

Locomotor/respiratory/Cardiovascular

Things highlighted in blue are OSPES

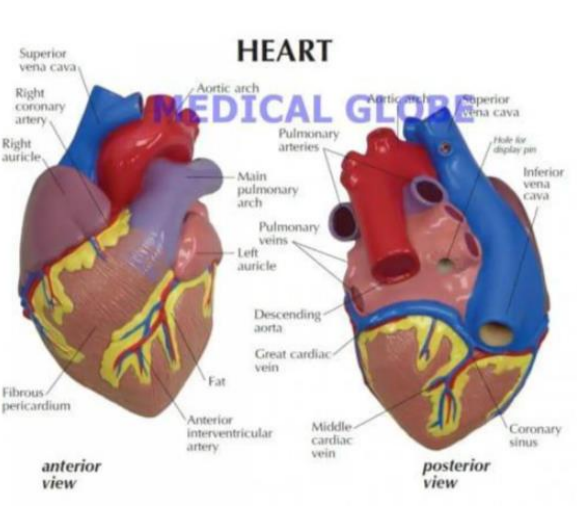
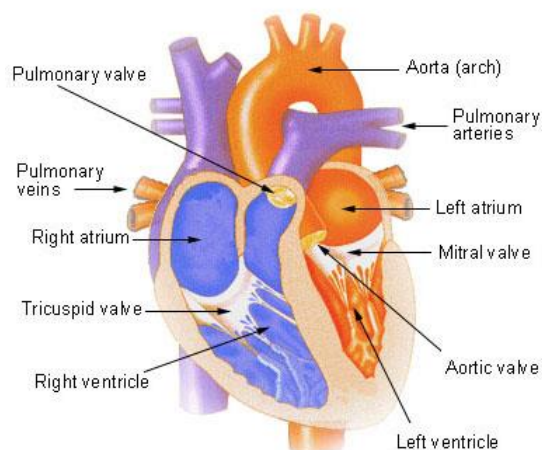
RABBI INNI LIMA ANZALTA ILAYYA MIN KHAYRIN FAQEER
RABBI ZIDNI ILMA

CVS:

anatomy

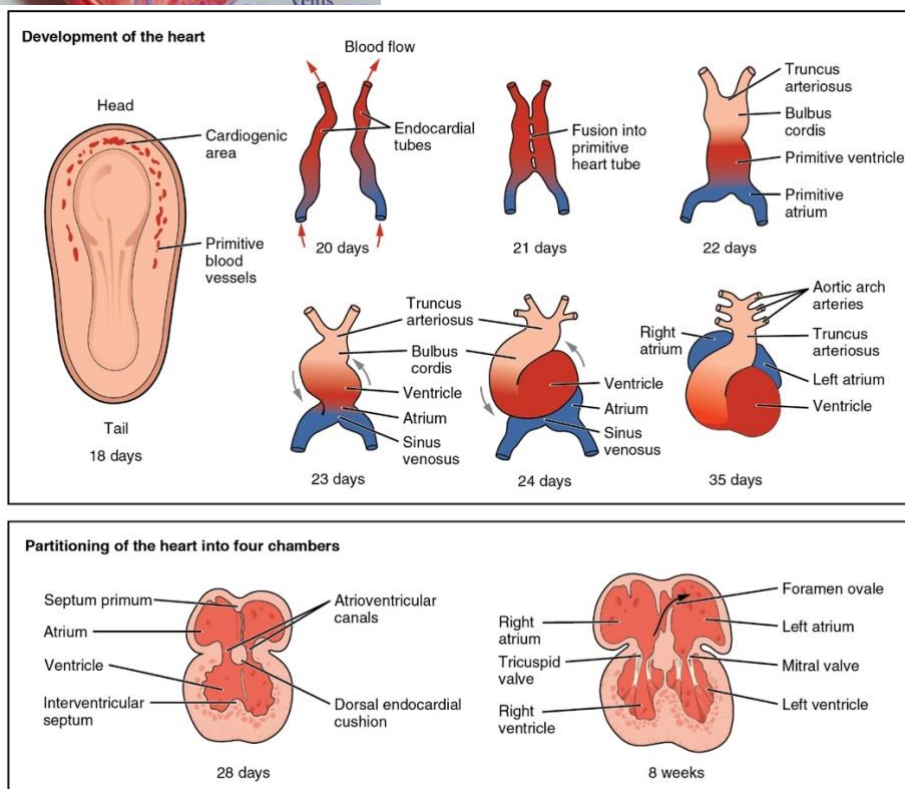
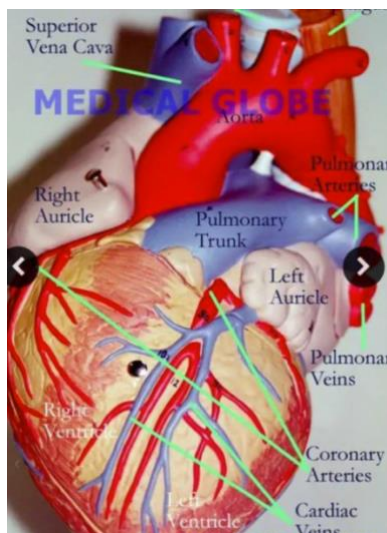
ospe of heart

Internal View of the Heart



Key

1. Right Auricle
2. Right Ventricle
3. Left Auricle
4. Left Ventricle
1. Ascending Aorta
2. Arch of Aorta
3. Brachiocephalic Trunk
4. Left Common Carotid Artery
5. Right Coronary Artery
6. Anterior Interventricular (Left anterior descending) branch of LCA
7. Circumflex branch of LCA
1. Superior vena cava
2. Pulmonary Trunk
3. Great Cardiac Vein
4. Anterior cardiac veins



What is the first branch of aorta?

Coronary artery. Do not make the mistake of naming the brachiocephalic artery as it is the first branch of the arch of the aorta, not the aorta itself.

Describe how Septum Primium and Septum Secundum are formed between the two atria.

Partition starts in the middle of 4th week and completes by 5th week. In 4th week swellings called Endocardial cushions form on dorsal and ventral walls. Cushions approach each other and fuse to separate

single AV canal into right and left AV canal. This canal partially separates the primordial atrium from the ventricle while the endocardial cushions function as AV valves.

Primitive Atrium is divided into right and left atrium by formation and further modification of septum primum and septum secundum. Septum primum is thin membrane which arises from the roof of primitive atrium and grows toward the fusing endocardial cushions. Septum primum grows in a curtain like manner leaving a large opening foramen primum during its fusing with cushions. Septum primum completely fuses with left side of cushion obliterating foramen primum. Before obliteration an opening is formed in the central part of septum primum called foramen secundum. Septum Secundum is a thick membrane it grows from the roof of primitive atrium to the septum primum. It gradually overlaps the foramen secundum such that the septum secundum incompletely partitions the atrium leaving an oval opening called foramen ovale.

