

Abstract View

FOCI OF TRAUMA-INDUCED SEIZURES LOCALIZED BY INDEPENDENT COMPONENT ANALYSIS

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Independent Component Analysis (ICA) was applied to local field potential recordings from isolated cortical slabs and intact cortex during electrographic seizures. Multi-channel recordings were obtained from anesthetized cats and seizures were induced by local trauma in the medial anterior area of the cortex. Ninety min after trauma, normal slow-wave sleep (<1 Hz) oscillations were interrupted by spike-and-wave (SW) complexes (1-2 Hz) that usually lasted 3-10 sec and repeated every 10-50 sec. During the seizure, SW complexes became shorter and re-occurred more frequently. ICA applied to these data showed that: (1) Slow (<1 Hz) sleep oscillations had several focal sources in the medial posterior area of the cortex. (2) The primary focus of the paroxysmal SW complexes was very close to the site of damage. (3) The initial focus of the SW complexes preceded the paroxysmal activity by about 1 sec and was localized more remotely from the trauma. (4) The initial and primary SW components oscillated out of phase, consistent with paroxysmal activity propagating between the foci. Paroxysmal oscillations might be first triggered in the region surrounding trauma because decreased spontaneous activity there could lead to increased sensitivity to activation.

Supported by: NIH, HFSP and CIHR

Citation:

M. Bazhenov, T.-P. Jung, I. Timofeev, M. Steriade, T.J. Sejnowski. FOCI OF TRAUMA-INDUCED SEIZURES LOCALIZED BY INDEPENDENT COMPONENT ANALYSIS Program No. 793.12. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.



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