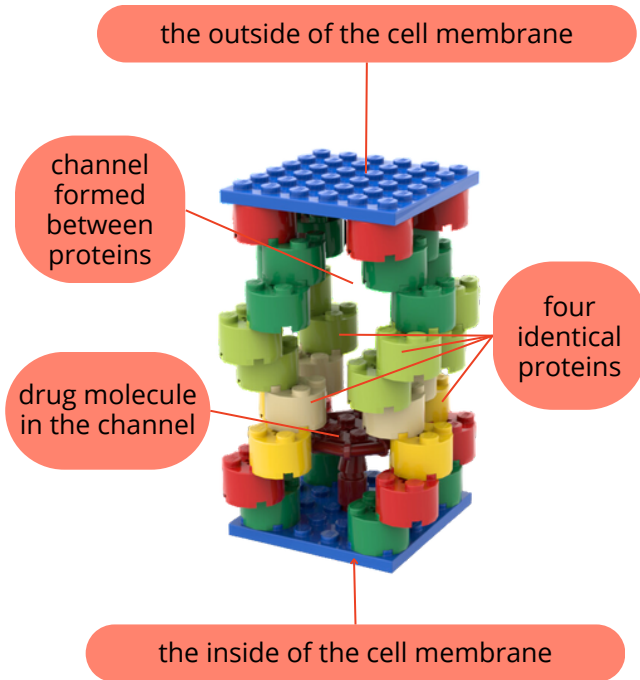


MEMBRANE CHANNEL

All living cells are surrounded by a membrane that separates the inside of the cell from the world outside. This cell membrane provides protection and structural support for the cell. The cell membrane also creates a stable environment inside the cell by regulating the transport of materials coming in and out of the cell. Nutrients are transported into the cell and toxic substances are transported out.

This constant flow of substances into and out of the cell occurs through channels in the cell membrane. These channels are forged by proteins inside the membrane, which create tunnels across the cell membrane through which different molecules can pass.

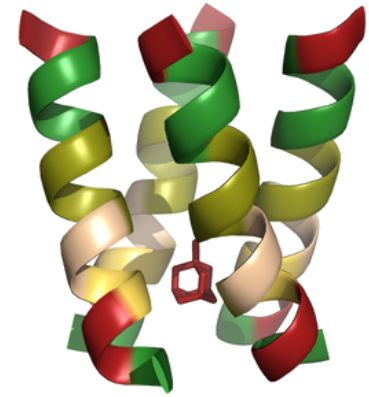


There are many different types of membrane channels. Some open and close spontaneously, while others must be activated. Some are very specific and will only allow a certain type of molecule to pass through. Others allow any positively or negatively charged ion to pass through. Some channels also connect cells to each other and allow the passage of molecules from one cell to the other.

The LEGO membrane channel you will build consists of 4 transmembrane helices, i.e. helices that stretch straight through the membrane. These are four copies of the same protein, which create a channel in the between them when they form. This is a clever way that the cell uses simple elements to create complex structures. The molecules use the channel to travel in and out of the cell. In the center of this channel you can see a drug molecule that blocks the channel so that no other molecules can pass through. This can be an effective treatment of certain diseases.

TO SEE A MOLECULE

Molecules are extraordinarily small. In the tiny dot in the line above, there are over a hundred million molecules. They are so small that you can't even see them with a microscope. To find out what molecules look like, researchers use different techniques. The main ones are X-ray crystallography, cryo-electron microscopy and NMR spectroscopy. In NMR spectroscopy, researchers place molecules in the center of superconducting magnets. The magnets cause the atomic nuclei of the molecules to spin around like a spinning top. The researchers use the frequency of the spin to find out what the molecules look like.



BUILD A MOLECULE

MEMBRANE CHANNEL



