*This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.*

The endocrine system uses hormones (chemical messengers) to coordinate body functions over longer timescales than the nervous system.

- Hormones: secreted by endocrine glands into blood → travel to target organs
- Insulin (pancreas): lowers blood glucose — stimulates glucose uptake, glycogen synthesis
- Glucagon (pancreas): raises blood glucose — stimulates glycogen breakdown
- Type 1 diabetes: no insulin produced (autoimmune) — treated with injections
- Type 2 diabetes: cells resistant to insulin — linked to obesity — diet and exercise
- Oestrogen and progesterone: control menstrual cycle. FSH: stimulates egg maturation. LH: triggers ovulation
- Adrenaline: fight or flight — increases heart rate, diverts blood to muscles

Key Terms

Insulin	Lowers blood glucose — from pancreatic beta cells
Glucagon	Raises blood glucose — from pancreatic alpha cells
Negative feedback	Response opposes change — restores normal level

■ **Exam Tip:** Blood glucose control is negative feedback: glucose rises → insulin released → glucose falls → insulin stops. This cycle keeps glucose in the normal range.