Capillary line definition

The smallest type of blood vessel. A capillary connects an arteriole (small artery) to a venule (small vein) to form a network of blood vessels in almost all parts of the body.

What are the types of cardiac shunts?

Atrial septal defect (ASD).

Atrioventricular septal defect.

Patent ductus arteriosus (PDA).

Total/partial anomalous pulmonary venous return (TAPVR/PAPVR).

Ventricular septal defect (VSD).




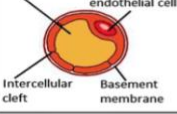
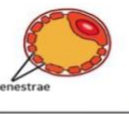
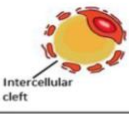
Non murmur producing cyanotic lesion?

Transposition of great vessels

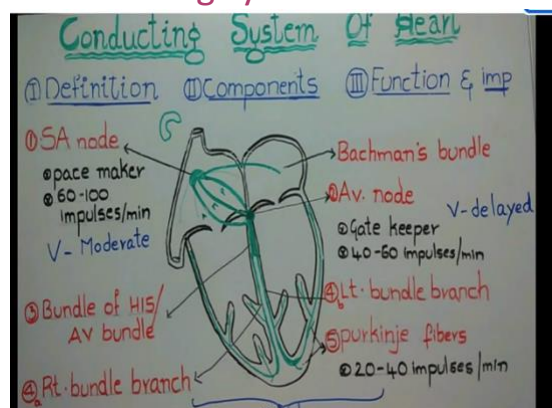
Cardiac index?

The cardiac index (CI) is an assessment of the cardiac output value based on the patient's size. To find the cardiac index, divide the cardiac output by the person's body surface area (BSA). The normal range for CI is 2.5 to 4 L/min/m².

--types with example

CAPILLARY TYPES		
		
		
CONTINUOUS CAPILLARY	FENESTRATED CAPILLARY	DISCONTINUOUS CAPILLARY
Examples: nervous system and muscle.	Examples: glomerular and gut mucosa.	Examples: liver and marrow.

--conducting system of heart



--TOF

The four cardinal features of tetralogy of Fallot include right ventricular outflow tract obstruction, ventricular septal defect, right ventricular hypertrophy, and aortic override of the septal defect.

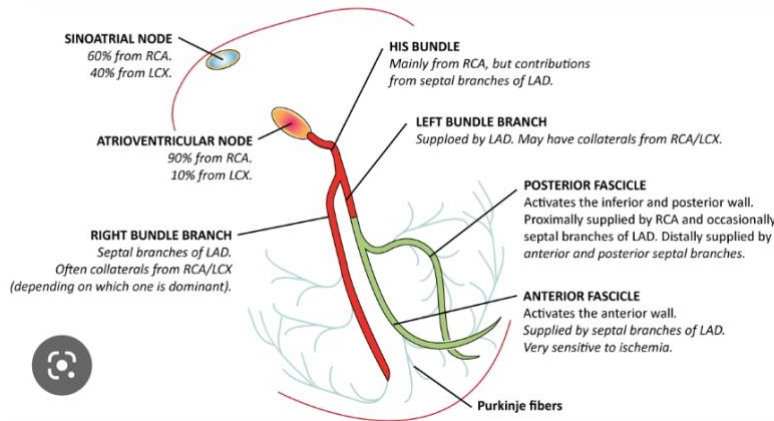
-- MI

A heart attack (myocardial infarction) happens when one or more areas of the heart muscle don't get enough oxygen. This happens when blood flow to the heart muscle is blocked.

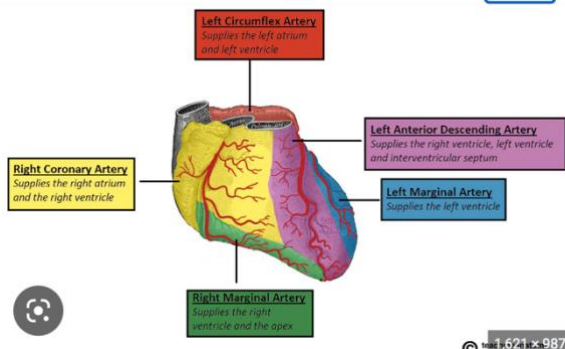
--coronary ischemia

Myocardial ischemia occurs when the blood flow through one or more of your coronary arteries is decreased. The low blood flow decreases the amount of oxygen your heart muscle receives. Myocardial ischemia can develop slowly as arteries become blocked over time.

--blood supply to conducting system



--Blood supply of heart?



--external and internal features of right atrium?

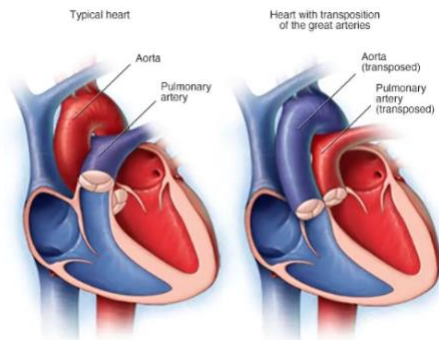
PCT(pectinate muscle,cristae terminalis,tricuspid valve)
Fossa ovalis

--Coarctation of aorta?

Coarctation of the aorta is a birth defect in which a part of the aorta is narrower than usual. If the narrowing is severe enough and if it is not diagnosed, the baby may have serious problems and may need surgery or other procedures soon after birth.

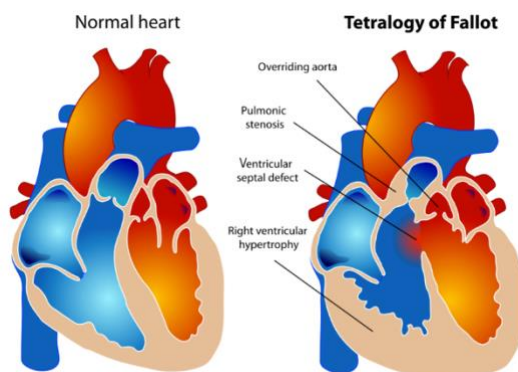
--transposition of great vessels?

Dextro-Transposition (pronounced DECKS-tro trans-poh-ZI-shun) of the Great Arteries or d-TGA is a birth defect of the heart in which the two main arteries carrying blood out of the heart – the main pulmonary artery and the aorta – are switched in position, or “transposed.”



Teratology of Fallot?

tetralogy of Fallot (pronounced te-tral-uh-jee of Fal-oh) is a birth defect that affects normal blood flow through the heart. It happens when a baby's heart does not form correctly as the baby grows and develops in the mother's womb during pregnancy.



--What are pericytes?

Pericytes, as mural cells covering microvascular capillaries, play an essential role in vascular remodeling and maintaining vascular functions and blood flow. Pericytes are crucial participants in the physiological and pathological processes of cardiovascular disease.

--Foramen ovale in fully developed heart is present as?

