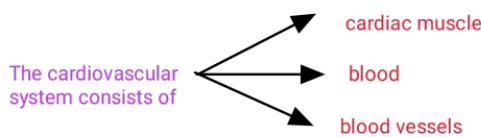


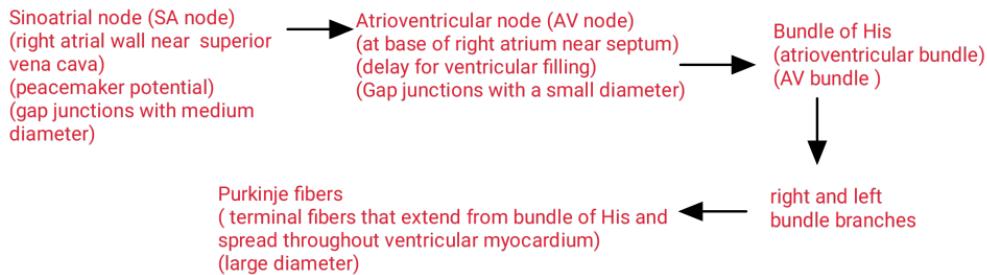
physiology lecture (8) part(2)



cardiac muscle compared to skeletal muscle

- ▶ cardiac muscle fibers are shorter in length (stair-step appearance)
- ▶ cardiac muscle fibers connect by intercalated discs (contain desmosomes)
- ▶ gap unit (synchronization)(coordinated)(Autorhythmicity)(automaticity)
- ▶ electrical synapse unlike skeletal muscles chemical synapse
- ▶ involuntary controlled unlike skeletal muscles they are subconsciously controlled
- ▶ they have more calcium ions and they need more ATP (a little ATP is produced by anaerobic cellular respiration unlike the skeletal muscle)
- ▶ single Central nucleus , while the skeletal muscle fibers contain multiple peripheral nuclei

cardiac action potential pathway :



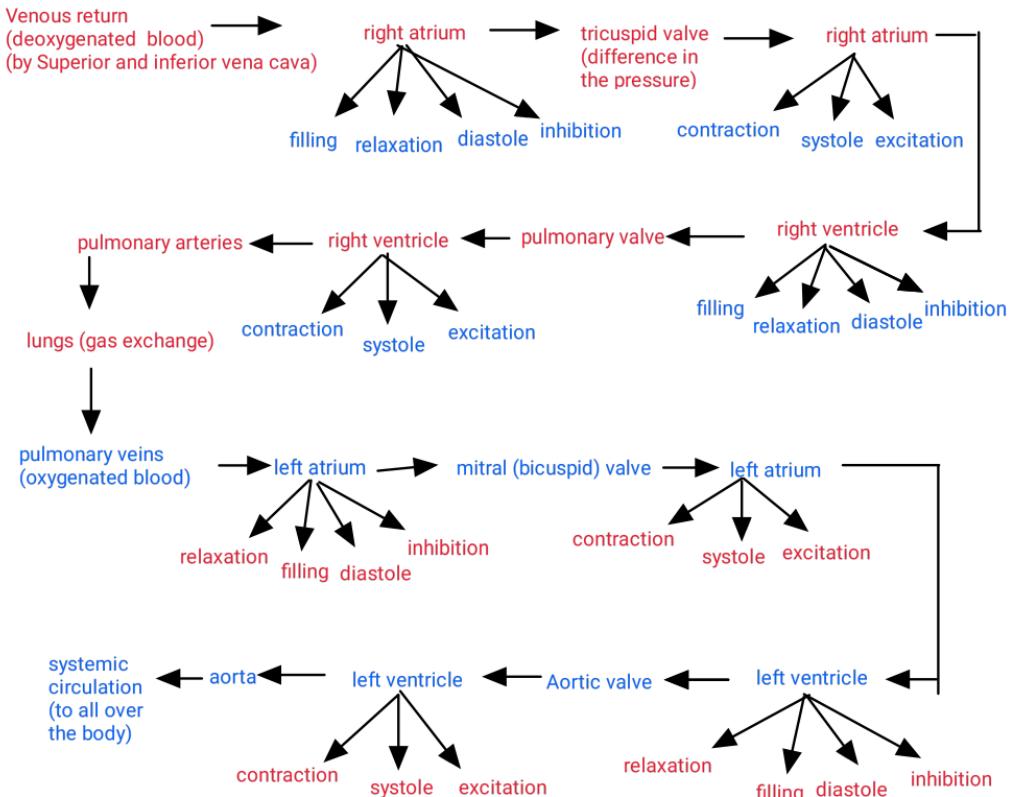
notes about cardiac muscle:

resting membrane potential= -90 threshold= -65
(Na ion channels opens) depolarization= +20

