

Redox biomarker could predict progression of epilepsy

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Approximately 2.9 million people in the United States suffer from epilepsy, according to the CDC. For patients living with this diagnosis and their doctors it is often difficult to predict the onset or progression of chronic seizures. Thanks to a newly published study from the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences at the Anschutz Medical Campus, that may be changing.

The [study](#), led by Drs. Manisha Patel and Li-Ping Liang of the University of Colorado Anschutz Medical Campus, was recently published in *Redox Biology*, a journal of the Society for Redox Biology and Medicine (SFRBM).

The study was designed to determine if the ratio of reduced and oxidized forms of an amino acid, cysteine and cystine respectively, could serve as an accurate biomarker to predict the onset or progression of seizures associated with epilepsy. Using a rat model, it was determined that decreased cysteine/cystine ratio in plasma may serve as a redox biomarker in epilepsy.

Specifically, seizures were chemically-induced in rats, which were then monitored closely for behavioral changes. Plasma was then taken from the rats 48 hours and 12 weeks after treatment to mimic acute and chronic epileptic conditions. It was found that cysteine/cystine ratio was an accurate redox biomarker for epilepsy. Plasma cysteine/cystine was reduced over 60% in rats with acute epileptic responses and over 37% in rats with chronic epilepsy. Interestingly, cysteine/cystine ratio was

unaltered in rats also treated with an antioxidant known to prevent epileptic brain injury.

"Currently the field of epilepsy lacks peripheral blood-based biomarkers that could predict the onset or progression of chronic seizures following an epileptogenic injury," said Dr. Manisha Patel a professor at the University of Colorado School of Pharmacy and SFRBM member. "We are confident that this study is a significant step toward changing this, and will one day help those living with temporal lobe [epilepsy](#)."

Provided by CU Anschutz Medical Campus

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