

CTE diagnostic test studied in NFL players

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by Zack Anchors

SAN DIEGO - Earlier this year marked the first time an official of the National Football League admitted the existence of a direct link between football and chronic traumatic encephalopathy (CTE). The admission was slow in coming in part because there is currently no way to diagnose CTE in living humans. But a new diagnostic test recently used on 78 NFL players could finally offer a reliable way of knowing whether an individual has CTE—and reveal the full extent of CTE within the ranks of the NFL and other football leagues.

Jim Joyce, CEO of the company developing the diagnostic test, tells *DDNews* that he hopes the NFL's public acceptance of the link between football and CTE will draw attention to the progress made towards diagnosing the disease.

"I think that kind of acknowledgement could really accelerate the discussion surrounding the need for a clinical test to identify and monitor CTE," he says. "There is a direct connection between football and CTE; there's really no doubt."

Currently the only way to diagnose CTE is through a post-mortem autopsy, but [Aethlon Medical Inc.](#) intends to change that with the diagnostic test being developed by its subsidiary [Exosome Sciences](#). The test being studied is designed to identify an abnormal protein called tau that builds up in brain tissue as a result of repetitive head trauma. CTE researchers believe that they have developed a means of measuring plasma exosomal tau, which they refer to as TauSome. Higher levels of TauSome are potentially indicative of CTE.

The test isolates TauSome through examining exosomes, which are very small vesicles that are released from all types of cells in the body, including brain cells. Exosomes carry within them the proteins from their cells of origin and they can be isolated in all body fluids, including blood plasma. Researchers thought that exosomes had potential as a means of identifying CTE because they cross the blood-brain barrier and can provide a unique method of measuring certain aspects of the contents of brain cells through a blood test.

Exosome Science was able to use its diagnostic blood test in 78 NFL players with histories of concussions as well as in a control group made up of 16 athletes involved in non-contact sports. The subjects are all part of a much larger National Institutes of Health (NIH)-funded project called DETECT, which is focused on developing a variety of biomarkers for CTE and involves researchers at Boston University School of Medicine and the University of Washington.

“We saw significantly higher levels of TauSome in the NFL group as compared to the control group,” Joyce tells *DDNews*. “But probably even more remarkable was how well the TauSome levels coordinated with cognitive decline based on a battery of memory and motor tests that were administered to individuals in the study. The higher the TauSome level, the worse the individual generally performed in those cognitive decline tests.”

The researchers involved in the study emphasize that it is a preliminary study of the diagnostic test—the first of several steps needed for its validation. Limitations of the study include its relatively small sample size and the lack of any other possible biomarker of CTE.

Exosome has already planned a series of future studies focused on TauSomes, including a follow-up study that will be part of a \$16-million NIH grant and that will enroll NFL players at up to 17 different clinical sites. That study is expected to start this summer.

“Our next steps are to duplicate what we found in the DETECT study,” says Joyce. “If we can do that, then there’s going to be a need for a clinical consensus group that determines what level of TauSomes in circulation might be the standard for defining early-stage CTE or CTE itself.”

Having a reliable way to diagnose CTE during life could allow researchers to better determine its incidence and prevalence and to examine risk factors to understand why some people get CTE and others do not. A diagnostic test could also lead to clinical trials for potential treatments and methods of preventing the disease. “With the absence of a diagnostic tool that’s validated to identify CTE, there’s no possibility to advance therapeutics,” says Joyce. “There is no treatment today.”

It is also possible that a diagnostic test for CTE could have implications for similar neurodegenerative diseases like Alzheimer’s disease.

Joyce also expects that Exosome’s diagnostic test, if validated, could come to play an critical role in managing risk and liability in contact sports like football. “What the NFL will begin to understand is that their players, by the time they draft them, have been playing football for more than a decade, and it could be very valuable to understand at the outset their TauSome level and be able to monitor that over time,” he says.

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