**Program Number:** 209.8 **Day / Time:** Sunday, Oct. 24, 11:00 AM - 12:00 PM

# Acute noise exposure alters hippocampal place - fields: Evidence for extralemniscal sensory pathway plasticity

T.J.Goble*; G.E.Farmer; J.Frank; A.R.Moller; L.T.Thompson

*Sch. of Behavioral and Brain Sci., Univ of Texas at Dallas, Richardson, TX, USA*

Tinnitus may be induced experientially and experimentally by acute exposure to high intensity noise. This noise may induce central neuronal plasticity via extralemniscal auditory pathways. Stimuli presented through different modalities alter hippocampal neuronal excitability, and also alter place-field activity (i.e. location-specific firing). Place-fields have served as a useful model for studying neuronal selectivity and stability as well as neuronal plasticity. The current study assessed changes in hippocampal place-field location, firing frequency, and stability after a noise exposure sufficient to induce experimental tinnitus.
Long-Evans male rats were chronically implanted with a moveable microdrive (Kubie, 1981) containing 8 microwire electrodes in the right hippocampal CA1 region. Rats were food-deprived, and were trained to transverse all eight arms on a radial-arm maze per 10 min session for food reward, to ensure equal distribution of the rat's spatial behaviors. Amplification and filtering of multi-unit signals was performed using a Multichannel Acquisition Processor (MAP) (Plexon Inc., Dallas, TX), and spike waveforms recorded and sorted using Plexon's RASPUTIN and OffLine Sorter software clients. Place-fields were analyzed with NeuroExplorer (Nex Technologies, Littleton, MA) and statistics performed using SPSS11 (SPSS Inc., Chicago, Il). After twenty stable 10 min sessions of place-field activity were obtained (over four days), each rat was exposed to a 4 kHz tone at 104 dB SPL for 30 min in a sound-proof booth. Rats were immediately placed on the maze after noise exposure, and place-field activity was analyzed for 20 more sessions. Place-field firing frequency and location significantly changed after noise exposure, indicating hippocampal unit plasticity induced through the non-classical auditory pathway may be involved in tinnitus.

*Support Contributed By: ATA*

**Citation:** T.J.Goble, G.E.Farmer, J.Frank, A.R.Moller, L.T.Thompson. Acute noise exposure alters hippocampal place - fields: Evidence for extralemniscal sensory pathway plasticity. Program No. 209.8. *2004 Abstract Viewer/Itinerary Planner.* Washington, DC: Society for Neuroscience