

Hormones and the endocrine system

Revision notes · Where hormones are made and how they travel, plus adrenalin and thyroxine (Higher tier).

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Hormones and the endocrine system Spec 7.1-7.3

The endocrine system Spec 7.1

Hormones are chemical messengers. They are made in **endocrine glands** and released straight into the blood. The blood plasma carries them around the whole body, but each hormone only affects its **target organs**.

1. An endocrine gland secretes a hormone into the blood.
2. The blood carries the hormone around the body.
3. The hormone reaches its target organ and causes a response.

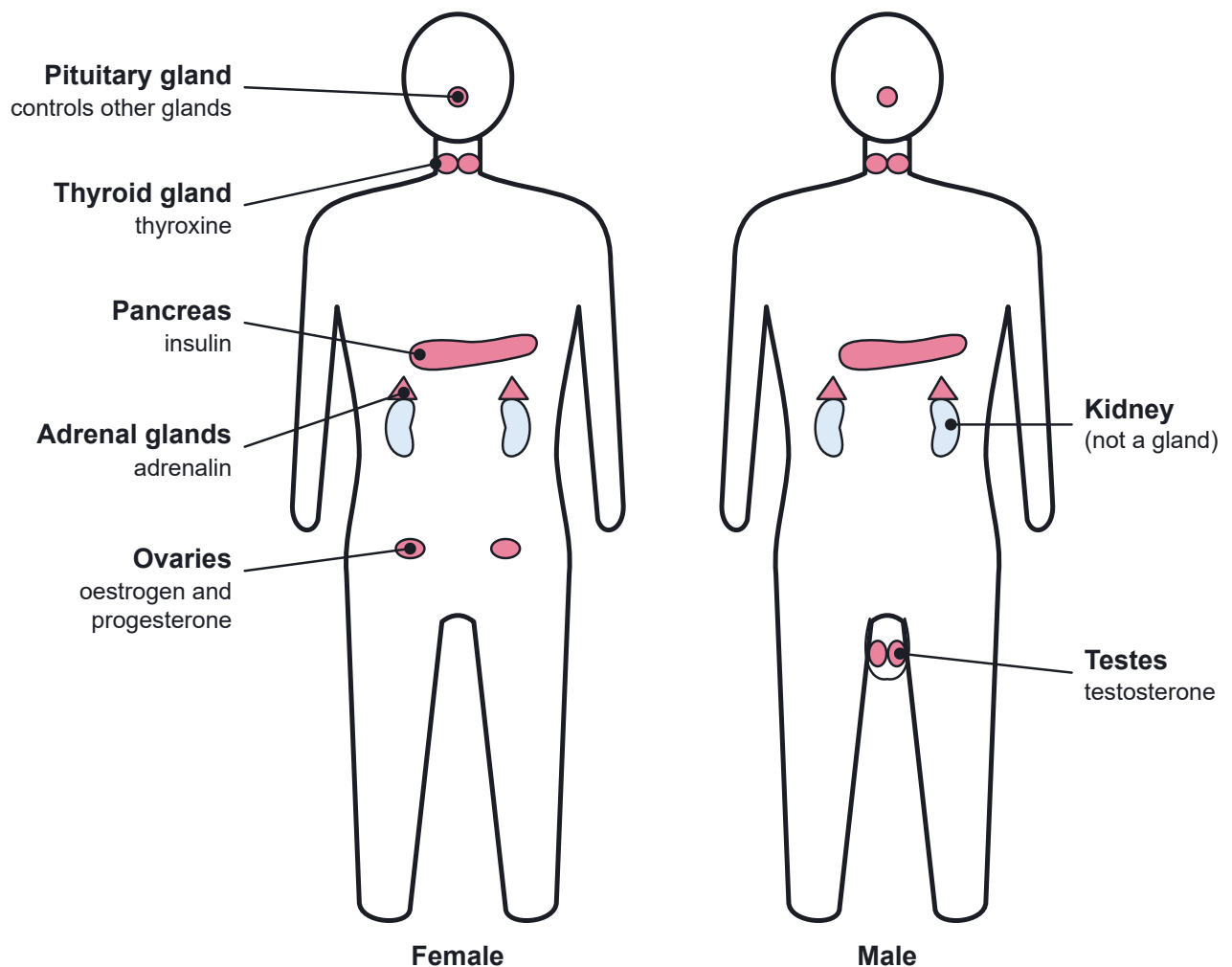
Endocrine glands you need to know

Gland	Where it is	Hormone made
Pituitary gland	At the base of the brain	Releases hormones that control other glands and organs
Thyroid gland	In the neck	Thyroxine
Pancreas	In the abdomen, below the stomach	Insulin
Adrenal glands	One on top of each kidney	Adrenalin
Ovaries	In the lower abdomen of a female	Oestrogen and progesterone
Testes	In the scrotum of a male	Testosterone

Higher tier

- The pituitary gland releases FSH and LH, which act on the ovaries, and TSH, which acts on the thyroid gland.
- The pancreas also makes a second hormone, glucagon.

Common mistake: Hormones travel in the blood, not along nerves. Write 'carried in the blood' or 'in the blood plasma' to get the mark.



The **endocrine glands** and the main hormone each one makes.

Adrenalin and fight or flight Spec 7.2 Higher tier

Adrenalin is produced by the adrenal glands. It prepares the body for **fight or flight**, for example when you are frightened or in danger. It makes the body ready to use a lot of energy quickly.