Plateau: A period of maintained depolarization = +10
(ca ion channels open)(k+ outflow balances ca+2 inflow)

then repolarization until it reaches -90
(more k+ outflow)

blood pathway :



Notes:

contraction of cardiac muscle is the same way of skeletal muscle contraction

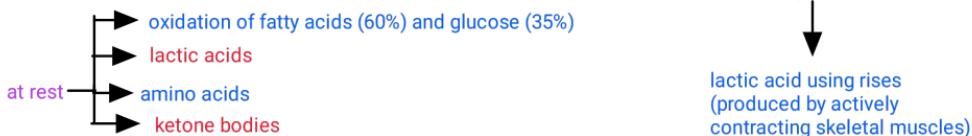
Substances that alter the movement of calcium ions through slow calcium ions channels influence the strength of heart contractions.

Epinephrine increases contraction force by enhancing calcium ions flow into the cytosol

The refractory period of a cardiac muscle fiber lasts longer than the contraction itself.

Their pumping function depends on alternating contraction (when they eject blood) and relaxation (when they refill).

ATP sources :



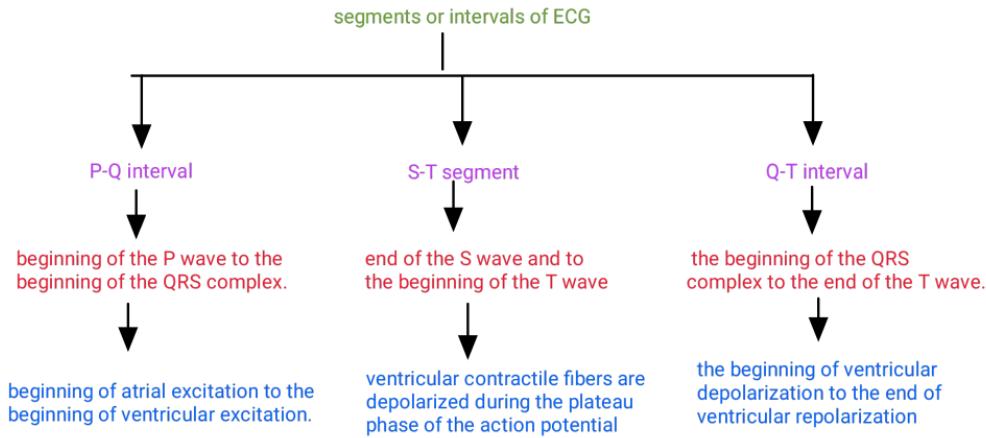
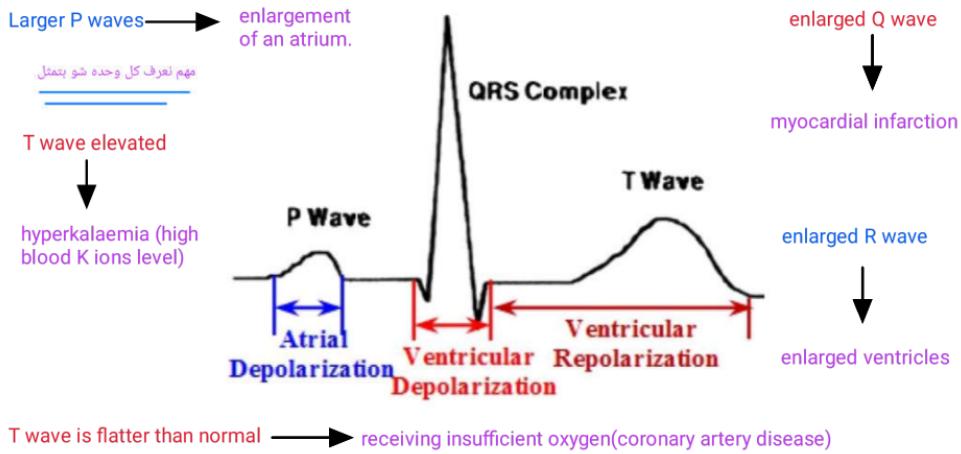
electrocardiogram

An electrocardiogram (ECG) or (EKG): (from the German word Elektrokardiogram), is a recording of electrical signals using electrocardiograph .

