

Researchers from the Saratov National Research State University named after Chernyshevsky studied the synchronization of paired neurons using the classical biophysical model of Hodgkin -Haxli.

Researchers used this particular model, since it describes in detail the electrical processes in the neuron membrane and sodium currents are taken into account. Scientists have found that neurons' behavior depends on the external current, initial membrane stress and the force of communication between them.

Three operating modes of a pair of neurons were allocated: a state of rest, a single "spike" and autocol. A strong connection can change the mode of operation of the second neuron, both activating it and suppressing excitement.

The modes can be controlled by external current, communication force and initial conditions. There is a threshold value of the force of communication, in case of excess of which neurons begin to fluctuate synchronously.

"It turned out that, depending on these parameters, a system of two neurons can be synchronized in one of the three modes: a state of rest (without hesitation), a single "adhesion" or a stable autocolous mode. Moreover, the behavior of one neuron directly depends on the second: a strong connection can change the initial regime of the second neuron-both to "wake up" it and suppress excitement," the press release says.