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New Research Points to Brain Injuries in College Football

(Corrects number of players in the study with elevated levels of the antibody linked to brain damage)

By Paul Tullis

(Bloomberg Businessweek) -- As the National Football League continues to face scrutiny and litigation over concussions, new evidence shows that brain injuries may be a problem at the collegiate level too. According to a study published today in PLOS One, college football players who sustain hits to the head may experience long-term brain damage even if they aren't concussed.

Researchers at the Cleveland Clinic used blood tests, brain scans, and cognitive and other tests to assess brain trauma in 67 college football players over the course of the 2011 season. Although none of the players experienced concussions, blood tests showed that the 5 players who absorbed the hardest hit had elevated levels of an antibody linked to brain damage. These players then underwent brain scans at the University of Rochester Medical Center. When the scans were analyzed in a double-blind process, researchers found abnormalities that were predicted by the presence of the antibody.

"This positive correlation could be an early indicator of a pathological process that, with time, could perturb players' brain health," says Nicola Marchi, a professor of molecular medicine at the Cleveland Clinic Lerner College of Medicine, who co-authored the study with Lerner colleague Damir Janigro and Rochester's Jeffrey Bazarian. "All football players have repeated subconcussive hits—throughout the game, the season, and their careers," he says, but without external symptoms of injury, the hits were hard to measure. The blood tests appear to offer an early warning system.

Concern about brain injuries in football has grown rapidly over the past decade, after evidence of chronic traumatic encephalopathy, or CTE, a degenerative brain disease that causes dementia and depression, was found in several former pro players, including some who committed suicide. The Center for the Study of Traumatic Encephalopathy at Boston University later found the disease in 34 of 35 former NFL players examined.

So far, most of the research and discussion has centered specifically on concussions, which are relatively easy to identify and diagnose. The CDC has reported that 47 percent of high school football players suffer a concussion over the course of a season. A concussed person is at greater risk of long-term brain damage, and every additional concussion increases that risk. The NFL has introduced rule changes to make the game marginally less brutal. It is also now standard procedure to bench concussed players until they are symptom-free.

The Cleveland study released today shows that even players who don't sustain concussions may be at risk, and it focuses new attention on college football. That in turn suggests that the risks may be far

more widespread than previously acknowledged: Around 20,000 men play at the highest levels of college football, compared with the 1,700 players in the NFL.

The NFL has faced criticism about head trauma for years and responded with task forces, rule changes, big fines for particularly hard hits, and financial resources for scientific research as well as for injured players. At the same time, the league is buffered by the fact that it is still the most popular professional league in the world, with revenue of \$9 billion last year. While questions remain about how quickly the league has responded to revelations of CTE and how effective its prevention policies are, the league and its fans can always point out that players are consenting adults who are compensated for their work; questions of liability are working their way through the legal process.

College football may not have the same buffers. Academic institutions have a responsibility to their students, and the NCAA was founded “as a way to protect student-athletes,” according to its website. And while football can raise millions for the institutions, players are forbidden to make money from football.

“We are actively collaborating with member institutions and research facilities to improve the health and safety of student-athletes,” Brian Hainline, the chief medical officer of the NCAA, tells *Businessweek*. Last year, the NCAA made a \$400,000 grant to the National Sport Concussion Outcomes Study Consortium to examine the effects of head injuries in college sports.

Meanwhile, spring practice, in which players say they sustain more hits than in games, starts this month.