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*****New use of dye helps MRI locate tiny tumors

DALLAS -- Scientists at The University of Texas Health Science Center at Dallas have devised a new strategy for locating and monitoring hidden tumors. The strategy, which was recently reported at the annual meeting of the Federation of American Societies for Experimental Biology, can locate internal tumors when their mass is about the size of a pinhead -- 100 times smaller than those detected by current techniques. It may allow surgeons to detect and remove small tumors before they can do any harm. It also may allow physicians to observe the effectiveness of tumor-killing drugs inside the patient.

The method improves upon existing technology for generating high-quality images of the internal organs, said the leader of the research team, Dr. David Ranney, director of the Laboratory of Targeted Diagnosis and Therapy in the Department of Pathology. Known as magnetic resonance imaging, or MRI, the technique uses magnetic impulses and radio frequency waves to generate high quality images of internal organs.

By injecting laboratory animals with a special dye, Ranney and his co-workers, including Drs. Peter Antich, Padmakar Kulkarni, William Erdman, Jesse Cohen and Jeffrey Weinreb, have been able to improve the effectiveness of MRI at locating tumors hidden in the body and at observing the action of anti-cancer drugs on tumors. The dye is a magnetic polymer, which is readily detectable by the MRI scanner and remains in the bloodstream except around tumors, Ranney explained.

Tumors, he added, have leaky, porous blood vessels. Therefore, when the dye reaches the tumor, it leaks through the blood vessels and is readily detected by the scanner. By using the dye, known as Gd-DTPA-dextran, the researchers can identify tumor structures that are only half a millimeter in diameter. This new tumor-imaging dye allows physicians to see quickly if a drug is killing all or only part of a tumor.

When tumor tissue dies, Ranney explained, its blood vessels become even more porous, ooze more dye and appear even brighter in the scanner. Furthermore, physicians can evaluate if tumors have responded to treatment as early as one and a half days after the drug is administered. This gives valuable time to plan alternate strategies in case a drug or combination of drugs is ineffective. With current imaging techniques, physicians must wait two to three weeks.

Ranney added that the new technique may also help physicians to diagnose problems of the heart, lungs and blood because the dye remains in the bloodstream for nearly an hour.

Gd-DTPA-dextran is a non-toxic dye and rapidly clears from the body. If current testing goes well, Gd-DTPA-dextran could be approved for use in hospitals within three years, said Ranney.

(More)

"Our report is the first to document that an MRI contrast agent can be used to monitor tumor responses to drugs," Ranney said. "Indeed, it is the only method at present that can quantify acute drug and radiation effects on tumors in the body at submillimeter resolution. It has the potential to contribute to earlier detection and improved clinical management of human breast, lung, colon and prostate cancers, as well as other solid tumors which metastasize to liver, lung and brain and thereby lead to increased survival rates for cancer patients."

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NOTE: The University of Texas Health Science Center at Dallas comprises Southwestern Medical School, Southwestern Graduate School of Biomedical Sciences and the School of Allied Health Sciences.