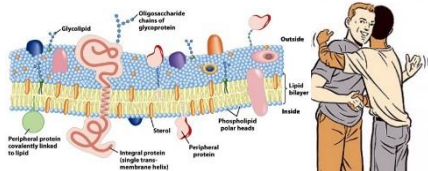


What is Cell Signalling?

- Regulate development
- Control growth & Cell division
- Coordinate cellular functions



Types of Cell-Cell Communication

1. **Secrete chemicals** that signal to cells some distance away
2. **Have membrane bound signalling molecules** that affect cells in direct physical contact (contact inhibition)
3. **Have gap junctions:**
 - Electrically coupled (unless GJ close)
 - Free movement below ~ 12,000 Da (small signalling molecules, IP₃, cAMP, cGMP)

Extracellular Receptors



Cell Signalling

Intracellular Receptors



Nature of the signal

- **Very fast** – Neurotransmitters
- **Short lasting** – water soluble hormones
- **Long lasting** – water insoluble hormones

Cell Surface Receptors

1. Ion channel linked
2. G protein linked 
3. Enzyme linked 

Intercellular Communication



Endocrine	• Slow • Secrete chemicals into blood stream • Can travel vast distances (via blood) • Specificity via limited cell types that detect it
Paracrine	• Secrete signalling molecule into surrounding medium • Diffusion of signal molecule is limited (rapid destruction and/or rapid immobilisation/uptake)
Autocrine 	• Cell releases a substance that acts on itself (e.g. some growth hormones) • Often a developmental signal • Groups of cells may enhance autocrine effect
Synaptic	• Fast • Changes in potential difference across CSM • Can travel large distances • Specific

Nerves VS Endocrine

Long distance	Long distance
Selectivity via cell receptors	Not capable of selectivity via cell receptors
Neurotransmitters rapidly broken down/reuptake	Hormones greatly diluted in blood stream (receptors sensitive to low levels)