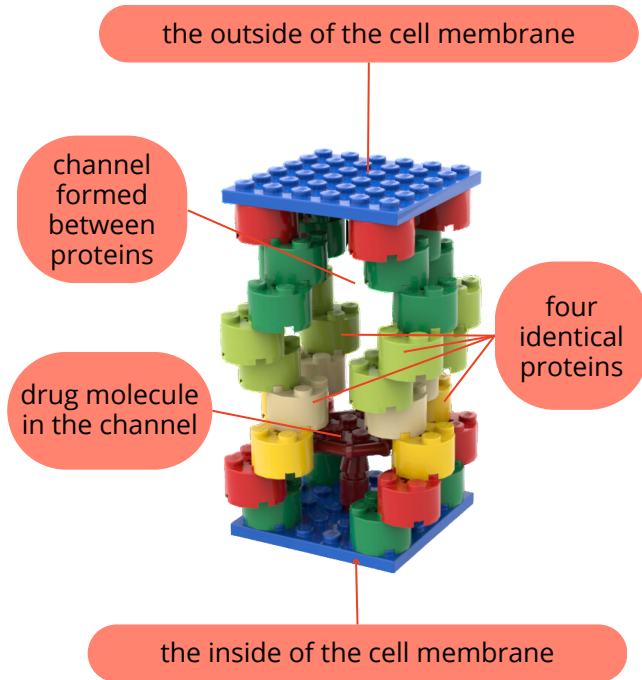


MEMBRANE CHANNEL

All living cells are surrounded by a membrane that separates the inside of the cell from the outside environment. The cell membrane provides protection and structural support to the cell. It 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 created by proteins inside the membrane, which form tunnels across the cell membrane through which different molecules can pass.

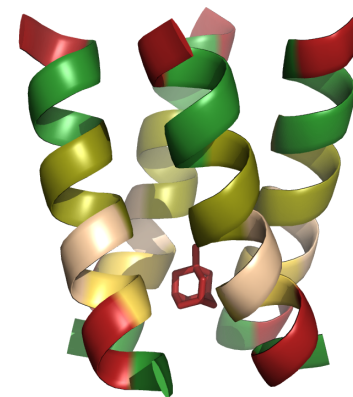


There are many different types of membrane channels. Some open and close spontaneously, while others must be activated. Some are very specific and will only allow a certain type of molecule to pass. Others, for example, allow any positively or negatively charged ion to pass through. Some channels also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

The LEGO membrane channel you will build consists of 4 transmembrane helices, i.e. helices that go straight through the membrane. It consists of four copies of the same protein, which creates a channel in the middle. This is a clever way in which the cell uses some simple elements to create more 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 molecules can pass through, which may be necessary to counteract certain diseases.

TO SEE MOLECULES

Molecules are quite 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



