BODY FLUIDS & CIRCULATION - L5

ZOOLOGY

PUSHPENDU SIR

ANTHE

AAKASH NATIONAL TALENT HUNT EXAM

Your Gateway To Success

For Class VII to XII

Current Students & Passouts

Aakash Live Webinars

Aakash + BYJU'S

How to score 360 Marks in NEET Biology

Dr. Sachin Kapur
Biology Expert - NEET

30th September, 2022

6:00 PM

MISSION MBBS

MON - SAT
4PM - 8PM

DROPPERS BATCH

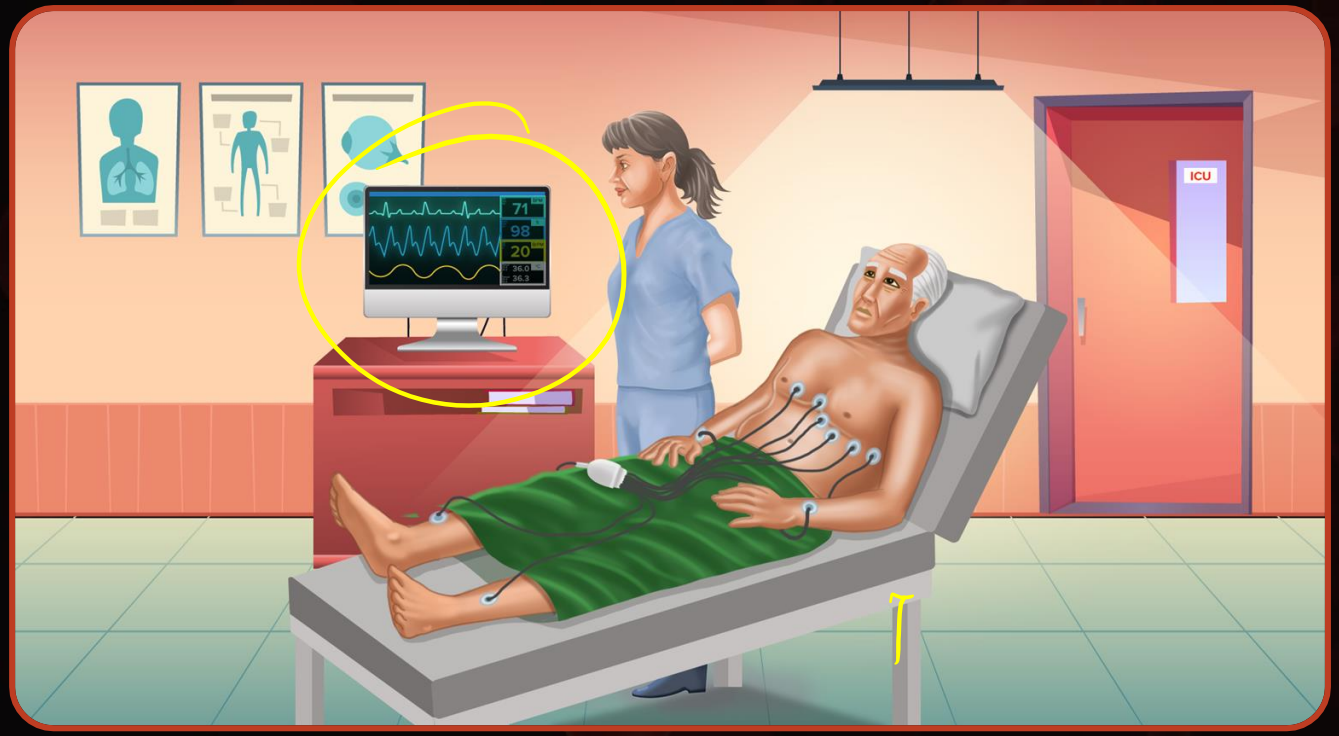
MON - FRI
2PM - 4PM

Aakash BYJU'S

NEET STUDENTS' SURVEY

LINK IN DESCRIPTION

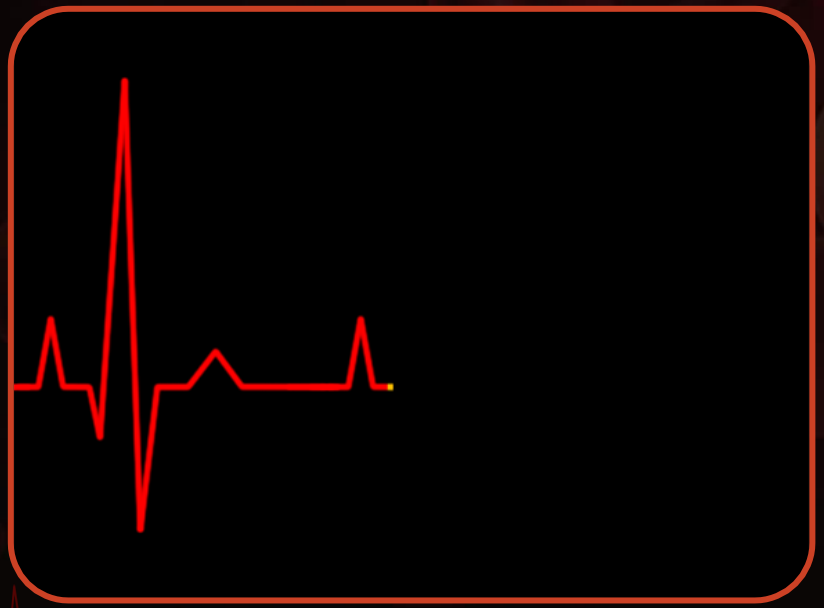
https://t.me/neetaakashdigital


71
98
20
ICU

What is ECG ?

ECG – Electrocardiogram

- **Graphic record** of the **electric** current produced by heart
- Also called **EKG**



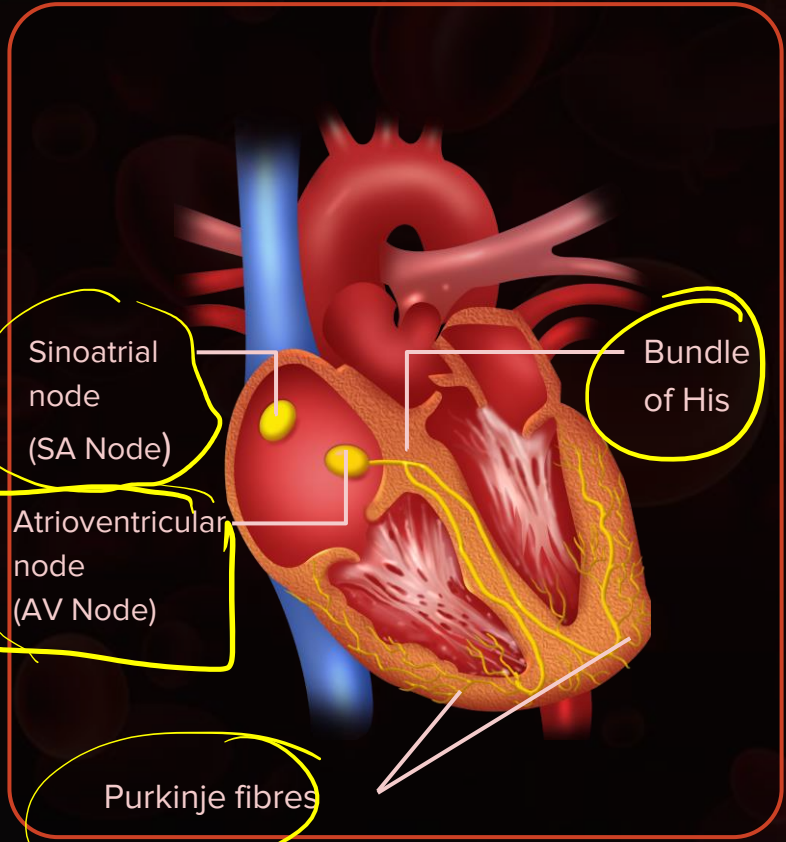
How does the heart produce electric current ?

What stimulates the heart muscle contraction ?

