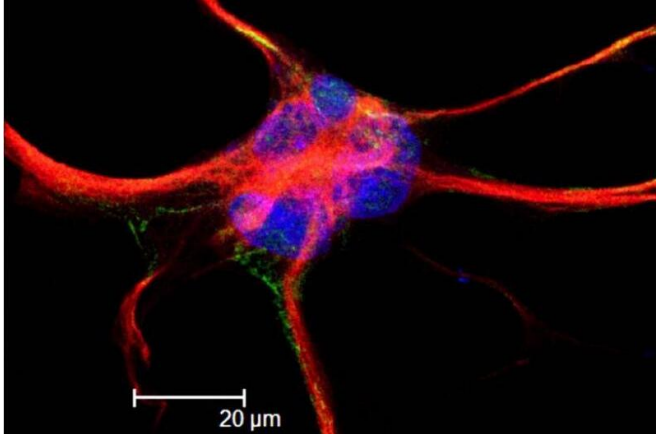


Astrocytes and epilepsy

16 September 2019, by Leigh MacMillan



may represent a novel therapeutic target for the treatment of epilepsy in TSC and perhaps other seizure disorders.

More information: Brittany Short et al. Cerebral aquaporin-4 expression is independent of seizures in tuberous sclerosis complex, *Neurobiology of Disease* (2019). [DOI: 10.1016/j.nbd.2019.05.003](https://doi.org/10.1016/j.nbd.2019.05.003)

Provided by Vanderbilt University

This is an astrocyte, labeled with GFAP (red), Focal Adhesion Kinase (FAK) green, and nuclear stain To-Pro (blue). Credit: Nathan S. Ivey at TNPRC. Via Wikipedia.

The neurodevelopmental disorder Tuberous Sclerosis Complex (TSC) is characterized by often severe epilepsy, along with autism and psychiatric disorders. Astrocytes—star-shaped glial cells that serve multiple functions in the brain—are suspected to play a role in TSC.

Robert Carson, MD, Ph.D., and colleagues proposed that the water channel aquaporin-4 (AQP4), which is important to the functions of astrocytes, contributes to TSC disease pathology.

Reporting in *Neurobiology of Disease*, they found increased expression of AQP4 in cortical brain tissue removed from TSC patients during epilepsy surgery. Using mouse models and cultured astrocytes, they demonstrated that inactivation of the genes *Tsc1* or *Tsc2* (mutations in these genes cause TSC) resulted in increased AQP4 expression.

Increased AQP4 expression has been previously reported in [temporal lobe epilepsy](#), supporting a broader role for this protein in astrocyte dysfunction that leads to seizure activity. AQP4

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