

## Erlangen

### Institutions

At the University Hospital Erlangen (UKE), a 7 Tesla MRI research system ready for future clinical use ("Magnetom Terra") was installed. The system will be operated in close collaboration by Siemens Healthcare and the UKER.

### Principal Investigators



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### 7T equipment

Hardware Whole body MR Magnetom Terra (Siemens)- research only (32ch head coil, 28 channel knee coil, parallel transmission)

Operational since 2016

Other equipment (human imaging): 1.5 T and 3T MRI (clinical use and research), 7 T ClinScan MRI (small animal)

### 7T Methods (as relevant for EUFIND)

#### Acquisition

- High resolution morphology
- High resolution diffusion tensor imaging
- QSM, SWI
- High resolution TOF imaging
- CEST MRI
- MRS, X-nuclei MRI (planned)
- O<sub>2</sub> metabolism (planned)
- Perfusion imaging (planned)

#### Analysis

- TBSS, fibre tracking and mapping of diffusion coefficients (FA, MD, RD), neuronal connectivity and plasticity, development of automated segmentation protocols
- Iterative image reconstruction for <sup>23</sup>Na-MRI
- Olea SPHERE and nordic ICE for PWI and DCE including leakage correction, Bayesian deconvolution and Mapping of K<sup>tr</sup>
- MATLAB for VBM (epilepsia, dementia)

### Research in neurodegeneration

#### Clinical and basic research topics

- DTI analysis of the visual system in (PEX-)glaucoma
- Perfusion imaging (ASL, PWI, DCE, PET) in minor cognitive impairment and Alzheimer's disease
- Multimodal imaging in Parkinson's and Alzheimer's disease and hereditary spastic paraplegia (SPG4) correlated to genetics
- High resolution imaging of iron deposition in Parkinson's disease and multiple sclerosis
- DTI analysis of neuronal connectivity and plasticity after intracerebral hemorrhage/stroke
- <sup>23</sup>Na-MRI and myelin water imaging in multiple sclerosis and epilepsy
- O<sub>2</sub> metabolic imaging (gliomas, neurodegenerative diseases)

#### Cohorts

- Healthy young and older (age-matched) controls
- Glaucoma (NTG, POAG, PEX)
- Minor cognitive impairment and Alzheimer's disease
- Parkinson's disease
- Multiple sclerosis
- Epilepsy
- Hereditary spastic paraplegia (SPG4)
- Intracerebral hemorrhage/Stroke
- Primary and secondary brain tumors

### Ethics Procedures

Approval for volunteers and patients in place (age > 18). Can be amended to include new sequences or incl/excl. criteria.