

PhD position in Medical and Physical Acoustics – 3 years

Experimental investigation on ultrasound treatment of stenosis

PHD OBJECTIVES

This research work focusses on the characterization of the change in a stenotic flow by applying high intensity ultrasound, in order to investigate possible treatment of stenosis by ultrasound. Velocity field measurements will be performed in a stenosis vessel model and analyzed in terms of mixing and wall shear stress, which are linked to stenosis formation or remodeling. Applying an ultrasound field in the vessel can generate streaming and cavitation which highly modify both mixing and wall stress. In complement, ex-vivo ultrasound shots on stenotic tissue can also be implemented. The goal of this research is to define ultrasound strategies for ultrasound treatment of stenosis, in collaboration with surgeons.

SCIENTIFIC CONTEXT

The local narrowing in a blood vessel (= vessel stenosis) is a major and very frequent cardiovascular problem, which often requires pharmacological or surgical treatment. As an alternative or complement to these treatments, high intensity ultrasound might be an interesting tool.

LOCAL CONTEXT

This research is in collaboration between two laboratories:

- **Lab of Therapeutic Applications of Ultrasound (LabTAU, Inserm U1032, Lyon)**, working on new ultrasound therapy treatment or apparatus. In particular, LabTAU investigates extracorporeal treatments of cardiovascular diseases, blood clot lysis by ultrasound cavitation and characterization of pulse flow in stenotic vessels. (Researchers involved in the project: B. Gilles, C. Inserra, JC Béra)

- **Lab of Fluid Mechanics and Acoustics (LMFA, CNRS UMR5509, Lyon)**, comprising an acoustic team specialized in measurements of acoustic flow. LMFA collaborates with surgeons on modelling of iliac endofibrosis (researcher involved in the project: T. Castelain, X. Escriva, P. Feugier)

FUNDING: 3 years, by Centre Lyonnais d'Acoustique (Lyon).

PROFILE

Master in Acoustics or Fluid Mechanics.

Motivation for experimental research - Skills in Acoustics and Fluid Mechanics - Interest for medical research or medical applications.

CONTACT: Jean-Christophe.bera@inserm.fr