

Heart Beat:

- Rhythmic contraction and relaxation of heart is called Heart beat.
- Actually, contraction and relaxation occurs separately in atria and ventricles.
- However, ventricular movements are quite prominent and forceful.
- Therefore, the beat is synonym with ventricular or apex beat.
- It increases temporarily with activity & disease.
- In Animals, beat is connected with size.
- In Mammals, smaller animals have higher heart beat.
Adult man \rightarrow 72/min
New born \rightarrow 120-140/min
Rabbit \rightarrow 210/min.
- Heart beat rate is higher in woman, children and infants and lower in aged persons.

Neurogenic Heart

1. Impulse of heart comes from outside of the heart.
2. Impulse is generated by nervous system.
3. Nerve fibres are spread over the heart to bring about contraction & relaxation.
4. Heart will stop beating if removed from the body.

5. Example: Heart of Arthropods & some Annelids.

Myogenic Heart

1. The impulse of heart beat develops within the heart.
2. Impulse is generated by a special muscular tissue.
3. They are special conducting muscle fibres for spreading the impulse.
4. It will continue to beat for some time, if detached heart is supplied with proper nourishment and favourable conditions.
5. Example: Molluscs & vertebrates.

Regulation of Heart beat

- Centre of Heart beat regulation is located in Medulla oblongata (Brain stem)

Heart beat is controlled by two ways —

(i) Nervous Control

- The 'cardiac centre' (neural centre) which regulates heart beat is found in 'Medulla oblongata'. It moderate the cardiac function through Autonomic Nervous System (ANS).
- This cardiac centre has two units —
 - A) cardio-acceleration centre
 - B) cardio-inhibitory centre.
- From the cardio-acceleration centre, a pair of sympathetic nerves go to the S.A. Node. This centre increase the rate of heart beat.
- While the cardio-inhibitory centre sends impulse to the S.A. Node through Cardiac branch of Vagus nerve. This centre reduces the rate of heart beat.

(ii) Hormonal Control

- Sympathetic and Parasympathetic nerves (parts of ANS) are connected to the heart and can modify the rate of spontaneous depolarization of S.A. Node.
- Sympathetic nerve ending release Nor-adrenaline/ sympathins which stimulates the SA Node that accelerates the heart beats, the strength of ventricular contraction and thereby cardiac output.
- The parasympathetic nerve ending release Acetylcholine which decrease the rate of heart beat, speed of conduction of impulse action potential and thereby cardiac output.
- The Adrenaline & Thyroxine hormones secreted by Adrenal medulla & Thyroid respectively also increase the heart beat and the strength of heart contraction.