

Answers to Workbook exercises

Chapter 14

Exercise 14.1 Endotherms and ectotherms

- a Endothermic animals: cat, rabbit, burrowing bettong;
Ectothermic animals: alligator, gopher snake, cyclodus lizard
- b The cat, rabbit and burrowing bettong use respiration to provide heat to keep their bodies warm when the environmental temperature is below 37°C. This requires fuel, which is in the form of carbohydrates, fats or proteins. The other three animals don't use food to produce heat energy, so they need much less.
- c At 5°C, the cat has a core body temperature of about 38°C, so its metabolic reactions will be taking place quickly, and it will be active. The lizard has a body temperature of about 5°C, so its reactions will be taking place slowly and it will be inactive.
- d As they have a constant core temperature, cats are able to be active in winter and summer, at night and in the daytime. This means they can hunt in all seasons and at all times of day. Rabbits, too, can be active at all of these times, so they are able to flee from predators no matter what the external temperature.

Exercise 14.2 Diabetes

- a When blood glucose levels rise higher than normal.
- b The starch is digested by amylase (in saliva and pancreatic juice) to produce maltose. Maltose is digested by maltase to produce glucose. Glucose is absorbed into the blood capillaries in the villi in the small intestine.
- c Person A. The blood glucose level rose higher after eating the starch, and stayed high for longer. In person B, insulin was secreted from the pancreas when the glucose rose above normal. This caused the liver to take some of the glucose out of the blood and change it into glycogen and store it. This did not happen in person A.
- d If blood glucose concentration is too high, water is drawn out of the blood cells and body cells by osmosis. This means that metabolic reactions cannot take place normally in their cytoplasm. If blood glucose concentration is too low, cells do not get enough glucose to be able to carry out respiration, which is essential to supply them with energy for active transport and other processes.