Title – Controlling blood glucose levels

LEARNING GOALS

- Recap hormones and why body's reactions to hormones are usually slower than nervous reactions
- Understand where insulin is produced and how it regulates blood glucose
- Recall how diabetes is caused and how it can be controlled

What is Homeostasis?

Homeostasis - involves maintaining a constant environment in the body

- Homeostasis makes sure our body has the correct levels of;

Temperature

Water

Oxygen

Carbon dioxide

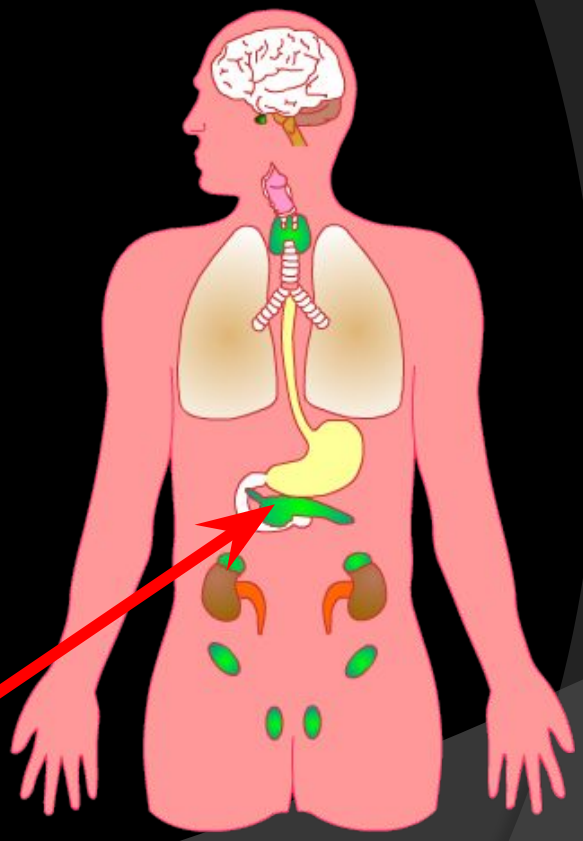
Blood sugar

Recap: What is a hormone?

- A chemical
- Hormones are secreted from our glands into the bloodstream.
- Travel in blood to target organs
- Regulate the functions of many organs and cells
- Coordinate many processes in the body

- Which gland produces the hormone insulin?

