

Stanford Report, January 26, 2010

Stanford-led research team aims for rapid detection of radiation dose

Researchers think blood proteins may hold key to developing instruments for use by first-responders, labs in the event of nuclear incidents.

BY DAVID ORENSTEIN

To develop a fast, cheap and accurate technology for determining the level of radiation exposure victims might suffer in a nuclear incident, Stanford is leading a new federally funded consortium of academic, government and industry researchers. The contract provides \$4.6 million in its first year, and up to \$38 million over five years if the first year's results are sufficiently promising.

"The current 'gold standard' for assessing radiation doses requires several days of processing time," said Shan Wang, a Stanford professor of materials science and engineering and of electrical engineering, who leads the consortium. "We propose to develop two devices – one for high-throughput screening in the lab and one for handheld use at the point of incident – with an assay time of 20 to 30 minutes and at low cost."

Stanford is among the nine institutions around the country to have earned research contracts of various sizes from the Biomedical Advanced Research and Development Authority (BARDA), as it seeks to grapple with the prospect of radiation exposure. BARDA, which is part of the U.S. Department of Health and Human Services, announced the contracts on Dec. 18, 2009. Wang said the work of the consortium began almost simultaneously.

The devices the consortium hopes to produce would be able to sort through blood samples of victims on the scene swiftly, as well as in the lab, looking for concentrations of particular proteins, or "biomarkers," that reliably reflect the dose of radiation a person has received. The idea is reflected in the consortium's name: RAPID, for "Rapid and Accurate Proteomic Index Dosimetry."

The research question for the first year of RAPID is whether the radiation biomarkers provide accurate dose information. If so, the next four years would involve creating and validating prototype devices that could be used by first responders and eventually approved by the Food and Drug Administration.

Wang and his team have a track record in this area. In recent research Wang's group has made [major advances](#) in building systems that use magnetically sensitive chips and specially treated, molecule-sized magnetic "nanoparticles" to detect very low levels of protein biomarkers for cancer. He also has been working with medicine and radiology Assistant Professor Joe Wu on a radiation biomarker validation project funded by the Defense Threat Reduction Agency.

Wu will continue to work with Wang in the new consortium. Joining them as co-principal investigator is Andrew Wyrobek, a radiation biologist at Lawrence Berkeley National Laboratory.