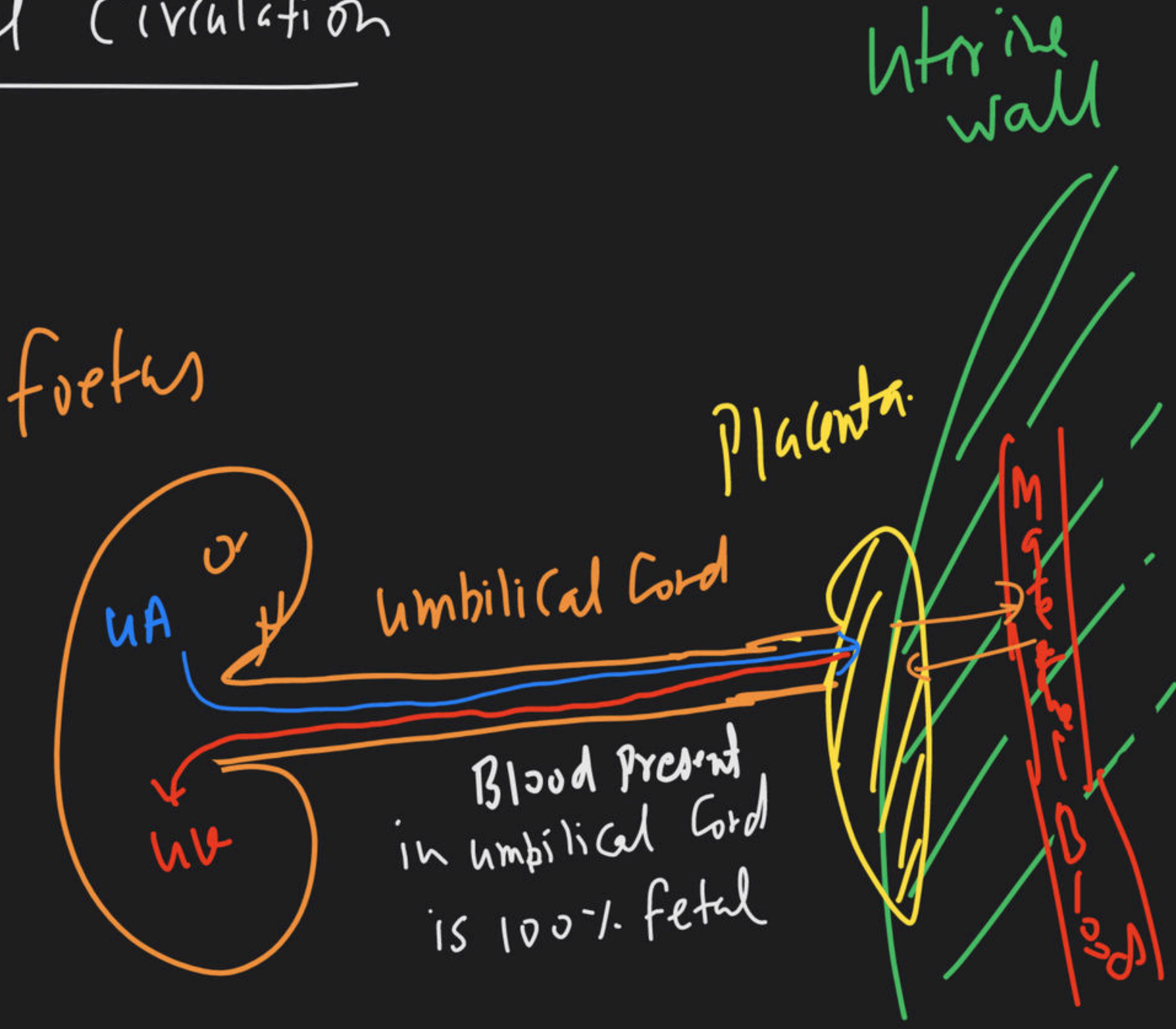
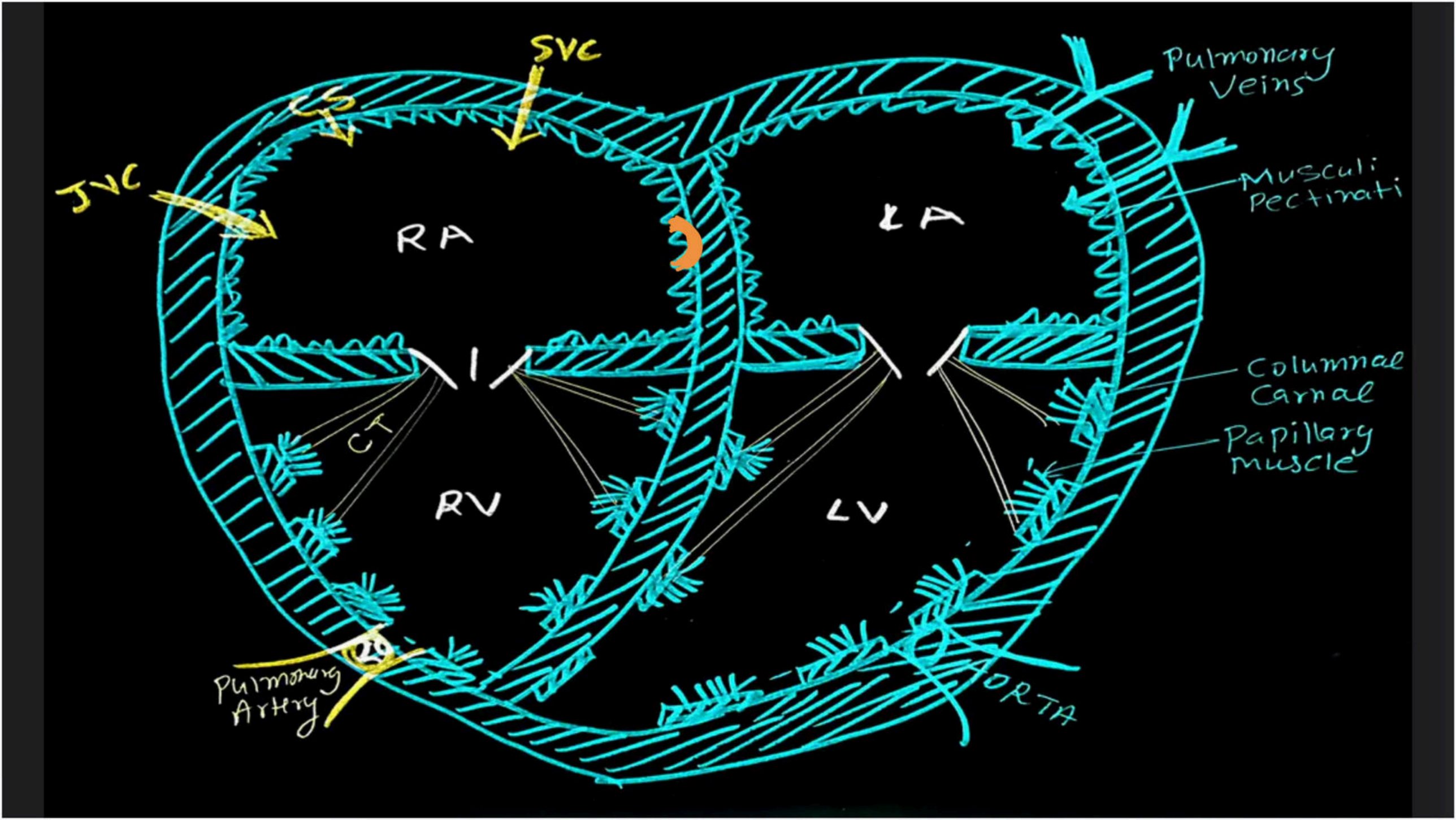
# Human Circulatory System - IV

