

Nuclear medicine tools could be beneficial in the fight against several human cancers

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In the fight against cancer, nuclear medicine may be one of the best tools in a physician's arsenal. Silvia Jurisson, a researcher at the University of Missouri, continues to develop breakthrough nuclear materials and methods used in the detection and treatment of cancer. She and her interdisciplinary team recently received a U.S. patent for a new delivery method that uses nuclear isotopes to help target, diagnose and treat cancer. The patented method, highlighting Jurisson's more than 30 years of research work, could prove invaluable in battling prostate, pancreatic, breast and small-cell cancers in the body.

"In [nuclear medicine](#), radiotracers are isotopes that, in extremely low concentrations, can be used to image and treat cancer," said Jurisson, professor of chemistry and radiology in the College of Arts and Science and a research investigator with MU Research Reactor (MURR). "They provide the delivery vehicles necessary to get treatments into the nooks and crannies of the body where cancer cells usually hide."

Jurisson and her team used three components to create the new delivery method for the peptides and medicine needed to diagnose and treat cancer. Arsenic 72, an imaging and diagnostic isotope, or Arsenic 77, a radiotherapeutic isotope, were attached to trithiol, a stable radioisotope. Trithiol then can be combined with medicine or diagnostic molecules. When the isotope complex is injected, it effectively "seeks out" and binds with [cancer cells](#), delivering the proper medicine.

"Trithiol is shaped a bit like a claw where the 'fingers' bind with arsenic

and the peptides or antibodies linked to the trithiol carry it to the cancer cell," Jurisson said. "Our lab worked out the basic chemistry and developed a way to bind arsenic with the trithiol. The next steps are to test the peptide linked arsenic trithiol complex in mice to make sure the [delivery method](#) is sound."

The early-stage results of this research are promising. If additional studies, including in vivo studies in mice, are successful within the next several years, then working with physicians at MU will be warranted.

Jurisson's work also highlights the collaborations that are possible at the university. Working with medical and veterinary scientists at MU, as well as scientists at MURR, the team is helping to develop the next generation of nuclear doctoral and graduate students. Anthony J. DeGraffenreid, a recent doctoral graduate from MU and co-author on the patent, now is working as a postdoctoral research assistant at Brookhaven National Laboratory, Jurisson said.

The patent, "Radioisotope Trithiol Complexes," was issued on Oct. 8, 2015. The research team also included Alan Ketring, associate director of the MURR Radiopharmaceutical Research and Development Program, and Cathy Cutler, a research professor formerly with the MURR Radiopharmaceutical Research and Development Program and an adjunct professor with the MU Department of Bioengineering.

Provided by University of Missouri-Columbia

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