

Serotonergic neuronal pair related to feeding behavior in Molluscs and Annelids

Magda Alania

e-mail: magda.alania@tsu.ge

Department of Biology, I.Javakhishvili Tbilisi State University, University str. 2, 0143, Tbilisi

First hypotheses about the integrative roles of neurotransmitters were mainly based on experiments with model invertebrates. From those studies especially noteworthy experiments that investigated impact of biogenic amine serotonin on feeding activity of the representative of ringed worms (Annelida) - medicinal leech (*Hirudo medicinalis*) [1]. In subesophageal ganglion of medicinal leech it was identified a large symmetrical pair of serotonergic LL (the Large Lateral) neurons, associated with feeding behavior. Recently, LL neuronal couple was characterized in connection of stomatogastric ganglionic ring [2].

Comparative analyses of subesophageal LL neurons of medicinal leech with early identified giant serotonergic symmetrical pair of neurons from cerebral ganglia of the representative of other phylum Mollusca - pond snail (*Lymnaea stagnalis*) revealed many similarities. This homologous pair of cerebral neurons that modulate feeding activity was earlier described in several other gastropod molluscs. Both subesophageal LL neurons of medicinal leech and cerebral giant serotonergic neurons of pond snail innervate ganglia that are responsible for feeding behavior and send projections to the periphery as well. However in a representative of gastropod molluscs serotonergic pair of neurons sends primary projections to ipsilateral buccal ganglion whereas LL neurons send their primary projections to the contralateral stomatogastric ganglia. In both phyla neurons of these pairs are electrically coupled. A high frequency discharges observed during spontaneous synaptic input is characteristic for both neuronal pairs. In both representatives origin of these discharges is linked with acetylcholinergic system.

It was suggested that in representatives of two different phyla of invertebrates, serotonergic projections that modulate feeding behavior are well conserved. The future embryonic and genetic analysis may help to determine a possible homology between these serotonergic neuronal couples.

Literature:

[1] C.M. Lent, *Brain Res. Bull.*, **14** (1985) 643–655.

[2] K. A. Mesce, M. Alania, K. A. Klukas, J. G. Puhl, *Soc. Neurosci. Abstr.*, **38** (2008) 574.8.