

NEUROSPIN

Institutions

Neurospin belongs to the biomedical imaging institute of the French Atomic Commission (CEA). It is located within the new Paris-Saclay University. Neurospin is an ultra-high field MRI research facility opened since 2007. It is dedicated to molecular imaging and translational research in neurosciences with a strong emphasis on clinical and cognitive neurosciences. The aim of NeuroSpin is to push forward the current limits of MRI to study the central nervous system, from animals to humans.

Principal Investigators



Alexandre
Vignaud
PhD



Cyril
Poupon
PhD



Michel
Bottlaender
MD, PhD

7T equipment

Hardware

Whole body MR (Siemens Healthineers) research only passively shielded magnet. AC84 head gradient set (upgrade to AS72 pending), Nova Medical 1Tx/32Rx head coil. Parallel transmission capabilities in Step 2.3 version and home-made 8Tx/22Rx head coil.

Other MR equipment: clinical 3T MRI (Siemens Prisma fit) / clinical 1.7T MRI (CEA-Siemens, to be installed in 2017) / preclinical Bruker 7T, 11.7T & 17.2T MRI

7T Methods (as relevant for EUFIND)

Acquisition

- High resolution EPI (sub millimeter fMRI and DMR)
- Task-fMRI
- QSM
- TOF Imaging
- Distortion correction for EPI (point spread function mapping)
- Prospective motion correction (ultra-high resolution anatomy, angiography)**
- MR-safety (DNA lesions, implants)

Analysis

- Development of brain segmentation protocols**
- Automated brain segmentation of MTL structures
- High-resolution functional parcellation of MTL
- fMRI hyperalignment
- Decoding of representations
- High precision co-registration for layer-specific fMRI
- Connectomics and diffusion-based**
- microstructure mapping using DMR
- High resolution visualization of small vessels (i.e. hippocampal vascular supply patterns)
- QSM-based vascular plasticity

Research in neurodegeneration

Clinical and basic research topics

- Longitudinal annual 3T and 7T on healthy elderly
- Multimodal imaging, MR and PET, on AD and other dementia
- Multimodal imaging, MR and PET, on MS
- Functional imaging of cognitive circuits
- Imaging pathology (i.e. iron deposition)

Cohorts

- Healthy elderly controls
- AD, FTD, and other dementia
- vascular dementia (CADASIL)
- Multiple Sclerosis

Ethics Procedures

Approval for healthy volunteers (from age 18). Can be amended to include new sequences or inclusion/exclusion criteria.