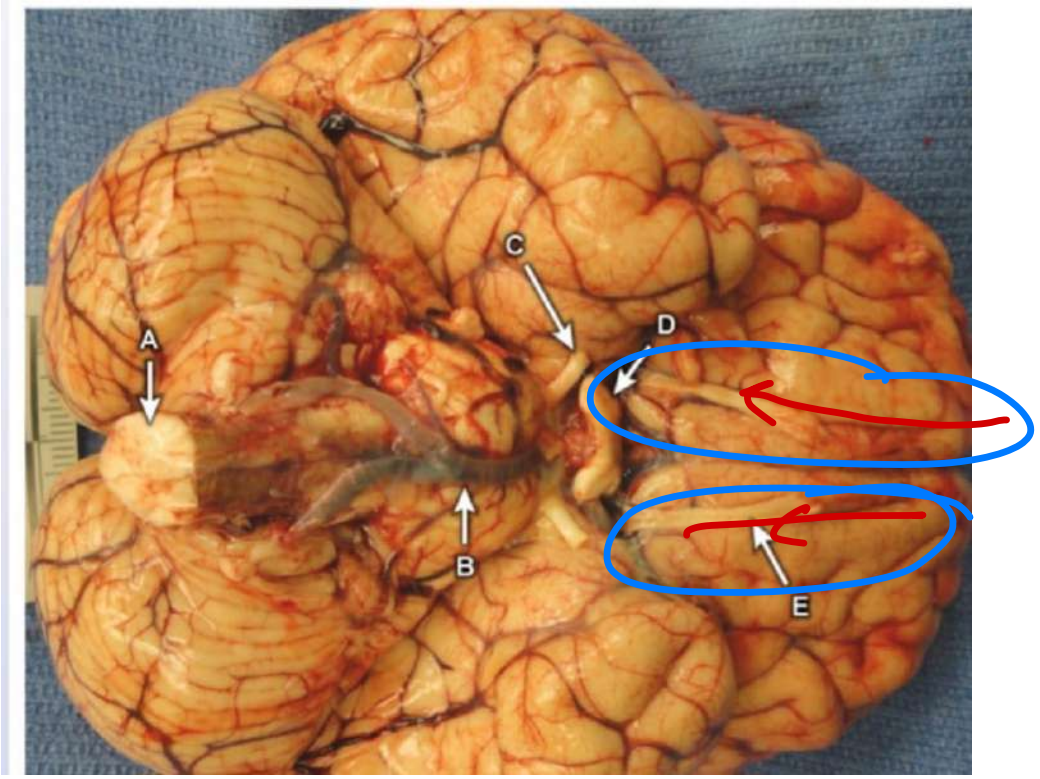
115. 24-year-old man is brought to the emergency department due to seizures. He has had 2 days of worsening fever, headache, and vomiting. Physical examination shows signs of meningeal irritation. The patient rapidly becomes comatose and dies 48 hours later despite aggressive medical care. Autopsy examination shows congested leptomeninges with fibrinopurulent exudate. Microscopy reveals numerous ameba in the exudate and brain tissue. Which of the following is the most likely portal of entry of this pathogen into the CNS?

A. A

B. B

C. C

D. E



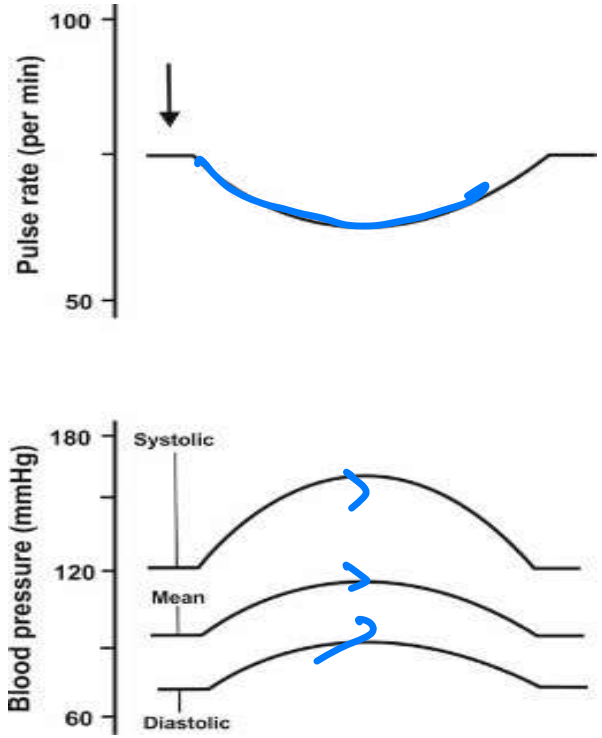
116. Following graph shows response of a drug, identify the drug?