Fossa ovalis

--Difference b/w right and left brachiocephalic veins

Due to the anatomic position of the superior vena cava on the right of the middle mediastinum, the left brachiocephalic vein is generally longer than the right, allowing for it to bypass the aortic arch. The right brachiocephalic vein measures typically 2 to 3 cm, while the left measures approximately 6 cm.

--Left coronary artery branches

The left main coronary divides into branches: The left anterior descending artery branches off the left coronary artery and supplies blood to the front of the left side of the heart. The circumflex artery branches off the left coronary artery and encircles the heart muscle.

--Which artery supplies SA node?

Right coronary artery (RCA). The right coronary artery supplies blood to the right ventricle, the right atrium, and the SA (sinoatrial) and AV (atrioventricular) nodes, which regulate the heart rhythm

--What forms the smooth part of left atrium?

The smooth-walled main cavity of the left atrium develops from the pulmonary veins.

--What is crista terminalis ?

The crista terminalis (or terminal ridge) is a ridge of myocardium within the right atrium that extends along the posterolateral wall of the right atrium between the orifice of the superior vena cava to the orifice of the inferior vena cava (IVC)

--What is Cyanosis?

Cyanosis is a bluish color in the skin, lips, and nail beds caused by a shortage of oxygen in the blood. Cyanosis occurs because blood with low levels of oxygen turns blue or purple. This low-oxygen blood causes a blue-purple tint to the skin.

--What are Congenital Defects leading to Cyanosis?

Cyanotic heart defects include:

Tetralogy of Fallot.

Transposition of the great vessels.

Pulmonary atresia.

Total anomalous pulmonary venous return.

Truncus arteriosus.

Hypoplastic left heart syndrome.

Tricuspid valve abnormalities.

--What are the 4 defects in T.O.F.?

Tetralogy of Fallot is the most common cyanotic congenital heart defect, representing about 10% of all congenital heart defects. There are four structural defects: ventricular septal defect (VSD), pulmonary stenosis, overriding aorta, and right ventricular hypertrophy.

--Which defect arises first?
interventricular septum defect

--How is heart cavity separated?

A wall of muscle called the septum separates the left and right atria and the left and right ventricles. These are referred to as the atrial and ventricular septum.

--What is the difference between the separations?

The left and right atria are separated by a fibromuscular wall known as the atrial (interatrial) septum, while the ventricles are separated by a similar structure, known as the ventricular (interventricular) septum.

--Elucidate the Conducting System of Heart.

What is the conduction system of the heart? Your heart's conduction system is the network of nodes (groups of cells that can be either nerve or muscle tissue), specialized cells and electrical signals that keep your heart beating. Two types of cells control your heartbeat: Conducting cells carry the electric signals

--Lymphatic capillary and blood capillary diff

S. No.	Lymph Capillaries	Blood Capillaries
1.	Colourless, difficult to observe	Reddish, easy to observe
2.	Blind (closed at the tip)	Joined to the arterioles at one end and to venules at the another end
3.	Wider than blood capillaries	Narrow than lymph capillaries
4.	Contain colourless lymph	Contain red blood

--Right left coronary artery difference?

COMPARE & CONTRAST THE RIGHT & LEFT CORONARY ARTERIES

RIGHT CORONARY ARTERY

- **ORIGIN** : Rt aortic sinus,
- **COURSE** : between RT auricle and conus & in AVG,
- **GEN. BRANCHES** : VICAN ;
 - V for ventricular,
 - I for interventricular septum (perforators)
 - C for conus,
 - A for atrial
 - N for nodal
- **CRUX** : where AV nodal branch is given off,
- **DISTRIBUTION** :
 - RT atrium,
 - Rt & Lt ventricles on the diaphragmatic surface
 - posterior 1/3 of IVS (one of perforating branches),
 - both nodal tissues
- **POTENTIAL ANASTOMOSES** : with circumflex, LADA, & perforators

LEFT CORONARY ARTERY

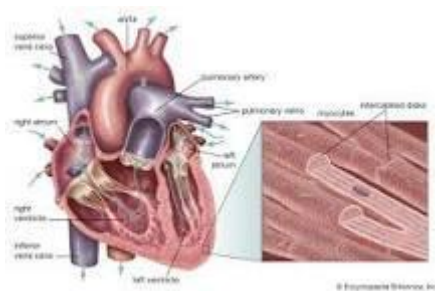
- **ORIGIN** : LT aortic sinus,
- **COURSE** : between LT auricle and conus & in AVG,
- **GEN. BRANCHES** : VICAN ;
 - V for ventricular,
 - I for interventricular septum (perforators)
 - C for conus,
 - A for atrial
 - N for nodal
- **DISTRIBUTION** :
 - Lt atrium,
 - Lt ventricle (most)
 - RT ventricle (some)
 - anterior 2/3 of IVS including bundle of His
 - nodal
- **POTENTIAL ANASTOMOSES** : with RCA, PIVA, & perforators

--Thoracic duct layers?

The tunica media is the thickest coat of the thoracic duct and consists of 4-9 layers of smooth muscle cells organized into inner longitudinal, middle longitudinal and oblique, and outer circular layers. The thickest coat exists in the abdominal thoracic duct

--Vessels opening into right atrium ?
SVC, IVC, CORONARY SINUS

--Features and grooves of heart and vessels in it.



Shallow grooves called the interventricular sulci, containing blood vessels, mark the separation between ventricles on the front and back surfaces of the heart.

--Is circumflex coronary artery branch or continuation of left coronary artery? It's continuation.

--What does endocardial and truncus cushion form?

Atrioventricular septum and septum of truncus arteriosus respectively.

--difference between vessels?

	Arteries	Veins	Capillaries
Function	Send blood from heart	Send blood to heart	Material exchange with tissues
Pressure	High	Low	Low
Lumen Diameter	Narrow	Wide	Extremely narrow (one cell wide)
Wall Thickness	Thick	Thin	Extremely thin (single cell thick)
Wall Layers	Three <ul style="list-style-type: none">• Tunica adventitia• Tunica media• Tunica intima	Three <ul style="list-style-type: none">• Tunica adventitia• Tunica media• Tunica intima	One <ul style="list-style-type: none">• Tunica intima
Muscle & Elastic Fibres	Large amounts	Small amounts	None
Valves	No	Yes	No

--morphology of right atrium

The determination of the atrial morphology is based on the appearance of the atrial appendages. The morphological right atrium is defined by the presence of a broad-based triangular appendage, unlike that of the left atrium, which is long and narrow-based.

--inner structures of right atrium

The internal wall of the right atrium is smooth, but the auricle is interlaced with muscular ridges, the pectinate muscles. Several vestiges of fetal circulation are also present in the right atrium, such as the fossa ovalis, an ovoid depression on the interatrial septum near the opening of the caudal vena cava.