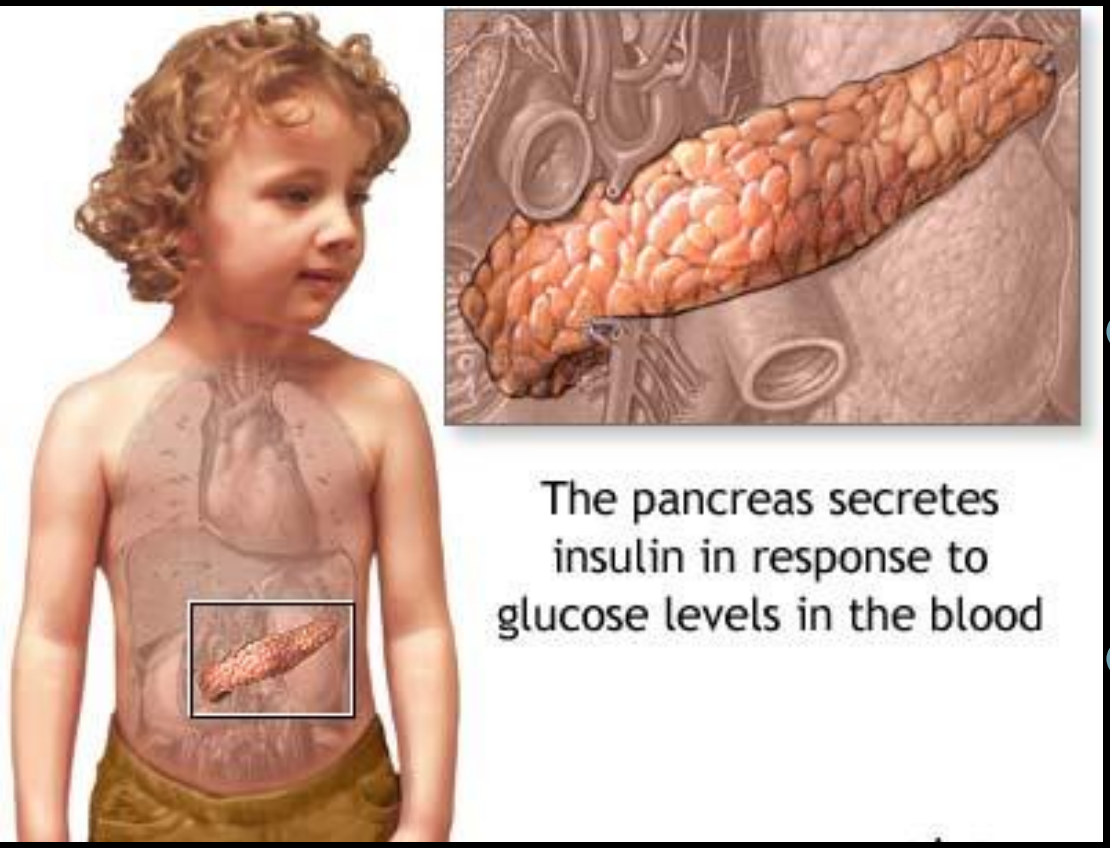
Pancreas



Hormones generally produce a slower reaction than nerve impulses – Why?

- Hormones co-ordinate long-term changes such as maturation
- Hormones have to be made and then released from cells where they need to travel to their target organs in the blood
- Nerve impulses are generated quickly and travel directly to the effectors

The Pancreas



- Insulin controls……..

  blood sugar levels in our bodies.

- Glucose is a sugar needed by cells for Respiration.

- It is important that the concentration of glucose in the blood is kept at a constant level.

Changing glucose levels

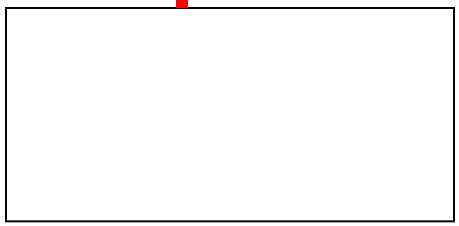
- After a meal the level of glucose in our bodies [increases]?
- After exercise the levels of glucose in our bodies [decreases]?

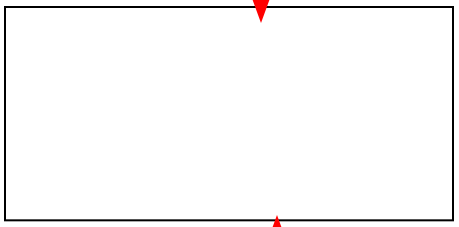
- Why do you think this happens?

Controlling Blood Glucose Levels

Glucose rises due to_____

Insulin produced by the _____ travels in the _____ to the liver and causes it to take up excess _____and store it as_____.





