Vitellogenin 6: A Novel Neuroprotective Gene Target for Epilepsy Treatment

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Epilepsy is the most common serious brain disorder recognized by the World Health Organization, affecting 60 million people worldwide. People with epilepsy suffer from recurrent unprovoked seizures, which are associated with higher rates of mortality, cognitive impairment, and psychosocial dysfunction culminating in an annual economic cost of $12 billion USD. Despite optimum medical therapy, medications cause serious side effects and are ineffective in 25% of epilepsy patients, compelling the need to explore alternative therapeutic options. To that end, vitellogenin isoform 6 (VTG6) has been identified as a novel target for upregulation in epilepsy treatment, since VTG6 overexpression protects the brain from cognitive impairment associated with epilepsy. This present study aims to investigate a potential mechanism for how VTG6 can protect the brain by analyzing the effect of VTG6 overexpression on neural proliferation. Consistent with other characterization studies, brain histological sections stained with proliferative markers showed that epilepsy increased neural proliferation in the hippocampus. Strikingly, VTG6 overexpression prevented excessive proliferation, indicating that VTG6 mediates neuroprotection via suppression of aberrant neurogenesis. While it was previously unclear whether altered neurogenesis reflects an endogenous compensatory response or contributes to epileptogenesis, this study shows that aberrant neurogenesis is a manifestation of how epilepsy damages the brain. Taken as a whole, this study identifies inhibition of neural proliferation as a novel therapeutic pathway for the treatment of epilepsy, and that VTG6 is a powerful target for protecting the brain against damages caused by epilepsy.

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