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Imaging agents offer new view of inflammation, cancer

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A series of novel imaging agents could make it possible to “see” tumors in their earliest stages, before they turn deadly. The compounds, derived from inhibitors of the enzyme cyclooxygenase-2 (COX-2) and detectable by positron emission tomography (PET) imaging, may have broad [applications](#) for cancer detection, diagnosis and treatment. Vanderbilt [University](#) investigators describe the new imaging agents in a paper featured on the cover of the October issue of [Cancer Prevention](#)

Research . “This is the first COX-2-targeted PET imaging agent validated for use in animal models of [inflammation](#) and cancer,” said Lawrence Marnett, Ph. D.

, director of the Vanderbilt Institute of Chemical Biology and leader of the team that developed the compounds. COX-2 is an attractive target for molecular imaging. It’s not found in most normal tissues, and then it is “turned on” in inflammatory lesions and tumors, Marnett explained. “As a tumor grows and becomes increasingly malignant, COX-2 levels go up,” Marnett said. To develop compounds that target COX-2 and can be detected by PET imaging, Jashim Uddin, Ph.

D. , research assistant professor of Biochemistry, started with the “core” chemical structures of the anti-inflammatory [medicines](#) indomethacin and [celecoxib](#) and modified them to add the [element](#) fluorine in various chemical configurations. After demonstrating that the fluorinated compounds were selective inhibitors of COX-2, the investigators incorporated radioactive fluorine (18-F) into the most promising compound. Intravenous injection of this 18-F compound into animal models provided sufficient signal for PET imaging. The researchers demonstrated the potential of this 18-F compound for in vivo PET imaging in two animal models: irritant-induced inflammation in the rat footpad and human tumors grafted into mice.

They showed that the 18-F compound accumulated in the inflamed foot, but not the non-inflamed foot, and that pre-treatment of the animals with celecoxib blocked the signal. In mice bearing both COX-2-positive and COX-2-negative human tumors, the 18-F compound accumulated only in the COX-2-positive tumor. The studies support further development of these agents as probes for early detection [of cancer](#) and for evaluation of the COX-2 status of pre-malignant and [malignant tumors](#). “Because COX-2 levels increase during cancer progression in virtually all solid tumors, we think these imaging tools will have many, many different applications,” Marnett said. Provided by Vanderbilt University [Medical](#) Center (news : web) View original post here:

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