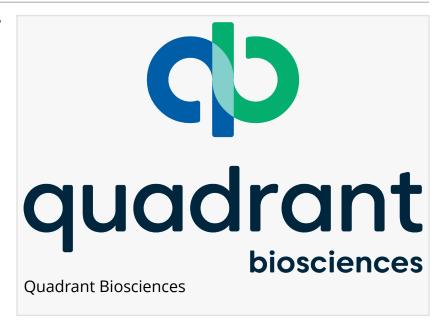# Saliva may hold key to concussion diagnosis and management

Simple saliva test also may predict nature and duration of concussion symptoms

SYRACUSE, NY, UNITED STATES, October 20, 2020 /EINPresswire.com/ -- A simple saliva swab may hold the key to diagnosing and managing mild traumatic brain injury (i.e., concussions), according to a study recently published in the journal Clinical and Translational Medicine. In a paper titled "Diagnosing mild traumatic brain injury using saliva RNA compared to cognitive and balance testing," researchers discovered that a

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noninvasive saliva test demonstrated similar diagnostic accuracy to neurocognitive and balance tests commonly used today, and greater diagnostic utility when combined with standardized symptom assessment. Moreover, the researchers from Penn State College of Medicine, SUNY Buffalo Jacobs School of Medicine, SUNY Upstate Medical and Quadrant Biosciences Inc., suggest that the saliva test may have additional clinical utility in predicting the type and duration of symptoms.

More than 3 million concussions occur each year, the majority occurring among children and young adults. Despite the prevalence of the injury, there are few clinically valid methods for its diagnosis or prognosis. As a result, there is great value in an objective biomarker that is not only accurate, but easily collected and measured.

"Currently, the diagnosis of concussion relies largely on subjective symptom reports from patients," explains Steven Hicks, MD, Ph.D., FAAP, Associate Professor of Pediatrics, Penn State Hershey Medical Center and one of the co-authors in this study. "The lack of objective tools for concussion assessment is problematic because symptom reports can be manipulated to expedite, or delay, return to activities. As a result, studies have shown that concussion is often under-diagnosed."

Quadrant Biosciences has been working the past several years with researchers from Penn State Medical Center and SUNY Upstate Medical University to explore the use of saliva biomarkers to objectively diagnose concussion. This earlier research, published in the Journal of the American Medical Association Pediatrics in 2018, identified a panel of small, non-coding molecules ("ncRNA") in the saliva that acted as a "molecular signature" to not only diagnose concussion, but predict the duration and character of concussion symptoms. The present study was designed, in part, to test that diagnostic and prognostic utility in a larger cohort of patients.

In this study of 538 individuals across 11 test sites, the researchers compared the ability of saliva RNA to identify mTBI, relative to a commonly used symptom scale, balance test, and neurocognitive assessment. Saliva was collected using the ORAcollect®·RNA (OR-100) device from OraSure Technologies. The saliva test identified participants who had suffered mTBI with similar accuracy to standard clinical tools. The best performing predictive model included symptom reports combined with saliva RNA measures.

These results suggest that saliva RNA represents a non-invasive, biologic measure with the potential to aid concussion diagnosis. Hicks said predicting the length of concussions as early as possible would help ensure patients get the right care, and advise patients and parents on how long to expect symptoms to continue. "With that knowledge," Hicks explained, "physicians could make more informed decisions about how long to hold a child out of sports, whether starting more aggressive medication regimens might be warranted, or whether involving a concussion specialist might be appropriate. Anytime we can use accurate, objective measures to guide medical care, I think that represents an opportunity to improve concussion treatment."

While more studies are needed, Hicks said he is hopeful that measuring microRNAs in saliva could one day be an accurate, quick way to diagnose and manage concussions.

"The ultimate goal is to be able to objectively identify that a concussion has happened and then predict how long the symptoms will go on for," Hicks said. "Then we can use that knowledge to improve the care that we provide for children who have concussions, either by starting medicine earlier or holding them out of activities for longer."

Dr. Hicks serves as a paid consultant and scientific advisory board member for Quadrant Biosciences. These potential conflicts of interest have been fully disclosed and are actively managed by the Penn State Conflict of Interest Committee.

About Quadrant Biosciences
Quadrant Biosciences is a life science company involved in the development of functional assessments and epigenetic diagnostic solutions for large-scale health issues. The company has entered into collaborative research relationships with a number of institutions including SUNY Upstate Medical University and Penn State University to explore and develop novel biomarker technologies with a focus on Autism Spectrum Disorder, concussion, COVID-19, and Parkinson's Disease. Quadrant Biosciences also participates in the Start-up NY program, a New York State

economic development program.

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