

INITIATION AND CONTROL OF THE HEARTBEAT

Initiation of Heartbeat

1. An area of the heart called the _____ or _____ node (SA node) initiates the heartbeat without the need for outside influence (ie. it has "intrinsic" rhythm)
 - the SA node is a specialized patch of _____ tissue in the _____ wall
 - it spontaneously generates nerve impulses and sends them through the _____ causing both to contract
2. Nerve impulses also travel from the _____ node to the _____ (atrioventricular) node
 - the AV node is another specialized patch of nerve tissue
 - located in _____
 - nerve impulses spread from the AV node, down nerve fibres called the _____ of _____ (in the _____) and then up the _____ fibres which travel through the walls of the _____
 - when impulse travels along the _____ fibres, the ventricles _____ (from bottom to top)

Control of Heartbeat

- two nerves run to the pacemaker of the heart from a part of the brain called the "_____ control centre" or "heart rate centre" located in the _____ (brain stem)
 - a) one stimulates heartbeat (_____ nerve)
 - b) one inhibits heartbeat (_____ nerve)
1. *Heartbeat can be SPEEDED up (increasing BP) when:*
 - impulses along the _____ nerve increase
 - impulses along the _____ nerve decrease
 2. *Heartbeat can be SLOWED down (decreasing BP) when:*
 - impulses along the _____ nerve increase
 - impulses along the _____ nerve decrease

How Does The Heart "Know" to Speed Up or Slow Down?

- stretch receptors in major blood vessels sense BP and send nerve impulses along _____ up to the heart rate centre
1. *If blood pressure is too HIGH:*
 - nerve impulses from the _____ artery and _____ tell heart rate centre to slow down heartbeat
 - heartbeat is then slowed when nerve impulses travel to the _____ along the _____ nerve (also, decreased impulses along the _____ nerve)
 2. *If blood pressure is too LOW:*
 - nerve impulses from the _____ tell heart rate centre to speed up heartbeat
 - heartbeat is then sped up when nerve impulses travel to the _____ along the _____ nerve (also, decreased impulses along the _____ nerve)

Note that **blood pressure can also be raised** by _____ blood vessels and lowered by _____ blood vessels. Various **solutes** also affect blood pressure. For example, high _____ intake causes blood to become more _____ which leads to osmosis of water into the blood vessel, increasing BP.