--muscle in right atrium

The main muscles forming the right atrial wall are the terminal crest and terminal pectinate muscles. The terminal crest, the most obvious muscle, is arranged longitudinally with its pectinate muscles connecting to the musculature of the atrioventricular vestibule.

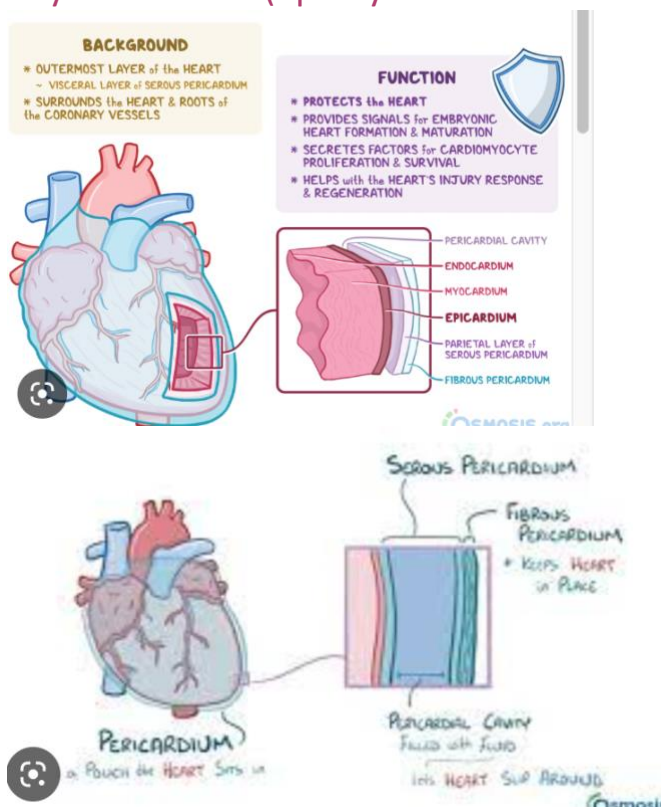
--PDA features

Patent ductus arteriosus (PDA) is a persistent opening between the two major blood vessels leading from the heart. The opening (ductus arteriosus) is a normal part of a baby's circulatory system in the womb that usually closes shortly after birth. If it remains open, it's called a patent ductus arteriosus.⁰⁷

--lining epithelium of heart
endocardium

relation between pleura and pericardium (I don't trust the answer.)
The pericardium is tethered by its reflection around the great vessels and fibrous connection with the vertebral column, sternum, and diaphragm. The outer surface of the pericardium is in direct contact with the pleura. The lungs constitute a space that envelops the heart and pericardium termed the cardiac fossa.

-layers of heart (epi myo and endocardium)



Q: What is another name for visceral pericardium?

A: Epicardium

Q: What is the surface anatomy of apex?

A: Mid-clavicular line, left 5th intercostal space

Q: What are the superior and inferior attachments of fibrous layer?

A: Superiorly to great vessels, inferiorly to central tendon sheath of diaphragm.

Q: What is fossa ovalis remnant of?

A: Foramen Ovale

Q: What is the crista terminalis?

A: Smooth ridge beginning at the opening of superior vena cava, derived from the right horn of the sinus venosus.

Q: How is syncytium of cardiac muscle made?

A: Through *gap junctions* in myocytes and *branches* between myocytes, which allows impulse to spread to neighboring myocytes.

Q: What are examples of elastic arteries?

A: Brachiocephalic, subclavian, common carotid, common iliac, etc.

Q: What is the difference between artery and vein?

A: Arteries have narrow lumen, thicker tunica media, more muscle layers. Veins have larger, irregular lumen, thin tunica media with a large tunica adventitia.

Q: What are layers of blood vessel?

A: From inside to outside, it is tunica intima, tunica media, and tunica adventitia.

Q: What are examples of muscular arteries?

A: Femoral Artery, Brachial Artery, Radial Artery, Popliteal Artery, etc.

Q: Where are continuous capillaries found?

A: Brain, lungs, etc.

Q: Where are discontinuous capillaries found?

A: Liver, spleen, etc.

Q: What is a gap junction?

A: Composed of fascia adherens, macula adherens, and hemidesmosomes. It allows the passage of ions/electrolytes between cells. They are found in cardiac myocytes.

Q: Where are gap junctions found?

A: Cardiac Myocytes

Q: What are the types of capillaries?

A: Continuous, Fenestrated, and Discontinuous

Q: What are divisions of coronary arteries and their tributaries?

A: Left Coronary Artery (circumflex & anterior descending branches) and Right Coronary Artery (marginal & posterior descending branches).

Q: What parts of the heart form the 4 borders?

A: Right Border = right atrium, Left Border = left ventricle, Superior Border = right and left atria, Inferior Border = right ventricle.

Q: Give an example of a cyanotic heart disease.

A: Tetralogy of Fallot, Pulmonary Atresia, Tricuspid Atresia, etc.

Average diet is rich in which type of lipids?

Normal adult consumes 60-150g of lipids per day. Most of it in the form of Triglycerides.

What is the storage form of Lipids?

Lipids are stored in adipose tissue as fat droplets composed of Triglycerides.

What do cholesterol synthesize?

Cholesterol is an important precursor in the synthesis of steroid hormones such as corticosteroids, aldosterone, estrogen and testosterone.

What is the role of HDL?

Removes cholesterol and protects from heart disease.

What are oxidants?

Oxidants are substances that cause others to lose electrons, and can create free radicals. Common ones include hydrogen peroxide.

What are anti-oxidants?

Anti-oxidants inhibit the oxidation of other molecules that when oxidized produce free radicals. They do so by being oxidizing themselves, which by definition makes them reduction agents. Common anti-oxidants are Vitamin C, glutathione, and Vitamine A.

What are free radicals?

Free radicals are substances with unpaired valence electrons. They play an important role in biological processes, both good and bad. They are necessary for killing of bacteria by granulocytes and macrophages, but the same free radicals can participate in causing cell damage.

Why does margarine melt before butter?

Margarine has a higher degree of unsaturation of fatty acids.

Which polyunsaturated fatty acid is involved in the synthesis of prostaglandins?

Arachidonic Acid

How many double bonds, and how many carbon atoms in Arachidonic Acid?

20 carbon atoms, and 4 cis double bonds.

