

ABSTRACT BOOK

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P6.1.

Changes in gamma range coupling oscillatory potentials between retina and primary visual cortex during stimulus variance and isoflurane anaesthesia in rats

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Coupling of distant brain areas in the CNS can be performed by time-locking gamma oscillations. In the visual system such kind of timing has been found between the retina and the primary visual cortex (V1). There are already two separately investigated oscillatory responses to flash in the visual system: the retinal oscillatory potentials (OPs) and the visual evoked potential OPs. The aim of the present study is to provide convincing data supporting that retinal and cortical OPs are timing or coupling signals like cortical gamma oscillations. We recorded the OPs from two structures of the visual system, the retina and the V1 of freely moving and isoflurane anaesthetized rats. The effects of stimulus parameter variance, such as stimulus width (0.01 - 1000 ms), stimulus intensity (800 - 5000 mcd/mm²), interstimulus interval (10 - 400 ms) and stimulus frequency (0.25 - 25 Hz), on the responses of the V1 were examined. After that, isoflurane dose effects on OPs were studied with the most adequate stimulus. Using 0.6% and 1.5% isoflurane, OPs (amplitude, latency, correlation) changed dose dependently. Introducing tetrodotoxin (TTX) on V1 surface demonstrated that retinal OPs do not passively spread to the cortex. Our results suggest that the oscillatory potentials serve time-locked coupling of the retina and the primary visual cortex. Moreover OPs follow the depth of the narcosis indicating changes in the level of coupling. Thus measuring oscillatory potentials could provide an effective method for monitoring narcosis progress in clinical practice by tracking changes in visual data processing.