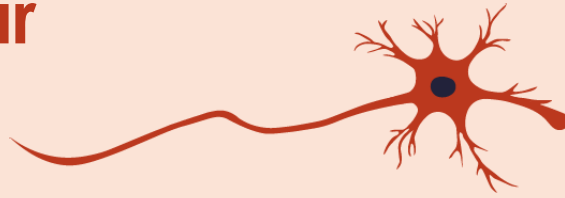


Seminar

iBrainN

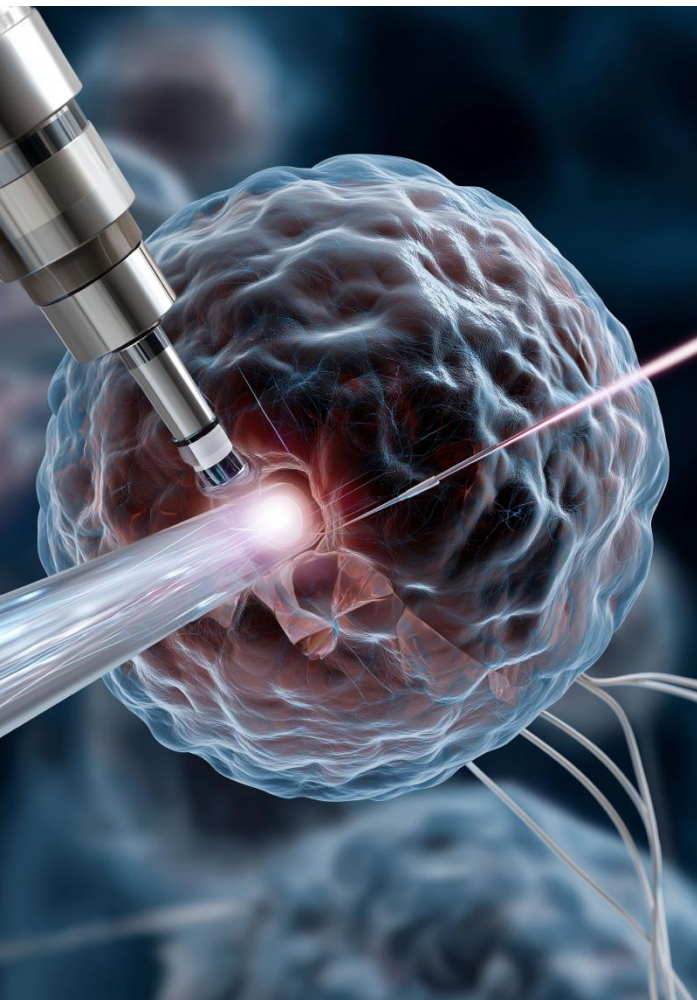


Monday, November 10th

11:00-12:00

Conference Room 1 – Faculty of Medicine

Ultrasound-mediated modulation and interrogation of tissue elasticity (and more)



Maxime LAFOND

CRCN Inserm

LabTau - Inserm, Université de Lyon 1

CLCC Léon Bérard, Lyon

Recent advances in therapeutic ultrasound have highlighted *histotripsy*—the mechanical fractionation of biological tissues—as a powerful technique. In cancer therapy, histotripsy rapidly liquefies tissue, enabling tumor debulking and stimulating immune responses. However, this complete tissue destruction also eliminates important biological functions, such as the growth-limiting role of the stroma in pancreatic cancer, and removes critical contextual cues from the tumor microenvironment (TME) that guide immune activity. In non-cancer applications, preserving tissue function is often preferable. We therefore introduce the concept of *histomalaxis*—partial tissue softening—achieved through controlled cavitation. This intermediate level of tissue alteration is proposed to enhance immune activation and increase permeability, while maintaining a physiologically relevant TME. In the first part of the talk, I will present two applications of cavitation-induced histomalaxis: pancreatic cancer treatment and presbyopia management. In the second part, I will describe three strategies for quantifying tissue softening by monitoring cavitation activity in situ: (1) analysis of bubble-induced shear waves, (2) characterization of chaotic interactions between imaging pulses and the cavitation cloud, and (3) extraction of features from the scattered cavitation signal. Finally, I will briefly step beyond cavitation to introduce a complementary method for monitoring tissue physiology: ultrasound-addressed functionalized implants.

Contact :

jean-michel.escoffre@inserm.fr