Magnetic nanoparticles show promise for combating human cancer

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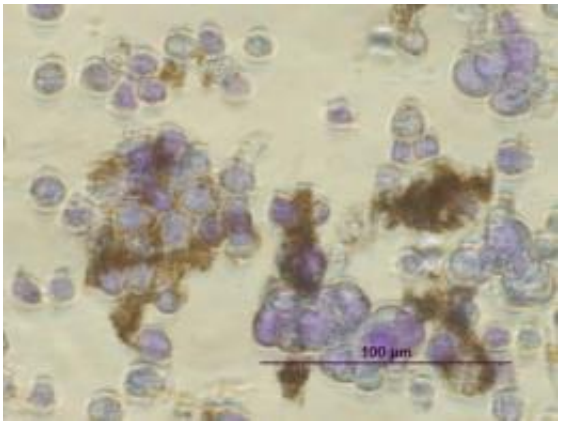

Nanoparticles, in brown, attach themselves to cancer cells, in violet, from the human abdominal cavity. Credit: Ken Scarberry/Georgia Tech

Scientists at Georgia Tech and the Ovarian Cancer Institute have further developed a potential new treatment against cancer that uses magnetic nanoparticles to attach to cancer cells, removing them from the body. The treatment, tested in mice in 2008, has now been tested using samples from human cancer patients. The results appear online in the journal *Nanomedicine*.

"We are primarily interested in developing an effective method to reduce the spread of ovarian cancer cells to other organs ," said John McDonald, professor at the the School of Biology at the Georgia Institute of Technology and chief research scientist at the Ovarian

Cancer Institute.

The idea came to the research team from the work of Ken Scarberry, then a Ph.D. student at Tech. Scarberry originally conceived of the idea as a means of extracting viruses and virally infected cells. At his advisor's suggestion Scarberry began looking at how the system could work with cancer cells.

He published his first paper on the subject in the Journal of the American Chemical Society in July 2008. In that paper he and McDonald showed that by giving the cancer cells of 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.

Now McDonald and Scarberry, currently a post-doc in McDonald's lab, has showed that the magnetic technique works with human cancer cells.

"Often, the lethality of cancers is not attributed to the original tumor but to the establishment of distant tumors by cancer cells that exfoliate from the primary tumor," said Scarberry. "Circulating tumor cells can implant at distant sites and give rise to secondary tumors. Our technique is designed to filter the peritoneal fluid or blood and remove these free floating cancer cells, which should increase longevity by preventing the continued metastatic spread of the cancer."

In tests, they showed that their technique worked as well with at capturing cancer cells from human patient samples as it did previously in mice. The next step is to test how well the technique can increase survivorship in live animal models. If that goes well, they will then test it with humans.