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Neuroscience 2002 Abstract

Presentation Number: 750.5**Abstract Title:** Theta oscillations in the rat MS/DB complex in vitro: a locally generated, inhibition-based brain rhythm.**Authors:** **Garner, H. L.*¹** ; Buhl, E. H.¹ ; Henderson, Z.¹¹School of Biomedical Sciences, University of Leeds, Leeds., United Kingdom**Primary Theme and** Synaptic Transmission and Excitability**Topics** - Synaptic Transmission

-- Postsynaptic mechanisms: Inhibitory

Session: 750. Synaptic transmission: postsynaptic mechanisms--inhibitory III
Poster**Presentation Time:** Wednesday, November 06, 2002 1:00 PM-2:00 PM**Location:** Convention Center Exhibit Hall, Poster Board E-27**Keywords:** Network Oscillations, Medial Septum, Bicuculline, GABA-A

The medial septum/diagonal band (MS/DB) complex, which forms part of the septohippocampal feedback loop, is thought to be critical for the generation and/or maintenance of the hippocampal theta rhythm (4-15 Hz) in vivo. Previously we demonstrated the presence of theta frequency rhythmic activity, within an in vitro slice preparation of the MS/DB, following application of the AMPA/kainate receptor agonist kainate (25–100 nM). Here we further investigate this rhythmic activity, in particular the effects of GABA_A receptor mediated inhibition, on kainate induced theta activity in the MS/DB, using bath application of bicuculline. Longitudinal slices of the MS/DB (450 μm), from 21 day old rats, were maintained at 32°C in an interface recording chamber perfused with oxygenated ACSF. Following the bath application of kainate at 100 nM to the MS/DB, extracellular recordings of neuronal population activity, using ACSF-filled micropipettes, revealed rhythmic theta frequency activity. Bicuculline was then applied to the recording chamber and subsequent changes to the kainate induced activity were recorded at 30 and 60 minutes there after. Application of 10 μM bicuculline produced a significant reduction ($P < 0.05$, Student's T test) in the activity recorded at theta frequency (spectral integral in 4-15 Hz range) and in peak amplitude within 60 minutes of application (n=6). These results indicate a pivotal role for inhibitory transmission in pacing and maintaining the rhythmic activity that is observed in the MS/DB slice preparation following kainate induced theta frequency oscillations. SPONSOR: British Neuroscience Association.

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