The effects of adrenalin	
Effect	Why it helps
Increased heart rate	Blood is pumped around the body faster
Increased blood pressure	Blood is pushed to the organs more quickly
Increased blood flow to the muscles	Muscles get more oxygen and glucose for respiration, so they can release more energy
Raised blood sugar level	Adrenalin stimulates the liver to change glycogen into glucose , which is released into the blood

Exam tip: Name the liver and say glycogen is changed into glucose. 'Sugar is released' on its own is too vague for the mark.

Thyroxine and negative feedback Spec 7.3 Higher tier

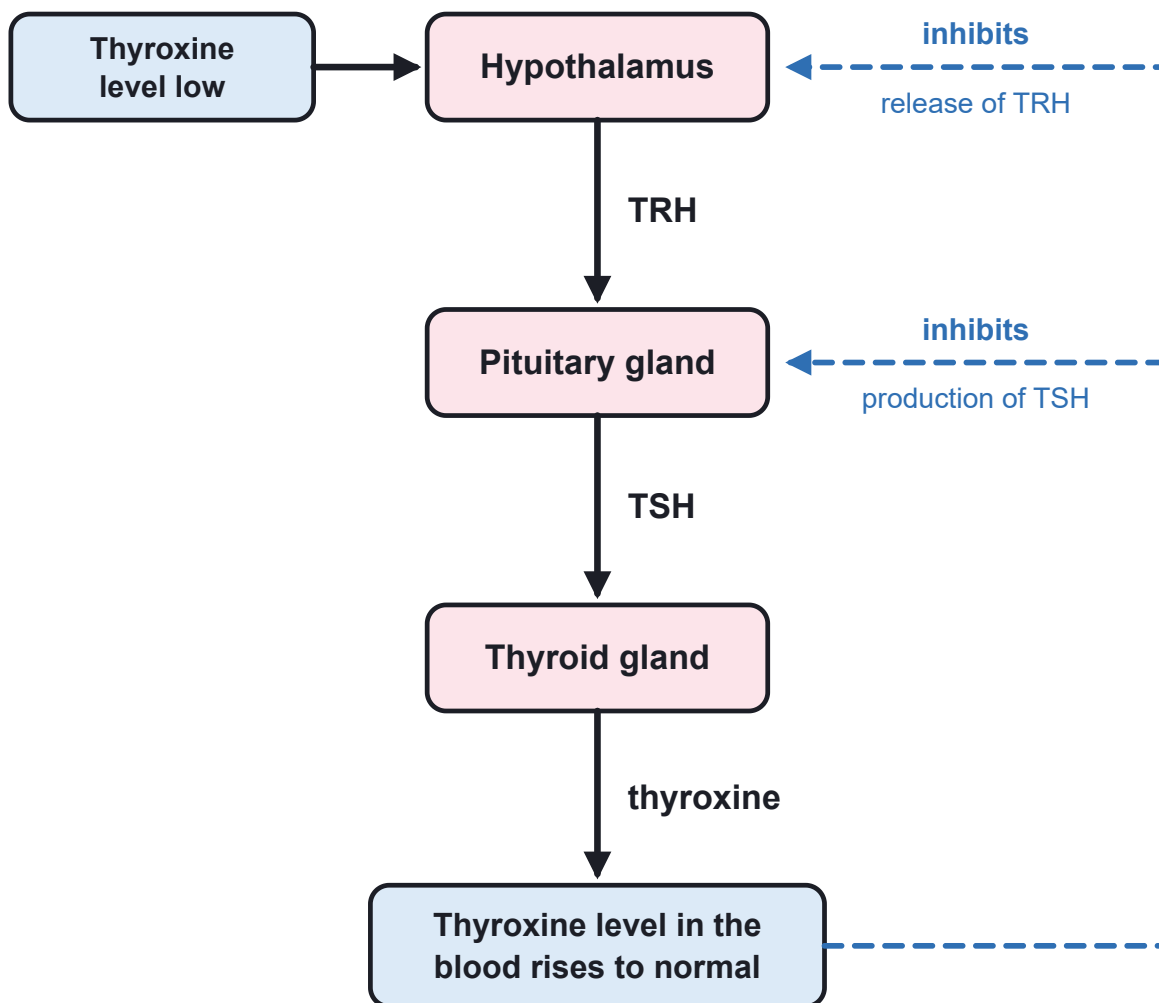
Thyroxine is made by the thyroid gland. It controls **metabolic rate**, which is the rate of the chemical reactions in the body. Its level is kept steady by **negative feedback**.

Negative feedback

A change in a level causes a response that reverses the change and brings the level back to normal.

1. A low level of thyroxine stimulates the hypothalamus to produce TRH.
2. TRH causes the pituitary gland to release TSH.
3. TSH acts on the thyroid gland to produce thyroxine.
4. The thyroxine level rises back to normal.
5. When the thyroxine level is normal, thyroxine inhibits the release of TRH and the production of TSH. This stops the level rising too far.

Common mistake: TRH is made in the hypothalamus and TSH is released from the pituitary gland. Mixing up the two organs loses marks.



Thyroxine is controlled by **negative feedback**: when its level is back to normal it inhibits TRH and TSH.

Quick check

1. How are hormones transported from endocrine glands to target organs?
2. Which gland produces insulin?
3. Name the four effects of adrenalin. (Higher)
4. Which hormone does the pituitary release to make the thyroid produce thyroxine? (Higher)

Quick check answers

Hormones and the endocrine system

1. In the blood (plasma).
2. The pancreas.
3. Increased heart rate, increased blood pressure, increased blood flow to the muscles, and raised blood sugar level.
4. TSH.