Nodal Tissue

Regulates Heartbeat

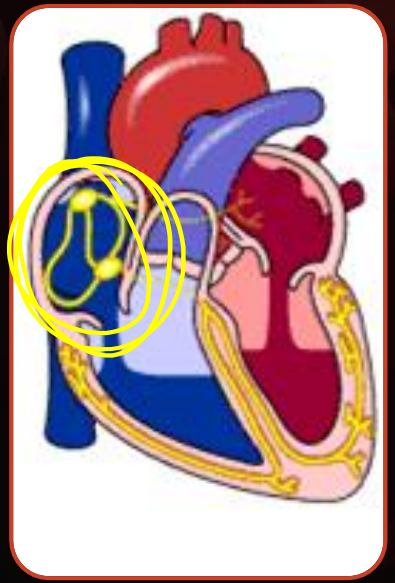
- SA Node
- AV Node
- Bundle of His
- Purkinje fibres



SA Node

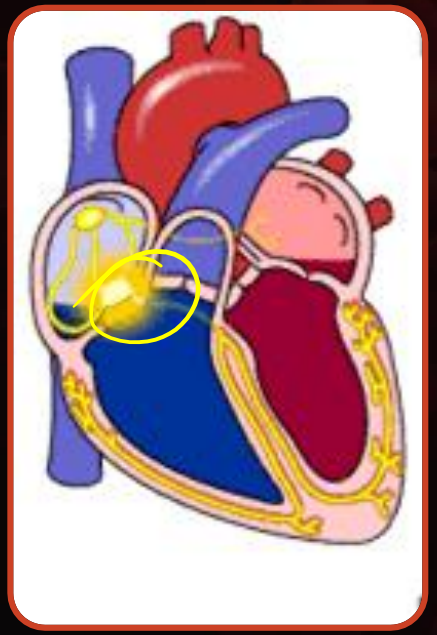
- Also known as the **sinoatrial node** – found in the **right atrium**
- **Generates action potential** – causes atria to contract
- Conducts the action potential to AV node

Pace maker



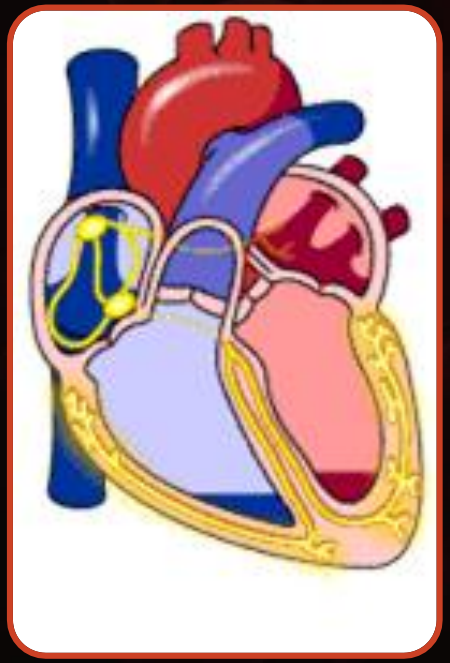
AV Node

- Also known as the **atrioventricular node**
- **Generates action potential** to the Bundle of His



Bundle of His

- Bundle of His conducts the action potential and helps in contraction of ventricles



Nodal Tissue

- Regulates the **beating of the heart intrinsically**
- Hence heart is called **myogenic**

Myogenic Heart

- Capable of generating a cardiac **contraction independent of nervous input.**

How does the heart produce electric current?

SA Node


Question Time !!

Action potential from SA Node stimulates the contraction of

a) right atrium

b) left atrium

c) both the atria

d) both the ventricles

Action potential from SA Node stimulates the contraction of

a) right atrium

b) left atrium

c) both the atria

d) both the ventricles

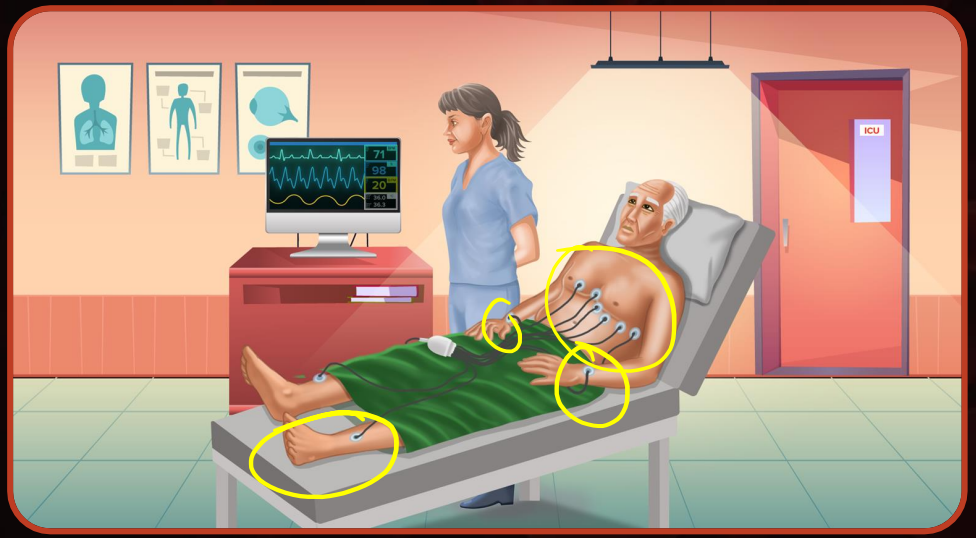
ECG – Electrocardiogram

- Obtained from **Electrocardiograph**
- Father of electrocardiography- **Einthoven**

Electrocardiograph

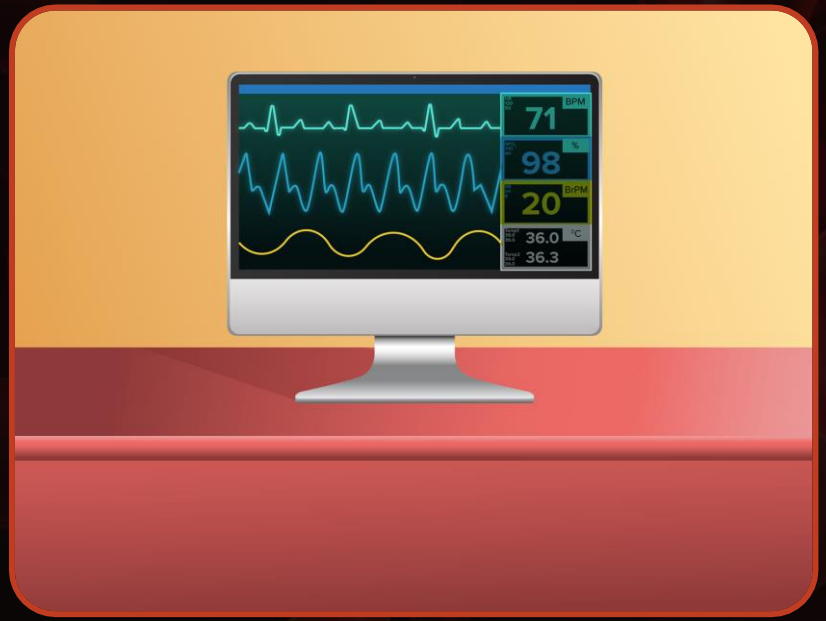
Electrocardiography

1. Gel applied on the chest



2. Electrodes connected

Electrocardiography

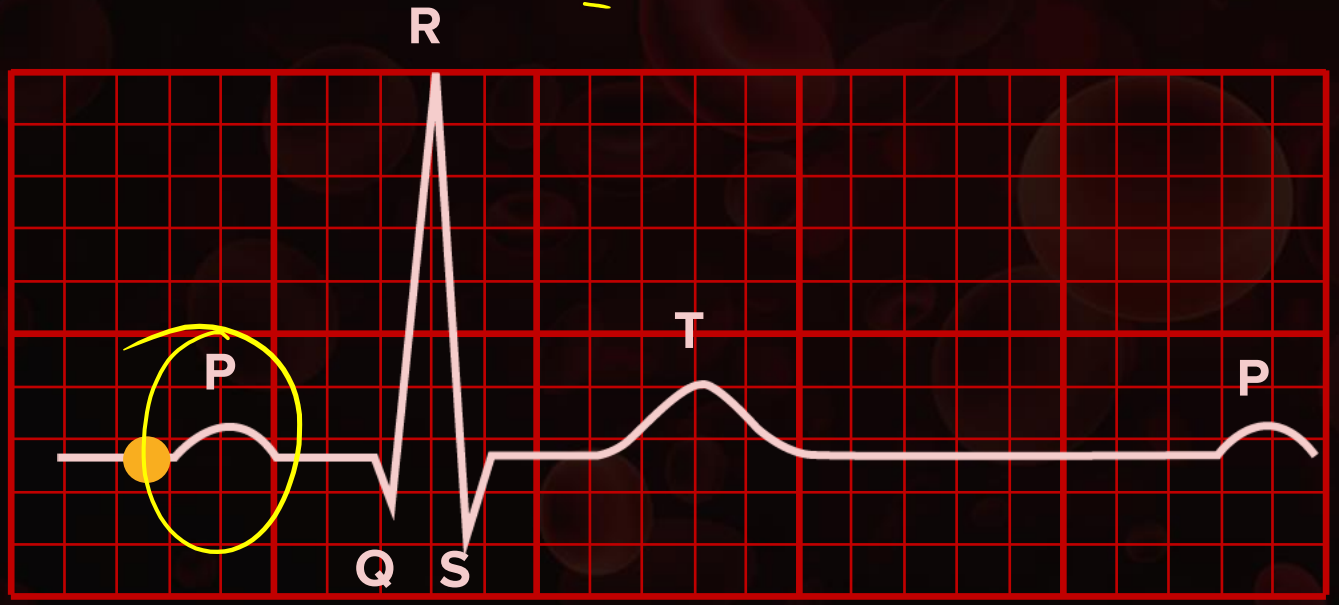


3. Deflection wave on screen

Electrocardiography

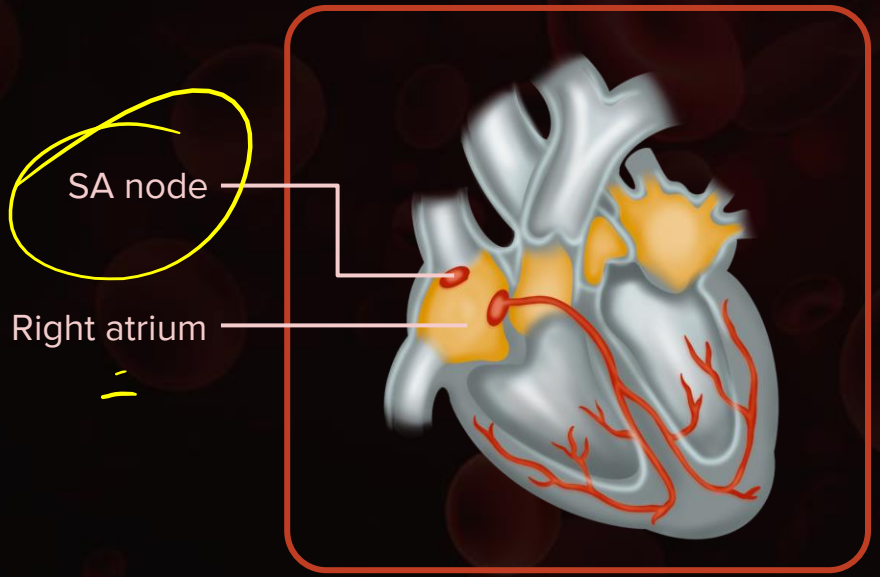
Electrocardiogram: P wave

- Small upward wave
- Atrial contraction (depolarisation)



