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### ALTERED MAGNETIC RESONANCE IMAGING (MRI) T<sub>2</sub> SIGNAL AFTER EXPERIMENTAL PROLONGED FEBRILE SEIZURES DOES NOT SIGNIFY NEURONAL DEATH

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**Rationale:** Whereas most febrile seizures carry a benign outcome, a subpopulation of individuals with prolonged febrile seizures are at risk for later temporal lobe epilepsy. Signal changes on MRI may provide early markers for changes in neuronal integrity that promote epileptogenesis in such individuals. Serial MRIs were obtained before and following experimental prolonged febrile seizures in immature rat, to determine the prevalence and distribution of T<sub>2</sub> weighted signal changes, and to determine their pathological substrate.

**Methods:** T<sub>2</sub> weighted coronal images were acquired using fast spin echo, on a 4 Tesla scanner (Picker console, Philips Medical Inc.). Initial scans were performed on day 10 of life (P10; n = 5 controls and 8 experimentals). Seizures were evoked in the experimental group on P11, and all animals were imaged on P12 (24 hours after the seizures in the experimental group), and 7 days later. Neuronal injury was assessed using the Fluoro-Jade method.

**Results:** 75% of immature rats with experimental prolonged febrile seizures had abnormal T<sub>2</sub> signal enhancement at 24 hours, and 87.5% at 8 days after the seizures. While abnormal signals involved the amygdala (87.5%), dorsal hippocampus (75%) and piriform cortex (87.5%), these changes were not accompanied by evidence of neuronal death in these regions.

**Conclusions:** Experimental prolonged febrile seizures lead to relatively frequent abnormal MRI signal in 'temporal lobe' structures. While these changes do not indicate cell death, they may signify pathological cellular processes that promote epileptogenesis. (Supported by an NIH grant 35439 and by a research initiative award from the AES.)