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Mutations in SCN3A gene cause early infantile Epilepsy

Tariq Zaman
Michigan State University, USA

Neurons allow the brain and body to communicate through electrical signals. Voltage-gated ion channels like sodium, calcium, potassium, and chloride channels are critical in electrical signaling. Sodium channels play an important role in the generation and propagation of the signals. Under normal conditions, these signals allow neurons to communicate, however, abnormal, and excessive excitation of neurons may lead to epileptic encephalopathies. The SCN3A gene, encoding the type 3 sodium channel, Nav1.3, is highly expressed in the brain starting from 16 weeks of fetal life. We have discovered that the mutations in SCN3A result in the gain of function by altering gating properties of the channel, leaving the ion channel stuck open that in turn causes current flood leading to electric sparking, a signature of epilepsy. Magnetic resonance imaging (MRIs) and neurological evaluations further revealed that the epileptic patients carrying mutations in SCN3A also exhibit malformation of cortical folding indicating its possible role in brain development. This study reinforces the role of variants in SCN3A as a cause of neurodevelopmental disorders along a spectrum of severity that includes epilepsy and polymicrogyria and suggests that gain of channel function is an important mechanism of disease pathogenesis. Manipulating epileptic genes in utero could be used to analyze roles of genes in embryonic development and intellectual disability. These are still early days, but with precision medicine, early prenatal diagnosis, SCN3A gene manipulation during the critical window, may help prevent brain malformations in babies.

References

1. A single-center SCN8A-related epilepsy cohort: clinical, genetic, and physiologic characterization 2019 Aug;6(8):1445-1455. doi: 10.1002/acn3.50839. Epub 2019 Jul 23.

2. LMO4 is required to maintain hypothalamic insulin signaling 2014 Jul 18;450(1):666-72. doi: 10.1016/j.bbrc.2014.06.026. Epub 2014 Jun 14.

3. BK Channels Mediate Synaptic Plasticity Underlying Habituation in Rats Apr 26;37(17):4540-4551. doi: 10.1523/JNEUROSCI.3699-16.2017. Epub 2017 Mar 27.

zamantar@msu.edu