What is Cholesterol?

cholesterol is a structural component of cell membrane; its flexibility contributes to the rigidity of the cell membrane it is the precursor of bile acids, steroid hormones and vitamin D3 it prevents water evaporation from the skin and is a major component of plasma lipoproteins the liver regulates the body's cholesterol balance the human body can synthesize about 3gm of cholesterol a day

What are the Cardiac Enzymes?

cardiac enzymes measure the levels of enzymes and proteins that are linked to the injury of heart muscles creatine kinase and proteins troponin I and troponin T these enzymes are usually low in your blood but increase when you have a MI and leak out of myocardial cells and their level in the blood stream rise

Troponin I is the most sensitive marker for MI levels rise about 2-4 hours after infarction, peak at 24 hours, and return to normal after about 7-10 days CK-MB is useful for detection reinfarction after an initial MI levels rise 4-6 hours after infarction, peak at 24 hours and return to normal by 72 hours

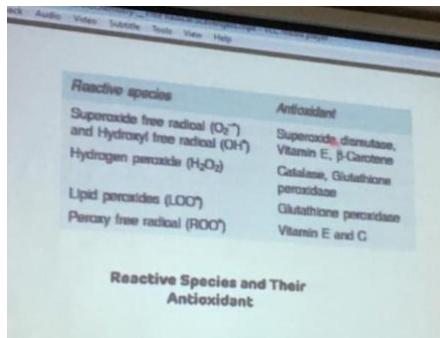
What are Lipoproteins?

lipoproteins are composed of triglycerides, cholesterol, cholesterol esters, phospholipids and purified proteins there are 5 types chylomicrons, VLDLs, IDLs, LDLs, and HDLs

What is the composition of Surfactant?

surfactant is mainly made up of phospholipids and proteins the main component is dipalmitoylphosphatidylcholine it decreases surface tension in the alveoli and keeps them from collapsing

Oxidants and antioxidants example?



Reactive species	Antioxidant
Superoxide free radical ($O_2^{\cdot-}$) and Hydroxyl free radical (OH^{\cdot})	Superoxide dismutase, Vitamin E, β -Carotene
Hydrogen peroxide (H_2O_2)	Catalase, Glutathione peroxidase
Lipid peroxides (LOO $^{\cdot}$)	Glutathione peroxidase
Peroxy free radical (ROO $^{\cdot}$)	Vitamin E and C

Reactive Species and Their Antioxidant

Isoenzymes of LDH?

Isoenzyme name	Composition	Composition	Present in	Elevated in
LDH ₁	(H ₄)	HHHH	Myocardium, RBC	myocardial infarction
LDH ₂	(H ₃ M ₁)	HHHM	Myocardium, RBC	
LDH ₃	(H ₂ M ₂)	HHMM	Kidney, Skeletal muscle	
LDH ₄	(H ₁ M ₃)	HMMM	Kidney, Skeletal muscle	
LDH ₅	(M ₄)	MMMM	Skeletal muscle, Liver	Skeletal muscle and liver diseases

What kind of fat is in our diet?

There are four major dietary fats in food:

Saturated fats. Trans fats. Monounsaturated fats. Polyunsaturated fats.

which fatty acid form prostaglandin

Omega-6 (ω -6) polyunsaturated fatty acids (PUFA), abundant in the Western diet, are precursors for a number of key mediators of inflammation including the 2-series of prostaglandins (PG). Arachidonic acid makes it

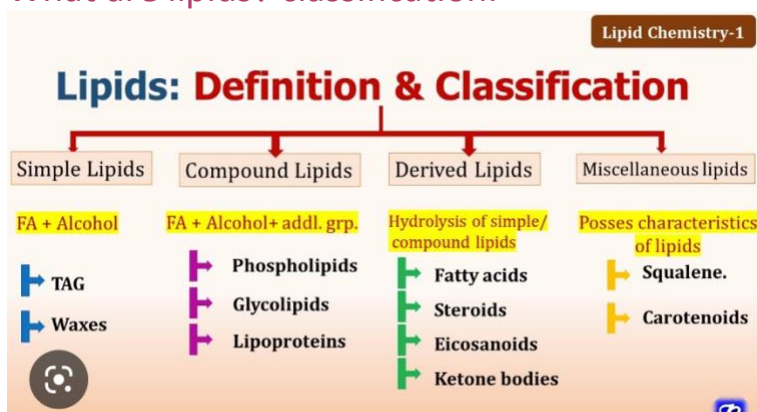
Why hemolysed blood is not used for the determination of CK-MB?

Hemolysis can cause falsely elevated creatine kinase (CK) values when spectrophotometric methods of measurement are used. This apparent increase in CK is due to the red blood cell enzyme adenylate kinase.

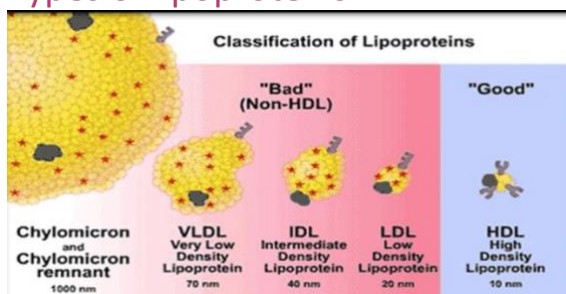
Difference between ghee and oil?



What are lipids? classification.



Types of lipoproteins



Which disease is cause if LDL receptor not present

Type 2 a hyperlipidemia

Which apo protein is specific to HDL
(Apo A1)

LDH raised in ?

Usually LDH isoenzyme levels increase 24–72 hours following myocardial infarction and reach a peak concentration in 3–4 days. The levels remain elevated for 8 to 14 days, making it a late marker for myocardial infarction.

function of B100/ APO-1

Apolipoprotein B100 (apoB100) is a protein that plays a role in moving cholesterol around your body. It is a form of low density lipoprotein (LDL).

causes of hypernatremia other than eating salt

Hypernatremia involves dehydration, which can have many causes, including not drinking enough fluids, diarrhea, kidney dysfunction, and diuretics. Mainly, people are thirsty, and if hypernatremia worsens, they may become confused or have muscle twitches and seizures. Blood tests are done to measure the sodium level.

why is HDL good cholesterol

HDL (high-density lipoprotein) cholesterol, sometimes called “good” cholesterol, absorbs cholesterol in the blood and carries it back to the liver. The liver then flushes it from the body. High levels of HDL cholesterol can lower your risk for heart disease and stroke.

Why LDH-1 is increased in myocardial infarction?

LDH consists of two subunits: heart (H) and muscle (M). LDH activity in heart and muscle is hundreds-of-times higher than that in normal serum. Hence, if the myocardium, skeletal muscle, or other tissues are damaged, the LDH level in serum is increased significantly (especially the levels of LDH1 and LDH2).

Cardiac enzymes , which comes first

Your doctor will most likely test for an enzyme called troponin. It goes into your blood soon after a heart attack. It stays at high levels even after other enzymes have gone back to normal.

what is troponin T

A troponin test measures the levels of troponin T or troponin I proteins in the blood. These proteins are released when the heart muscle has been damaged, such as occurs with a heart attack. The more damage there is to the heart, the greater the amount of troponin T and I there will be in the blood.

Hypercholesterolemia & causes

Poor diet. Eating too much saturated fat or trans fats can result in unhealthy cholesterol levels. ...

Obesity. Having a body mass index (BMI) of 30 or greater puts you at risk of high cholesterol.

Lack of exercise. Exercise helps boost your body's HDL , the "good," cholesterol.

Smoking. ...

