

## **Astrocyte-to-neuron communication: functional relevance for synaptic transmission in the respiratory network?**

**Speaker:**

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**Project description:**

Astrocytes have now been identified as key players for normal brain function. Presumably most important is their contribution to the stabilization of the environment of neurons, due to their capability to regulate the extracellular concentration of potassium as well as neurotransmitters. Moreover, it has become evident that astrocytes themselves can utilize and release transmitter (so called gliotransmitters) to signal to neurons. This kind of astrocyte-to-neuron communication has been shown to depend on a calcium-dependent release of e.g. glutamate or ATP from astrocytes, thus, astrocytes are capable to influence synaptic transmission directly. In the respiratory centre, however our understanding of the role of astrocyte-derived transmitter molecules for synapses between respiratory neurons is still rudimentary. In the proposed project we shall answer the following questions regarding astrocyte-to-neuron communication in the ventral respiratory group (VRG) of the caudal medulla: Do astrocytes in the VRG release gliotransmitters to neighboring respiratory neurons and synapses? Do spontaneous astrocytic calcium oscillations trigger gliotransmitter release in VRG astrocytes? Which conditions are required to influence the entire network? To answer these questions we will combine electrophysiological and optical techniques. We will perform dual whole-cell recordings from pairs of identified astrocytes and neighboring respiratory neurons. This allows on the one side a direct manipulation of the astrocyte using electrical stimulation, uncaging of second messengers or intracellular perfusion of specific antagonists and on the other to monitor synaptic transmission by recording inhibitory or excitatory postsynaptic currents. In parallel we will image and modulate astrocytic calcium signals during ongoing respiratory network activity.

**Quelle:**

<https://gepris.dfg.de/gepris/projekt/82921243>