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Tuesday, August 14, 2012

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COLLEGE OF MEDICINE RECEIVES \$1 MILLION GRANT TO RESEARCH CANCER-FIGHTING TECHNOLOGY

HERSHEY, PA—[Penn State College of Medicine](#) has been awarded a \$1 million research grant from the PA Department of Health's CURE program, earmarked for the development of a cancer treatment with commercialization potential. [Mark Kester, Ph.D.](#), G. Thomas Passananti Professor of Pharmacology and director of Penn State Center for NanoMedicine and Materials, is principal investigator working on nanotechnology to deliver cancer-fighting medications directly into cancer cells.

Nanotechnology allows researchers to deliver sub-microscopic capsules of medication directly to cancer cells. Typically, the capsules are attracted to a specific protein that the cancer cells produce, preferentially targeting tumors while leaving healthy cells untouched.

"Current cancer fighting drugs are limited by the inability of the medicine to get efficiently into the cancer cells, without affecting other normal growing cells," Kester said. "The next generation of cancer fighting agents are novel molecular-based drugs, therapies that target mutated genes, which are also severely limited by cell impermeability, toxicity, and degradation. Nanotechnology offers the promise of enhancing the ability of cancer cells to accept these molecular-based medications by targeted delivery via nontoxic, nanosized packages."

Kester, working with [James Adair, Ph.D.](#), Penn State Department of Material Sciences and Engineering, and private company Keystone Nano, has developed a NanoJacket particle which targets a gene mutation that causes overexpression of an oncogenic protein in breast cancer patients with poor outcomes. The NanoJacket delivers siRNA to the cancer cell. SiRNA is a

segment of RNA that when delivered into a cell interferes with expression of a specific mutated gene, leading to cell death.

“One aspect of personalized medicine is identifying genetic mutations in individual cancer patients, as opposed to a ‘one size fits all’ approach,” Kester said. “Nanotechnology enables the therapeutic targeting of these mutations with siRNA.”

The \$1 million grant will be used for preclinical trial work with the goal of submitting an Investigational New Drug application to the FDA to begin clinical trials. In particular, further study will be done on the best NanoJacket structure to work in the body and evaluation of medication doses. Preclinical trials in preparation of the FDA review will be conducted by Pennsylvania Contract Research Organizations.

The Pennsylvania Department of Health’s CURE grants were initiated in 2001 for clinical, health services and biomedical research.

Kester and Adair are co-founders and chief medical officer and chief scientific officer, respectively, of Keystone Nano.

[Penn State College of Medicine](#), located on the campus of [Penn State Milton S. Hershey Medical Center](#) in Hershey, Pa., boasts a portfolio of more than \$105 million in funded research. Projects range from the development of artificial organs and advanced diagnostics to groundbreaking cancer treatments and understanding the fundamental causes of disease.