



Military drives state university's study of brain injuries

Using a grant from the Department of Defense, UF researchers are developing a blood test that would quickly diagnose brain injuries.

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GAINESVILLE - Some of the worst injuries of war aren't always obvious. It's an unfortunate lesson doctors are learning more about during the fighting in Iraq. When soldiers are targeted by a grenade or suicide bomber, brain injuries may not show. But those hidden hurts can get worse without speedy treatment. Scientists at the University of Florida are working to develop a quick, portable blood test that would help diagnose soldiers with brain injuries while they're still on the battlefield - a test that eventually could help identify people injured in everyday settings, from football fields to car crashes.

"The brain is the neglected organ in many ways," said Ronald L. Hayes, director of the Center for Traumatic Brain Injury Studies at the University of Florida's Evelyn F. and William L. McKnight Brain Institute. "You're much better off having a heart attack than a brain injury. We have vastly better diagnostics and treatment available."

Hayes and his team of researchers want to change that. The university has a \$2.2-million grant from the U.S. Department of Defense and is working with the Walter Reed Army Institute of Research to develop such a blood test.

In past wars, head injuries have caused about 25 percent of combat deaths, said Frank Tortella, chief of Walter Reed's applied neurobiology department, who is working with Florida scientists. In the current Iraq conflict, researchers say they believe the proportion of brain injuries among the wounded is even higher.

Part of the problem, Tortella said, is because soldiers' body armor has become so effective. Explosions or gunfire that once would have killed are no longer fatal - but they still cause brain-shaking blasts.

"I have no doubt this (brain-injury) problem existed in World War II, Korea, Vietnam," Tortella said. "The difference is the soldiers would have died. . . . We're sort of victims of our own success."

A rapid test could help identify soldiers with head injuries and get treatment started before brain swelling or bleeding causes more damage.

Battlefield tests also could help combat medics make the hardest decisions, researchers said.

"In a way they have a horrible job," Hayes said. "Are you worth spending effort on? Do we need to risk more lives to get you out of here?"

Or picture the medic trying to treat many wounded soldiers, Tortella said. Who should be treated or evacuated first? What if medical supplies are limited?

Both Hayes and Tortella have a personal interest. Hayes is a former Air National Guard fighter pilot and Tortella has a son serving in Iraq.

Although getting the test onto the battlefield is years away, the research has sparked interest from other scientists.

"Having these kinds of tests to use in the battlefield would be extraordinarily helpful for improving outcomes," said George Zitnay, chairman of the National Brain Injury Research Treatment and Training Foundation.

Hayes spoke to Zitnay and other neuroscientists about the research a few weeks ago, when he received the foundation's highest honor, the Lance Award. Past recipients include Dr. John Jane, who treated actor Christopher Reeve after his spinal cord injury, and Graham Teasdale, co-developer of a widely used scale to the severity of comas.

Brain injuries don't get enough public attention, despite the 1.5-million U.S. residents a year who suffer traumatic brain injuries, say Hayes and Zitnay. More than 5.3-million Americans live with brain injury disabilities - more than the 4-million Americans with Alzheimer's disease, Hayes pointed out.

A rapid test could help injured civilians as well, scientists say. Paramedics could decide which car wreck victim to airlift first. Coaches would know whether to send the football player back into the game.

And if there were ever another large-scale terrorist attack, there wouldn't be time to give hundreds of CT scans, Tortella said. But a blood test could identify brain injury victims instead.

When the brain is injured, its cells release proteins, some of which make their way into the bloodstream. If scientists could identify those proteins, a quick finger prick could show whether someone has a brain injury, what kind it is and how bad it is. Florida scientists envision combat medics using a handheld computer that tests a small blood sample to assess soldiers on the battlefield.

In lab studies, university scientists have identified about a half-dozen proteins released in rat brains after injuries, said Kevin K.W. Wang, an associate professor and director for the Center for Neuroproteomics and Biomarkers at McKnight.

Scientists identified the chemicals using powerful computer technology to map which proteins are present in samples of blood and the fluid that surrounds the brain and spinal cord.

Scientists are working with blood drawn from emergency patients to see if the same proteins show up in human patients who have brain injuries - and to make sure they're not present in people who don't.

"We would like to have a protein marker that tells us if we have cell deaths . . . or brain swelling," Wang said.

Eventually, chemical markers might be found to help diagnose other brain problems, such as stroke or substance abuse, Wang said. The scientists, along with the university, have formed a company, Banyan Biomarkers, to help produce the test.

The technology used for the test has only been available for a few years. Hayes hopes that better diagnosis will lead to the next step: better treatment.

Early treatment is especially important for brain injuries because over time, the brain can swell, blood vessels can constrict, and brain enzymes can malfunction - all compounding the damage of the first injury. "In the absence of really good diagnostics, you can't drive good treatment or therapy," Hayes said. "Without diagnostics, you're driving in the dark."