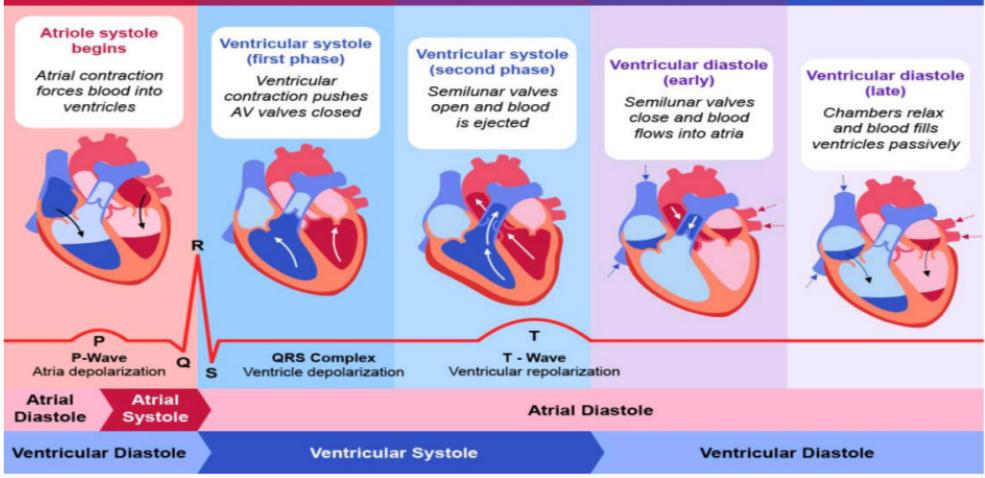
to determine if

- conducting pathway is abnormal.
- heart is enlarged
- certain regions of the heart are damaged
- the cause of chest pain

ELECTROCARDIOGRAM



PHASES OF THE CARDIAC CYCLE



Cardiac output (CO) is the volume of blood ejected from the left ventricle (or the right ventricle) into the aorta (or pulmonary trunk) each minute.

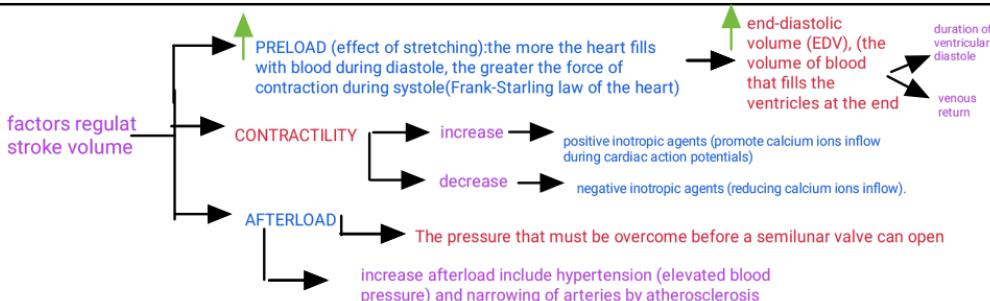
$$CO \text{ (mL/min)} = SV \text{ (mL/beat)} \times HR \text{ (beats/min)}$$

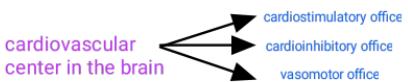
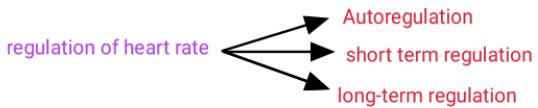
من الوحدات بتقدّر تعرّف تعرّيف كل وحدة

طبعا اي قانون مذكور بالسلайдات مطلوب كحل وتطبيق عليه لانه الدكتوره قالت انه بتجيب اسئلة حل

