Radio immune assay

Cell Signals: Introduction

What Are Cell Signals?

- Cell signals are the **messages** that cells use to **communicate** with each other. Just like people talk using words, **cells "talk" using chemicals**.
- This process is called **cell signaling**.

Why Do Cells Need to Communicate?

- **Cells in the body need to:**
  - Know what's happening around them
  - Make decisions (like whether to grow, divide, or die)
  - Work together in tissues and organs
- For example, if your body gets hurt, cells near the injury **send signals** to the immune system to come help.

What Are Cell Signals Made Of?

- Most signals are **molecules**, such as:
  - **Hormones** (like insulin)
  - **Neurotransmitters** (used by brain cells)
  - **Growth factors** (that tell cells to divide)
- These signal molecules travel **from one cell to another**.

Types of Cell Signaling

There are **four main types** based on how far the signal has to travel:



1. **Autocrine signaling:**
   - ➢ The cell sends signals to **itself**.
   - ➢ **Example**: Cancer cells often send signals to keep dividing.

2. **Paracrine signaling:**
   - The signal goes to **nearby cells**.
   - **Example**: Nerve cells releasing neurotransmitters to nearby nerve or muscle cells.
3. **Endocrine signaling:**
   - The signal (like a hormone) travels through the **bloodstream** to **distant cells**.
   - **Example**: The pancreas releases insulin, which travels to muscles and liver to control sugar levels.
4. **Juxtacrine signaling:**
   - Cells are **directly touching** each other.
   - **Example**: Immune cells interacting with infected cells.

Receptors for Cell Signals

What Is a Receptor?

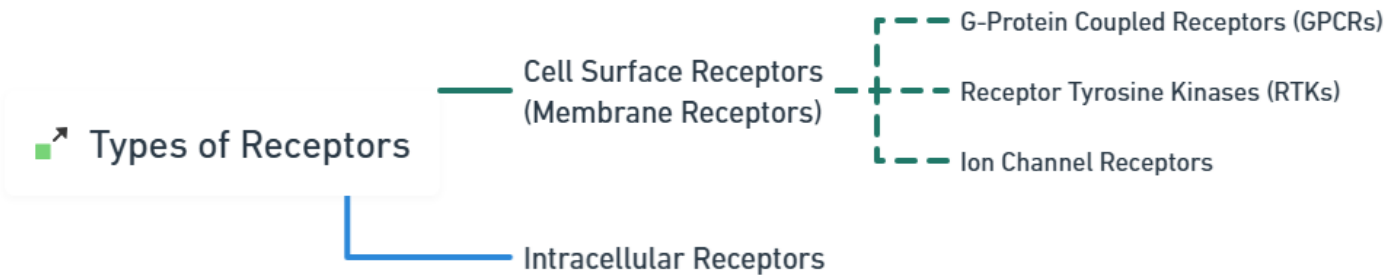
- A receptor is like a lock that waits for the right key (signal molecule).
- It is usually a protein found on the surface or inside of a cell.
- When the signal molecule (the key) fits into the receptor (the lock), it activates the receptor.
- This starts a response inside the cell.

Where Are Receptors Located?

- **Cell membrane receptors**: These are on the outside of the cell. They catch signals that cannot enter the cell (like protein hormones).
- **Intracellular receptors**: These are inside the cell (in the cytoplasm or nucleus). They respond to small signals (like steroid hormones) that can cross the membrane.

Types of Receptors

There are **two main categories** based on their location:



A. Cell Surface Receptors (Membrane Receptors)

- Located on the outside of the cell membrane.
- They are used for signals that cannot cross the membrane, like proteins or polar molecules.

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