Targeted therapy from within

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A group of researchers at Johns Hopkins University has designed nanoparticles that can carry cancer-treating radioisotopes through the body and deliver them selectively to tumors. Today in Anaheim, CA, they will report the latest results of their research, including studies in animal models, at the 51st meeting of the American Association of Physicists in Medicine (AAPM).

The nanoparticles are made with a commercially available product known as "liposomes" -- small chemical spheres made of fatty molecules that can package drugs and other chemicals. Liposomes are a powerful emerging tool in medicine because they can be designed to carry many different drugs and manipulated to control how long they stay in the bloodstream. One type of liposome, Doxil, is already approved by the U.S. Food and Drug Administration (FDA) for delivering Doxorubicin, a chemotherapeutic that is toxic to the heart.

The Hopkins scientists are using liposomes that have been modified with antibodies, a class of immune system proteins that recognize and bind to many different microscopic targets -- bacteria, viruses, other proteins, and human cells. Some antibodies specifically bind to cancer cells, and by attaching these cancer-specific antibodies to the liposomes, the scientists have created "immunoliposomes," which will wend their way through the bloodstream and seek out tumors inside the body. When they come into contact with their target cells, they deliver their payload into the cells.

"It's a promising approach to solving the problem of how to deliver more

of a therapeutic to cancer cells," says George Sgouros, a radiology professor at Johns Hopkins who led the research.

Similar studies by other groups of researchers have already demonstrated how immunoliposomes could be packaged with tiny radioactive tracers used for imaging tumors. What Sgouros and his colleagues have done is figure out how to reproducibly package much more powerful radioisotopes, called alpha-particle emitters that have the ability to kill cancer cells without damaging nearby normal cells, and they have tested how effectively they can treat mice with a very aggressive type of metastatic breast cancer.

Early results show that they can pack a relatively large dose of radionuclides into the liposomes and substantially extend the life of treated mice.

"This treatment is much less toxic than chemotherapy because it is targeted to tumor cells rather than to all rapidly dividing cells " says Sgouros. "Nanoparticles designed to deliver these powerful isotopes have a great potential in cancer therapy, particularly for metastatic disease."

Source: American Institute of Physics