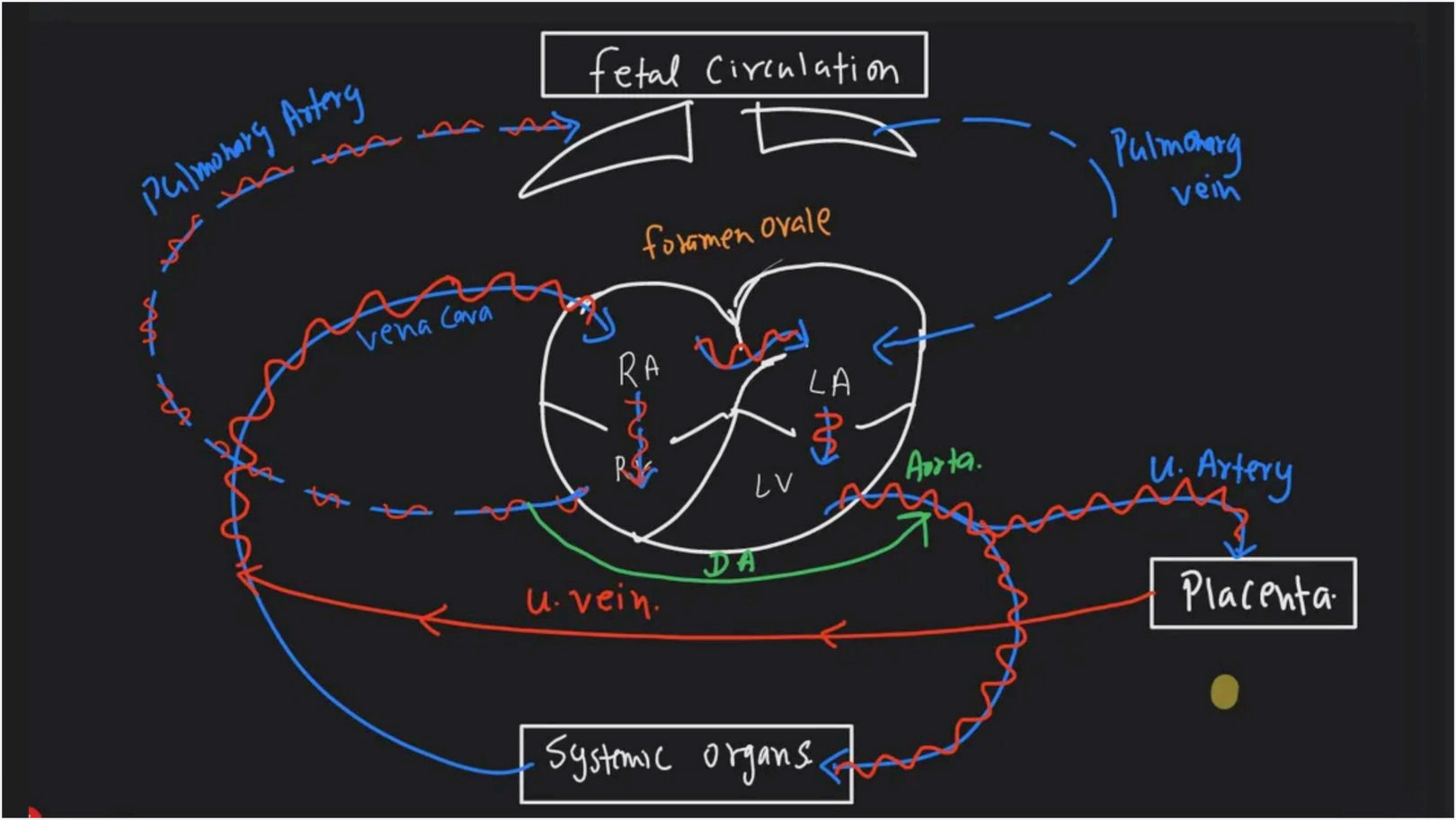
Course on Human Physiology: Body Fluids & Circulation