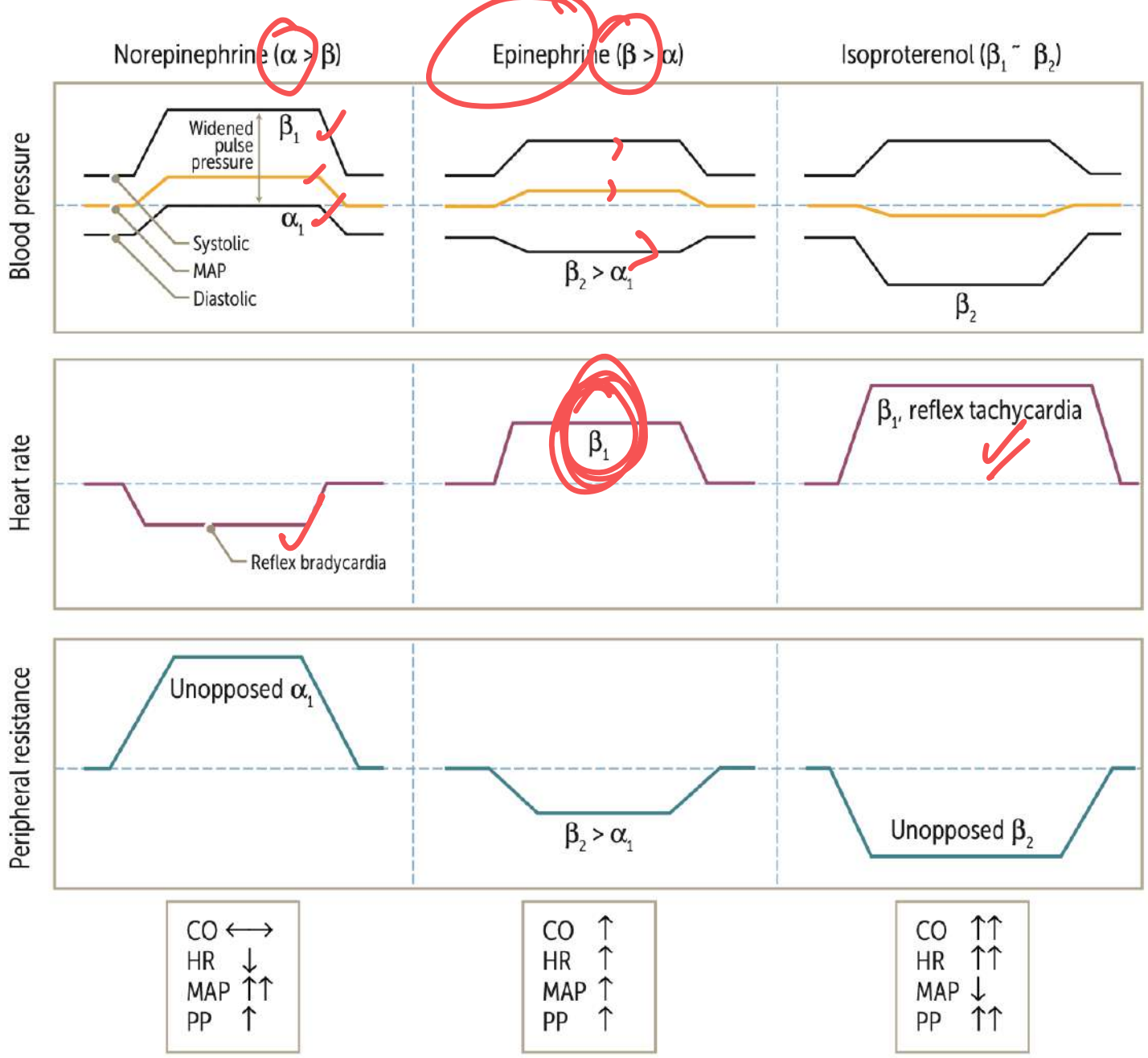
A. Dopamine

B. Epinephrine

C. Isoproterenol

D. Norepinephrine




Norepinephrine (α > β)
Epinephrine (β > α)
Isoproterenol (β1 ~ β2)
Blood pressure
Widened pulse pressure
β1
α1
Systolic
MAP
Diastolic
β2 > α1
β2
Heart rate
β1
β1, reflex tachycardia
Reflex bradycardia
Peripheral resistance
Unopposed α1
β2 > α1
Unopposed β2
CO ⟷
HR ↓
MAP ↑↑
PP ↑
CO ↑
HR ↑
MAP ↑
PP ↑
CO ↑↑
HR ↑↑
MAP ↓
PP ↑↑

