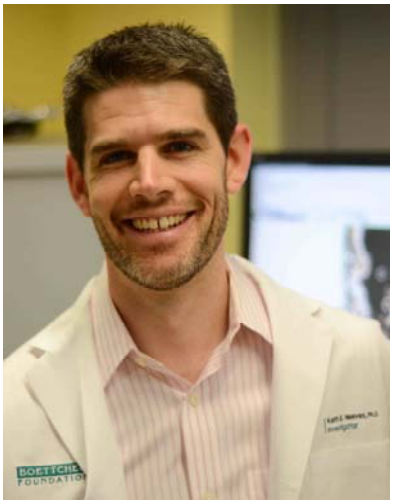
CBR

The Centre for Blood Research Seminar Series

Wednesday, November 30, 2016
LSC 3 | 12:00 - 1:00PM



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"Reinventing the Wheel: Magnetically propelled microwheels for rapid fibrinolysis"

Ischemic strokes can be treated with either chemical or mechanical means, each with advantages and disadvantages. Tissue plasminogen activator (tPA), the only FDA approved fibrinolytic, is effective at dissolving some types of thrombotic clots, but can lead to bleeding and neuronal death and must be used within hours after symptoms first occur. Catheter-based mechanical methods can restore blood flow quickly but are invasive and can leave residual prothrombotic material on vessel walls, increasing risk for secondary stroke. In the case of small vessel stroke, which accounts for 20% of ischemic strokes, tPA is often ineffective because it can take a prohibitively long time to diffuse to the clot, and catheters cannot access small vessels. To address these drawbacks, we propose a targeted delivery approach performed through an injectable colloidal solution controlled by an external magnetic field. This non-invasive approach combines pharmacological and mechanical methods for clot removal. Here, individual particles in solution are injected into the blood and, upon application of a magnetic field, self-assemble into small microdevices capable of targeting fibrinolytic agents and mechanically attacking a clot in the absence of catheters. As both microdevice assembly and driving forces are provided by the external field, once the procedure is finished, devices "self- disassemble" into small building blocks removable by the body via phagocytosis.

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