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Researchers make advancement in nanotechnology cancer treatment

A team at Purdue University built a nanodevice that transports therapeutic molecules for the prevention or treatment of diseases. When tested in living mice the nanoparticles completely blocked cancer development.

- Using RNA nanotechnology researchers say they constructed delivery vehicles that can carry anticancer therapeutic agents directly to infected cells.
- The team demonstrated the use of the nanodevices against cancer growth in mice and human cells.
- "RNA has immense promise as a therapeutic agent against cancer but, until now, we have not had an efficient system to bring multiple therapeutic agents directly into specific cancer cells where they can perform different tasks," says Peixuan Guo, PhD, professor, molecular virology, Purdue University, West Lafayette, Ind., who led the research team from Purdue, the University of Central Florida, and the University of California, Riverside.
- The nanostructures Guo and his team created are made from pRNA, a form of RNA that mimics those in a bacteria-killing virus called phi29.
- These pRNA strands can be linked to other types of RNA to form longer, hybrid strands with properties the researchers could assign.
- "We looked around for RNA strands that would behave in certain ways when they encounter a cancer cell because each of them needs to perform one step of the therapy," Guo says.
- To accomplish these tasks, the team turned to small interfering RNA (siRNA), RNA aptamers that bind to cancer cell surface markers, and ribozymes, which can be designed to degrade specific RNA in [cancer cells](#) or viruses.
- When tested in living mice that were in the process of developing cancer the team found that the [nanoparticles](#) completely blocked cancer development.
- A second group of mice tested with mutated inactive RNA all developed tumors.
- The results are very promising, Guo says, but more work needs to be done to ensure that the nanoparticles safely target cancerous cells and are stable enough to avoid degradation by enzymes in the body.

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