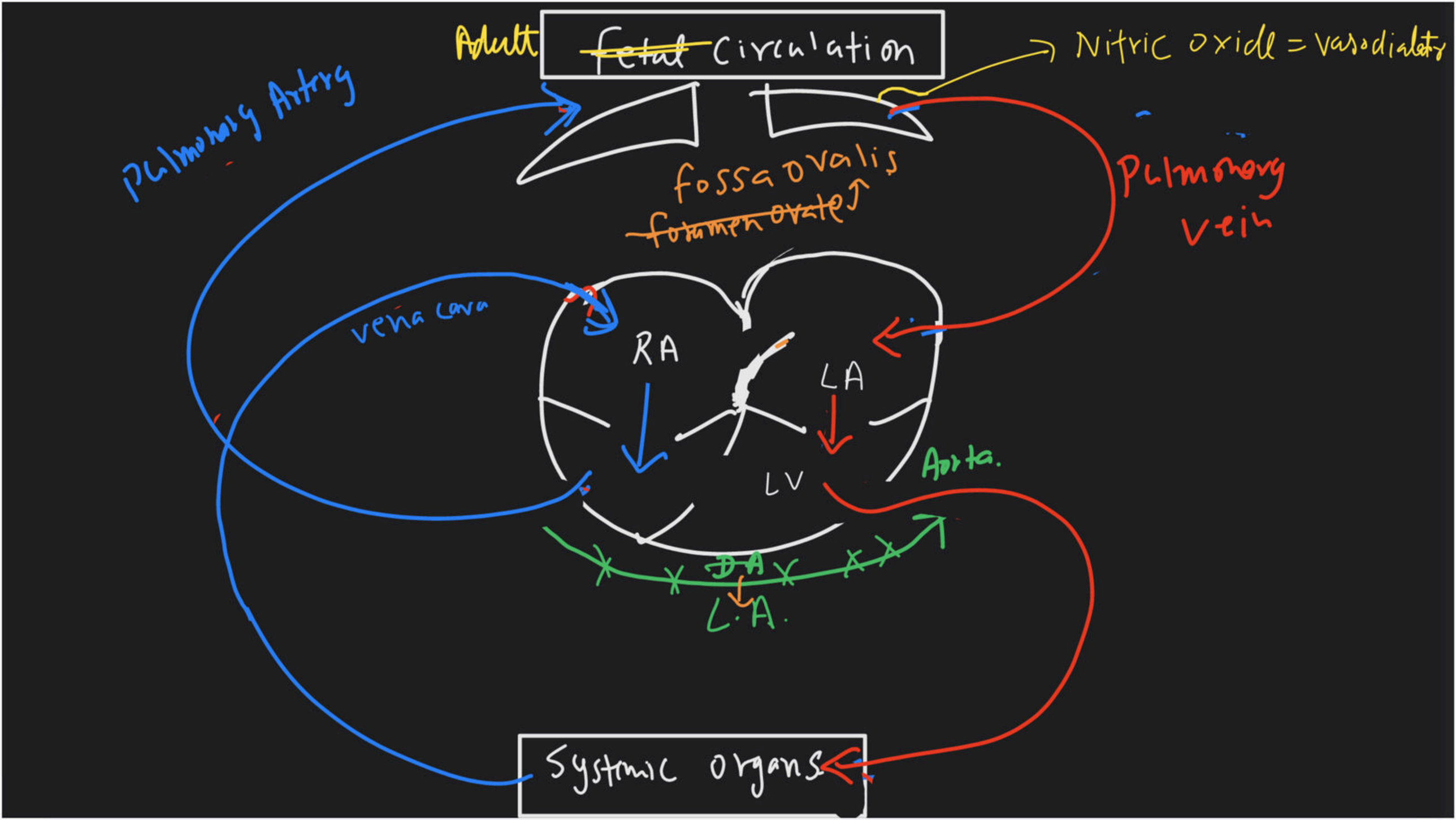
**Dr Amit Gupta** • Lesson 10 • Sept 23, 2021

# fetal circulation




SVC
JVC
Pulmonary Veins
Musculi Pectinati
RA
LA
Columnae Carnae
Papillary Muscle
CT
RV
LV
Pulmonary Artery
AORTA


fetal Circulation
Pulmonary Artery
Pulmonary vein
foramen ovale
vena cava
RA
LA
RV
LV
Aorta.
U. Artery
DA
U. vein.
Placenta.
Systemic organs