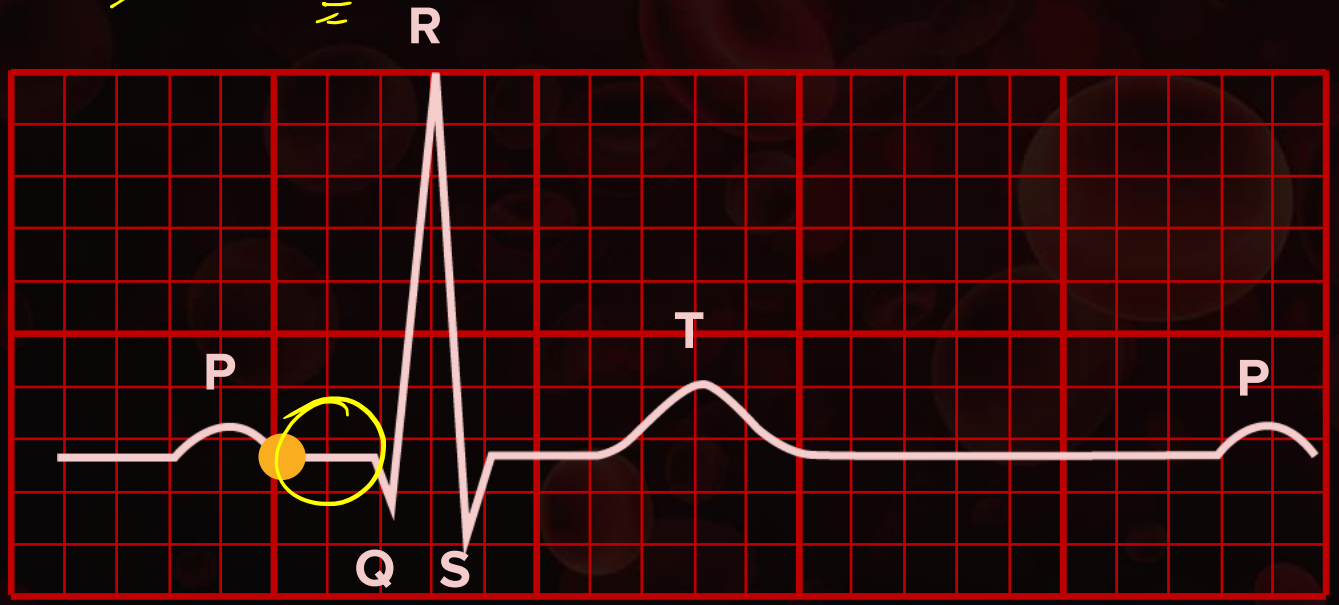
Electrocardiogram: P wave

- Activation of **SA node**
- Signals of **contraction** spread throughout **atria**



