Neuronal Nitric Oxide Synthase in the Central Nervous System of Mollusk

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The regulatory mechanisms of NO have been investigated in the invertebrate CNS, as well as in mammalian brain system. However, none of neuronal NOS (nNOS) including the PDZ domain has been isolated in invertebrates. Recently, nNOS genes were first isolated in the CNS of the land slug, *Lehmannia valentianai*.

In the pond snail *Lymnaea stagnalis*, previous reports showed the regulatory role of NO in feeding behavior and memory formation. The histological analyses showed that the NADPH-diaphorase positive signals were mainly localized in the neuropile but not in the soma, indicating the subcellular localization of NOS proteins in the CNS. To start analyzing the functional NOS involved in the synaptic regulatory mechanism in the *Lymnaea* CNS, we first identified neuronal NOS gene with the PDZ domain, and named it as *Lymnaea* NOS3 (LymNOS3). The deduced amino acid sequence was highly identical with other species' nNOS. More, we quantitative RT-PCR for three NOS genes identified in *Lymnaea*. We also performed *in situ* hybridization for LymNOS3 mRNA and NADPH-d staining to examine which neuron expresses the functional NOS. The results indicate the functional NOS in *Lymnaea* CNS was LymNOS3.