Adult
~~fetal~~ Circulation
Nitric oxide = vasodialator
Pulmonary Artery
fossa ovalis
~~foramen ovale~~
Pulmonary Vein
vena cava
RA
LA
LV
Aorta.
~~D~~A
L.A.
Systemic Organs

# Congenital Heart Disease

A) ☆ Patent foramen ovale (Most Common)

B) ☆ Patent Ductus Arteriosus (Least fatal)

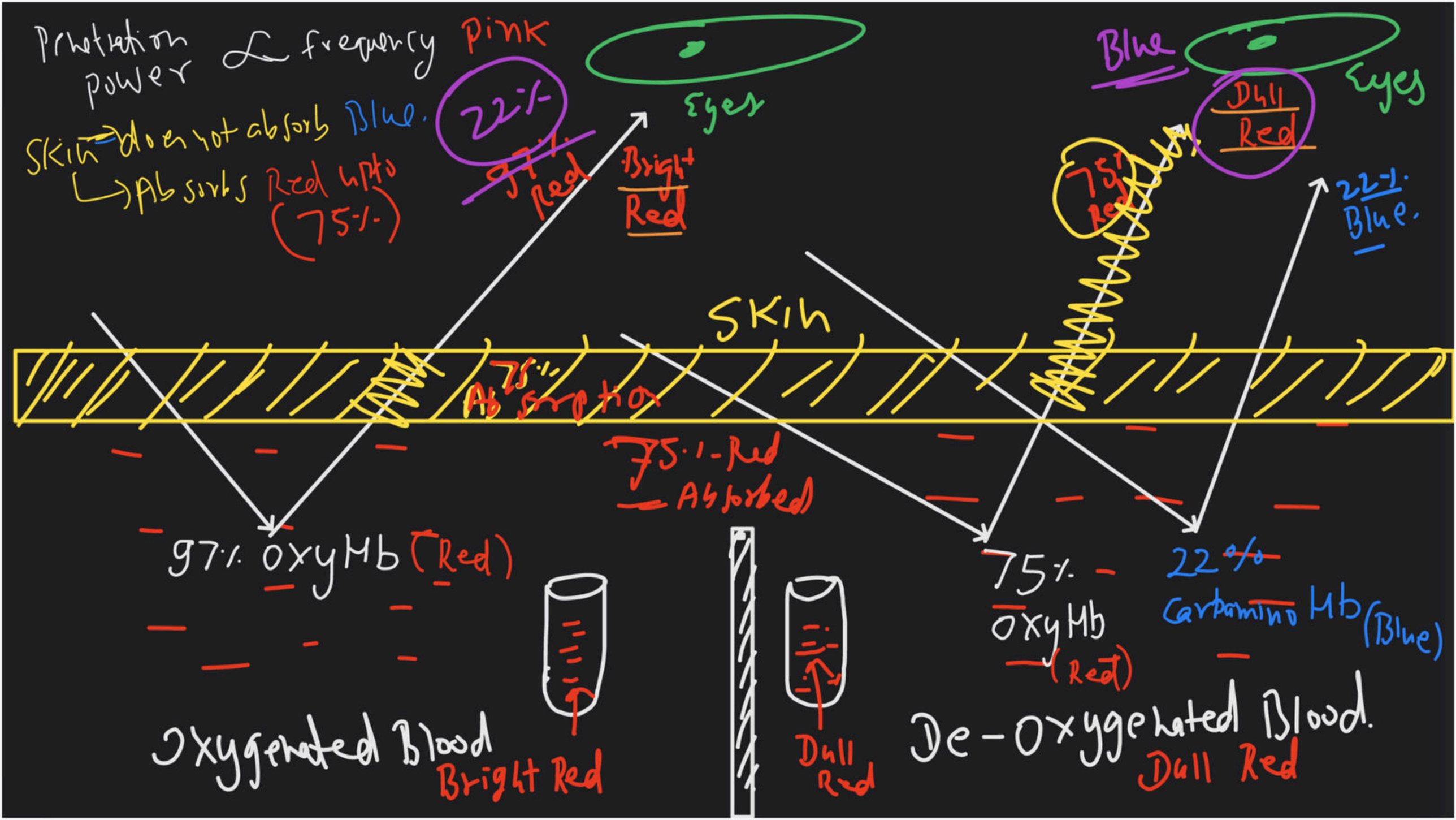
C) ☆ Ventricular septal Defect (Most fatal)