Glucose falls due to_____

_____ is released by the pancreas and causes _____ in the liver to be converted back to glucose

Controlling Blood Glucose Levels

Glucose rises due to eating

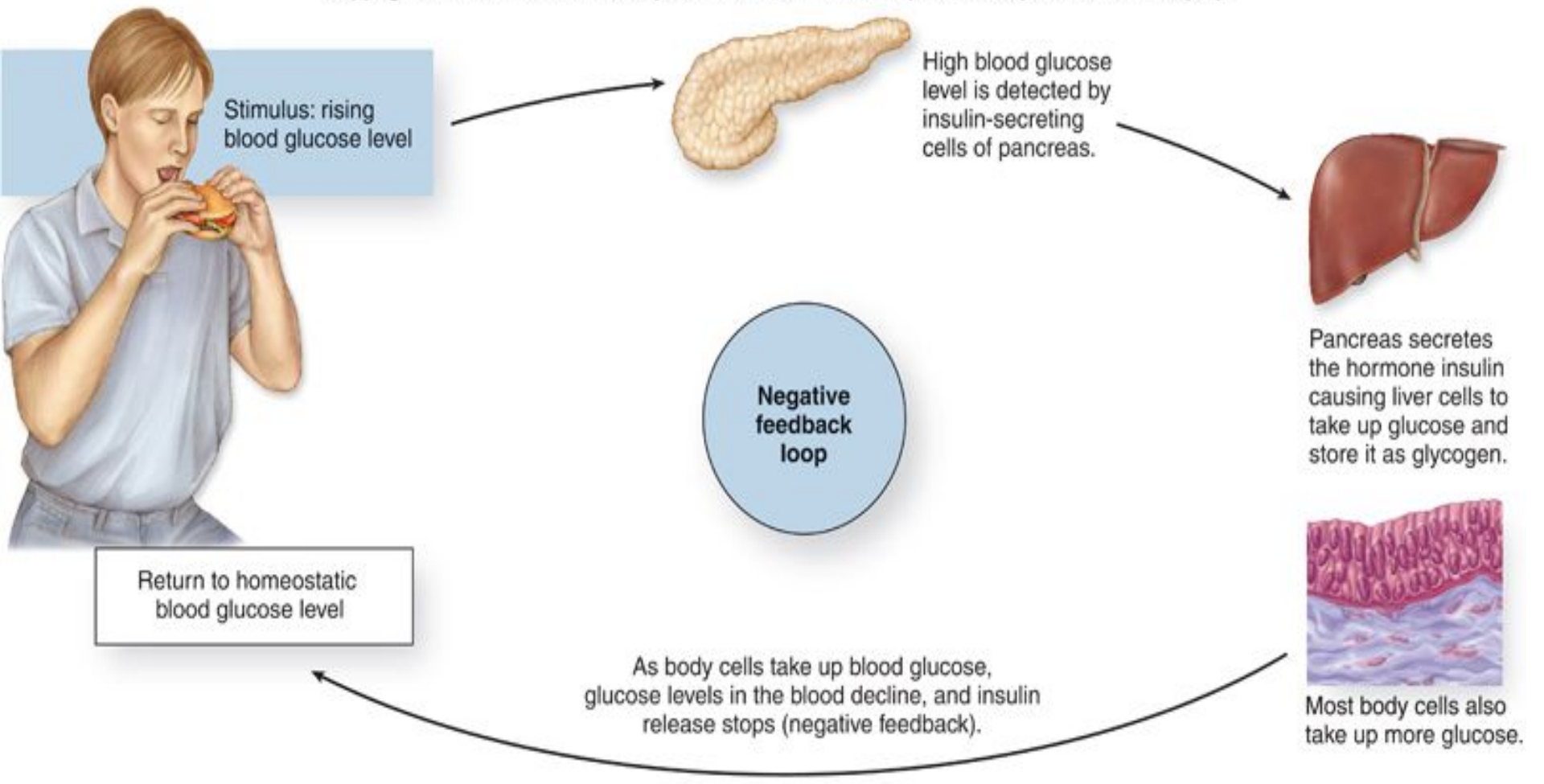
Insulin produced by the pancreas travels in the blood to the liver and causes it to take up excess glucose and store it as glycogen.

Normal blood glucose level.