117. Which of the following is not a common feature of ABPA?

A. Distal bronchiectasis
B. Cough
C. Wheezing
D. Raised serum IgE levels

Table 2. Diagnostic criteria for ABPA by the international society for human and animal mycology (ISHAM) (2013).[7]

Baseline conditions: asthma and/or cystic fibrosis.	
Mandatory criteria:	
1. IgE specific to *A. fumigatus* (OR)	>0.35 kU/L
2. A positive skin test against *A. fumigatus* (AND)	
3. Total serum IgE	>1000 UI/mL
Other criteria (at least 2 must be present)	
1. IgG against *A. fumigatus* (OR)	>27 mg/L
2. Radiological changes typical of ABPA (OR) • Central and proximal cylindrical bronchiectasis • Alterations predominantly in the upper lobe • Nodules • Atelectasis • Air trapping	
3. Total eosinophil count	>500 cells/UL

ABPA, allergic bronchopulmonary aspergillosis.

118. Which of the following patients comes under the category III non-heart-beating donor?

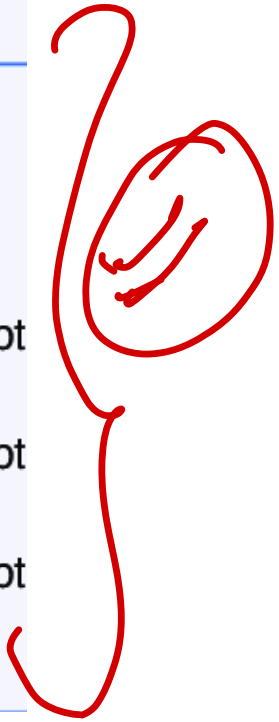
A. A patient who died during transportation to the hospital

B. A patient who died after failed resuscitation after reaching the hospital

C. A patient who was brought dead to the hospital

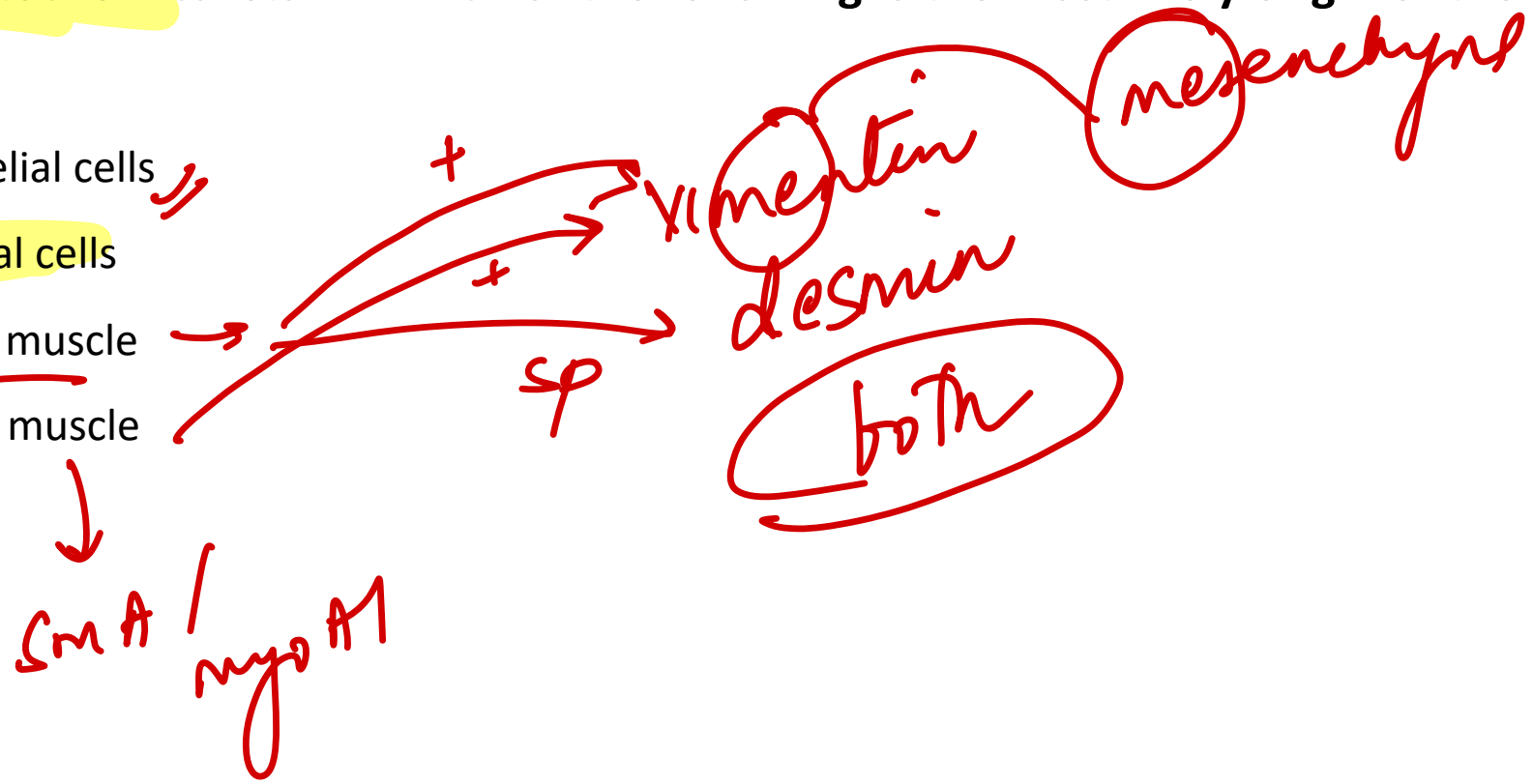
D. A patient who is awaiting death in the hospital