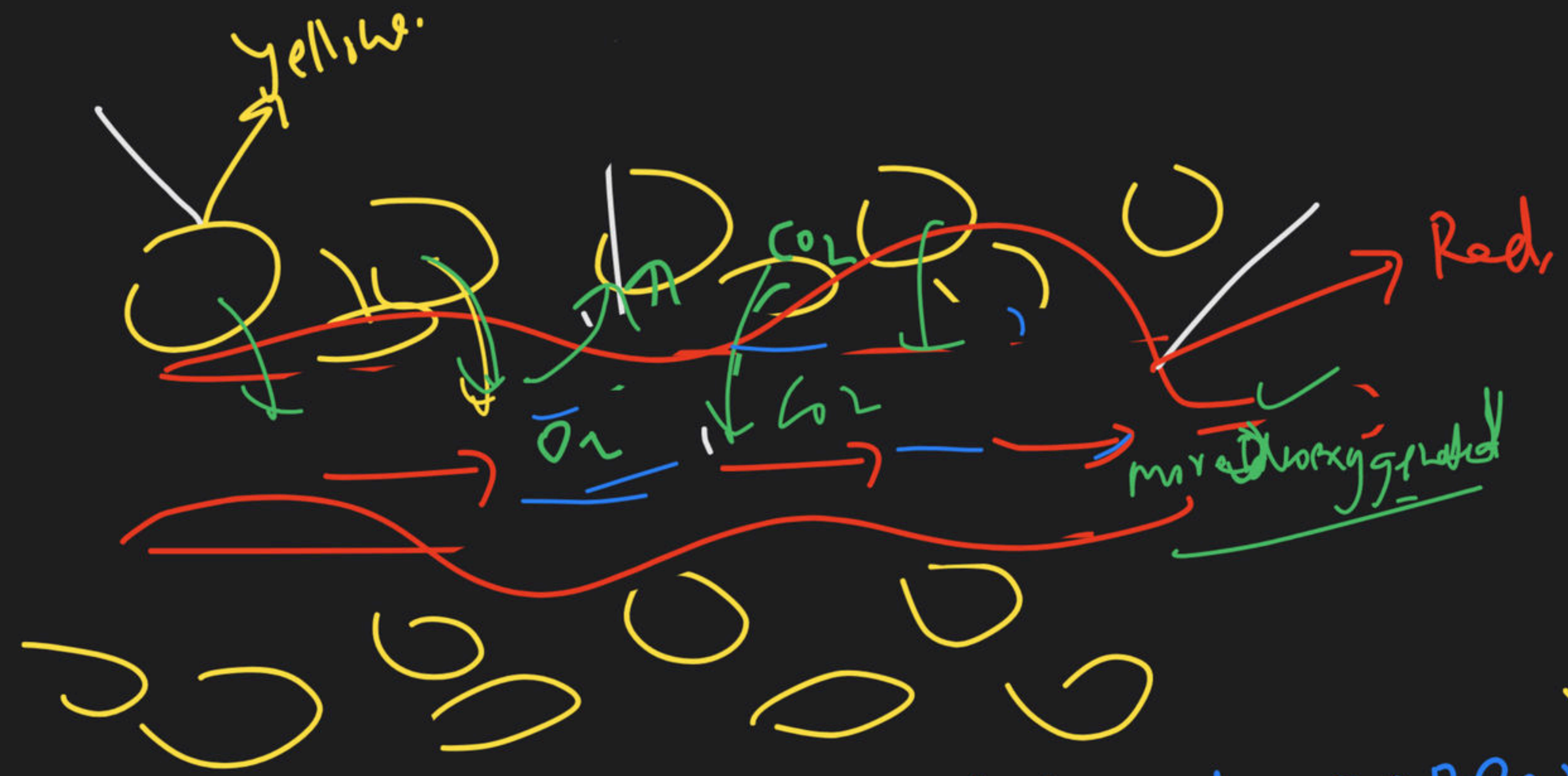
Blue Babies

Rx - Surgery

Slow growth/dvpt, Exhaust early.

