

World first -- Localized delivery of an anti-cancer drug by remote-controlled microcarriers

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Soon, drug delivery that precisely targets [cancerous cells](#) without exposing the healthy surrounding tissue to the medication's toxic effects will no longer be an oncologist's dream but a medical reality, thanks to the work of Professor Sylvain Martel, Director of the Nanorobotics Laboratory at Polytechnique Montreal.

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Microcarriers on a mission

The therapeutic magnetic microcarriers (TMMCs) were developed by Pierre Pouponneau, a PhD candidate under the joint direction of Professors Jean-Christophe Leroux and Martel. These tiny [drug-delivery](#) agents, made from [biodegradable polymer](#) and measuring 50 micrometers in diameter — just under the breadth of a hair — encapsulate a dose of a therapeutic agent (in this case, doxorubicin) as well as magnetic nanoparticles. Essentially tiny magnets, the nanoparticles are what allow the upgraded MRI system to guide the microcarriers through the blood vessels to the targeted organ. During the experiments, the TMMCs injected into the bloodstream were guided through the hepatic artery to the targeted part of the liver where the drug was progressively released. The results of these in-vivo experiments have recently been published in the prestigious journal *Biomaterials* and the patent describing this technology has just been issued in the United States.

More information: Pouponneau, P., Leroux, J.-C., Soulez, G., Gaboury, L. and Martel, S. (2011). Co-encapsulation of magnetic nanoparticles and doxorubicin into biodegradable microcarriers for deep tissue targeting by vascular MRI navigation. *Biomaterials*. Volume 32, Issue 13, May 2011, Pages 3481-3486.

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