

**SUPPLEMENTARY MATERIALS**

**The Biochemical Model of the Synapse in Turpaev's Studies**

**D. A. Sakharov**

*Kol'tsov Institute of the Developmental Biology, Russian Academy of Sciences, Moscow, Russia*

Received April 17, 2018

Supplementary file S15

**NITRIC OXIDE AND EXCITABILITY OF PREMOTOR INTERNEURONS OF SNAIL**

T. K. Bogodvid<sup>1,2\*</sup>, A. N. Golovchenko<sup>1</sup>, V. V. Andrianov<sup>1</sup>, K. L. Gainutdinov

<sup>1</sup>*Kazan Federal University*; <sup>2</sup>*Volga Region State Academy of Physical Culture, Sport and Tourism, Kazan, Russia*

\*e-mail: [tat-gain@mail.ru](mailto:tat-gain@mail.ru)

The discovery of the ability of mammalian cells to synthesize the nitric oxide free radical (NO) has stimulated significant efforts of researchers to study the role of NO in all the areas of biology and medicine. However, despite for today has accumulated a huge amount of data on the signaling targets of NO, a clear opinion on this matter is missing. NO is intra- and intercellular mediator that performs various signal functions, it's molecule synthesized in response to physiological need in the cell from L-arginine with the participation of NO-synthase (NOS), activated by increased Ca<sup>2+</sup> ions. NO-synthesizing neurons were also found in the nervous system of invertebrates, including mollusks. It is shown that NO plays in them a role as intercellular messenger and signaling molecule. It is discovered that NO coordinates a number of behavioral programs in mollusks, it is found that NO is involved in the processes of learning and memory. NO also controls the plastic properties of neurons.

Therefore, the aim of this work was to study effects of NO donor and nonspecific NOS inhibitor L-NAME on the electrical characteristics of premotor interneurons of snail. The terrestrial snails *Helix lucorum*, the nervous system of which is well described, were used for the experiments. The electrical characteristics of the premotor interneurons of the snail's pneumostome closure reflex LPa3 и RPa3 were analyzed. The recordings of the electrical characteristics were carried out using intracellular glass microelectrodes with resistance of 3-10 MoM. The effects of the application (during 30 min) of NOS inhibitor L-NAME and sodium nitroprusside (SNP), a donor of NO (at a concentrations of 10<sup>-4</sup> mol/l), into the solution bathing the preparation of intact snails, on the membrane and threshold potentials of the premotor interneurons were studied. In the experiments it is found that the application of NO donor SNP at a concentration of 10<sup>-4</sup> mol/l into the solution bathing the preparation of the intact snails, causes the increasing hyperpolarization of the premotor interneuron membrane by 5.5 mV during 10 minutes. Application of NOS inhibitor L-NAME at a concentration of 10<sup>-4</sup> mol/l caused the reliable decrease of the membrane potential of the premotor interneurons from -60.2±0.8 mV to -55.4±1.7 mV. There are not observed the changes of the threshold of the action potential.

Supported by RFBR (grant 18-015-00274).