

Ion Channel Receptors

ION CHANNEL (8nm,MADE OF ATOMS) >
NA⁺ ATOM GOES THROUGH DOORWAY
ONE AT A TIME > NEURON BECOMES
SUFFICIENTLY CHARGED WHEN ENOUGH
NA⁺ HAS ENTERED

How do the channels open?

>>>Neurotransmitter molecules from one cell
bind to neuroreceptors on another cell opening
the channel doorway.

Here is a breakdown by sense type:

Touch -- Physical pressure leads to a
deformation of the 3D shape of the cells around
the sensory neuron, called a
mechanoreceptor. This causes shear forces at
the surface of the cell to physically deform the
ion channel and open its doorway, thus
activating the neuron.

Smell and taste -- Chemical molecules floating
in the air or dissolved in water land on the inside
surface of the nose or mouth and bind directly
to special "odorant-specific" ion channels on
chemoreceptors, changing their shape and
causing their doorways to open, thus activating
the neuron.

Heat and cold -- The change in temperature in
the vicinity of a thermoreceptor changes the
protein folding pattern of the neuroreceptor,
causing its shape to change and its doorway to
open, thus activating the neuron. Certain heat
receptors are activated by capsaicin in hot
pepper oil, causing hot peppers to feel "hot".

Certain cold receptors are activated by menthol
contained in mint oil, causing mint to feel
"cool". Alcohol lowers the activation threshold
of heat receptors, causing hard alcohol to feel
hot..

Ion Channel Receptors (cont)

Light -- Photons hitting the photoreceptor of the
eye are "captured" by photosensitive pigment
molecules which become chemically altered by
the photon. (The pigment molecule
incorporates Vitamin A, which is why Vitamin A
is good for vision.) The altered molecule has a
different physical shape, and the change in
shape mechanically opens the doorway of an
ion channel it is adjacent to, thus activating the
neuron.

Sound -- As Colin Gerber explains, the air
pressure waves move "hair cells" inside the
cochlea. The "hairs" shear against each other
as they move, mechanically opening and
closing ion channel doorways, thus activating
the neuron.

ENZYME COUPLED RECEPTORS

Receptors are linked to enzyme usually protein
kinase

LONG DISTANCE COMMUNICATION

Hormone-released by cell in one part of the
body and affects another part of the organism.

JENSEN AND GORSKI

Steroid binds to cytoplasmic receptor >
Receptor changes conformation and then is
translocated to nucleus where Hormone
Receptor binds to DNA and genes are altered.

NUCLEAR HORMONE RECEPTORS

-Ligand activated
-Signal molec./Small hydrophobic
-Receptor-ligand complex---Acts as
Transcription Factor

C

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