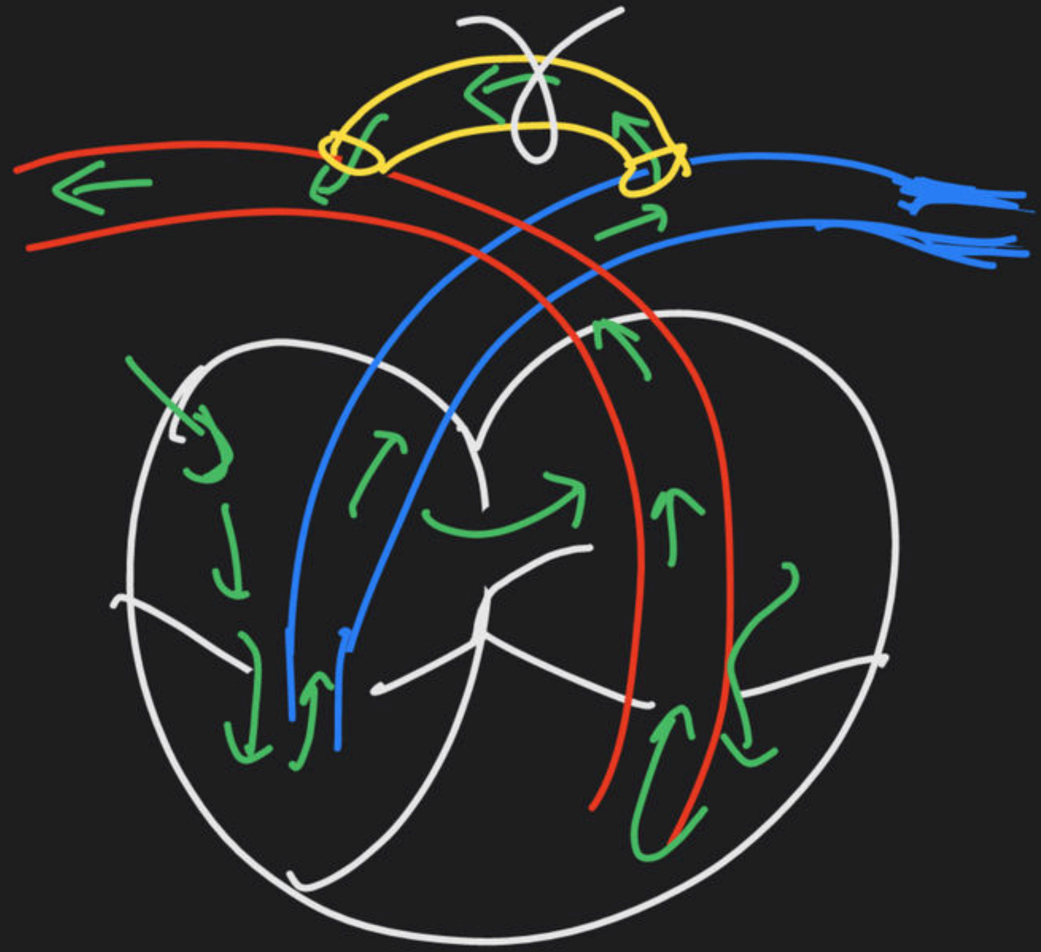
Bluish discoloration of skin = cyanosis

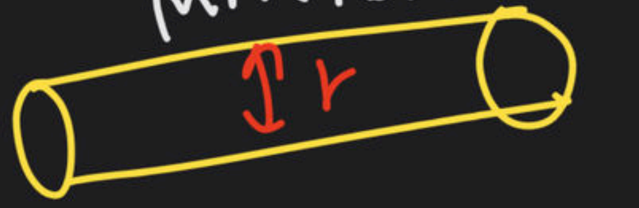

Penetration power ∝ frequency
Pink
Eyes
Skin → does not absorb Blue.
→ Absorbs Red upto (75%)
22%
97% Red
Bright Red
Skin
75% Absorption
75% Red Absorbed
97% oxyHb (Red)
Oxygenated Blood
Bright Red
Dull Red
Blue
Eyes
Dull Red
75% Red
22% Blue.
75% oxyHb (Red)
22% Carbamino Hb (Blue)
De-Oxygenated Blood.
Dull Red




