Coronary heart disease

Syllabus section 9.2, Student Book sections 2.28 and 2.29

Objectives:
- To know that the heart requires a supply of oxygen and glucose
- To know that the heart has its own blood supply through the coronary arteries
- To understand that factors such as lifestyle, diet and family history may affect the risk of coronary heart disease

Overview:
Students review the need for a circulatory system, and the heart as a pump for this system.
Students review heart structure, and the importance of the coronary arteries in supplying heart muscle with glucose and oxygen.
Heart disease: atheroma, risk factors, managing the risk, coronary bypass surgery
Ethical problems associated with heart surgery

Activities
The lesson is based around a PowerPoint: here is the summary of the main learning points of the presentation:
- The heart is a powerful muscle
- It has four chambers, two to receive blood and two to pump blood out again
- The heart muscle is supplied with oxygen and glucose through the coronary arteries
- Blockage of the coronary arteries by atheroma can cause chd (even a heart attack)
- The risk of chd can be reduced by adopting a careful lifestyle
- A blocked coronary artery can be bypassed to restore heart efficiency

Assessment/homework:
Crossword from CD
Questions on spread 2.29

Key words:
coronary arteries, bypass operation, coronary heart disease (CHD)

Resources:
- PowerPoint on CHD (from CD)
- Crossword on CHD/circulation (from CD)
Homeostasis: keeping a steady state

Syllabus section 14.4, Student Book sections 2.45 and 2.46

Objectives:
- To be able to define the term ‘homeostasis’
- To understand why the body must keep constant conditions around the cells
- To understand the principle of negative feedback

Overview:
Students recall that the body and its cells will only function under the correct conditions (such as temperature).
Students recall that the composition of the blood can be controlled, and that this in turn controls the composition of the tissue fluid surrounding cells.
The idea of negative feedback is introduced – a good analogy is the use of the automatic pilot for flying an aircraft, and the maintenance of comfortable cabin conditions using sensors and effectors.

Health and Safety:
Alcohol is highly flammable, and should be kept away from naked flames.

Activities
- Starter: ask students what their body temperature is, and what the temperature of the lab environment is. Remind them about the effects of temperature on enzymes.
- Carry out activity on the functions of perspiration – see page xx
- Introduce the idea of homeostasis and negative feedback.
  Watch PowerPoint on negative feedback.
- Possibly pre-plan investigation on heat loss from a model body – see page xx
- Use this as a means of reviewing experimental design.

Extension
Students research internal features (specifically ribosomes/mitochondria) and explain why they are not visible using a simple light microscope

Assessment/homework:
- Exercises on spread 2.45 of Student Book.
- Preparation for follow-up investigation could include reading spread 2.46.

Key words:
homeostasis, negative feedback, thermoregulation

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