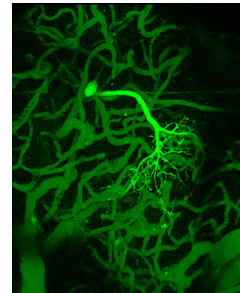




3 Postdoctoral Positions are available in the team of Serge Charpak, at the Vision Institute, Paris France

Our team aims at understanding how interactions between neurons, astrocytes and mural vascular cells (pericytes and smooth muscle cells) contribute to the vascular signals used in human functional imaging. This imposes to work at microscopic and mesoscopic spatial scales and to understand deeply the relationship between the activity of a given neuronal network and the nature of the imaging signal used to report its activation.



Using cellular and vascular microscopic approaches (electrophysiology, 2P or 3P fluorescence microscopy), we study sensory responses to natural stimulations in the CNS, and we correlate these responses with metabolic (oxygenation, 2P phosphorescence lifetime imaging) and macroscopic vascular responses measured with fUS imaging and BOLD MRI. These data can be used to predict macroscopic vascular signals by computing transfer functions in the normal and pathological brain.

Using these approaches, we are looking for 3 postdocs:

Position 1: The postdoc will investigate the contribution of cellular, vascular and metabolic dysfunctions in the hippocampus (3P microscopy) of a mouse model of Alzheimer Disease. The work will be done in collaboration with Gilles Bonvento (CEA, Fontenay-aux-Roses) who recently demonstrated that glycolysis is impaired in astrocytes of 3xTg-AD mice, at the early stages of disease (Le Douce et al. Cell Metab. 2020). The position is funded for 24 months by the FRM and the Fondation Plan Alzheimer.

Position 2: fUS is used to image brain activity. However, the extent to which the fUS signal quantitatively reports local brain activation is unknown. The postdoc will investigate (2P microscopy), within a single voxel, the cellular and hemodynamic signals underlying the fUS signal. He will compute the transfer functions linking the micro-and mesoscopic signals, both in control mice and in CADASIL mice, a model of small vessel disease (In collaboration with Anne Joutel (IPNP, Paris). The position is funded for 36 months by the ANR (AAPG 20).

Position 3: Brain oxygenation is altered in several brain pathologies. The postdoc will use 2P phosphorescence lifetime microscopy to investigate O₂ steady state values, gradients across the vessels walls, as well as the mean O₂ extraction per unit of capillary length i) in the neocortex grey matter and ii) in the corpus callosum. The compromise of neurovascular coupling, and its consequences on O₂ delivery, will be explored following sensory stimulation. The position is funded for 24 months by the Leducq Fondation.

-The positions are available now. Salaries will depend on the postdoc experience and qualification.

-PhD or MD/PhD with a background in neuroscience, optics or fUS are welcome.

-The CV, a cover letter and the contact information of references should be sent to: serge.charpak@inserm.fr