**Introduction to cell signaling:** Think your cells are just simple building blocks and static as bricks in a wall. If so, can cells detect what's going on around them or respond from their neighbors and environment. At this moment, your cells are sending and receiving millions of messages in the form of chemical signaling molecules.

**Cell signaling** is the process of cellular communication within the body driven by cells releasing and receiving hormones and other signaling molecules. As a process, cell signaling refers to a vast network of communication between, and within, each cell of our body. Cell signaling enables coordination within multicellular organisms.

**Overview of cell signaling:** Cell signaling can occur through a number of different pathways where the actions of one cell influence the function of another. Cell signaling is needed by organisms to coordinate a wide variety of functions. Because of cell signaling, a tiny gland within the brain can react to external stimuli like light, odors, or touch and coordinate a response. Cells typically communicate using chemical signals. These chemical signals in form of proteins, toxins, drugs, neurotransmitters or other molecules are produced by a *sending cell*. These signal molecules are often secreted from the cell and released into the extracellular space. Different cells communicate with each other through cell signaling. Examples include Nerve cells that communicate with muscle cells to create movement, immune cells must avoid destroying cells of the body, and cells must organize during the development of a baby.

At its core cell signaling can simply be described as the production of a **"signal"** by one cell. This signal is then **received by a "target"** cell.



**Stages of Cell Signaling:** Not all cells can receive a particular chemical message. In order to detect a signal by a target cell, a neighbor cell must have the right receptor for that signal. When a signaling molecule binds to its receptor, it alters the shape or activity of the receptor, triggering a change inside of the cell. Signaling molecules are called **ligands** that bind specifically to other molecules called receptors.

The message carried by a ligand is often carried through a chain of chemical messengers inside the cell. Ultimately, it leads to a change in the cell, such as alteration in the activity of a gene or even the induction of a whole process, such as cell division. Thus, the original **intercellular** (between-cells) signal is converted into an **intracellular** (within-cell) signal that triggers a response.