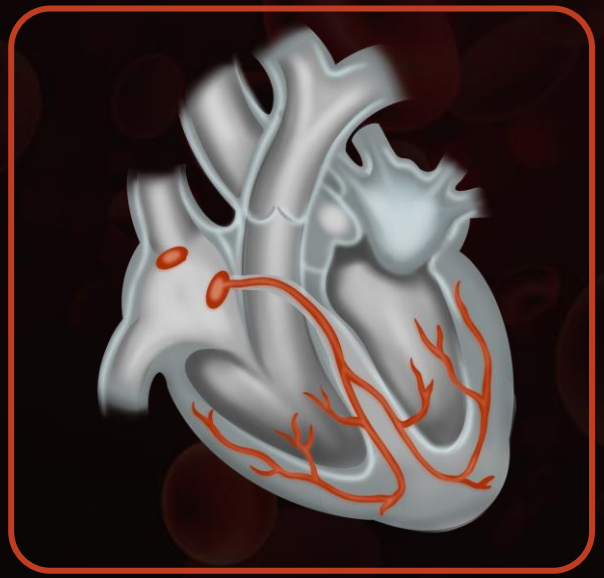
Electrocardiogram: P wave

- Short straight line
- AV node delay

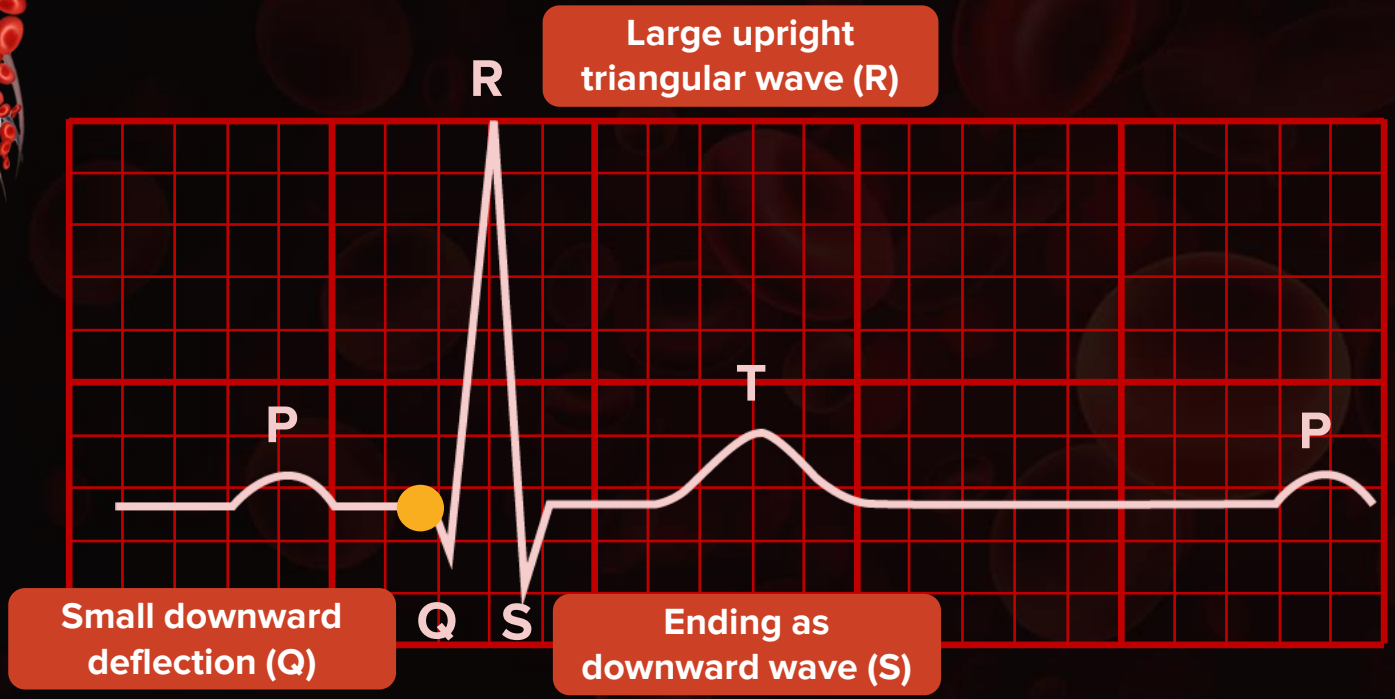


Electrocardiogram: P wave

- Short straight line
- AV node delay



Electrocardiograph: QRS wave

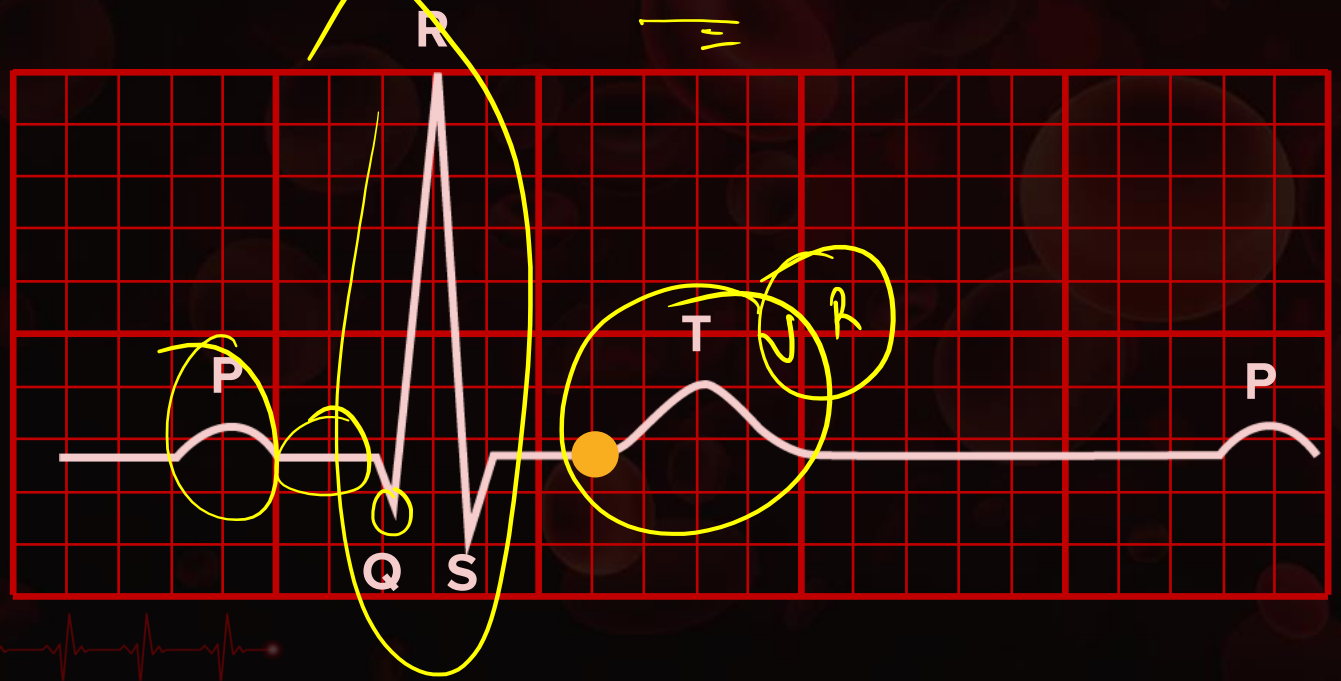


Electrocardiogram: QRS wave

- Impulses from AV node travels through Bundle of His and Purkinje fibres
- Spread of impulse to the ventricles - **Ventricular contraction (depolarisation)**

Electrocardiogram: T wave

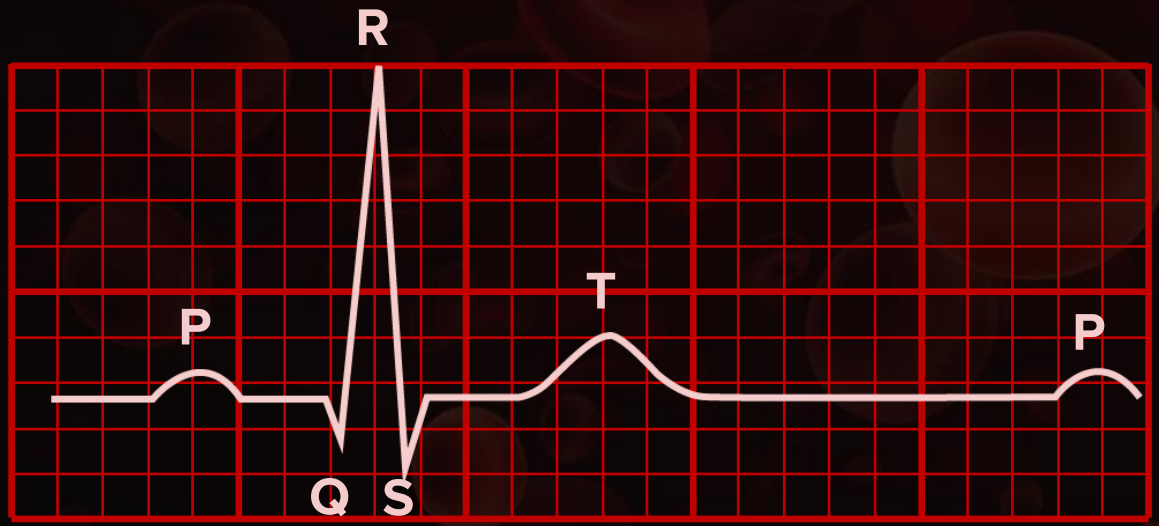
- Upward dome-shaped wave
- Ventricular relaxation (repolarisation)



What is the significance of the ECG?

Electrocardiogram: Significance

- Can determine the **heart rate** of an individual
- Deviation from this shape at times indicates **abnormality or disease**



Did you know ?

Life = Ups and downs

Question Time !!

Which of the following is correctly matched?

a) P - Depolarisation of atria

b) T - End of diastole

c) S - Start of signal at SA node

d) R - Repolarization of ventricles

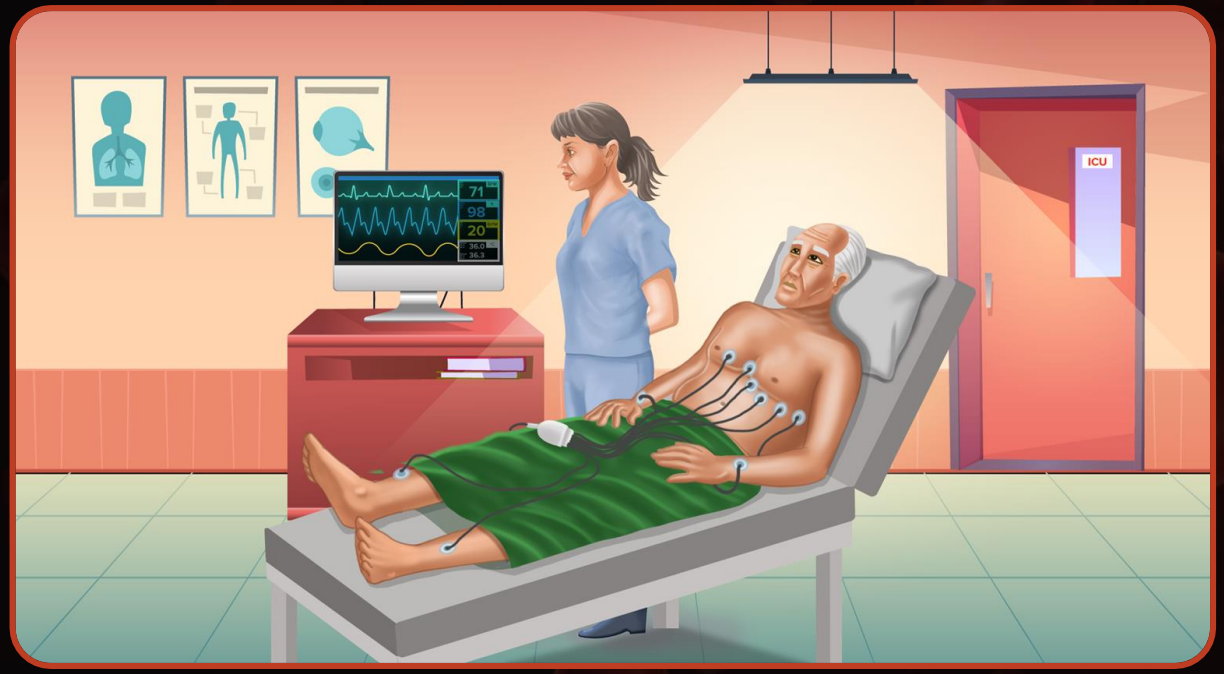
Which of the following is correctly matched?

a) P - Depolarisation of atria

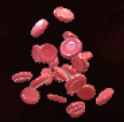
b) T - End of diastole

c) S - Start of signal at SA node

d) R - Repolarization of ventricles


71
98
20
ICU

Coronary Artery Disease (CAD)



Coronary Artery Disease (CAD)

- Also known as **atherosclerosis**
- Caused by build up of plaque of:
  - **Calcium**
  - **Fat**
  - **Fibrous tissues**
- Makes **lumen** of arteries **narrower**
- **Affects supply of blood** to heart muscles

Angina

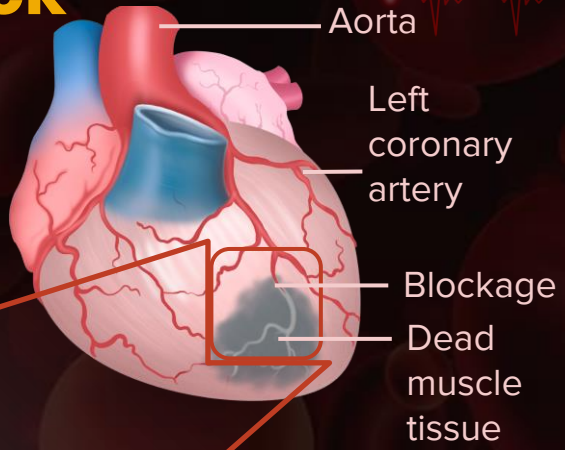
Angina

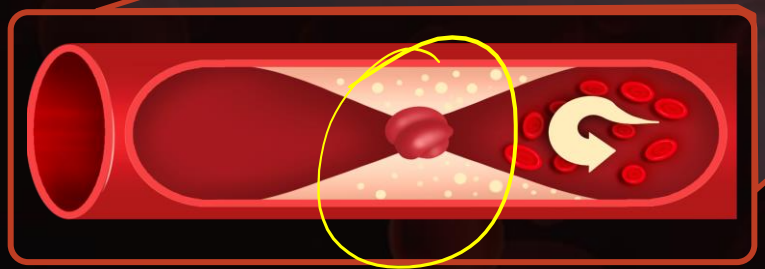
- Also called **‘angina pectoris’**
- **Not enough oxygen** reaching heart muscle
- Symptom: **Acute chest pain**
- Can occur in men and women

Heart Attack

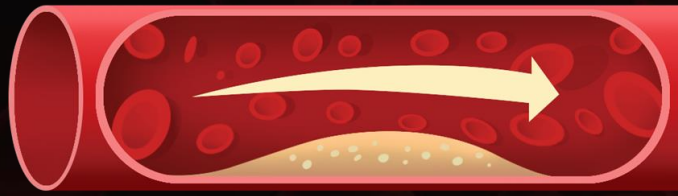
Heart Attack

- Also called **myocardial infarction**
- Plaque ruptures and causes blockage
- Damage or death of cardiac muscle tissue





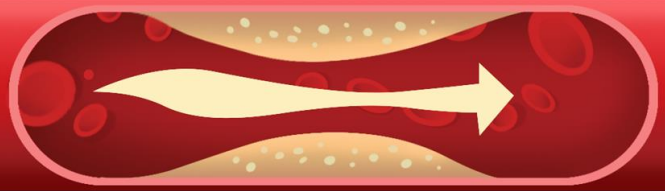
To Sum Up!