Maastricht classification	Presentation of death	DCD situation	Organs procurable
I	Dead on arrival	Uncontrolled	Tissue (heart valves, cornea)
II	Unsuccessful resuscitation	Uncontrolled	Kidney
III	Anticipated cardiac arrest	Controlled	All organs except heart
IV	Cardiac arrest in brain dead donor	Controlled	All organs except heart
V	Unexpected cardiac arrest in a hospital inpatient	Uncontrolled	All organs except heart



119. 54-year-old man comes to the OPD due to a neck mass that has been slowly growing over the past 3 months. He has smoked a pack of cigarettes per day for the last 30 years and has used alcohol occasionally. Physical examination reveals a 2-cm, hard, left-sided supraclavicular lymph node. Biopsy of the lymph node reveals anaplastic cells that are diffusely positive for cytokeratin immunohistochemical stain. Which of the following is the most likely origin of the cells detected on the biopsy?

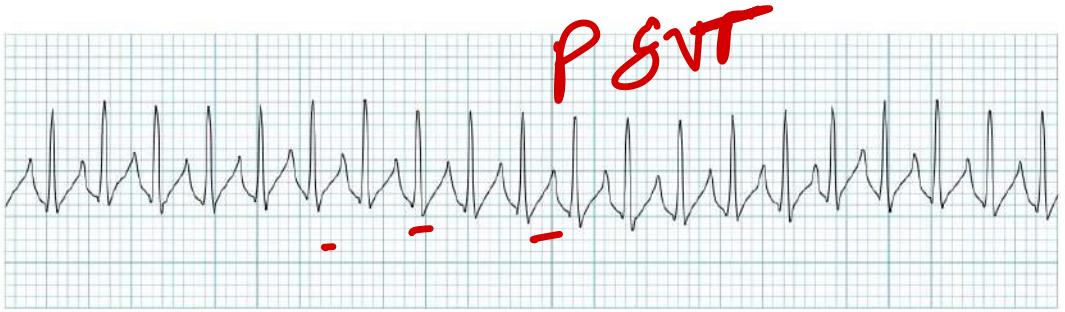
A. Endothelial cells
B. Epithelial cells
C. Skeletal muscle
D. Smooth muscle



120. 56-year-old man comes to the emergency department due to chest palpitations The patient feels that his heartbeat is fast and irregular. The patient normally drinks only 2-3 times a year, but he hosted a party last night for his wife's birthday and consumed a large amount of alcohol. Pulse check confirms the presence of an irregularly irregular rhythm with a rate of 138/min. This patient's ECG strip is most likely to show which of the following?

A.

B.



C.

D.