

## Cannabinoid 1 receptor as therapeutic target in preventing chronic epilepsy

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Temporal lobe epilepsy (TLE) is the single most common form of refractory epilepsy. Cannabinoid type 1 (CB<sub>1</sub>) receptor, a major G-protein-coupled receptor in brain, regulates neuronal excitability and has been shown to mediate the anticonvulsant effects of cannabinoids in several acute animal models of seizure. However, the potential of cannabinoids for preventing chronic epileptic damage and, moreover, the role of the endogenous cannabinoid system in regulating seizure activity are not clear.

We investigated the neuroprotective role of the CB<sub>1</sub> receptor against the hippocampal damage occurring in a chronic pilocarpine (PILO) model of TLE in rats. We simulated a therapeutic approach by administering the CB<sub>1</sub> agonist WIN55.212-2 to rats for 15 days, beginning 24 hours after the induction of acute epileptic syndrome with PILO.

After 6 months, the animals treated with WIN55.212-2 for 15 days following PILO administration, showed (relative to vehicle control): decreased epileptic behavior, reduced abnormal fiber sprouting in the dentate gyrus, preservation of GABA-ergic neurons, less oxidative injury through NADPH oxidase activation, and normalization of CB<sub>1</sub> receptor distribution and expression. Taken together, these data suggest that novel compounds targeting CB<sub>1</sub> receptor or downstream signaling pathways may be efficacious in the prevention of chronic TLE. Given the prevalence and severity of TLE, there is great potential of such compounds.

### Biography

Roberto Di Maio has completed his Ph.D in neurosciences on 2005 from University of Palermo and postdoctoral studies from University of Pittsburgh, School of Medicine. His studies focus on the early mechanisms of epileptogenesis and on possible novel therapeutic approaches aimed at preventing the chronic epileptic injury after the occurrence of acute seizures. He has published peer-reviewed manuscripts in reputed journals and book chapter in the field and serving as reviewer in neurosciences journals and in grant applications.

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