

Using magnetic nanoparticles to combat cancer

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Magnetic Nanoparticles Capture Ovarian Cancer Cells

Scientists at Georgia Tech have developed a potential new treatment against cancer that attaches magnetic nanoparticles to cancer cells, allowing them to be captured and carried out of the body. The treatment, which has been tested in the laboratory and will now be looked at in survival studies, is detailed online in the *Journal of the American Chemical Society*.

"We've been able to use magnetic nanoparticles to capture free-floating cancer cells and then take them out of the body," said John McDonald, chair of the School of Biology at Georgia Tech and chief research scientist at the Ovarian Cancer Institute. "This technology may be of special importance in the treatment of ovarian cancer where the

malignancy is typically spread by free-floating cancer cells released from the primary tumor into the abdominal cavity."

The idea came to the research team from the work of Ken Scarberry, a Ph.D. student in Tech's School of Chemistry and Biochemistry. Scarberry originally conceived of the idea as a means of extracting viruses and virally infected cells when his advisor, Chemistry professor John Zhang, had another idea. He asked if the technology could be applied to cancer. Scarberry suggested it might be an effective means of preventing cancer cells from spreading.

They began by testing the therapy on mice. After giving the cancer cells in the mice a fluorescent green tag and staining the magnetic nanoparticles red, they were able to apply a magnet and move the green cancer cells to the abdominal region.

"If the therapy is able to pass further tests that show it can prevent the cancer from spreading from the original tumor," Scarberry said, "it could be an important tool in cancer treatment."

This technology holds more promise than solely using antibodies to fight cancer because there seems to be less potential for the body to develop an immune response due to the unique peptide-targeting strategy, and the composition of the magnetic nanoparticles.

"If you modify the nanoparticle and target it directly to the tumor cells using a small peptide, you are less likely to generate an undesirable immune response and more accurately target the cells of interest," said Research Scientist Erin Dickerson.

In addition to testing magnetic nanoparticles, the research team is

collaborating with other groups at Georgia Tech to determine how peptide-directed gold nanoparticles and nanohydrogels might also be used in fighting cancer.

Source: Georgia Institute of Technology

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