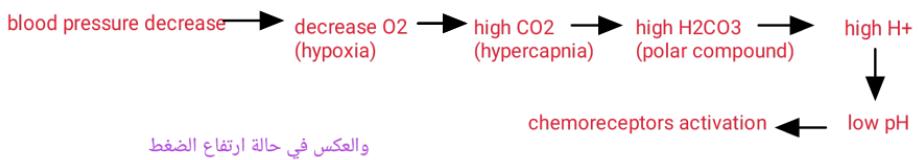
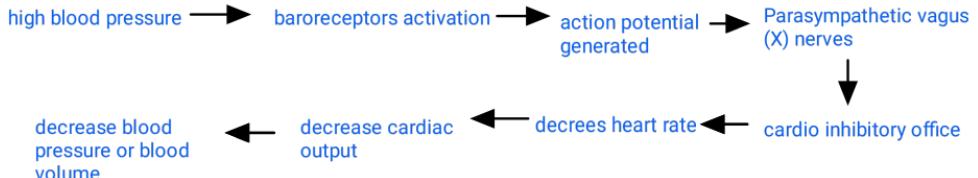
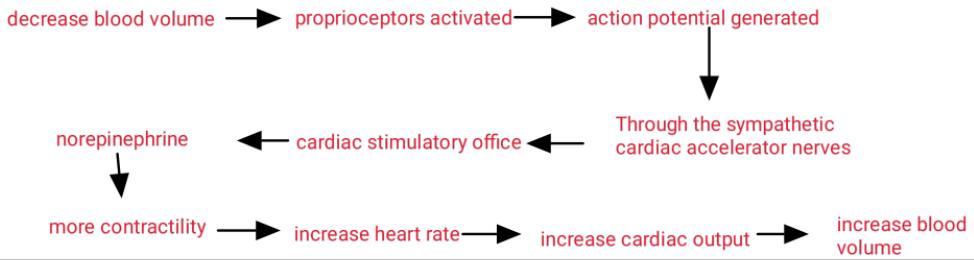
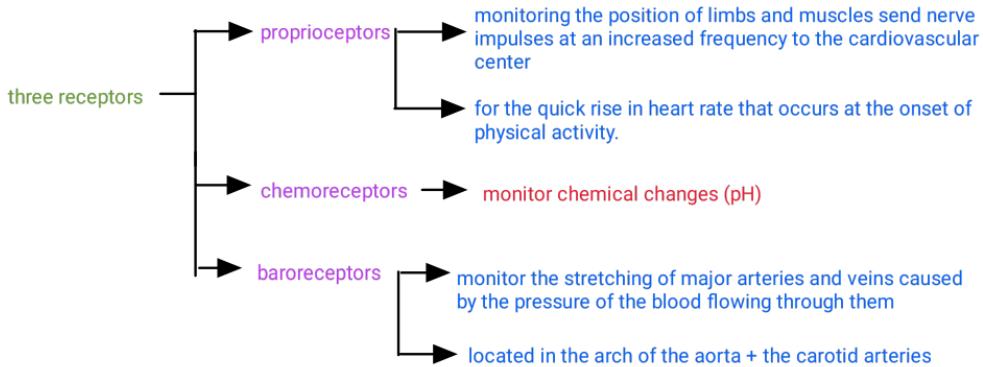
stroke volume heart rate

Cardiac reserve is the difference between a person's maximum cardiac output and cardiac output at rest
cardiac reverse for average person = 4 resting value or 5 resting value



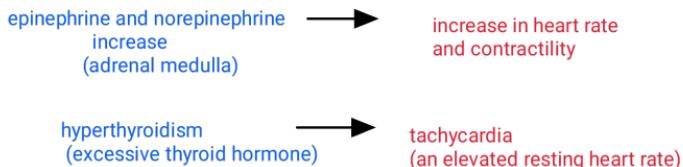


short-term regulation :

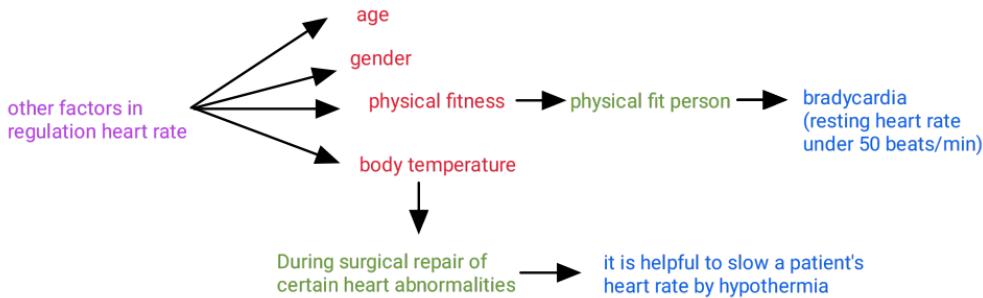
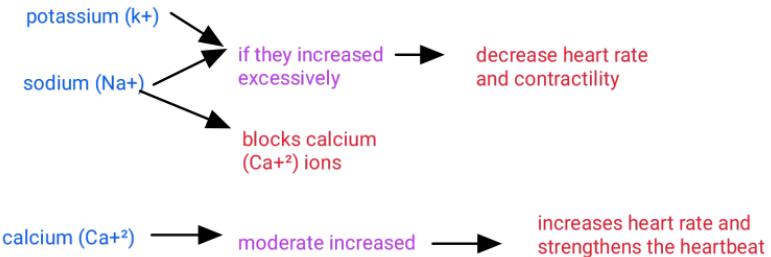


chemical regulation of heart rate

1. Hormones:



2. cations



Cardiac transplantation is the replacement of a severely damaged heart with a normal heart from a brain-dead or recently deceased donor.