Alcohol. ...

Age.

HDL kese krta hai transfer from periphery to liver book mai hai and Reverse cholesterol transport mai Normal cholesterol level (200)

what are chylomicron remnants

The removal of triglycerides from chylomicrons in the peripheral tissues results in the formation of chylomicron remnants. The remnants are smaller particles that are mainly composed of cholesterol and are taken up by the liver via the Remnant and LDL receptors by recognition of ApoE.

Examples of Free Radicals

Superoxide anion radical.

Hydrogen peroxide.

Hypochlorite.

Nitric oxide radical.

Peroxyntrite radical.

Name some sources of Anti-Oxidants.

allium sulphur compounds – leeks, onions and garlic.

anthocyanins – eggplant, grapes and berries.

beta-carotene – pumpkin, mangoes, apricots, carrots, spinach and parsley.

catechins – red wine and tea.

copper – seafood, lean meat, milk and nuts.

cryptoxanthins – red capsicum, pumpkin and mangoes.

How many molecules of Vitamin A are made by one Beta-Carotene?

One molecule of beta-carotene can be cleaved by human intestinal enzymes into two molecules of vitamin A; thus, beta-carotene is the main dietary source of vitamin A

What are the Sources of Beta-Carotene?

The richest sources of beta-carotene are yellow, orange, and green leafy fruits and vegetables (such as carrots, spinach, lettuce, tomatoes, sweet potatoes, broccoli, cantaloupe, and winter squash).

What is the function of Cardiac Enzymes?

What are cardiac enzymes? Enzymes are proteins that speed up chemical reactions and biological processes around the body. When your heart sustains damage or injury, it releases cardiac enzymes — also known as cardiac biomarkers — that doctors can test to measure the health impact of a suspected heart attack.

TAG function

Triacylglycerides, store energy for the body. Calories are stored in the form of triglycerides in the liver and adipose tissue of the body. Between meals, when the body needs energy, hormones trigger the release of triglycerides into the blood stream.

Na⁺ role in contraction

When muscles are inhibited by high [K⁺]_o or low [Na⁺]_o, acute hormone- or excitation-induced activation of the Na⁺-K⁺ pumps can restore excitability and contractile force in 10-20 min. Conversely, inhibition of the Na⁺-K⁺ pumps by ouabain leads to progressive loss of contractility and endurance.

Apo 1 function

The APOA1 gene provides instructions for making a protein called apolipoprotein A-I (apoA-I). ApoA-I is a component of high-density lipoprotein (HDL). HDL is a molecule that transports cholesterol and certain fats called phospholipids through the bloodstream from the body's tissues to the liver.

TAG breakdown enzyme

The primary enzyme that hydrolyzes triacylglycerol in plasma is lipoprotein lipase. Lipoprotein lipase hydrolyzes triacylglycerol into free fatty acids and 2-monoacylglycerol. pancreatic lipase

In the upper section of the jejunum, TAGs are broken down by pancreatic lipase. This enzyme attacks sn-1 and sn-3 position of TAG to release one 2-monoacylglycerol (MAG) and two free fatty acids, then these molecules are absorbed in the small intestine (Mattson and Beck, 1956; Mattson and Volpenhein, 1964, 1968).

cardiac enzymes

CARDIAC ENZYMES AND TROPONINS

- Cardiac enzymes and troponins are markers of myocardial injury.
- The markers are elevated in myocardial infarction.
- Cardiac enzymes include ;
 1. Creatine phosphokinase (CK)
 2. Aspartate aminotransferase (AST)
 3. Lactate dehydrogenase (LDH)
- Troponins include; troponin I and troponin T

Q: What are free radicals?

A: Highly reactive atoms or compounds with one or more unpaired electrons. Free radicals will oxidize other atoms or compounds.

Q: What are positive effects of antioxidants?

A: Reduced oxidative stress, leading to lower risk of cardiovascular diseases.

Q: What are lipoproteins and types?

A: Class of conjugated lipids (lipid + protein), include chylomicrons, VLDL, IDL, LDL, and HDL.

Q: What is the precursor of cholesterol?

A: Acetyl Coenzyme A (Acetyl CoA)

Q: What is the rate-limiting step of cholesterol metabolism?
A: HMG CoA-reductase

Q: What are antioxidants?
A: Chemical compounds that inhibit or prevent oxidation.

Q: What are examples of antioxidants?
A: Vitamin E, Vitamin C

Q: What are examples of antioxidant enzymes?
A: Glutathione Peroxidase, Glutathione Reductase, Catalases

Q: What proteins are found in the extracellular matrix?
A: Collagen, elastin, proteoglycans, GAGs, etc.

Q: Define extracellular matrix?
A: Large network of proteins and carbohydrates.

Q: What is the function of apoproteins?
A: Solubility and act as ligands for lipoprotein receptors

Q: What are apoproteins of LDL and HDL?
A: LDL is B100, and HDL is A1

Q: What is the action of diuretics during hypertension?
A: Medicine that reduce the salt and water within the body by increasing urination.

Q: Define renin-angiotensin-aldosterone system?
A: System of hormones that plays a role in blood pressure regulation.

Q: What is oxidative stress?
A: It is caused by an imbalance within production and detoxification of reactive oxygen species, or free radicals.

Q: What is the function of chloride in heart?
A: Major extracellular anion, takes part in fluid regulation. Increase may lead to hemodynamic stability, and decrease may result in advanced stages of cardiac failure.

Q: How many types of chloride channels are there in the heart?
A: Protein kinase-A activated chlorine current (Cl PKA), stretch-activated chlorine current, and Ca^{2+} activated chlorine current.

Q: What is the structure of collagen?
A: 3x alpha chains wound together strongly to form a helix.

Q: What helps collagen synthesis?
A: Vitamin C is used in collagen synthesis, in addition to zinc and copper.

Q: What is the function of LDL?
A: Transport of cholesterol from liver to peripheral tissues.

Q: What is the fate of LDL?
A: Travels to liver to be metabolized.

Q: What is the function of HDL?

A: Transport of cholesterol from peripheral tissues to liver, and gives C2, D, and E apoproteins to LDL.

Q: What is the characteristic feature of HDL?

A: Apoprotein A1

Q: What effect does insulin and glucocorticoids have on cholesterol synthesis?

A: Insulin increases cholesterol synthesis, as HMG CoA-reductase synthesis is upregulated. Glucocorticoids decrease cholesterol synthesis, as HMG CoA-reductase synthesis is downregulated.

Q: What is hypernatremia?

A: Increased sodium concentration within the extracellular fluid/plasma (above 145 mEq/L).

Q: What are the causes of hypernatremia?

A: Dehydration, diabetes, excessive intake of salt, etc.

