Molecules can move between cells if they are nearby Cells can use electrical impulses (neural) Cells can use chemical messengers (hormones)

The Endocrine System

- Hormones are chemical messengers that are produced in special types of cells (secretory cells) and can have their effect;
 - Within the same cell (autocrine)
 - On nearby cells by moving into the tissue fluid and then interacting with neighbouring cells (paracrine)
 - Cells far away as they are released into the blood stream and transported around the body (main type) (endocrine)

Hormones:

- In general terms, hormones are;
 - $\circ \quad \text{Slow to act} \quad$
 - Long lasting
- Hormones will only cause a response in a cell that has a specific receptor for that hormone
 - Some cells have multiple receptors for multiple hormones
 - Some cells that have one receptor for one hormone
 - A reaction in the one type of cell to a particular hormone may be different to the reaction cause in a different type of cell.



Amino Acid Derivative

- Structurally related to amino acids
- Water soluble (hydrophilic)
- Unable to cross cell membranes
- Travel in blood stream and take effect on receptors on cell surface
- Steroid
 - Related to cholesterol
 - Lipophilic: can cross cell membranes
 - Require carrier protein to be transported in blood
 - Testosterone and progesterone
- Peptide and Protein
 - Chains of amino acids
 - Water soluble (hydrophilic)
 - Unable to cross cell membranes
 - Travel in blood stream
 - Take effect on receptors
 - On cells surface
 - Insulin (peptide)
 - Thyroid Stimulating
 - Hormone (TSH)