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STRUCTURAL FEATURES OF NEUROGLIOVASCULAR ENSEMBLES IN RAT OLFACTORY BULB GLOMERULI

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The glomeruli of the olfactory bulb of mammals are the primary coding elements of olfactory information. The pattern of excitation formed by individual glomeruli in response to olfactory stimulation is stable and specific to certain odors. First of all, this is due to the structure of the neural chains of the olfactory bulb. Nevertheless, there is reason to believe that supporting cells of the nervous system — astrocytes — play a role in the organization of the primary processing of the olfactory signal. It is known that astrocytes have a direct effect on synaptic activity and plasticity, as well as coordinate the joint work of neuronal chains and the vascular component, forming the so-called neurogliovascular ensembles. In this work, we undertook a morphological study of the peripheral processes and gap junctions of astrocytes in order to study the structure of neurogliovascular ensembles at the level of neuropil organization of the olfactory bulb glomeruli. The study showed that the bulk of the astrocytic processes inside the glomeruli are located in the area of dendro-dendritic connections of interneurons and projection neurons of the olfactory bulb, while in the zone of the primary switching of the olfactory signal, the astrocytic processes are practically absent. We also found a pronounced imbalance in the expression of the main astroglial connexins between the different functional poles of the neurogliovascular ensembles of the olfactory bulb and the presence of heterotypic contacts involving Cx30. The functional significance of the observed differences remains to be explored.

Keywords: gap junction, astrocyte, neurogliovascular ensemble, olfactory bulb, connexins, olfactory glomeruli