

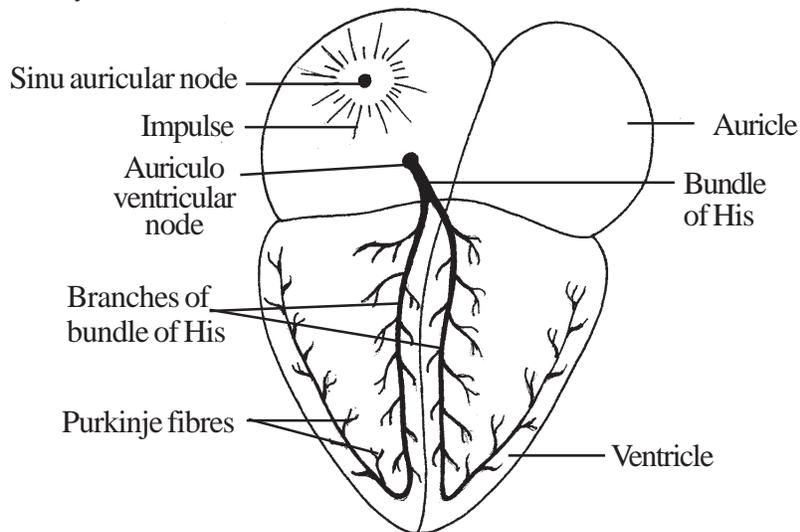
### Conduction of Heart Beat

The impulse originated from the sinu-auricular node is picked up and propagated by a special system of tissues present in the heart. The conducting system includes the following components:

1. *Auriculo Ventricular node*
2. *Bundle of His* and
3. *Purkinje fibres*

The impulse arising from the sinu auricular node is picked up by the *auriculoventricular node* located at the posterior right border of the inter auricular septum. It functions as a relay station and it transmits the impulses to other parts of the heart through the bundle of His. When the sinu-auricular node fails to function, it acts as a *reserve pace maker* because it can also initiate the cardiac impulse.

From the auriculoventricular node a bundle of tissue originates. It is called *bundle of His*. It extends into the ventricle. Immediately after its origin it divides into two branches. They run along the inner border of each ventricle and reach the tip of the ventricle. Then they run upwards along the outer margin of the ventricle. The bundle of His and its branches produce minute branches called *Purkinje fibres*. They ramify the wall of the ventricles.



*Fig.8.30: Origin and Conduction of heart beat.*

During heart beat the auricles contract first and ventricles contract later. This is because the auricles receive the impulse directly

from the sinu-auricular node. The ventricles receive the impulses through auriculoventricular node, bundle of His and Purkinje fibres.

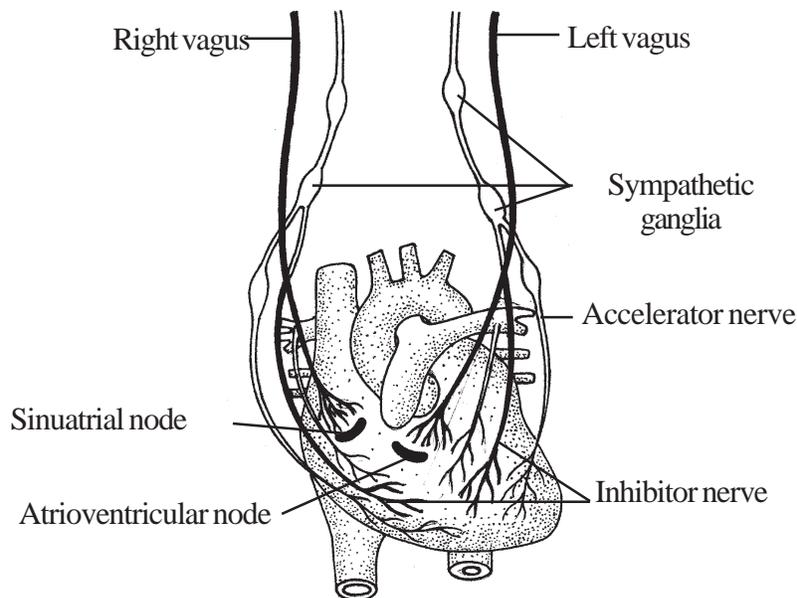
### Regulation of the Heart Beat

The heart beat is controlled by the nervous system, hormones, temperature and pH.

#### 1. Nervous Regulation

In the intact animals the activity of the heart is regulated to a large extent through the *central nervous system*. The heart receives branches of the *vagus nerves* from the *medulla* and *sympathetic* nerve fibres from the spinal cord.

**Vagus Nerve:** The vagus nerves are *cardio inhibitory* nerves. This inhibitory nerve is controlled by the cardio inhibitory centre situated within the medulla. When the vagus nerve is stimulated the activity of the heart is inhibited. The inhibitory action of the vagus nerve is brought about as follows:



*Fig.8.31: The innervation of the heart.*

1. The heart rate is slowed down and even it may stop.
2. The conductivity of the bundle of *His* is reduced.
3. The force of contraction is diminished.
4. The duration of systole is diminished, but that of diastole is increased.