principal cell heterogeneity. Trends Neurosci.V. 35. P. 175. https://doi.org/10.1016/J.TINS.2011.10.005

Lau P.Y.P., Katona L., Saghy P., Newton K., Somogyi P., Lamsa K.P. 2017. Long-term plasticity in identified hippocampal GABAergic interneurons in the CA1 area in vivo. Brain Struct. Funct. V. 222. P. 1809. https://doi.org/10.1007/S00429-016-1309-7

Leite J.P., Chimelli L., Terra-Bustamante V.C., Costa E.T., Assirati J.A., De Nucci G., Martins A.R. 2002. Loss and sprouting of nitric oxide synthase neurons in the human epileptic hippocampus. Epilepsia. V. 43 Suppl. 5. P. 235. https://doi.org/10.1046/J.1528-1157.43.S.5.29.X

Levone B.R., Codagnone M.G., Moloney G.M., Nolan Y.M., Cryan J.F., O'Leary O.F. 2021. Adult-born neurons from the dorsal, intermediate, and ventral regions of the longitudinal axis of the hippocampus exhibit differential sensitivity to glucocorticoids. Mol. Psychiatry. V. 26. P. 3240. https://doi.org/10.1038/S41380-020-0848-8

Lothmann K., Deitersen J., Zilles K., Amunts K., Herold C. 2021. New boundaries and dissociation of the mouse hippocampus along the dorsal-ventral axis based on glutamatergic, GABAergic and catecholaminergic receptor densities. Hippocampus. V. 31. P. 56. https://doi.org/10.1002/HIPO.23262

Lorente de Nò R. 1934. Studies on the structure of the cerebral cortex. Journal für Psychologie und Neurologie. V. 46. P. 113.

Meyer M.A.A., Radulovic J. 2021. Functional differentiation in the transverse plane of the hippocampus: An update on activity segregation within the DG and CA3 subfields. Brain Res. Bull. V. 171. P. 35. https://doi.org/10.1016/J.BRAINRESBULL.2021.03.003

Mikulovic S., Restrepo C.E., Hilscher M.M., Kullander K., Leão R.N. 2015. Novel markers for OLM interneurons in the hippocampus. Front. Cell Neurosci.V. 9. P. 201. https://doi.org/10.3389/FNCEL.2015.00201

Paxinos G., Watson C. 2007. The rat brain in stereotaxic coordinates, 6th edition. N.Y.: Elsevier/Academic Press. 456 p. https://doi.org/10.1016/S0166-2236(84)80278-7

Pelkey K.A., Chittajallu R., Craig M.T., Tricoire L., Wester J.C., McBain C.J. 2017. Hippocampal GABAergic inhibitory interneurons. Physiol. Rev. V. 97. P. 1619. https://doi.org/10.1152/PHYSREV.00007.2017

Price C.J., Cauli B., Kovacs E.R., Kulik A., Lambolez B., Shigemoto R., Capogna M. 2005. Neurogliaform neurons form a novel inhibitory network in the hippocampal CA1 area. J. Neurosci. V. 25. P. 6775. https://doi.org/10.1523/JNEUROSCI.1135-05.2005

Squire L.R. 2004. Memory systems of the brain: a brief history and current perspective. Neurobiol. Learn Mem. V. 82. P. 171. https://doi.org/10.1016/J.NLM.2004.06.005

Suzuki E., Okada T. 2007. Regional differences in GABAergic modulation for TEA-induced synaptic plasticity in rat hippocampal CA1, CA3 and dentate gyrus. Neurosci. Res. V. 59. P. 183. https://doi.org/10.1016/J.NEURES.2007.06.1472

Tóth K., Ero'ss L., Vajda J., Halász P., Freund T.F., Maglóczky Z. 2010. Loss and reorganization of calretinin-containing interneurons in the epileptic human hippocampus. Brain. V. 133. P. 2763. https://doi.org/10.1093/BRAIN/AWQ149

Tóth K., Maglóczky Z. 2014. The vulnerability of calretinin-containing hippocampal interneurons to temporal lobe epilepsy. Front. Neuroanat. V. 8. P. 100. https://doi.org/10.3389/FNANA.2014.00100

Tyan L., Chamberland S., Magnin E., Camiré O., Francavilla R., Suzanne David L., Deisseroth K., Topolnik L. 2014. Dendritic inhibition provided by interneuron-specific cells controls the firing rate and timing of the hippocampal feedback inhibitory circuitry. J. Neurosci. V. 34. P. 4534. https://doi.org/10.1523/JNEUROSCI.3813-13.2014

Zhou X. yan, Zhang F., Ying C. jiang, Chen J., Chen L., Dong J., Shi Y., Tang M., Hu X. tong, Pan Z. hua, Xu N. na, Zheng K. yang, Tang R. xian, Song Y. jian. 2017. Inhibition of iNOS alleviates cognitive deficits and depression in diabetic mice through downregulating the NO/sGC/cGMP/PKG signal pathway. Behav. Brain Res.V. 322. P. 70. https://doi.org/10.1016/J.BBR.2016.12.046

Nitroxidergic and Calretinin-Containing Non-Pyramidal Neurons of the Rat Hippocampus

I. O. Iliasov[a], D. A. Sufieva[a, *], and D. E. Korzhevskii[a]

[a] *Institute of Experimental Medicine, St. Petersburg, 197376 Russia*

**e-mail: dinobrione@gmail.com*

Hippocampal interneurons, unlike pyramidal neurons, are a heterogeneous group of neurons that differ in morphological, cytochemical, and functional characteristics. The research was aimed at comparative morphological analysis of nitroxidergic (NOS^+) and calretinin-containing (CR^+) non-pyramidal neurons of the rat hippocampus CA1 and CA3 zones using immunohistochemical methods. Qualitative and quantitative differences between the populations of NOS^+ and CR^+ non-pyramidal neurons in different layers of the hippocampal CA1 and CA3 zones were demonstrated. Also it was shown the differences in quantitative composition of the interneurons under study in two subregions of the hippocampus, which correspond to the dorsal and intermediate hippocampus. It was found that NOS^+ interneurons are more common in the dorsal hippocampus, while a greater number of CR^+ interneurons are present in the intermediate hippocampus. The data obtained may contribute to understanding the role of non-pyramidal neurons in the formation of functional specialization of different hippocampal areas.

Keywords: hippocampus, interneurons, NO-synthase, calretinin, immunohistochemistry