Gold nanoparticle prostate cancer treatment found safe in dogs, study shows

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Scientists at the University of Missouri have proven that a new form of prostate cancer treatment that uses radioactive gold nanoparticles, and was developed at MU, is safe to use in dogs.

Currently, large doses of chemotherapy are required when treating certain forms of cancer, resulting in toxic side effects. The chemicals enter the body and work to destroy or shrink the tumor, but also harm vital organs and drastically affect bodily functions. Now, scientists at the University of Missouri have proven that a new form of prostate cancer treatment that uses radioactive gold nanoparticles, and was developed at MU, is safe to use in dogs. Sandra Axiak-Bechtel, an assistant professor in oncology at the MU College of Veterinary Medicine, says that this is a big step for gold nanoparticle research.

"Proving that gold nanoparticles are safe to use in the treatment of prostate cancer in dogs is a big step toward gaining approval for clinical trials in men," Axiak-Bechtel said. "Dogs develop prostate cancer naturally in a very similar way as humans, so the gold nanoparticle treatment has a great chance to translate well to human patients."

For their treatment, Kattesh Katti, a curators' professor of radiology and physics in the School of Medicine and the College of Arts and Science, and other MU scientists, have found a more efficient way of targeting prostate tumors by using radioactive gold nanoparticles. This new treatment would require doses that are thousands of times smaller than chemotherapy and do not travel through the body inflicting damage to

healthy areas.

"We found remarkable results in mice, which showed a significant reduction in tumor volume through single injections of the radioactive gold nanoparticles," said Katti. "These findings have formed a solid foundation, and we hope to translate the utility of this novel nanomedicine therapy to treating human cancer patients."

Current treatments for prostate cancer are not effective in patients who have aggressive prostate cancer tumors. Most of the time, prostate cancers are slow-growing; the disease remains localized and it is easily managed. However, aggressive forms of the disease spread to other parts of the body, and is the second-leading cause of cancer deaths in U.S. men. The MU scientists believe their treatment will be able to shrink aggressive tumors or eliminate them completely. Axiak-Bechtel says this treatment can be safe and effective in dogs as well as humans because dogs are the only other mammal to naturally contract the aggressive form of prostate cancer.

"Being able to test the gold nanoparticle treatment on dogs is very helpful, because dogs develop these tumors naturally," Axiak-Bechtel said. "Because dogs can't tell us how they feel, many times they are diagnosed with the disease too late, but this treatment gives us some hope that we can still combat aggressive tumors."

Axiak-Bechtel and Katti, who is also a senior research scientist at the MU Research Reactor, have been working with colleagues in the Department of Radiology and Cathy Cutler at the MU Research Reactor, to develop the gold nanoparticle treatment. This research was presented at the 2012 World Veterinary Cancer Conference in Paris.

This study is a result of collaboration through the One Health, One Medicine area of Mizzou Advantage. Mizzou Advantage is a program

that focuses on four areas of strength: food for the future, media of the future, one health, one medicine, and sustainable energy. The goals of Mizzou Advantage are to strengthen existing faculty networks, create new networks and propel Mizzou's research, instruction and other activities to the next level.

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