Edexcel (B) Biology A-level

9.8 - Control of heart rate in mammals

Flashcards

State the name and location of the 2 nodes involved in heart contraction.

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Sinoatrial node (**SAN**): within the wall of the right atrium.

Atrioventricular node (**AVN**): near lower end of right atrium in the wall that separates the 2 atria.

Describe how heartbeats coordinated.

Describe how heartbeats are coordinated.

1. SAN initiates wave of depolarisation (WOD).
2. WOD spreads across both atria = atrial systole.
3. Layer of fibrous, non-conducting tissue delays impulse while ventricles fill & valves close.
4. AVN conveys WOD down septum via Bundle of His, which branches into Purkinje fibres along ventricles.
5. Causes ventricles to contract from apex upwards.

What is the autonomic nervous system?

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System that controls involuntary actions of glands and muscles.

2 subdivisions: sympathetic & parasympathetic.

Name the receptors involved in changing heart rate and state their location.

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Baroreceptors (detect changes in blood pressure): carotid body.

Chemoreceptors (detect changes in pH e.g. due to increase in CO_2 concentration): carotid body & aortic body.

How does the body respond to an increase in blood pressure?

How does the body respond to an increase in blood pressure?

1. **Baroreceptors** send **more impulses to cardioinhibitory centre** in the **medulla oblongata**.
2. More impulses to SAN down vagus nerve via **parasympathetic nervous system**.
3. Stimulates release of **acetylcholine**, which decreases heart rate.

How does the body respond to a decrease in blood pressure?

How does the body respond to a decrease in blood pressure?

1. **Baroreceptors** send **more impulses to cardioacceleratory centre** in the **medulla oblongata**.
2. More impulses to SAN via **sympathetic nervous system**.
3. Stimulates release of **noradrenaline**, which increases heart rate and strength of contraction.

How does the body respond to an increase in CO_2 concentration?

How does the body respond to an increase in CO_2 concentration?

1. **Chemoreceptors** detect **pH decrease** and **send more impulses to cardioacceleratory centre** of **medulla oblongata**.
2. More impulses to SAN via **sympathetic nervous system**.
3. **Heart rate** increases, so rate of blood flow to lungs increases = rate of **gas exchange** and **ventilation** rate increase.