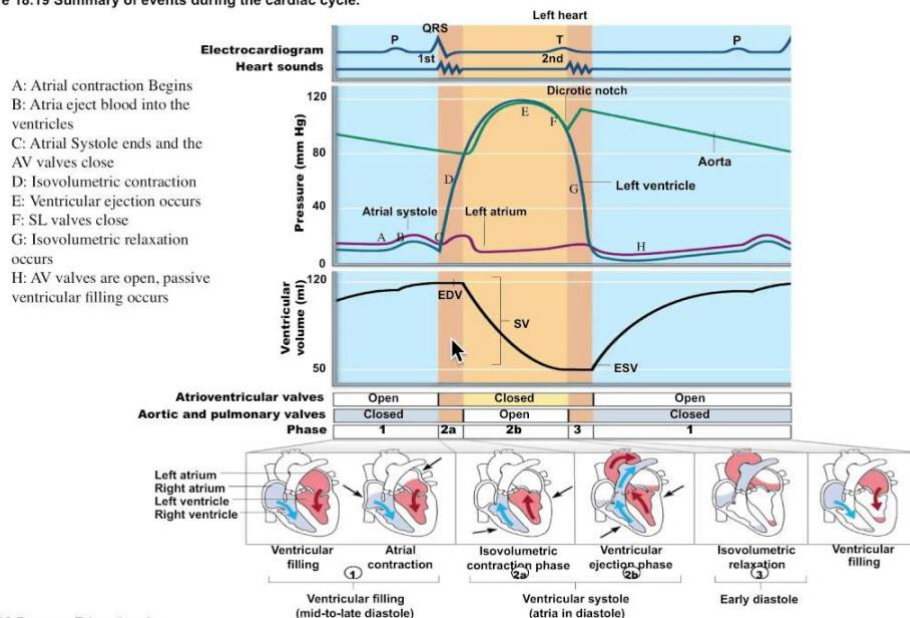
Q: What is the function of ADH in hypernatremia?

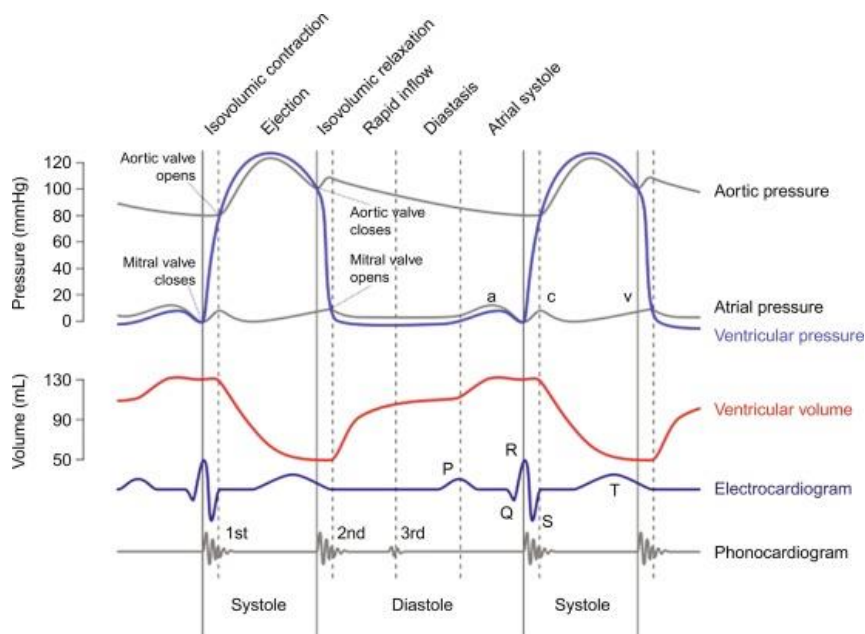
A: ADH is a compound produced by the brain which controls the amount of water reabsorbed from kidneys. More ADH = more resorption & less urine, and vice versa.

physio

Cardiac cycle graph?

Figure 18.19 Summary of events during the cardiac cycle.





What is the cardiac cycle?

The cardiac cycle refers to a complete heartbeat from its generation to the beginning of the next beat, and so includes the diastole, the systole, and the intervening pause.

What are the stages of the cardiac cycle?

Phase 1: Atrial Contraction Phase 2: Isovolumetric Contraction Phase 3: Rapid Ejection Phase 4: Reduced Ejection Phase 5: Isovolumetric Relaxation Phase 6: Rapid Filling Phase 7: Reduced Filling

What is end diastolic volume?

EDV or preload is the volume of blood in the left ventricle, just prior to systole. For a normal adult, it is about 142 mL.

What is end systolic volume?

ESV is the volume of blood left in the left ventricle after contraction. For a normal adult, it is about 47 mL.

What is Stokes Adams syndrome?

Stokes-Adam or cardiovascular syncope, refers to sudden transient episode of syncope (loss of consciousness, due to insufficient blood flow to the brain caused by low blood pressure) occasionally featuring seizures. Results from a second or third degree heart block resulting in inadequate blood flow to the brain.

What are the different heart sounds?

S1: The “Lub”, caused by the bulging back of the atrioventricular valves. S2: The “Dub”, caused by bulging back of the semilunar valves. Shorter and snappier than S1. S3: S3 is created when the ventricles relax and pressure from the filling blood rapidly distends the ventricle. Normal in young individuals, but associated with heart failure in people over 40. S4: Also known as atrial heart sound. It occurs when the atrium contracts & pumps blood to the ventricles. This sound is almost never heard by the stethoscope. Only normal in children.

What does QRS complex show?

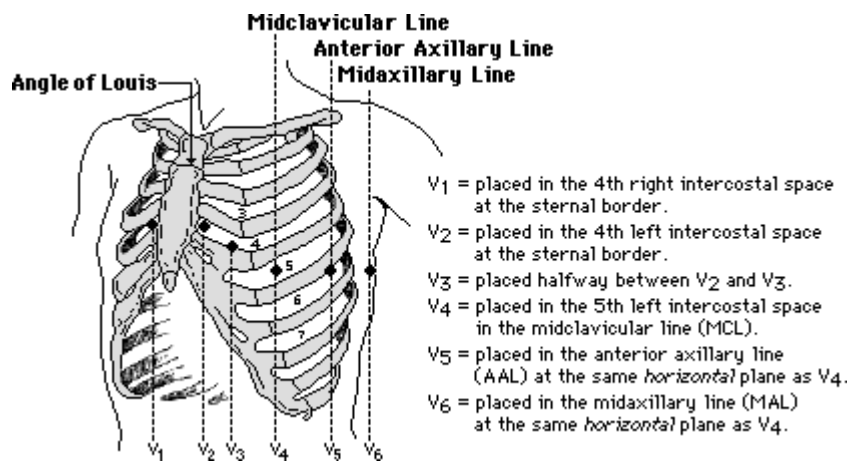
The QRS complex shows the beginning of ventricular depolarization. Ventricular depolarization ends after the T wave

Describe the Leads used in ECG/

Bipolar Limb leads ECG recorded from two specific electrodes connected to the limbs lead 1 positive electrode on left arm, negative on right arm lead 2 - on right arm, + on left leg lead 3 + on left leg, - on left arm

