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Neuroprevention in epilepsy

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Experimental animal-based research in epileptogenesis plays a vital role in discovering therapeutic targets against epileptogenesis. This study evaluates currently proposed interventions for epileptogenesis through the analysis of articles found in the PubMed library. The keyword epileptogenesis was used to search for articles published between 2007 and 2016. A detailed animal model of epileptogenesis, the latency period, and the type of interventions performed were necessary for article inclusion. Articles lacking data required for statistical analysis were excluded. In this study 1,486 articles have been screened, and 76 articles were included. From a preliminary analysis, 23% of the studies used kindling, and 64% used status epilepticus to induce epileptogenesis. Regarding spontaneous recurrent seizures as a major outcome, 23% of the studies evaluated seizure frequency; 22% evaluated seizure severity; 27% evaluated seizure duration; 6% evaluated amplitude of electrical activity; 10% evaluated threshold for seizure susceptibility, 3% evaluated prevalence of seizure recurrence and 26% evaluated latency period. Regarding aberrant plasticity as an outcome, 18% of articles evaluated dendritic spines and mossy fibers. In addition 5% of articles evaluated IL-1B and TNF-alpha levels as inflammatory markers. In total 32% of articles demonstrated attenuation of epilepsy development. 56% of the studies conducted a post-SE intervention with 6% using rapamycin. Anti-inflammatory compounds, voltage-gated sodium channel blockers, and rapamycin do not prevent epileptogenesis but do limit seizure frequency. Our preliminary data identifies several potential modulators of neuronal networks that could prevent the onset of epilepsy.

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