Why does deoxygenated blood appear blue below the skin

# Ductus Arteriosus.



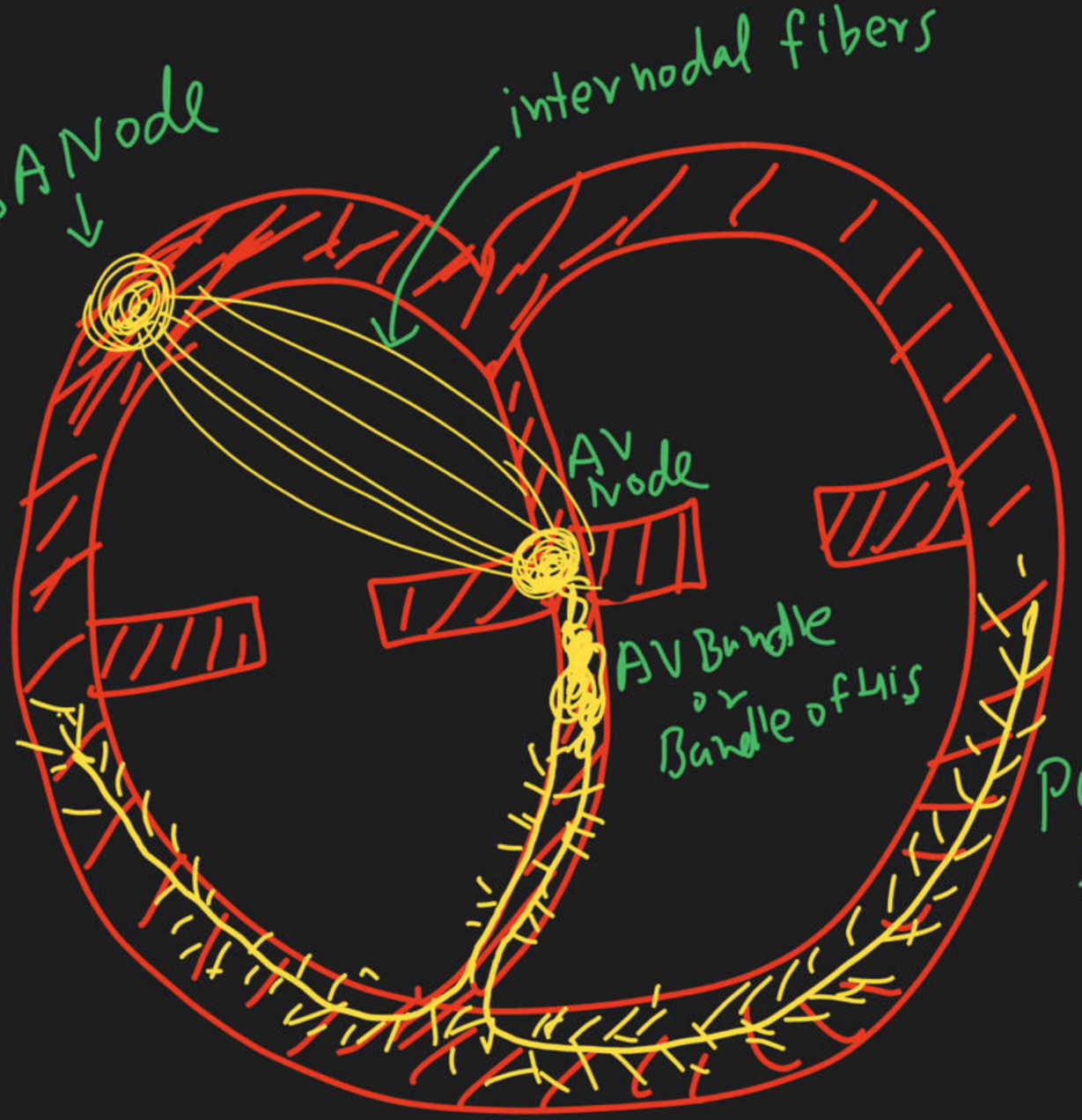



Property of Self Excitation

of

⇓

neuromuscular fibers




Muscle fibers having nerve like properties

Dpyth = Systole

Rpyth = Diastole

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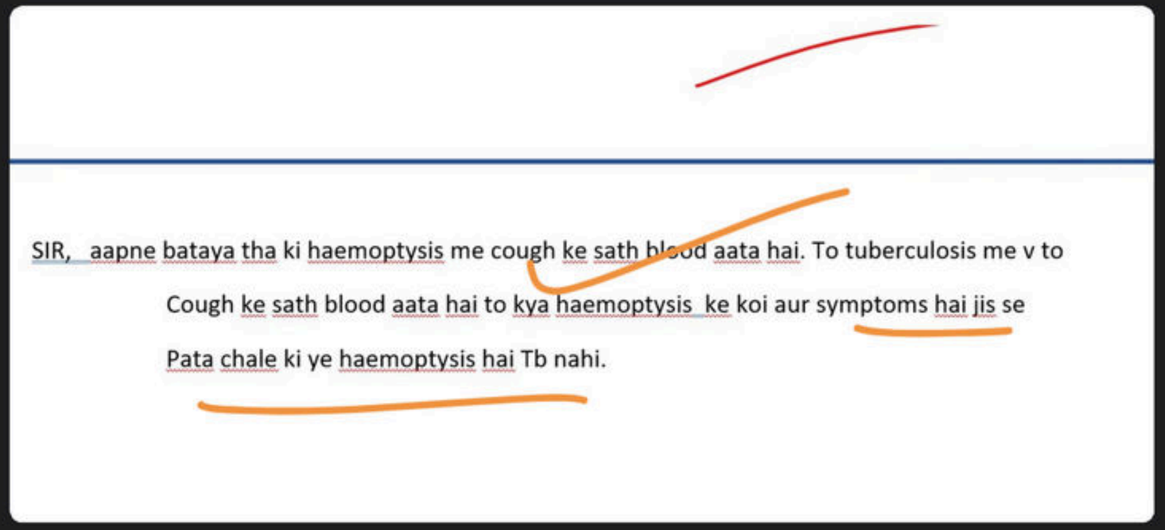
▲ 2 • Asked by Sabbi

Please help me with this doubt


SIR, aapne bataya tha ki haemoptysis me cough ke sath blood aata hai. To tuberculosis me v to Cough ke sath blood aata hai to kya haemoptysis ke koi aur symptoms hai jis se Pata chale ki ye haemoptysis hai Tb nahi.

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▲ 1 • Asked by Mayur

Please help me with this doubt

A drop of each of the following, is placed separately on four slides. Which of them will not coagulate?

(a) Blood serum

(b) Blood from pulmonary artery

(c) Whole blood from pulmonary vein

(d) Blood plasma

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▲ 2 • Asked by Mayur

Please help me with this doubt

Detection of blood groups is done by agglutinisation test using antiserum. According to this method, if the blood shows coagulation with

(a) antiserum B, blood group is AB
(b) antiserum B, blood group is B
(c) antiserum A and B, blood group is O
(d) antiserum A, blood group is O.

