



## Highsted Knowledge Organiser

### High Performance Learning

#### Year 10: Biology

##### *What I need to know - Overview*

Hormonal control involves chemical messengers called hormones that are released by endocrine glands and transported in the blood to target organs. Hormones regulate many body processes including growth, metabolism, blood glucose levels, water balance and reproduction. Hormonal responses are usually slower than nervous responses but have longer-lasting effects. This topic focuses on how hormones control the menstrual cycle, blood glucose concentration, and water balance, and how these systems use feedback mechanisms to maintain internal conditions.

##### *Key Vocabulary (with definitions)*

- **Hormone** – A chemical messenger released by an endocrine gland into the bloodstream.
- **Endocrine system** – A system of glands that release hormones directly into the blood.
- **Target organ** – An organ that responds to a specific hormone.
- **Gland** – An organ that produces and releases substances.
- **Negative feedback** – A control mechanism that reverses a change to maintain normal conditions.
- **Adrenaline** – A hormone that prepares the body for action.
- **Insulin** – A hormone that lowers blood glucose concentration.
- **Glucagon** – A hormone that raises blood glucose concentration.
- **Pancreas** – A gland that produces insulin and glucagon.
- **Thyroxine** – A hormone that controls metabolic rate.
- **Oestrogen** – A female sex hormone involved in the menstrual cycle.
- **Progesterone** – A hormone that maintains the uterus lining.
- **FSH (Follicle-Stimulating Hormone)** – A hormone that causes eggs to mature.
- **LH (Luteinising Hormone)** – A hormone that triggers ovulation.
- **ADH (Antidiuretic Hormone)** – A hormone that controls water balance.
- **Osmoregulation** – The control of water levels in the body.

##### *Knowledge*

##### **The Endocrine System**

- Endocrine glands include the pituitary, thyroid, adrenal glands, pancreas and reproductive organs.
- Hormones are released into the bloodstream and travel to target organs.
- Hormonal responses are slower but longer lasting than nervous responses.

## **Control of Blood Glucose Concentration**

- Blood glucose levels are monitored and controlled by the pancreas.
- Insulin is released when blood glucose is too high.
- Insulin causes glucose to be removed from the blood and stored as glycogen in the liver and muscles.
- Glucagon is released when blood glucose is too low.
- Glucagon causes glycogen to be converted back into glucose and released into the blood.
- This is an example of negative feedback.

## **Adrenaline and the Fight or Flight Response**

- Adrenaline is released from the adrenal glands.
- It increases heart rate and breathing rate.
- It causes glucose to be released into the blood.
- It prepares the body for action.

## **Thyroxine and Metabolism**

- Thyroxine is produced by the thyroid gland.
- It controls metabolic rate, heart rate and growth.
- Thyroxine release is controlled by negative feedback involving the pituitary gland.

## **The Menstrual Cycle**

- The menstrual cycle lasts about 28 days.
- FSH causes an egg to mature and stimulates oestrogen release.
- Oestrogen repairs and thickens the uterus lining and inhibits FSH.
- LH triggers ovulation.
- Progesterone maintains the uterus lining.
- If pregnancy does not occur, progesterone levels fall and menstruation occurs.

## **Control of Water Balance (Osmoregulation)**

- The kidneys control water content of the blood.
- ADH is released by the pituitary gland.
- More ADH causes more water to be reabsorbed by the kidneys.
- Less ADH causes less water to be reabsorbed, producing dilute urine.
- This uses negative feedback.

## ***Key Assessment Information***

- Compare hormonal and nervous control.
- Describe the roles of insulin and glucagon in blood glucose control.
- Explain negative feedback using hormone examples.
- Interpret graphs of hormone levels in the menstrual cycle.
- Explain how ADH controls water balance.
- Apply knowledge to unfamiliar contexts and GCSE-style questions.