Coronary Artery Disease

Plaque builds up in an artery

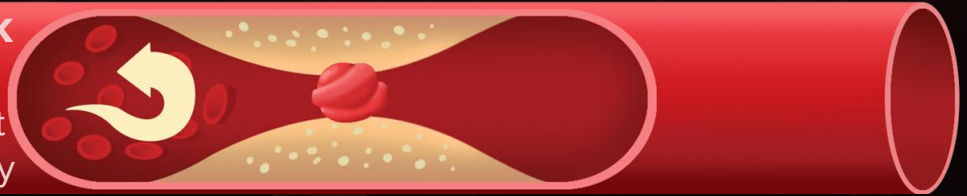
Angina



It is harder for blood to get through artery

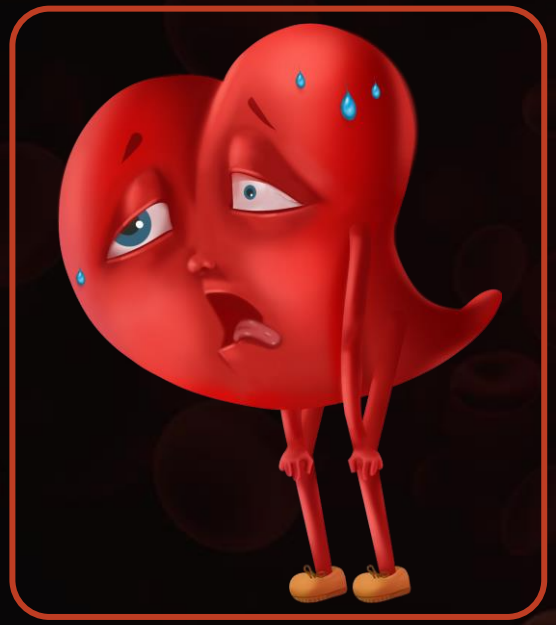
Heart Attack

Plaque cracks and a blood clot blocks the artery



Heart Failure

Heart Failure

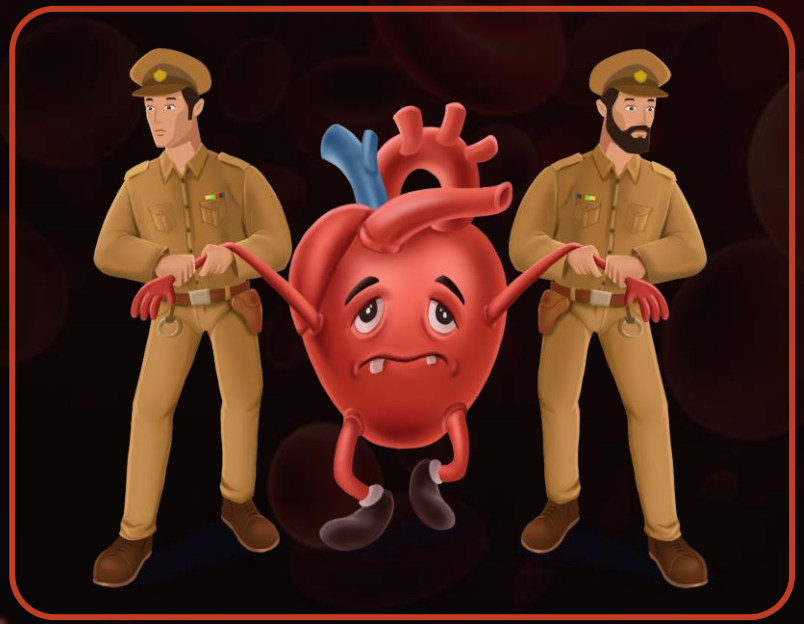


- Heart does not pump blood **effectively**
- Also called **congestive heart failure**
- **Congestion** of lungs

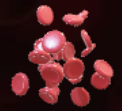
Cardiac Arrest

Cardiac Arrest

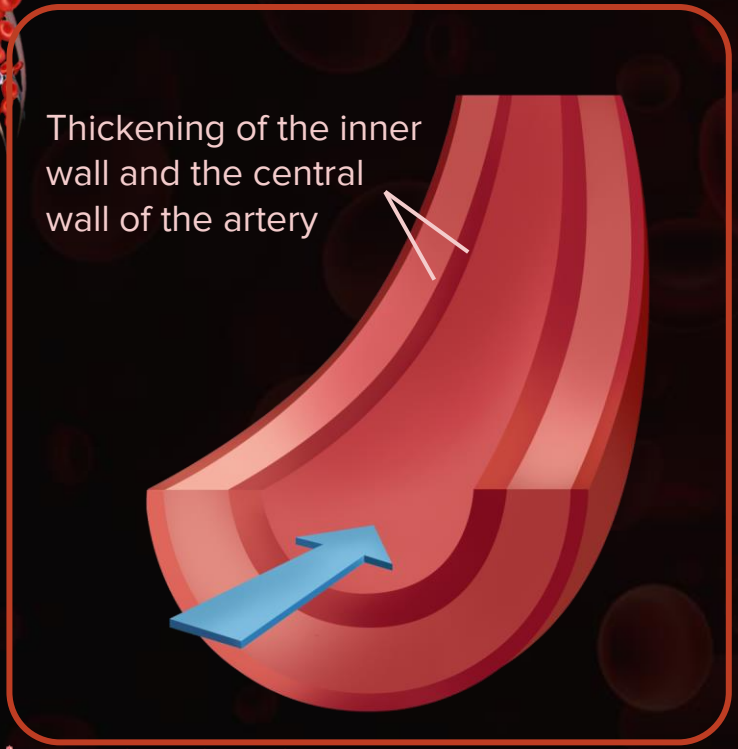
- Heart stops beating
- Blood stops flowing to brain and other vital organs



