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ASSESSING ASTROCYTE NEUROPATHOLOGY IN CHRONIC TRAUMATIC ENCEPHALOPATHY

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Chronic Traumatic Encephalopathy is a neurodegenerative disease associated with repeated brain trauma and has recently gained national prominence in sports leagues such as the National Football League. CTE is characterized by a distinct distribution of p-Tau pathology within the brain as well as other neuropathological changes. During the course of investigating the radiological pathological correlation in CTE using immunohistochemistry stains and diffusion tensor imaging, we serendipitously discovered an unexpected astrocytic pathology in our tissue. This astrocytic pathology has not been reported in previous literature. This pathology seems to be representative of astrocyte degeneration in regions of white matter. Astrocytes are one of the most abundant cells found in the brain, and play a variety of roles, including maintaining the blood-brain barrier, controlling cerebral blood flow, and maintaining pH. They are generally some of the more robust cells, not particularly prone to degeneration. We are now in the process of testing the novel hypothesis that this degeneration is a result of an autoimmune attack on the astrocytes. Previous studies have shown that human anti-GFAP antibodies are elevated in the blood after repeated traumas, and a possible mechanism involves these antibodies making it past the blood-brain barrier and attacking the astrocytes, leading to the degeneration that we see. Our methods include utilizing immunoelectron microscopy techniques to scan on a structural level. Additionally, IHC stains for typical autoimmune antibodies will also be performed. Learning more of the mechanism behind astrocyte degeneration could have implications for our understanding of CTE overall.