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Antioxidant therapy may have promising potential in concussion treatment

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A new study out of West Virginia University suggests antioxidants may play a key role in reducing the long-term effects of concussions and could potentially offer a unique new approach for treatment.

Common among athletes and soldiers, it is estimated that 3.4 million concussions occur each year in the United States. The development of a readily available oral supplement would have the potential to improve brain function in a percentage of concussion sufferers.

The study adds to recent findings that concussions can lead to chronic traumatic encephalopathy. Head injuries often lead to chronic traumatic encephalopathy, a disease associated with long-term brain damage and behavioral symptoms including memory loss, impulsive behavior, depression and aggression. The number of retired athletes and veterans diagnosed with chronic traumatic encephalopathy has climbed in recent years.

"Concussions can contribute to long-term changes within the brain and these changes are the result of cell death, which may be caused by oxidative stress," said Brandon Lucke-Wold, a M.D./Ph.D. student at West Virginia University's Medical School who conducted the research. "This study shows that antioxidants such as lipoic acid can reduce the long-term deficits when given after a concussion."

In Lucke-Wold's research, rats were divided into three groups: a non-concussed control group, a group that experienced concussive injury and

another concussed group that received lipoic acid supplementation. Seven days after the concussion, the rats were tested for seemingly impulsive behavior through an elevated maze. The rats exposed to concussion without lipoic acid had increased impulsive behavior, and spent more time exploring open spaces indicative of risk taking behavior.

"This increase in impulsive behavior was an indication of underlying brain damage," said Lucke-Wold, who will present the research at the American Society for Pharmacology and Experimental Therapeutics (ASPET) Annual Meeting during Experimental Biology 2015.

Analysis of brains of the group receiving supplementation showed markedly decreased impulsive behavior. "These findings make sense because lipoic acid works to help reduce toxic free radicals that can damage cells," said Lucke-Wold.

"By understanding the mechanisms behind brain injury following concussion, we can more effectively target treatment interventions to reduce these damaging effects," he added.

Provided by Federation of American Societies for Experimental Biology

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