Arteriosclerosis

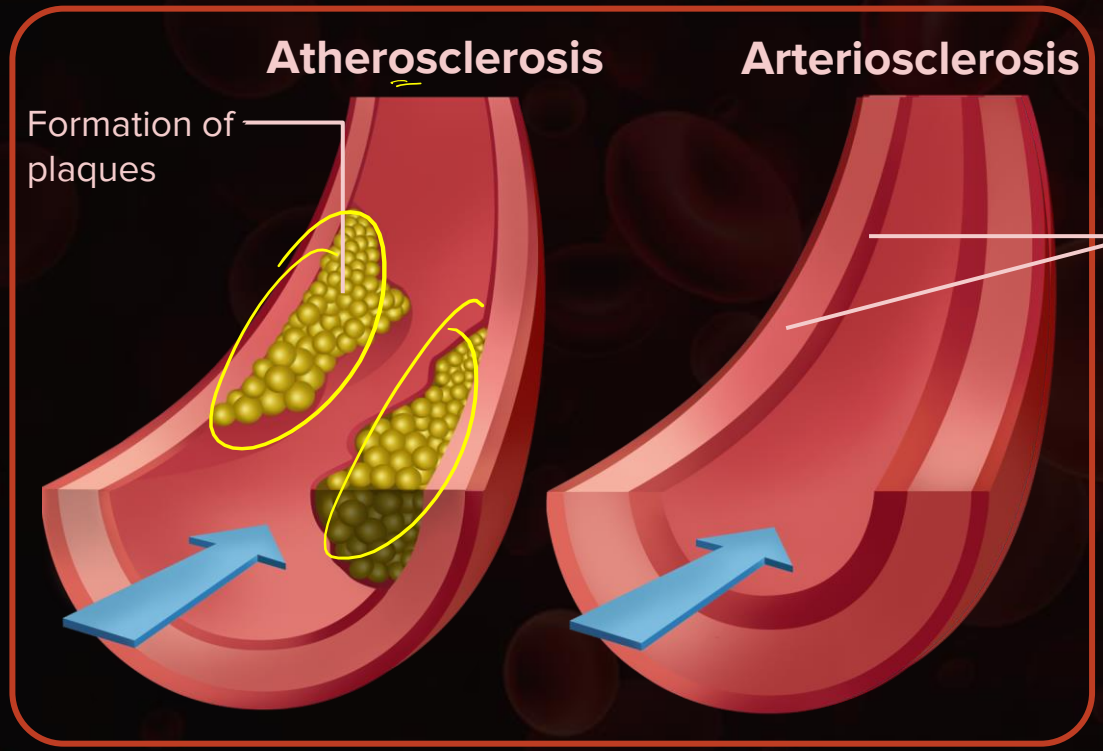


Arteriosclerosis



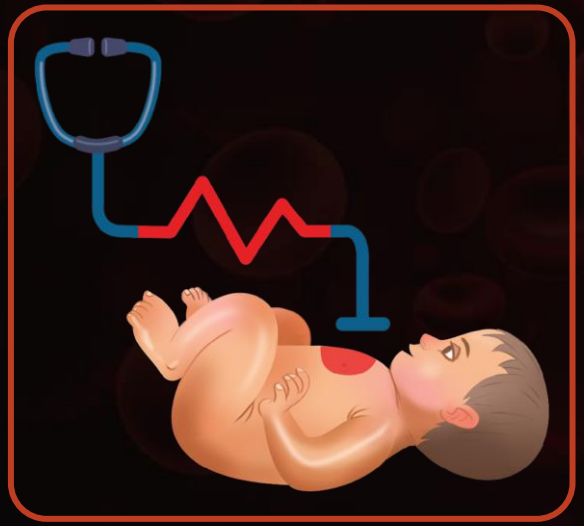
- **Hardening** and **loss of elasticity** of arteries
- Due to **calcification of plaques**
- **Walls rupture** due to loss of elasticity
- Clot formation may lead to **heart attack**

Atherosclerosis vs Arteriosclerosis



Congenital Heart Disease

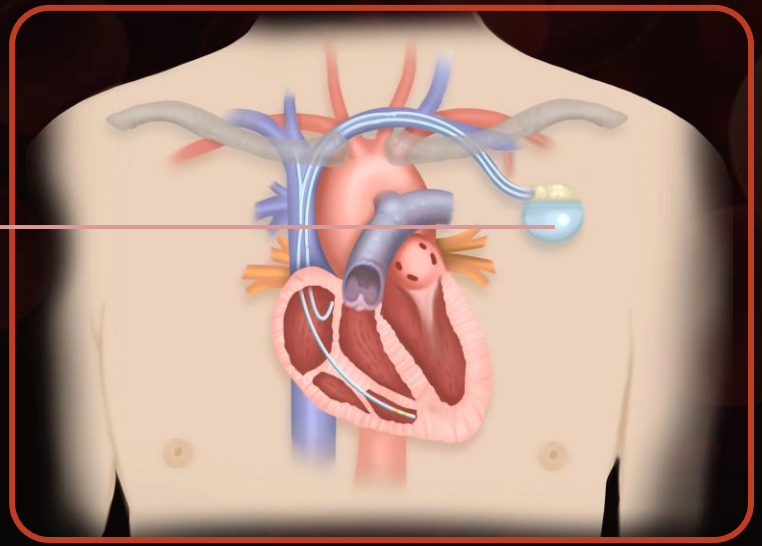
Congenital Heart Disease

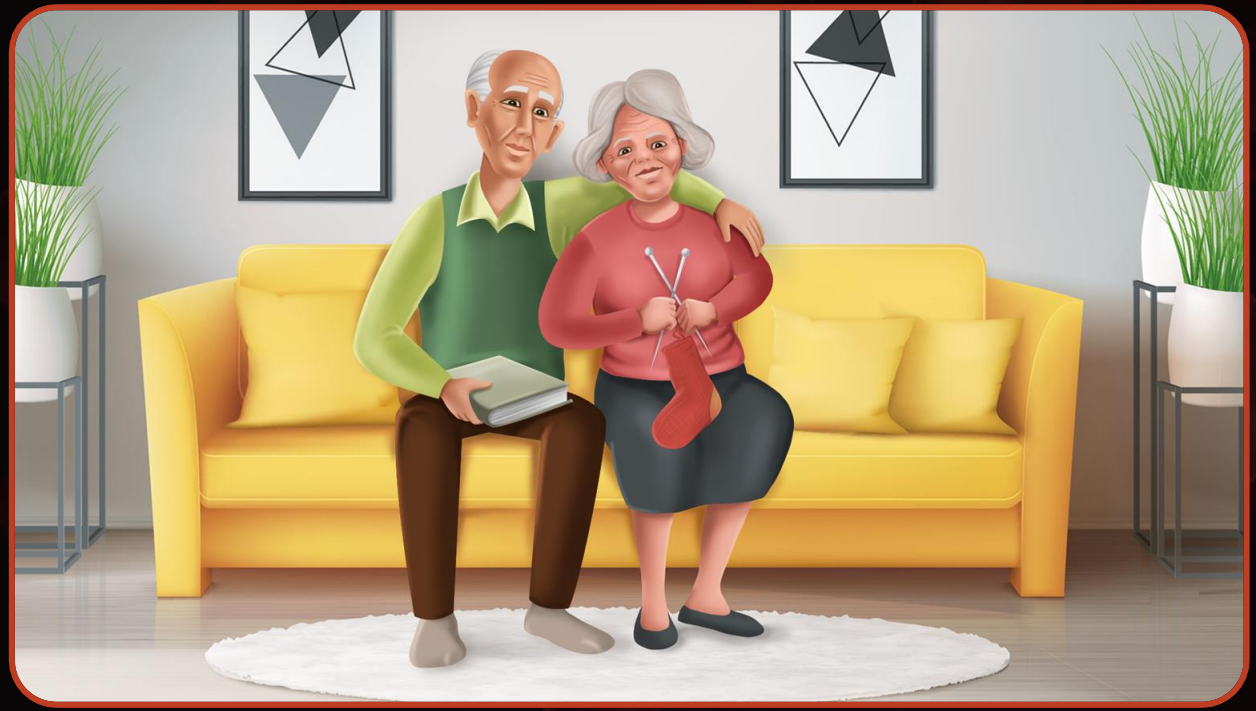


- **Birth defects**
- **Infections** in mother like rubella
- **Harmful drugs** during pregnancy
- **Chromosomal abnormalities**

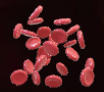
Artificial Pacemaker

- Used in case of blockage or dysfunctional SA node
- Restores and maintains normal heart beat





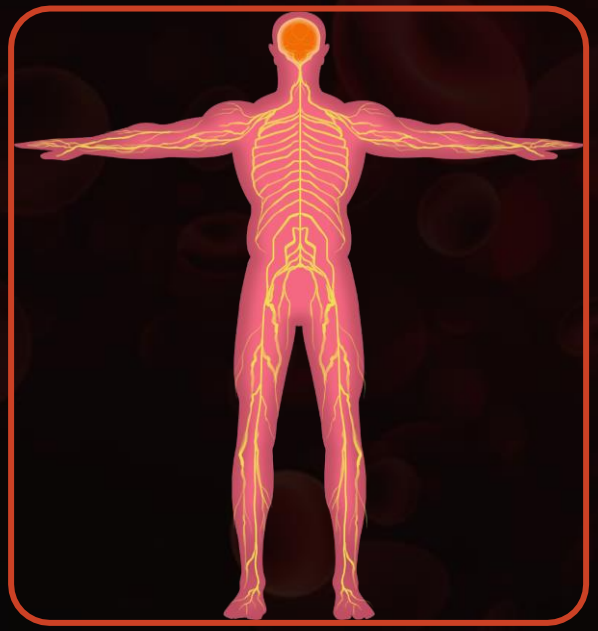
What regulates the speed of your heartbeat ?



Regulation of Cardiac Activity

Nervous System

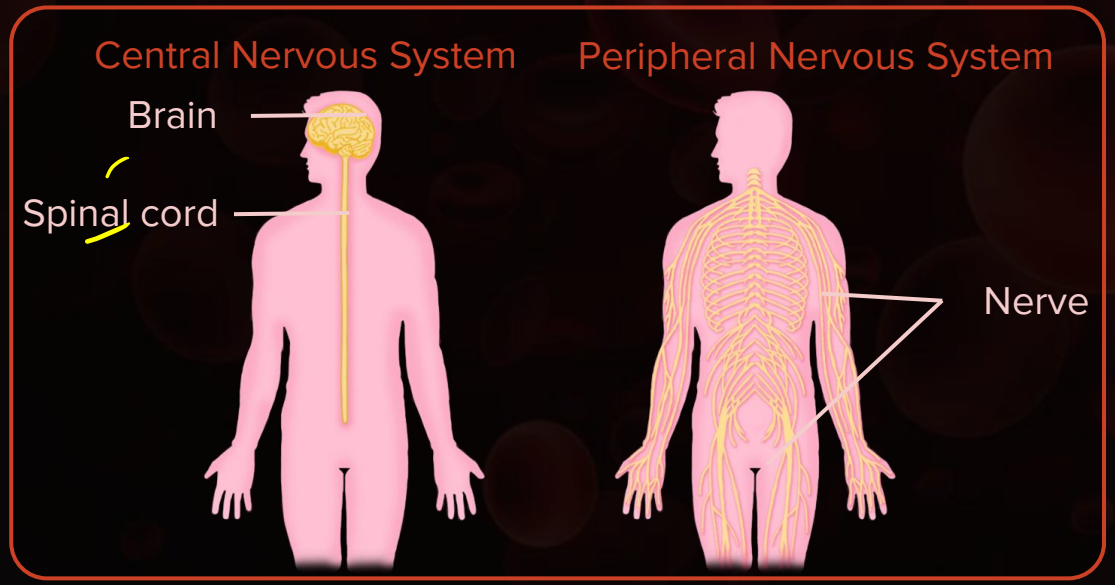
- Regulates the **increase or the decrease of the heartbeat.**



