Subject Review cardiovascular system Date No.

effect the ions in heart rate (increase . decrease) :-

Ca^{+2} increase ⇒ increase heart rate (increase contraction)

K^+ increase ⇒ decrease heart rate (decrease contraction)

Na^+ increase ⇒

↳ possitive ionotropic :- agent that increase Ca^{+2}

negative ionotropic :- agent that decrease Ca^{+2}

sympathatic

centrally (in the heart or near from the heart) ⇒ vasodilation to increase blood flow ⇒ increase heart rate

perephrally (in the perephral far the heart) ⇒ vasoconstriction to decrease the blood flow in perephral organ and back largest possible quantity on the systemic circulation

Subject Review cardiovascular system Date No.

two main circulation in the body ?

1/ systemic circulation :- carry the oxygenated blood

2/ pulmonary circulation :- carry the deoxygenated blood

point of maximal intensity :- the apical impulse hear between five and six ribs if hear between six and seven or seven and eight the patient injured for heart enlargment.

the conduction system :- (four) component

1/ Sinoatrial node :- production the action potential in the right atrium.

2/ atrioventricular node :- the gap junction is small so the transmission of the electrical impulse slower than other cell (bundle of his, and purkinje fiber), and these cell present between atrium and ventride . so the plateau period occure (delay in transmission of action potential)

3/ bundle of his :- atrioventricular bundle, the gap junction is large

4/ purkinje fiber :- the gap junction is large so the electrical impulse transmission more rapid.

the heart component from three type of the tissue :-

1/ pericardium :- act as a protection and composed from three layer :-

① fibrous pericardium ② parietal pericardium ③ visceral pericardium

serous pericardium ← → (epicardium)

2/ myocardium :- around the chamber, resposible on the contraction for the chamber (largest around the left ventricle)

NOTEBOOK

Subject Review cardiovascular system Date No.

sympathatic increase heart rate and contractility.
parasympathatic decrease heart rate and contractility.
atrial fiber and ventricular fiber play an important role in transmitting the action potential in the heart.
the hormone in sympathatic is epinephrine and norepinephrine and the receptor adrenargic receptor (alph, beta)
the hormone in parasympathatic is acetylcholine, and the hormone receptor is cholinargic receptor (nicotinic and muscarinic)

the affected of the sympathatic and parasympathatic on the SA node, AV node, atrial and ventricular fiber:-
SA node:- is the pacemaker of the heart, the effected parasympathatic on the SA node lead to decrease conduction rate, the effected sympathatic on the SA node lead to increase conduction rate:-

AV node:- parasympathatic decrease conduction rate and sympathatic increase conduction rate.

atrial muscle:- parasympathatic decrease conduction rate and sympathatic increase conduction rate

ventricular muscle:- parasympathatic no affected and sympathatic increase contractility so that the affected of sympathatic more strong than parasympathatic on heart rate

Subject Review cardiovascular system Date No.

[3] endocardium :- around the chamber from inside to maintain on the smooth blood flow and composed from endothelial cell.

the compare between the cardiac muscle and skeletal muscle?
[1] shorter than skeletal muscle fiber.
[2] have single nucleus. [3] have striation
[4] depend on aerobic metabolism [5] autorhythmicity
[6] present Mitochondria and smooth endoplasmic reticulum more than skeletal muscle.
[7] present gap junction to transmission the electrical impulse.

Heart sounds :- (four sound)
[1] S_1 caused by closing the Atrioventricular valve. (lubb)
[2] S_2 caused by closing the semilunar valve. (dupp)
[3] S_3 maybe normal (exercise the sport, pregnant women) or abnormal
[4] S_4 always abnormal.

electrocardiogram :-
[1] p-wave :- atrial depolarization. [2] QRS complex :- ventricular depolarization. [3] T-wave :- ventricular repolarization.

patent ductus arteriosus :-
opening the aortic artery to pulmonary artery due to mixing the oxigynated blood with deoxygenated blood.

Subject Review of cardiovascular system Date No.