Precordial chest leads ECG is recorded by placing +ve electrode to one of 6 separate positions on chest over heart and by connecting the -ve electrode simultaneously to right arm, left arm and left leg

V1- 4th intercostal space 1 inch away from right sternal border V2- 4th intercostal space 1 inch from left sternal border V3- mid point between V2 and V4 on the sternum V4- 5th intercostal space at left midclavicular line V5- point where axillary line cuts perpendicularly the horizontal line extended from V4 V6- point where mid-axillary line cuts perpendicularly the horizontal line extended from V4



Describe the types of circulation and their function.

pulmonary circuit brings blood to the lungs via pulmonary artery to get oxygenated and then returns to the heart via pulmonary vein going into the left atrium. Systemic circulation receives oxygenated blood from the pulmonary vein. Blood goes through the mitral valve and then left ventricle to the aorta and from there arteries take the oxygenated blood to the tissues where it is utilized to create ATP.

different btw S1 and S2

S1: The “Lub”, caused by the bulging back of the atrioventricular valves.

S2: The “Dub”, caused by bulging back of the semilunar valves. Shorter and snappier than S1.

What is vasovagal syncope?

Vasovagal syndrome is a heart condition that can cause a sudden, rapid drop in heart rate and blood pressure, which leads to fainting. The condition may also be described as a vasovagal or neurocardiogenic syncope, or vasovagal attack.

occurs when you faint because your body overreacts to certain triggers, such as the sight of blood or extreme emotional distress. It may also be called neurocardiogenic syncope.

What is sinus arrhythmia?

changing sinus node rate with the respiratory cycle, on inspiration and expiration.

Q: Define cardiac index?

A: Parameter relating the cardiac output to body's surface area.

Q: Define cardiac output?

A: Volume of blood ejected by each ventricle in one minute.

Q: Define cardiac cycle?

A: Sequence of cardiac events that occur from one heartbeat to another.

Q: What are the phases of cardiac cycle?

A: Atrial Systole, Atrial Diastole, Ventricular Systole (isovolumic contraction, rapid ejection, slow ejection) and Ventricular Diastole (isovolumic relaxation, rapid filling, and slow filling).

Q: What is preload and afterload?

A: Preload is initial stretching of cardiac myocytes prior to contraction. Afterload is the force against which the heart must contract to pump blood.

Q: What are factors affecting cardiac output?

A: Temperature, age, sex, emotional state, etc.

Q: Define blood pressure?

A: Force that the heart must use to pump blood throughout the circulatory system.

Q: What is ECG and its components?

A: Graphical representation of the electrical activity of the heart, includes p-wave, QRS- complex, and T-wave.

Q: Define ejection fraction?

A: Volume of end-diastolic volume that is ejected out the ventricle (60%).

Q: What are the values of end-systolic and end-diastolic volumes?

A: End-systolic is about 50 to 60 mL, end-diastolic is about 110 to 120 mL.

Q: What are a/b/c/d waves?

A: a = is the end-diastolic point at which contraction begins, b = is the point at which pressure rises above aortic pressure opening the aortic valves, c = is the end-systolic point, and d = pressure falls below atrial pressure opening the AV valves. v = end of vent. systole.

Q: What is heart failure?

A: Progressive condition in which the heart is not able to keep up the body's demand of blood with reference to its workload.

Q: What is first degree heart block?

A: Prolonged PR interval of more than 0.20 seconds (normal is 0.16 seconds)

Q: What is third degree heart block?

A: Impulses from SA node does not pass through the AV node due to complete block; dissociation of p-wave from QRS-complex. Ventricles contract in their own rhythm.

- normal blood pressure is 90-120/60-80
- the renin angiotensin system: low blood pressure or nerve impulses in stressful situations, the kidneys release an enzyme called renin, juxtaglomerular kidney cells sense changes in renal perfusion, which is activating angiotensinogen in the liver, the renin catalyzes it into angiotensin 1, which is then activated again by angiotensin 2 by ACE which is located in the lungs. It is a vasoconstrictor, aldosterone is also released because of angiotensin, which increases water reabsorption along with sodium retention. All of this increases systemic blood pressure.
- The inversion of the T wave means there is a MI
- Isovolumetric contraction contraction without emptying of ventricles
- Ejection fraction how much blood left ventricle pumps out each contraction Stroke volume the amount of blood ejected from the ventricle with each cardiac cycle
- Prominent Q wave present in myocardial infarction ECG records the electrical signals in your heart.
- What is PR interval and normal range .12 to .2

Most of the questions were from the past papers, listed here are some of the unique ones asked from me Q which smooth muscle cells are derived from the ectoderm sphincter and dilator pupilli and muscle tissue of sweat glands

Q tracheoesophageal fistula's first diagnostic sign? Polyhydramnios on ultrasound Q is the muscular inter ventricular septum anatomically a part of right or left ventricle? Left ventricle Q list some neurotransmitters (memorize more than six or seven) norepinephrine, epinephrine, acetylcholine, dopamine, glycine, serotonin, GABA Q Two basic teratology of fallos lesion sub pulmonary stenosis and ventricular septal defect (basic here meant the fundamental abnormalities) Q All about iliotibial tract I don't remember the answer to this so please look it up yourself Q oxygen debt excess oxygen, more than the body generally needs, that has to be taken in after events like heavy exercise in order to replenish the stores of oxygen and energy used during the event like myoglobin and creatine phosphate Q Why do we take serial measurements of cardiac markers ? To monitor changes in the levels of the cardiac markers over time to assess the status of and changes in the

rate of myocardial damage over time Q which rises first troponin T or I I is the answer

One last thing, I was asked about the cutaneous supply of leg to which I mentioned the nerves which I have mentioned in the past paper answer, but the examiner told me that there were 2 more nerves mentioned in the answer key with her, even she seemed surprised that there were two more. Please look up into this matter by yourselves

What are veins Differentiate between veins and arteries What is coarctation of aorta Main defects in TOF How are cholesterol transported What are lipoproteins Role of HDL What degrades phospholipids Ldl receptor deficiency leads to What are cardiac markers Which is the first one to be elevated What are the derivatives of 4th aortic arch

Most of the questions were from the past papers, so I am only going to post those that were not Q which smooth cells are derived from the ectoderm Q tracheoesophageal fistula on ultrasound will show what (polyhydramnios) Q is the muscular inter ventricular septum anatomically a part of right or left ventricle? Left ventricle Q list some neurotransmitters (memorize more than six or seven) Q Two basic teratology of Fallot lesion (sub pulmonary stenosis and vsd) Q All about iliotibial tract Q oxygen debt Q Why do we take serial measurements of cardiac markers? Q which rises first troponin T or I (I is the answer)

YOU ARE DOING GREAT , MASHA ALLAH.

By Unaiza (DMC'27)