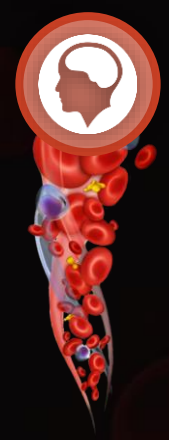
Parts of the Nervous System

Nervous System

- Central nervous system
- Peripheral nervous system



Parts of the Peripheral & Central Nervous System



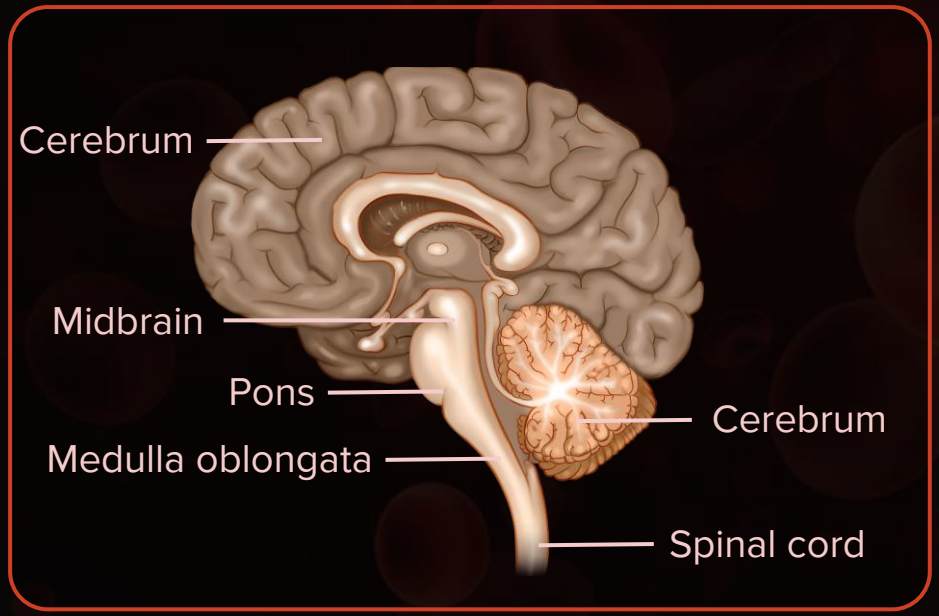
- Human Nervous System
  - Peripheral Nervous System
    - Autonomic Nervous System
      - Sympathetic Nervous System
      - Parasympathetic Nervous System
    - Somatic Nervous System
  - Central Nervous System
    - Brain
    - Spinal Cord

Autonomic Nervous System

- Works automatically **(autonomously),** without a person's conscious effort.
- **Medulla oblongata** regulates the functions of the autonomic nervous system.

Medulla Oblongata

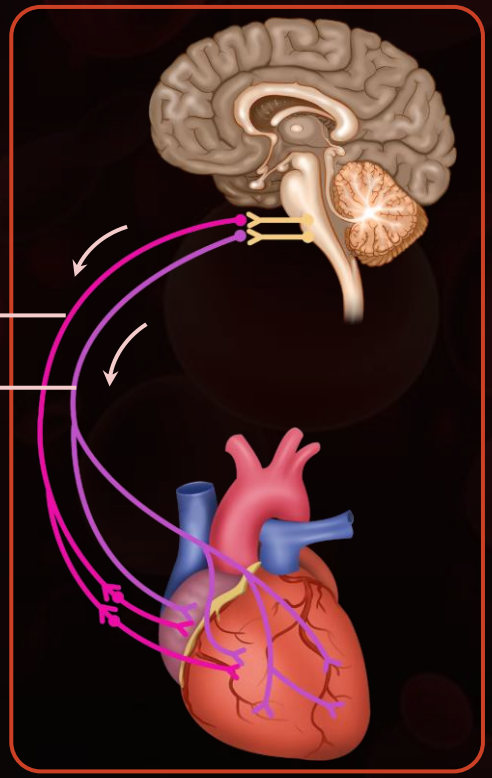
- Found in the **lower part of the brain**
- Has a **centre for cardiac function**



Medulla Oblongata

Two nerves connected to the medulla regulate heart rate

- Sympathetic
- Parasympathetic



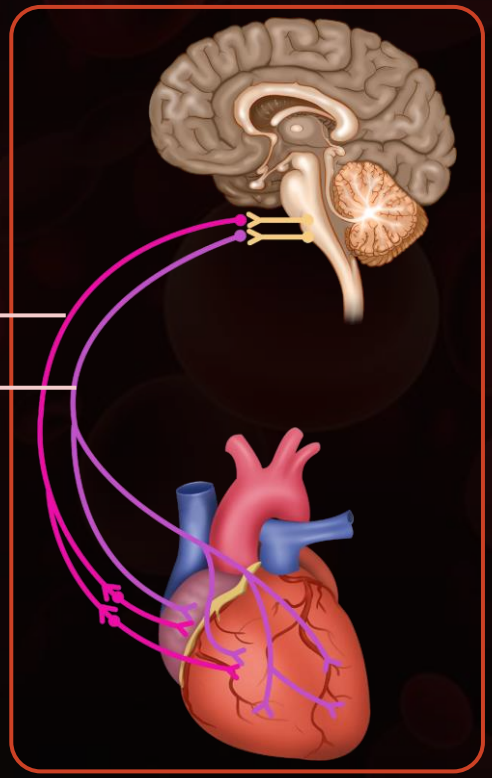
Functions of the Sympathetic and Parasympathetic

Sympathetic Nervous System	Parasympathetic Nervous System
Prepares the body for intense physical activity	Relaxes the body and inhibits or slows many high energy functions
Fight or flight	Rest and digest

Medulla Oblongata

Sympathetic neural signals

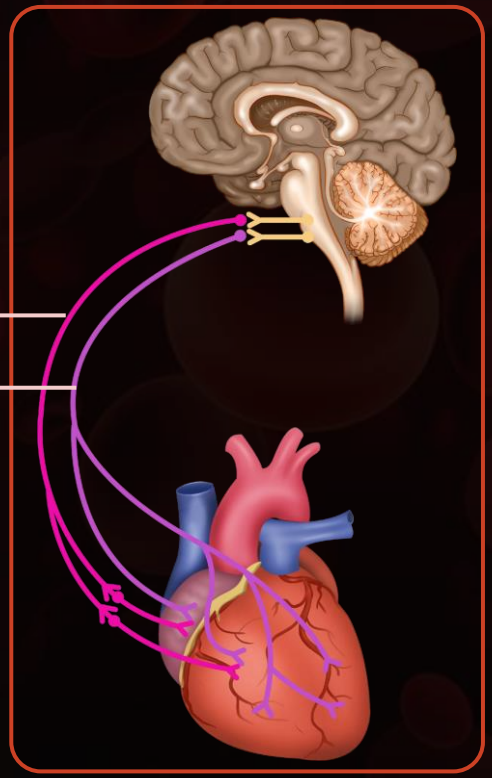
- **Increase** the rate of heartbeat
- The strength of ventricular contraction and
- Thereby the cardiac output



Medulla Oblongata

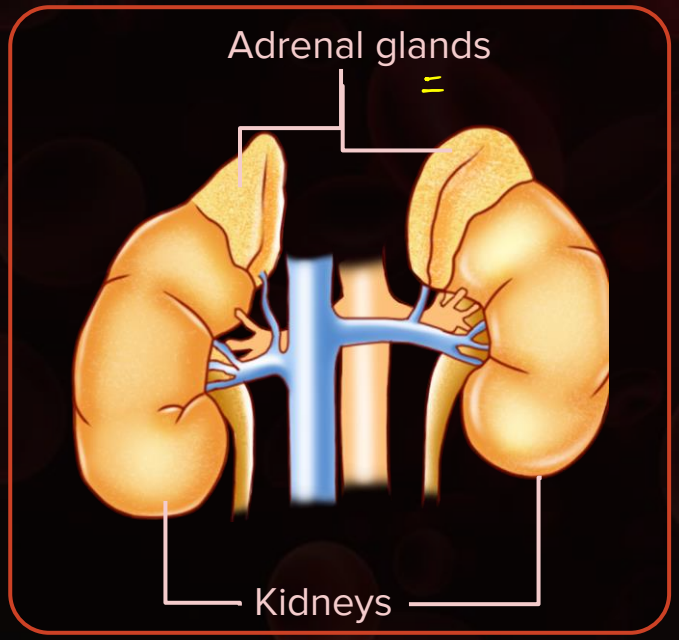
Parasympathetic neural signals

- **Decrease** the rate of heartbeat
- Speed of conduction of action potential
- Thereby the cardiac output

