

# Nanoparticle-based invention moves new cancer drugs closer to clinical testing

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(Medical Xpress)—Penn State College of Medicine researchers have developed a nanoparticle to deliver a melanoma-fighting drug directly to the cancer.

Delivering [cancer drugs](#) directly to tumors is difficult. Scientists are working on new approaches to overcome the natural limitations of drugs, including loading them into nanoparticles.

"The drug is packaged into a lipid ball significantly smaller than the width of a hair to make it soluble in the blood stream and prevent negative side effects. The drug-containing nanoparticle ball then travels in the bloodstream to the tumor, where it accumulates and the drug is released in the tumor to kill the [cancer cells](#)," said Gavin Robertson, professor of pharmacology, pathology, dermatology, and surgery and director of the Penn State Hershey Melanoma Center.

In [previous research](#), Robertson discovered the cancer-fighting characteristics of leelamine, a substance derived from pine bark. But leelamine cannot be given by mouth because of poor uptake in the gastrointestinal tract or be injected intravenously because it causes damage to [red blood cells](#).

To address this issue, Robertson and his team developed a new nanoliposome that loads leelamine, called Nanolipolee-007. Nanolipolee-007 can be injected intravenously without causing damage to red blood cells. It then accumulates in tumors because of its small size

where it releases the drug to kill the cancer cells.

Leelamine is the first of a new unique class of drugs that inhibits cholesterol movement around a cancer cell to shut down signals needed for cancer cell survival. As a result, protein pathways like the PI3K, MAPK and STAT3 that are highly active and help cancer cells multiply and spread, are turned off and the cancer cells die. Since [normal cells](#) are not addicted to the high levels of activity of these pathways that occur in cancer cells, the drug has a minor effect on them.

"This nanoparticle moves leelamine one step closer to the clinic," Robertson said. "We now have a [drug](#) that has the potential to be given to humans that could not be done before."

The researchers showed the results of Nanolipolee-007 on cells growing in culture dishes and in tumors growing in mice following intravenous injection. Leelamine inhibited tumor development in mice with no detectable side effects.

Researchers report their results in the journal *Molecular Cancer Therapeutics*.

Nanolipolee-007 containing Leelamine is a first of a new class of possible drugs for the treatment of melanoma that inhibits cancer cell cholesterol transport. More research required by the Food and Drug Administration (FDA) must be completed before it can be tested in clinical trials in humans.

Penn State has patented this discovery and has licensed it to Melanovus Oncology, for the next series of FDA-required tests to enable it to be tested in humans. Melanovus Oncology is partly owned by Penn State and Robertson.

Provided by Pennsylvania State University

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