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# UF looks at injury in battle

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As the U.S. military prepares for a possible war with Iraq, University of Florida researchers are developing a test they hope someday will increase the chances of soldiers surviving a common battlefield injury.

According to Ron Hayes, director of the Center for Traumatic Brain Injury Studies at UF's McKnight Brain Institute, outside of bleeding, traumatic brain injury is the most common cause of death and disabling injury in combat. Time is critical in treating such an injury.

Hayes, who leads the research team, sees a future far beyond the battlefield for the diagnostic test.

"Traumatic brain injury is a scandalously ignored health problem," he said Friday. "It's the biggest killer of kids. Funding this research is where homeland defense provides a service for the soccer mom."

The Department of Defense has allocated $2.2 million to help scientists at the McKnight Brain Institute and the Walter Reed Army Institute of Research develop the first routine diagnostic tool to define the scope of penetrating brain injuries.

Such injuries claim 25 percent of soldiers killed in battle, according to Defense officials, yet there is no effective way to diagnose traumatic brain injury short of a brain scan, which is not practical in combat conditions.

"Combat personnel now wear new Kevlar helmets that can stop a 9 mm . . . round, but there is a lot of energy that is still absorbed by the brain. Where once you would die, you are now left with a serious concussive injury," he said.

"The current engagement in Afghanistan is very real to us," said Col. Geoffrey Ling, an Army neurologist based at Walter Reed. "Right now, we have soldiers on the front lines getting injured. We needed this test yesterday. Our focus is on the young men and women we are sending into harm's way."

Ling said combat medics have to make life-and-death judgments with few resources to help them.

"Sometimes you have to determine who will live through the helicopter ride back (to safety)," Ling said. "At the front, we don't have a CT scanner, we don't have a neurosurgeon. But if we have a few drops of blood and can use that to determine whether someone is mildly, severely or moderately injured, that would be a huge contribution to making that decision."

The goal, Hayes said, is to develop a lightweight, portable blood-based test for such a brain injury that would be as simple as a test for blood sugar now is for diabetics. Another alternative could be a type of Breathalyzer test that would reveal markers for injury in the breath.

"When cells are injured, they break down into smaller and smaller pieces that are considerably more mobile in the body than had been previously recognized," the neuroscientist said. "They end up in some surprising places, like the blood and breath."

**Pinpointing injuries**
The test would pinpoint biochemical markers that cells release into the bloodstream after an injury. Although non-invasive, blood-based methods of diagnosis can quickly assess injuries to other organs, like the heart. But no such test is available for the brain.

Hayes and his research team hope to be testing such diagnostics in patients within two or three years.

Hayes emphasized that although the portable test could find immediate use in a combat situation, "the real beneficiaries will be the parents whose kid plays soccer and gets whacked in the head with a soccer ball.

"Right now, we don't have any rational way of knowing how injured the child is and how to manage him after that," Hayes said.

**'Brain wellness test'**
Traumatic brain injuries cost the country more than $48 billion a year, according to the National Institute of Neurological Disorders and Stroke, and between 2.5 million and 6.5 million Americans alive today have had such an injury.

Joining Hayes in the study will be Kevin K.W. Wang, an associate professor of psychiatry and neuroscience at UF, and Nancy Denslow, director of the Protein Chemistry Core Facility. The three researchers have formed Daimonion Diagnostics, a Gainesville-based company, to take the technology to the public market.

Hayes said he can foresee a time in the near future when today's baby boomers would routinely get a "brain wellness test" as part of their annual physical.

"We look forward to examining changes in brain function related to aging, so that when you go in for a physical, along with the other routine blood tests you'll have a blood test that looks at brain function. If the test shows you have precursors of age-related problems (such as Alzheimer's disease or memory loss), you could respond in a timely fashion."

He added, "This is the first grant of this kind awarded by a federal agency to study brain injury and disease. We are delighted to be in the vanguard in applying very sophisticated proteomics technology to this problem."

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