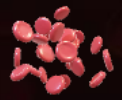


Adrenal Medullary Hormones

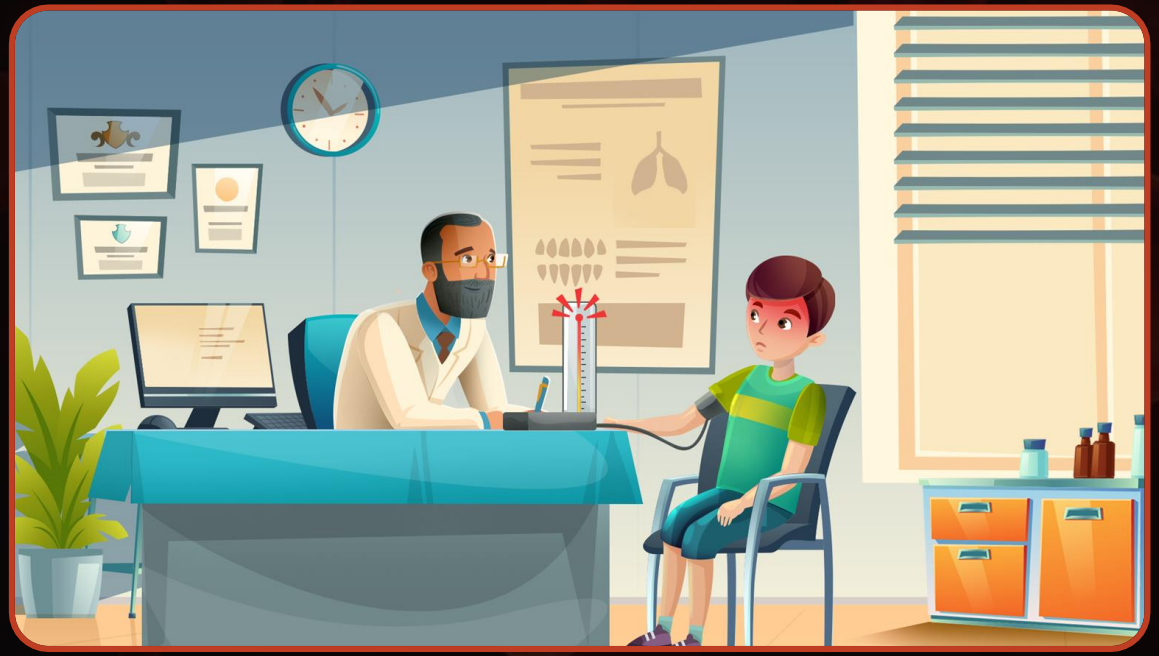
- Also **increases the cardiac output.**



Ever experienced anxiety and nervousness at the doctor's chamber?

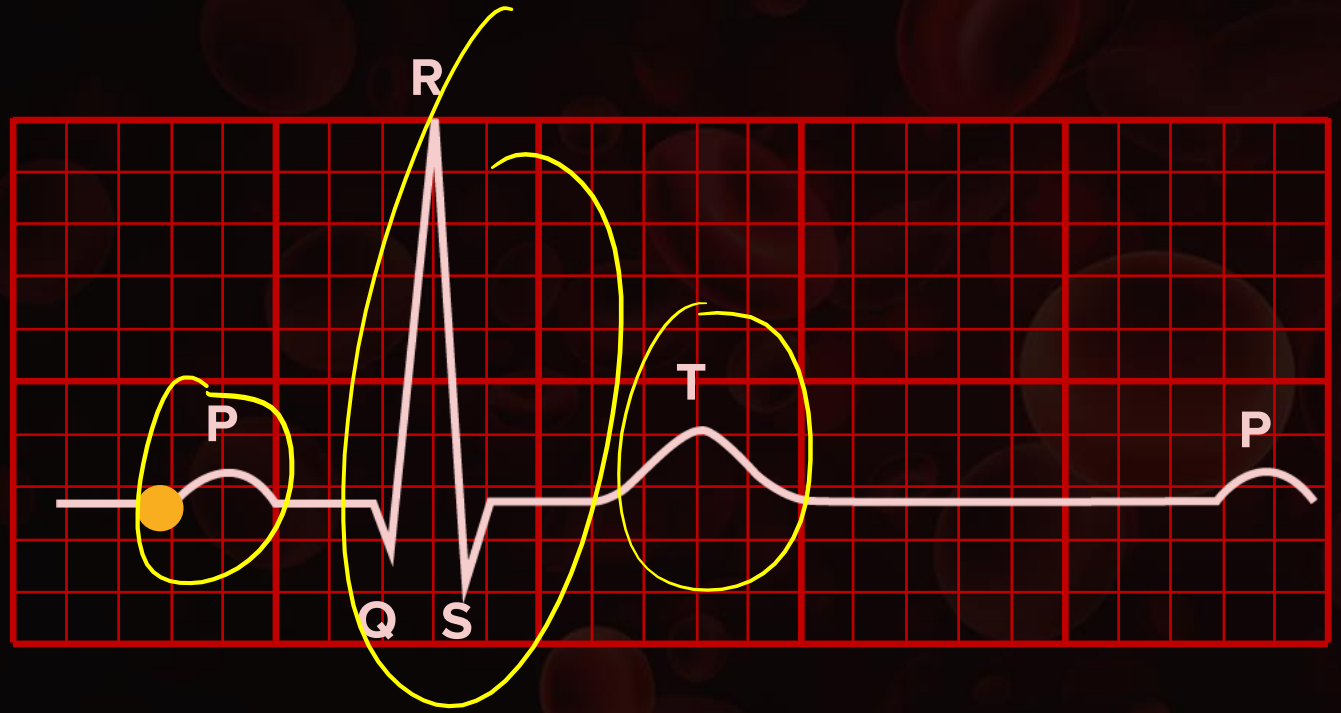


White Coat Hypertension!



Let’s Revise!

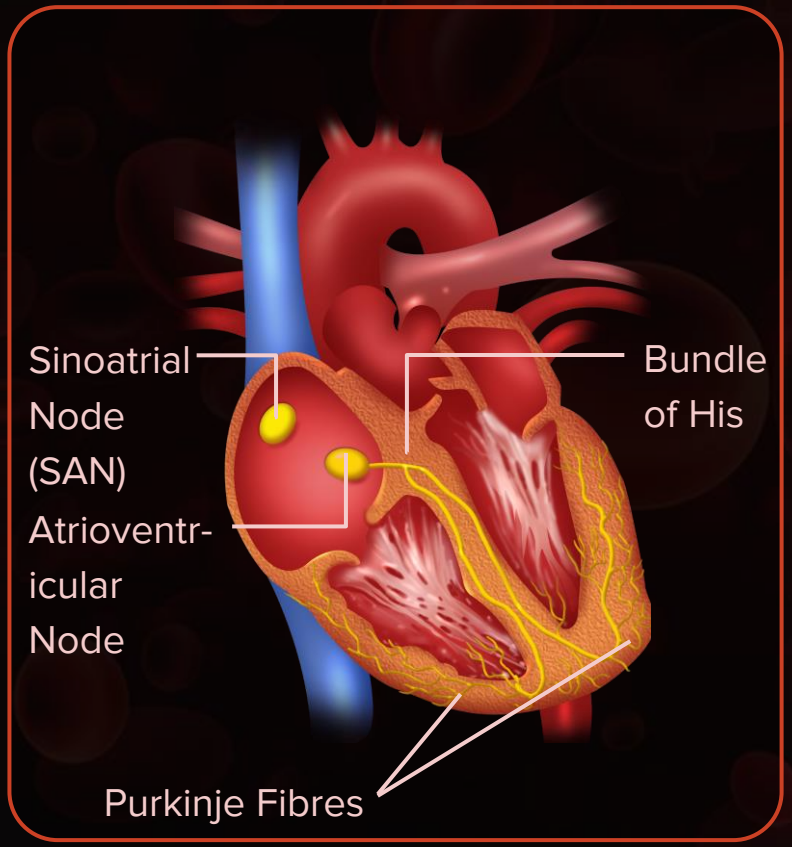
Electrocardiography



Nodal Tissue

Regulates Heartbeat

- SAN
- AVN
- Bundle of His
- Purkinje Fibres



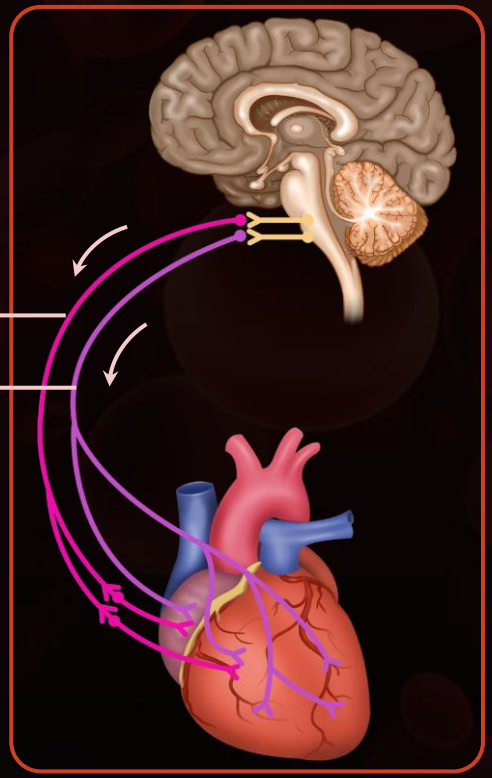
Heart Diseases

- Coronary Artery Disease (CAD)
- Angina
- Heart Attack
- Heart Failure
- Cardiac Arrest
- Arteriosclerosis
- Congenital Heart Disease

Medulla Oblongata

Two nerves connected to the medulla regulate heart rate

- Sympathetic
- Parasympathetic



Keep Learning..!