

# Cell to Cell Communication via Ion-Channel Receptors

PACKET #17

# Ion Channel Receptors

- ▶ Ion channel receptors are found in numerous cells, and in numerous places, within the body.
  - ▶ They can be found in muscle and nervous tissue for example.
- ▶ These receptors have the ability to convert chemical signals into electrical signals
  - ▶ Receptors serve for rapid transmission of signal across synapses in the nervous system

# Types of Ion Channel Receptors

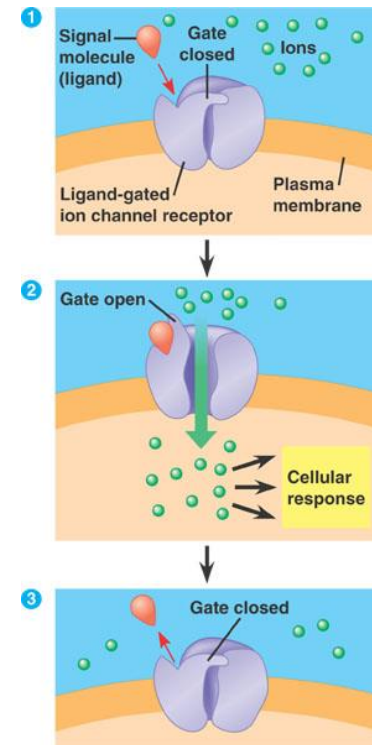
# Types of Ion Channel Receptors

- ▶ There are three basic types of ion channel receptors.
  - ▶ Ligand gated ion channel receptors
    - ▶ Activated by a ligand
  - ▶ Voltage gated ion channel receptors
    - ▶ Activated by a change in voltage
  - ▶ G-protein linked ion channel receptors
    - ▶ Activated by the activation, and attachment, of a G-protein.

# Ligand Gated Ion Channel Receptor

# Ligand Gated Ion Channel Receptors

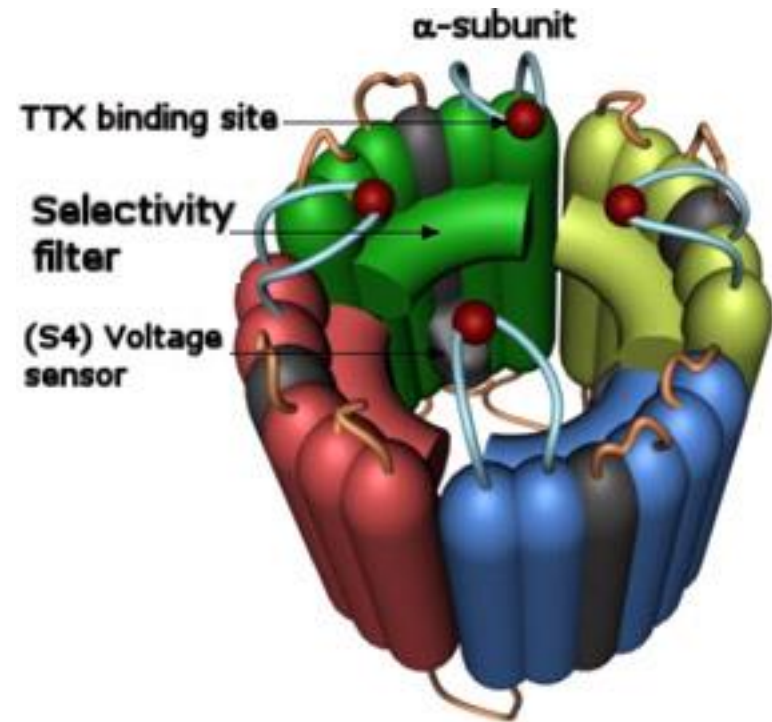
- ▶ Ligand arrives at the receptor and binds onto it.
- ▶ Gates open/close.
  - ▶ Ion flows through the channel if the gates open.
- ▶ Results in change in electrochemical gradient.
  - ▶ If the signal (ligand) is a neurotransmitter, it will either promote or inhibit neurotransmission.



# Voltage Gated Ion Channel Receptors

# Voltage Gated Ion Channel Receptors

- ▶ Voltage change arrives at the channel.
- ▶ The change in voltage causes the channel to open/close.
  - ▶ If opened, ions will enter the channel.
  - ▶ If closed, ions will stop entering the channel.





## Other Info...

### Examples of Ions Moved

- ▶  $\text{Na}^+$
- ▶  $\text{K}^+$
- ▶  $\text{Ca}^{2+}$
- ▶  $\text{Cl}^-$

### Examples of Neurotransmitters

- ◆ Nicotinic acetylcholine
  - ◆ Nerve and muscle
- ◆ GABA
  - ◆  $\Gamma$ -aminobutyric acid
    - ◆ CNS
- ◆ Glycine
  - ◆ CNS

# Review