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## **The Effects of Medial Septal Modification on the Theta Rhythm of the Amygdala**

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**THE EFFECTS OF MEDIAL SEPTAL MODIFICATION ON THE  
THETA RHYTHM OF THE AMYGDALA**

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The theta rhythm is a 3-12 Hz electroencephalographic oscillatory phenomenon that has been recorded from the hippocampus of small animals during large motor movements, periods of arousal, and memory tasks. Theta denotes the amount of brain synchrony occurring, with higher theta amplitude corresponding to more synchrony. The proposed pacemaker of the hippocampal theta rhythm is the medial septal area (MSA), which consists of neurons that fire rhythmically in frequencies corresponding to the theta rhythm. Despite the proven physical connection between the MSA and the amygdala, there is uncertainty as to whether the MSA serves as a pacemaker for the amygdala theta rhythm as well. To assess the effect of MSA neuronal firing on the amygdala theta rhythm, cholinergic antagonists and GABAergic agonists were infused into the MSA. Eight male Long-Evans rats were anesthetized with a ketamine/xylazine mixture. A guide cannula was placed into the MSA and a recording electrode was placed into the amygdala. After one week, rats were re-anesthetized and attached to recording amplifiers. Baseline recordings were first taken for 5 minutes, and the rats were infused with one of a series of drugs: scopolamine (20 mg/ml or 40 mg/ml), muscimol (one or two doses of 0.5 µl), ethanol (0.1% or 1.0%), saline, or a scopolamine/muscimol mixture. A within-subjects ANOVA was used to analyze pre- and post-infusion differences in theta power and frequency. Based on previous findings, it is expected that infusion of each drug except saline will result in a decrease in theta power and frequency.