

Modeling of activation and deactivation processes in postsynaptic membrane

Tuesday, 4 December 2018 13:25 (20 minutes)

Modern technologies are increasingly turning to the issue of modeling nerve impulse transmission mechanisms to create artificial simulators. Despite the fact that the basic principles of the specialized contact zone between two neurons (chemical synapse) are known, there still a lot questions are open.

In this paper, we research the issue of building a physical model of the process of activation and deactivation of the postsynaptic membrane in a chemical synapse. Based on the diffusion process, considering the interaction of choline with receptors on the postsynaptic membrane, we obtained a temporary dependence of activated receptors on the postsynaptic membrane. The relationship between the activation time of the postsynaptic membrane and the number of activated receptors was also analyzed. The work also calculated the space-time distribution of the anti - mediator (choline) in the synaptic cleft.

We hope that the results obtained in the work will help to better understand the processes occurring during the transmission of the nerve signal and will give impetus to further research in the field of medical preparations and the construction of artificial neural networks.

Primary authors: Mr KULISH, Oleksii (Taras Shevchenko National University of Kyiv); Dr VASILEV, Aleksey (Taras Shevchenko National University of Kyiv, Faculty of Physics)

Presenter: Mr KULISH, Oleksii (Taras Shevchenko National University of Kyiv)

Session Classification: Physics of Biological Macromolecules

Track Classification: Physics of Biological Macromolecules