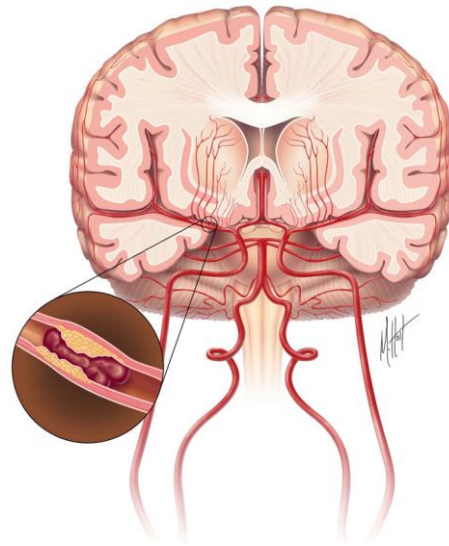


Microspheres through the clot: modelling thrombus permeability using an experimental phantom

Introduction

An acute ischemic stroke (AIS) is caused by a severe restriction of the blood supply to the brain due to the occlusion of a vessel by a thrombus. The occluding thrombus is commonly formed by a fibrin fibre network trapping red blood cells (RBC), platelets and other blood constituents. Occluding thrombi vary in composition, age, and morphology, which results in a wide spectrum of thrombus characteristics that may affect treatment outcome. Thrombus permeability is an important thrombus characteristic that determines the remaining blood flow through the thrombus. The quantification of thrombus permeability is challenging since it cannot be directly measured in patients nor derived from radiological imaging data.



We would like to study thrombus permeability by characterizing how the blood travels through the thrombus on an experimental phantom. We hypothesize that blood travels through the gaps between adjacent fibrin filaments and trapped particles, which may form an interconnected open structure, similar to channels along the thrombus.

Goal

The goal of this project is to study thrombus permeability on an experimental phantom. You will build an experimental phantom representing an occluded artery. You will perform experiments to characterize blood flow through the thrombus using fluorescent microspheres that simulate RBCs.

Tasks

- Research literature of thrombus permeability and ischemic stroke
- Build an experimental phantom
- Work in the lab and perform experiments with microspheres
- Write a scientific report



Figure: fluorescent microspheres

Duration and eligible curricula

This project is available for a (Bachelor or) Master's student in biomedical sciences, medicine or alike. Minimum project duration is four months; upon acceptance we will propose a detailed plan based on your background, available time and interests.

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