

Connection between brain inflammation and CTE identified

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For the first time, researchers have shown that inflammation in the brain may have direct involvement in the development of chronic traumatic encephalopathy (CTE). In addition, they found that the number of years one plays contact sports may predict the occurrence of CTE and that this association is partly due to increased inflammation in the brain.

The findings, which appear online in *Acta Neuropathologica Communications*, are important steps in understanding how CTE develops and may help efforts to identify and treat CTE during life.

CTE is a progressive degenerative disease of the brain found in athletes and others with a history of repetitive brain trauma, including symptomatic concussions as well as asymptomatic subconcussive hits to the head.

Brains from former American football players and non-athlete controls were examined after death for CTE pathology and markers of inflammation in the brain. Researchers from Boston University School of Medicine (BUSM) and the VA Boston Healthcare System studied the numbers of [inflammatory cells](#) in the frontal cortex of the brain using markers for different cell types. They then compared the number of years playing football to the numbers of inflammatory cells, the development of CTE pathology, and the presence of dementia in life. A statistical model then tested the hypothesis that the number of years of exposure to football predicted [brain inflammation](#), CTE pathology and the development of dementia.

"This study provides evidence that playing football for a prolonged period can result in long-term brain inflammation and that this inflammation might lead to CTE," said first author Jonathan Cherry, PhD, postdoctoral fellow in neurology at BUSM. "Although inflammation may be protective in the brain especially right after an injury, our study

suggests that years after a period of playing football inflammation can persist in the brain and is linked to the development of CTE," he added.

According to the researchers inflammation has an important role in a number of other degenerative diseases such as Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis, and injury from repetitive head impacts and may play a role in the development of these diseases as well.

The researchers believe that future studies are needed to determine whether treating this inflammation can prevent or lessen the development of CTE. "Furthermore, brain [inflammation](#) could be used as a predictive biomarker to help identify patients at risk of developing CTE in life," said Cherry.

More information: Jonathan D. Cherry et al, Microglial neuroinflammation contributes to tau accumulation in chronic traumatic encephalopathy, *Acta Neuropathologica Communications* (2016). DOI: [10.1186/s40478-016-0382-8](https://doi.org/10.1186/s40478-016-0382-8)

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