

National 7T facility, Copenhagen, Denmark

Institutions

The national 7T facility is located at the Danish Research Centre for Magnetic Resonance (DRCMR) at Copenhagen University Hospital Hvidovre. The centre has a strong focus on neuro imaging and stimulation and a particular clinical interest in parkinsonism. The imaging efforts are closely linked to the clinical research at the Department of Neurology, Copenhagen University Hospital Bispebjerg. The 7T system at DRCMR is the only human 7T system in Denmark and it serves as a methodological and clinical research instrument for all institutions across Denmark.

7T equipment

Hardware Whole body MR (Philips)-research only (32ch head coil, parallel transmission 2/8ch)

Operational since 2016

Other equipment (human imaging): *3T MR (Philips Achieva Tx) / 3T MR (Siemens Verio) / 3T MR (Siemens Prisma) / 1.5T MR (Siemens Avanto) / 1.5T MR (Siemens Espree) * = research only; (animal equipment) Bruker Biospec 70120 7T

7T Methods (as relevant for EUFIND)

Acquisition

- Highresolution EPI / fMRI
- Highresolution structural MRI
- Quantitative Imaging, T1, T2, PD, QSM etc.
- Multimodal studies including EEG, TMS and tDCS
- Angiographic imaging and vessel wall imaging
- Arterial Spin Labeling Perfusion
- Advanced Diffusion Imaging
- Spectroscopy (SVS, editing, MRSI)
- Multi Nuclear Spectroscopy
- Diffusion Weighted Spectroscopy

Research in neurodegeneration

Clinical and basic research topics

- Multi-center studies in preclinical and manifest PD, PDD; atypical PD (MSA, PSP, CBD), ALS, Lewy body.
- Bispebjerg hospital treat about 1600 PD and 250 atypical parkinsonism patients and research in use advanced methods such as deep brain stimulation and apomorphine and carbidopa/levodopa pumps
- Intervention studies on structural and functional plasticity using TMS and EEG and MR as readout
- Functional imaging of cognitive circuits
- Imaging pathology (iron, volume and function)

Ethics Procedures

Approval is done on a project by project basis. Approval for local studies involving Parkinson's patients and healthy controls are under preparation.

Principal Investigators



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Head of DRCMR



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7T Group Leader



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Analysis

- Dedicated *ReaderCenter* for large scale studies
- Automated brain segmentation
- Automated co-registration
- fMRI / rsfMRI / decoding of representations
- DTI tractography and mapping of brain connectivity
- Identify pattern changes in the brain's connectome
- Biophysical interpretation of spectroscopy data
- Multimodal analysis and interpretation

Cohorts

- Life span imaging: Healthy young and older controls (e.g. HUBU, UFEMABS and USA studies)
- Multiple Sclerosis
- Movement disorders (PD, PDD, atypical PD)
- Women with Migraine with Aura Neuroimaging (WOMAN study)