**Repetitive Cortical Spreading Depression (CSD) of Somatosensory Evoked Potentials (SSEP) in Rats**

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**Abstract:** Cortical Spreading Depression (CSD) has long been suspected of occurring in clinical brain injury (1) and shown to be associated with worse outcome (2,3).  However, whether CSD resulting in massive membrane depolarization with increased oxygen demand and perfusion is injurious to the healthy non-ischemic or traumatized brain is unknown. Does the metabolic and perfusion stress placed upon the healthy brain impair the ability of the brain to respond to the stimuli of evoked somatosensory evoked potentials.Hypothesis: Repeated CSD compromises the ability of the brain to respond to SSEP.  Male SD rats weighing 350 to 400 grams body weight were anesthetized with urethane 1.5 g/kg, i.p. They were intubated and their lungs mechanically ventilated with 30% oxygen and 70% nitrogen with arterial blood gases and pH controlled within normal limits.  Blood electrolytes and glucose and lactate were also measured on a GEM4000 (Instrumentation Labs, Bedford, MA). Femoral artery and vein catheters were inserted for blood pressure monitoring, blood sampling and fluid replacement with Lacated Ringers, 1.0 ml/hr. The rats were fixed in stereotaxic frame and Ag/AgCl ball electrodes inserted over the parietal cortex covering the somatosensory cortex.  Evoked potential (EP) electrodes were inserted into the region of the contralateral vibrissae region stimulating at 1.5 sec at 2 mA, 2 ms duration.  The placement of the cortical recording electrodes via high input impedance bioamplifiers (BIOPAC, Goleta, CA).   CSD recording electrodes (3 Channels) were placed onto the somatosensory areas of the rat parietal cortex.  For studies with electrode stimulation, a craniotomy (3 mm diam) was made between the electrodes (red circle) for the placement of a Ag/AgCl electrode for stimulation at 1.5 mA, 10 Hz, 2 sec duration.  These electrical stimulations were made every 12-15 min to induce CSD throughout the study for 4-6 hrs. SSEP amplitude measurements were made before CSD, during the CSD, after the CSD and in the recovery phase following each consecutive CSD elicited by electrical stimulation.