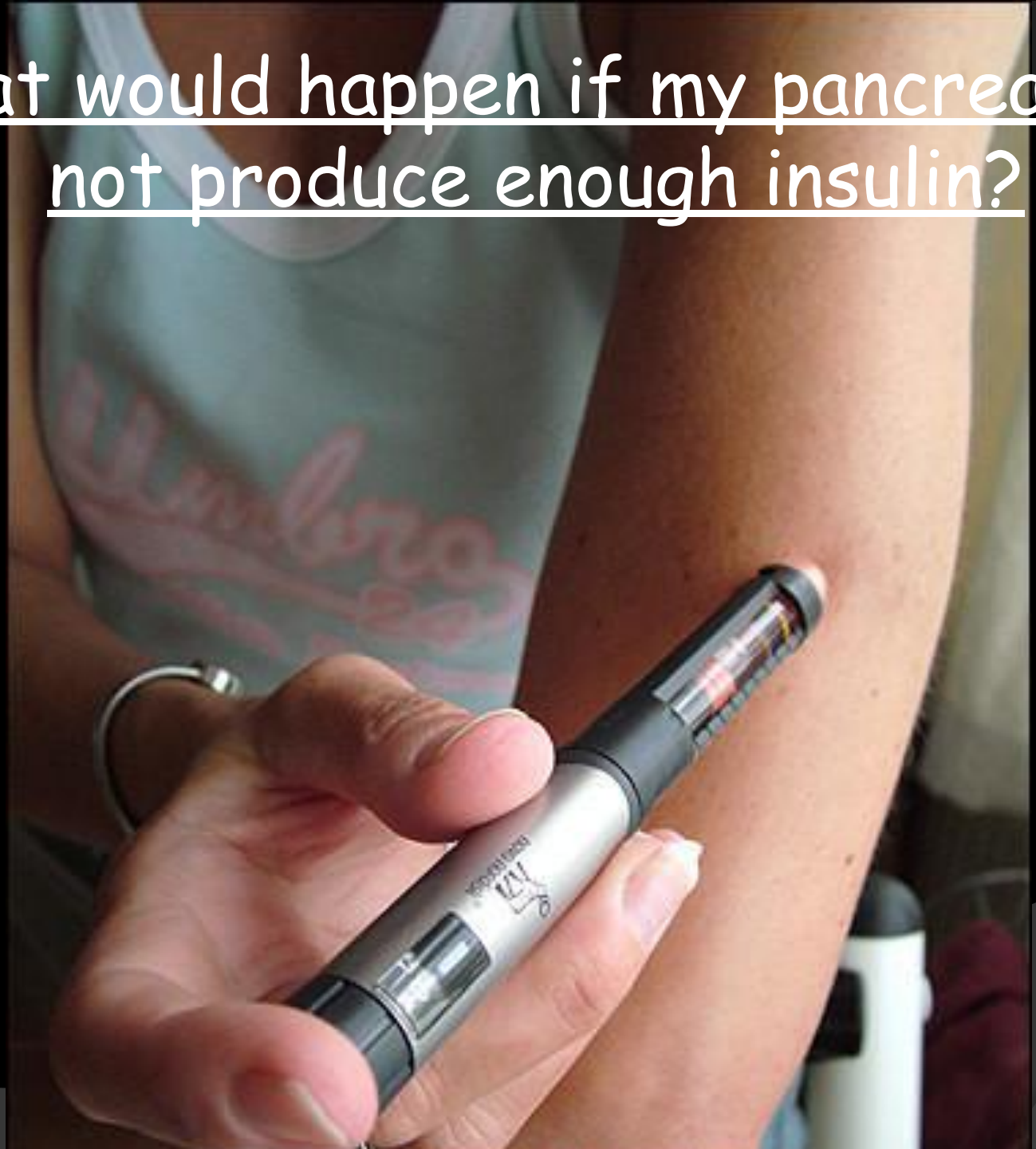
Normal blood glucose level.

Glucose falls due to exercise

Glucagon is released by the pancreas and causes glycogen in the liver to be converted back to glucose


Stimulus: rising blood glucose level
High blood glucose level is detected by insulin-secreting cells of pancreas.
Pancreas secretes the hormone insulin causing liver cells to take up glucose and store it as glycogen.
Most body cells also take up more glucose.
As body cells take up blood glucose, glucose levels in the blood decline, and insulin release stops (negative feedback).
Return to homeostatic blood glucose level
Negative feedback loop

What would happen if my pancreas did not produce enough insulin?



Symptoms of Diabetes

Glucose in urine

Thirsty

Tiredness

People with diabetes test their blood to see how much glucose is in it and inject with insulin accordingly

Use the internet have given you to fill in the table about diabetes

Type of diabetes	Cause	Method of control

Extension: How is the insulin that is injected by diabetics produced?

How can diabetes sufferers control their symptoms?

- Making sure that they do not eat too much sugary food
- Carry out exercise to convert excess glucose to energy
- Amount of insulin injected depends on the amount they eat and how active they are