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Biomarkers Could Save Soldiers

By LORI SHULL

POTSDAM - A Clarkson University research project could someday help preserve the lives of wounded soldiers.

Evgeny Katz, a professor in the chemistry and biomolecular science department, is studying biomarkers, chemicals that the body releases that indicate health or illness, to determine what chemicals are released when the body suffers a traumatic injury. The project is being funded by the Department of Defense and will eventually be used to monitor certain chemicals in the body and administer others to keep injured soldiers alive.

"This soldier was injured in (his) brain and we can recognize it immediately," said Mr. Katz, who is originally from Israel. "The system can immediately supply some drug to protect the soldier from immediate death and keep him alive until the hospital."

The system will analyze the chemicals, and chemical reactions, found in bodily fluids to determine what kind of injury there is and what kinds of chemicals need to be administered to keep a person stable until help arrives. It then administers those chemicals automatically.

A system of electrodes analyzes levels of dozens of chemicals found in the body, like glucose, lactate and norepinephrine, a hormone. It can determine, based on levels of each of the chemicals, if a body is functioning normally or if it has been injured. It can then specify what kind of injury has been sustained and what chemicals are necessary to keep a person alive.

And it's all done without a computer or outside inputs, unlike other systems.

"Modern computers do not process chemical information," Mr. Katz said. "It is much simpler than computers, simpler to process. We don't need a computer, we don't need to watch movies, we don't need to open the Internet.

The system, once developed, can be used in a multitude of ways.

Another professor from the University of California, San Diego, is experimenting with inserting the system in the elastic waistbands of underwear. The waistbands come into close and constant contact with the skin.

However, the system itself - and the waistbands - are a long way off.

The Office of Naval Research has agreed to provide $2 million over four years for research on the project. The team of scientists are into their second year of funding, but even after the four years, the biomarker system won't be ready to enter a battlefield. There will still be years of testing and development to go.

"Even at the end of the four years, it will not be possible to put this device on a soldier and protect him from injuries," Mr. Katz said. "Between mental research and practical application, there's a very big gap."

Also not easily developed is "smart underwear," as the San Diego project is being called, the only possible application for this kind of technology. It could also be used to monitor other health problems, like cardiac diseases, according to Mr. Katz. It all depends on who is providing the funding for research.

"Smart underwear, this is just one side of our project. Smart underwear is just a technical part," he said. "The concept is much bigger and much more fundamental."