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Title	ENTRAINMENT OF GAMMA OSCILLATIONS BY SENSORY STIMULATION IN THE ACUTE PHASE AFTER STROKE IMPROVES FUNCTIONAL RECOVERY
Abstract (max 300w)	The reduction of cerebral blood flow during stroke results in loss of both afferent and efferent neuronal pathways. This loss results in an interruption of rhythmic brain oscillations and an imbalance of inhibition and excitation. Former mice studies, using optogenetic stimulation in the gamma frequency, have shown advantageous effect on post-stroke recovery. However, optogenetics lack of potential for human treatment. Therefore, this project is investigating the therapeutic potential of sensory brain stimulation at 40 Hz to restore intra- and interhemispheric balance. Here, we used two-photon calcium imaging of parvalbumin-expressing interneurons in awake mice to investigate neuronal communication pre and post photothrombotic stroke. Additionally, motor impairments were evaluated up to seven days after stroke by performing a neuro-deficit score and beam walking test. Fluorescent traces from parvalbumin expressing interneurons were extracted using Suite2p and further analysed using a graph theory-based approach. Thus, the connectivity structure of parvalbumin expressing interneurons was investigated and compared before and after stroke. As expected, increases in fluorescence defined as changes a higher spike signal showed activation of the inhibitory neurons upon visual stimulation in both control and treated mice at baseline. Following stroke, we could detect changes in neuronal activity and connectivity between treatment conditions. Consistent with neuronal data, an improvement of motor function was observed. These results suggest that sensory entrained gamma oscillations might have a potential therapeutic effect following stroke.

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