

Research uncovers new link between head trauma, CTE and Lou Gehrig's disease

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Researchers at Western University have uncovered a unique neurobiological pathway triggered by head trauma which underlies both Chronic Traumatic Encephalopathy (CTE) and Lou Gehrig's disease.

CTE is a [fatal neurodegenerative disease](#) shown to be a result of repeated [head trauma](#), and is associated with elite athletes involved in contact sports. Previous research has shown that between 4 and 6 per cent of patients with CTE will also simultaneously show clinical features of [amyotrophic lateral sclerosis](#) (ALS or Lou Gehrig's Disease) - that's 800 fold higher than the prevalence of ALS in the general population.

The study, published in the January 2018 issue of *Neurology*, the medical journal of the American Academy of Neurology, identifies a common neurobiological link between those who have CTE and those who have a variant of ALS that causes cognitive impairment. In addition, the researchers demonstrate that this pathway can be triggered in an experimental model of head trauma.

"The hallmark of CTE, regardless of whether there is ALS or not, is tau aggregate formation. We have now shown that tau aggregates of those who have CTE and those who have this variant of ALS are the same," said Dr. Michael J. Strong, Dean of the Schulich School of Medicine & Dentistry at Western University and principal investigator on the study.

Tau is an important protein in maintaining the structure of neurons in the brain; however when tau is abnormally phosphorylated, it forms piles of

tau within a cell, called tau aggregates. These tau aggregates indicate a disease state in the brain.

By studying brain tissue from the U.S. Department of Veterans Affairs-Boston University-Concussion Legacy Foundation Brain Bank, the researchers, based out of Robarts Research Institute at Western were able to show a unique phosphorylation state for tau in both CTE and those with CTE and ALS. The researchers also demonstrated that head trauma in an animal model triggered this process of tau phosphorylation to occur.

"The key is that for the first time, we've provided a window into the pathway by which the pathology for both CTE and the variant of ALS that causes [cognitive impairment](#) occurs and begins the critical trail of finding a treatment," said Strong.

More information: Alexander J. Moszczynski et al, Pathologic Thr175tau phosphorylation in CTE and CTE with ALS, *Neurology* (2018). [DOI: 10.1212/WNL.0000000000004899](https://doi.org/10.1212/WNL.0000000000004899)

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