

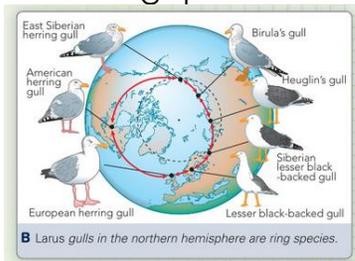
B1.3 – Species

A species is a group of organisms that can breed with each other and produce fertile offspring. A few species can interbreed to produce hybrid offspring, but often these hybrids are sterile.

- Problem 1 – Some species reproduce asexually from parts of their body or by dividing in two. If we do not see two organisms breeding together we cannot be sure if they're the same species.
- Problem 2 – Some organism from closely related species can interbreed and produce hybrid offspring that are fertile

Difficulties with classification

- Mallard ducks can hybridise with other, closely related species to produce fertile hybrid offspring. This produces ducks with a continuous range of characteristics, rather than separate species.
- Neighboring populations of the same species may have slightly different characteristics but still interbreed. Sometimes there is a chain of different populations that can all breed with their neighboring populations but the two populations at either end of the chain cannot interbreed. The chain often forms a ring shape and so these organism are called ring species.
- It is hard to divide ring species into separate species.



Naming a species

- An organism's scientific name has two Latin words (genus and species). This is called the binomial system. Organisms that share the first word in their name are closely related. Scientists can tell from the name whether two organism are closely related.
- The binomial system is also useful because organisms with the same common names may actually be different species. For example a robin in America is not the same as a robin in the UK. The system is agreed by scientists all over the world to allow them to communicate clearly, whatever the language.



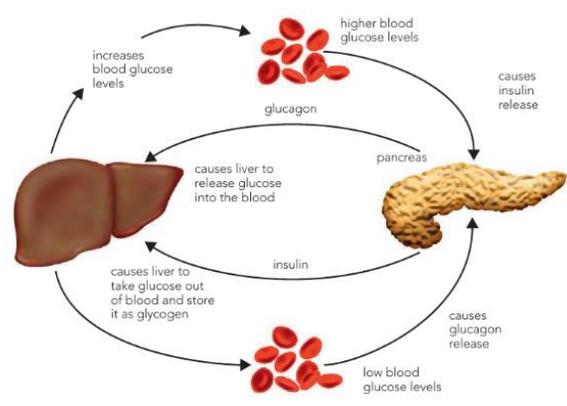
B1.15+16 Hormones + Diabetes

Hormones

- Hormones are produced and released by endocrine glands. Hormones travel in the blood and act as 'chemical messengers', causing certain parts of the body to respond to their presence. An organ that responds to a certain hormone is a target organ.

Controlling blood glucose levels

- Carbohydrates in your food are mainly digested into a sugar called glucose. After a meal the concentration of glucose in your blood goes up. When it goes about a certain level your pancreas releases a hormone called insulin. Insulin affects certain cells, which then take glucose out of blood and convert it into glycogen.



C Insulin and glucagon control blood glucose levels.

Type 1 Diabetes

- Between 5 and 10% of people have type 1 diabetes. This is when the pancreas does not produce insulin, so when blood glucose concentration rises, the body is unable to correct them. People with type 1 diabetes have to inject themselves with insulin every day.
- Insulin must be injected into the subcutaneous fat layer beneath the skin, as fat easily absorbs the insulin. The insulin then spreads around the body.

Type 2 Diabetes

- This usually occur when the cells in a person's body respond less well to insulin – the cells become resistant to it.
- There are a number of factors that may cause type 2 diabetes including high-fat diets, lack of exercise, getting older and being overweight.
- You are classed as obese if you have a BMI of over 30. A BMI gives an estimate of how healthy a person's mass is for their height.
- $BMI = \text{weight} / \text{height}^2$



B1.24 – Ethics and transplants

Transplanting organs

- In a transplant a healthy organ such as a liver or heart is taken from one body (the donor) and put into a patient to replace an organ that no longer functions properly.

Difficult decisions

- Doctors use a scientific criteria to make decisions based on the likelihood of success. These include whether the patient and donor
 - Have similar tissues
 - Are similar ages
 - Are geographically close
 - How ill the patient is

An ethical decision uses ethical criteria to reach an answer that most people think is right or fair.

Other ethical issues

- Some donors would like to choose who should or shouldn't get their organs. Some people think that they should be able to sell organs from relatives who have recently died of themselves.

