

University Medical Center Utrecht, The Netherlands

Institutions

7T MRI in the University Medical Center Utrecht is part of the Center for Image Sciences (CIS) that provides clinical and preclinical imaging technology for research, patient care and image guided therapy. Brain research is performed in the Brain Center Rudolf Magnus, which has the following research themes: Stroke, Epilepsy, Neuromuscular disorders, Psychotic disorders and Developmental disorders.

7T equipment Passively shielded whole body 7T MRI (Philips) - research and limited clinical availability (32ch head coil, 2 to 8ch parallel transmission, 3^d order static shimming, various transmit-receive solutions outside brain), operational since 2007

Other equipment 13 MRI systems (Philips) for diagnosis, therapy planning and research (ranging from 0.5 to 7.0T); MRI-guided high intensity focused ultrasound therapy (HIFU); MRI-guided radiotherapy (3 integrated MR-linear accelerator platforms); State of the art clinical CT, PET-CT, SPECT-CT and 3D-ultrasound platforms; Preclinical Image platforms (small bore MRI, 4.7 and 9.4T (Varian)).

7T Methods (as relevant for EUFIND)

Acquisition

- 3D isotropic high res. morphology (T1, T2, FLAIR)
- TOF and SWI
- Intracranial vessel wall imaging
- Velocity pulsation measurements in perforating arteries (basal ganglia and white matter)
- CO2 reactivity measurements (Respiract System)
- High res. laminar functional and structural imaging
- SAR modeling for newly built coils

Research in neurodegeneration

Clinical and basic research topics

- Clinical and pre-clinical research on stroke
- Imaging pathology (i.e. micro infarcts, etc) in relation with cognition and (vascular) risk factors
- Cerebral small vessel disease

Ethics Procedures

Approval for volunteers in place (age 18 and older). Patients require additional ethics.

Principal Investigators involved in EUFIND-7T



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Analysis

- Development of brain segmentation methods
- Microbleed detection (semi-automated)
- Microinfarct detection
- Pipeline for combined functional and structural laminar analysis
- Automated functional assessment (velocity, pulsation) of perforating arteries, including CO2 induced reactivity
- Vein segmentation, tracking and tortuosity assessment
- Advanced analysis diffusion data
- Resting state fMRI analysis

Cohorts

- Healthy young and older controls
- Subjective memory complainers
- Preclinical AD and MCI
- AD, FTD, ALS, epilepsy
- Vascular dementia, small vessel disease
- Diabetics