antiserum = Serum containing Antibodies

Eg → AntiSerum A contain anti-A

AntiSerum B contain anti B

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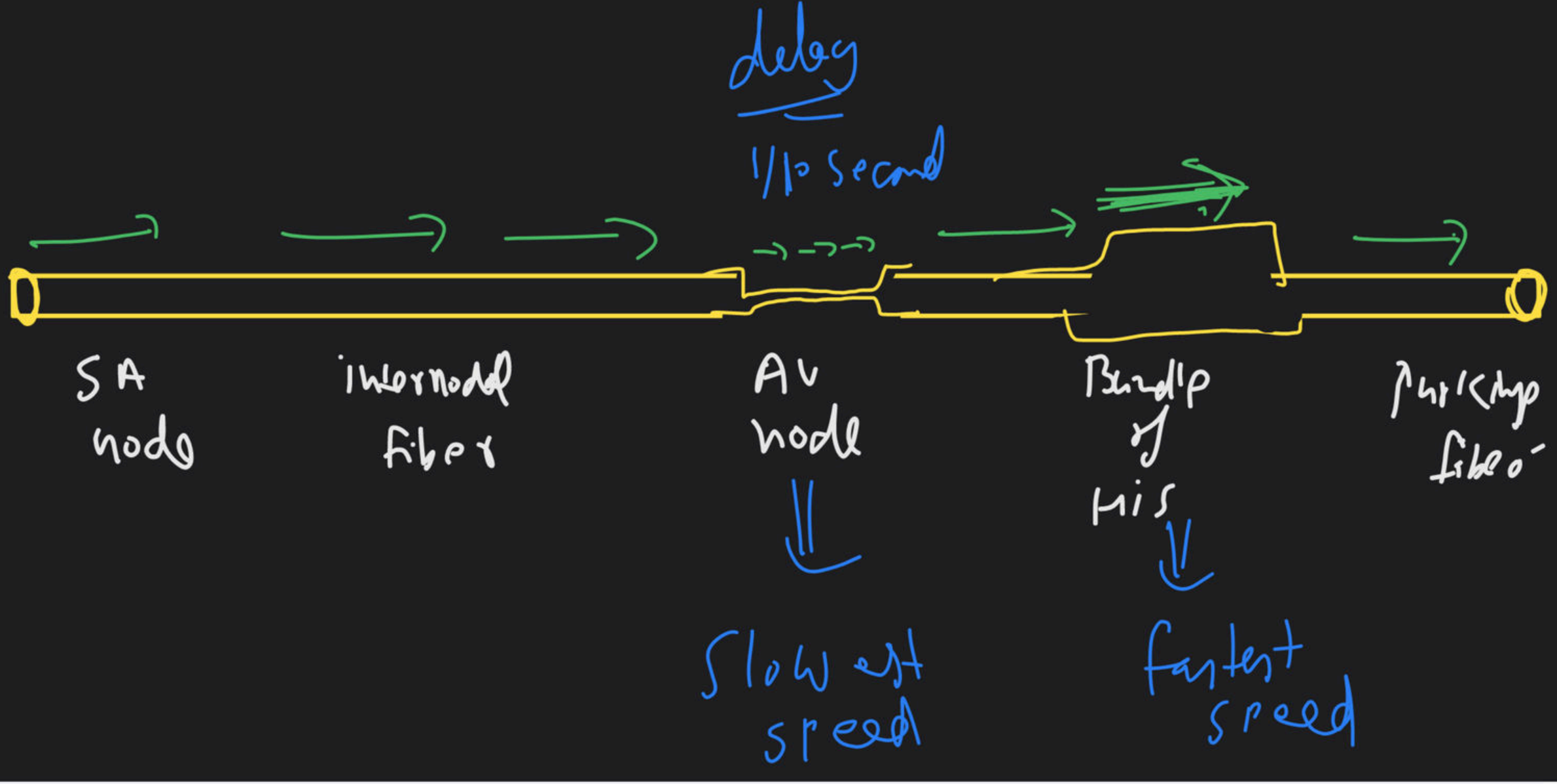
▲ 4 • Asked by Ayush

Please help me with this doubt

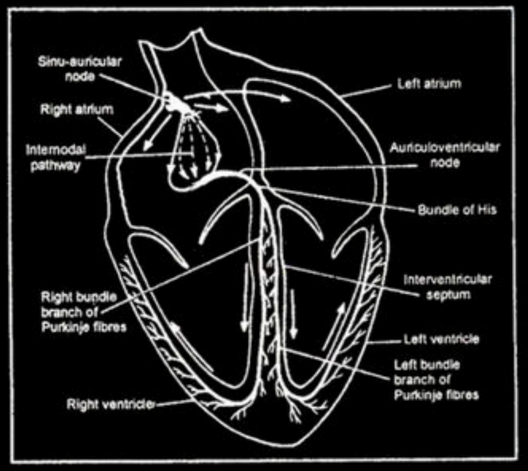

delay
1/10 second
SA node
internodal fiber
AV node
Bundle of His
Purkinje fibers
slowest speed
fastest speed

## The Conducting system of Heart

It is made of myocardium that is specialised for initiation and conduction of the cardiac impulse. Its fibres are finer than other myocardial fibres, these are completely cross striated and posses special nerve like properties (= self excitatory neuromuscular pathway).

The conducting system has the follwoing parts.

S.A. Node (Pacemaker)
↓
Inter nodal pathway
↓
A.V. Node
↓
Bundle of His
↓
Purkinje fibres (Rt & Lt)




Rate of conduction is fastest in bundle of His and slowest in AV node

(1) **Sinuatrial node (SA node).** It is known as the "pacemaker" of the heart. Located in the wall of Rt. Atrium it generates impulses at the rate of about 72 per minute. and initiates heart beat.

(2) **Internodal pathway.** it is the network of neuromuscular pathway that connects the SA node to the AV node.

(3) **Atrioventricular node (AV Node).** It is smaller than SA node and is situated in the atria near AV septum. It capable of generating impulse at rate of about 40/mt.

(4) **Bundle of His (AV Bundle) .** it is the connection between the atrial and ventricular musculature. It begins at the AV node and then divides into left and right branches as it descends down towards ventricles.

The left branches of the AV bundle descends on their respective side of the interventricular septum and is distributed to the ventricles after dividing into Purkinje fibres.

(5) **The Purkinje fibres.** These are distributed through the endocardium of the ventricles and propogate the impulse in the entire ventricle musculature.

**Why SA node is called the pacemaker of the heart ?**

*Although impulse is produced by the entire neuromuscular pathway, the frequency of impulse generation is maximum is case of SA node in comparison to other parts of pathway. Hence it guides the rhythm of heart beat and is called the pacemaker of the heart. The AV node on the other hand just conducts the impulse forwards.*