How the heart maintain homeostasis ?
via pumping the blood

the cardiovascular system composed from three component :-
[1] heart [2] blood [3] blood vessel

[1] blood :- component from
① red blood cell ② white blood cell ③ platlet ④ plasma
↳ transfer O_2, ↳ immune system ↳ cloting ↳ protien,
clearance the cell from CO_2 (40-45)% ↓(1%) nutrient, hormone

[2] blood vessel :- branching of blood vessel
artery, arteriol, capillary (arterial, venus), veniol, vein
characteristics of the blood vessel ?
[1] diameter (near the heart → diameter large)
(far the heart → diameter small)
[2] three layer of the blood vessel
[1] tunica interna :- component from endothelial cell, the Function :-
① the main Function smooth blood flow ② maintain on the vascular tone (contraction, relaxation) ⇒ stimulation on the produce vasoconstricter, vasodilater ③ maintain on the balance between coagulation and anticoagulation and maintain the balance between molecules that stimulate the inflammation and molecules that decrease inflammation

Subject Rewiew of cardiovasculer system Date No.

[2] tunica media :- composed from smooth muscle, the function :- responsible on the contraction and relaxation.

[3] tunica externa :- the function :- protection.

note :- in the capillary not present tunica media (not present smooth muscle), How does blood flow occure ?
present two structure before and after the capillary that help on the blood flow, ① pre-capillary sphincters (before the branches the capillaries ←, component from smooth muscle and help to push blood in these branches) ② metarterioles (after the branches, composed from smooth muscle. ↳ (2-3) capillaries
the right side of the heart carry the deoxigenated blood.
the left side from the heard carry the oxigenated blood (O_2 and nutrient)
Filtration :- process transmission the o_2 and nutrient to interstitial fluid ← from the arterial capillary.

reabsorption :- process transmission the waste and CO_2 from interstitial fluid to venus capillary.
→ the de-oxigenated blood come back to the right side of the heart via superior and inferior vena cava.

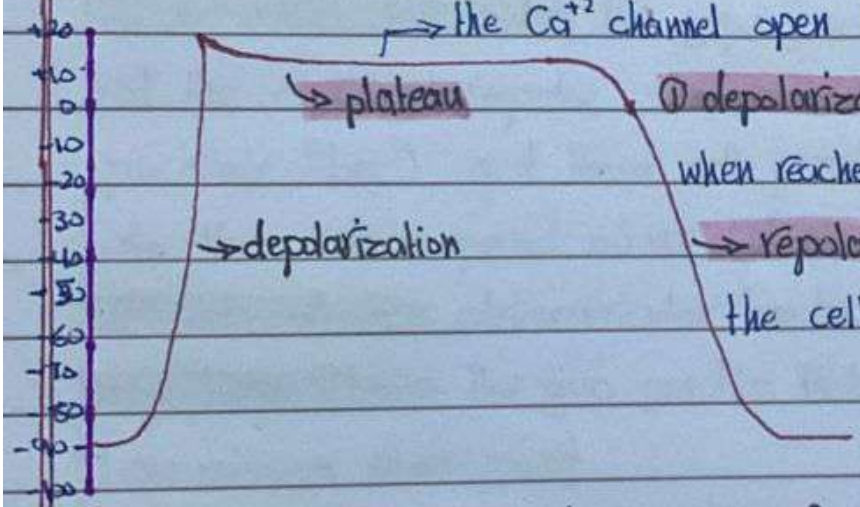
[3] heart muscle :- we have four chamber (right ← atrium, ventricle) (de-oxigenated blood), (left atrium, ventricle) (oxygenated blood).

Subject Review cardiovascular system Date No.

semilunar valve (aortic valve, pulmonary valve) → between right ventricle and pulmonary artery.
↳ between left ventricle and aorta artery.

atrioventricular valve (bicuspid valve, tricuspid valve) → between left atrium and ventricle.
↳ between right atrium and ventricle

why the valve open in one direction? when the main chamber fill in blood the chordae tendineae slack and the papillary muscle relaxed then the valve open.
and during the chamber filling in blood the papillary muscle contraction and the chordae tendineae taut.



the deoxygenated blood transfer from vein to right atrium via superior and inferior vena cava ⇒ deoxygenated blood transfer from right atrium to ~~left ventricle~~ right ventricle ⇒ via bicuspid valve ⇒ deoxygenated blood transfer from right ventricle to pulmonary artery via pulmonary valve ⇒ occure exchage gas via exhalation and inhalation ⇒ oxygenated blood transfer to ~~right~~ left atrium ⇒ oxygenated blood transfer from left atrium to left ventricle via tricuspid valve ⇒ then to aorta via aortic valve ⇒ then all over the body.