

Portable ultra-low field MRI correspondence to high field MRI and feasibility in real-word London Memory Services

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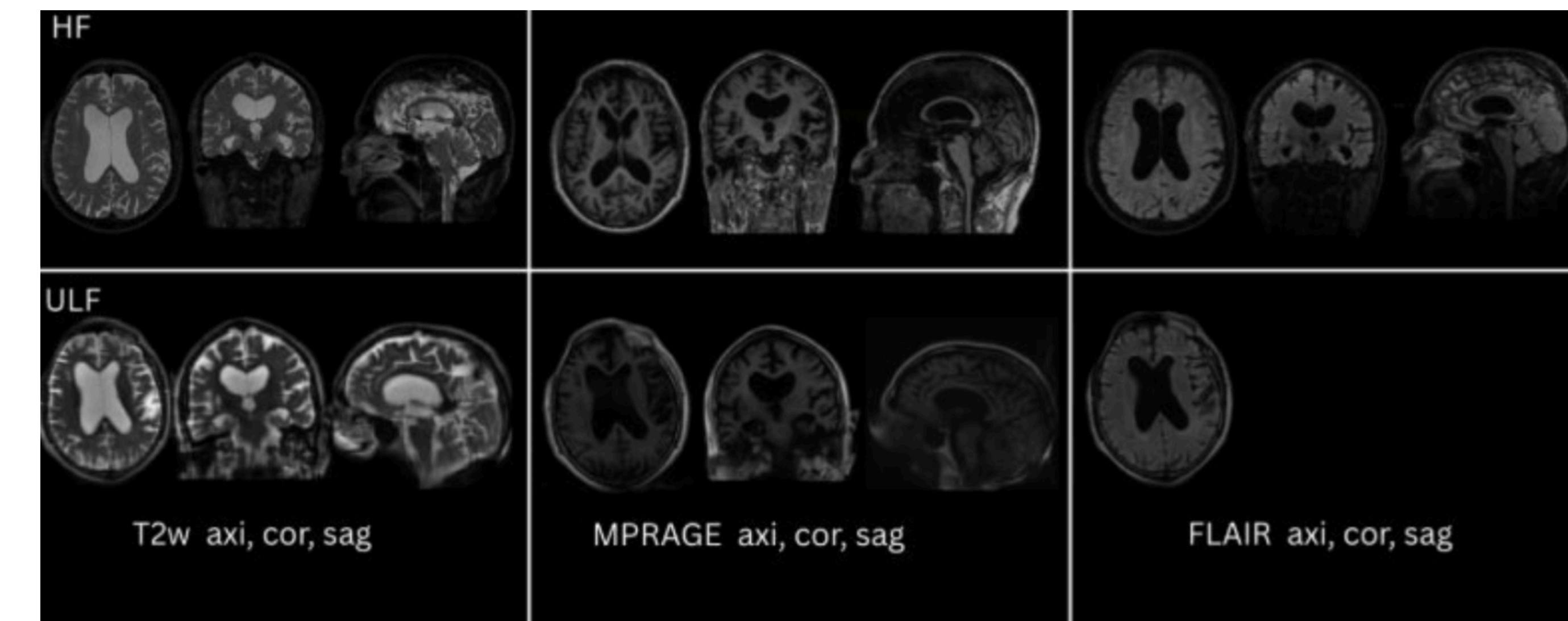
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Introduction and Motivation

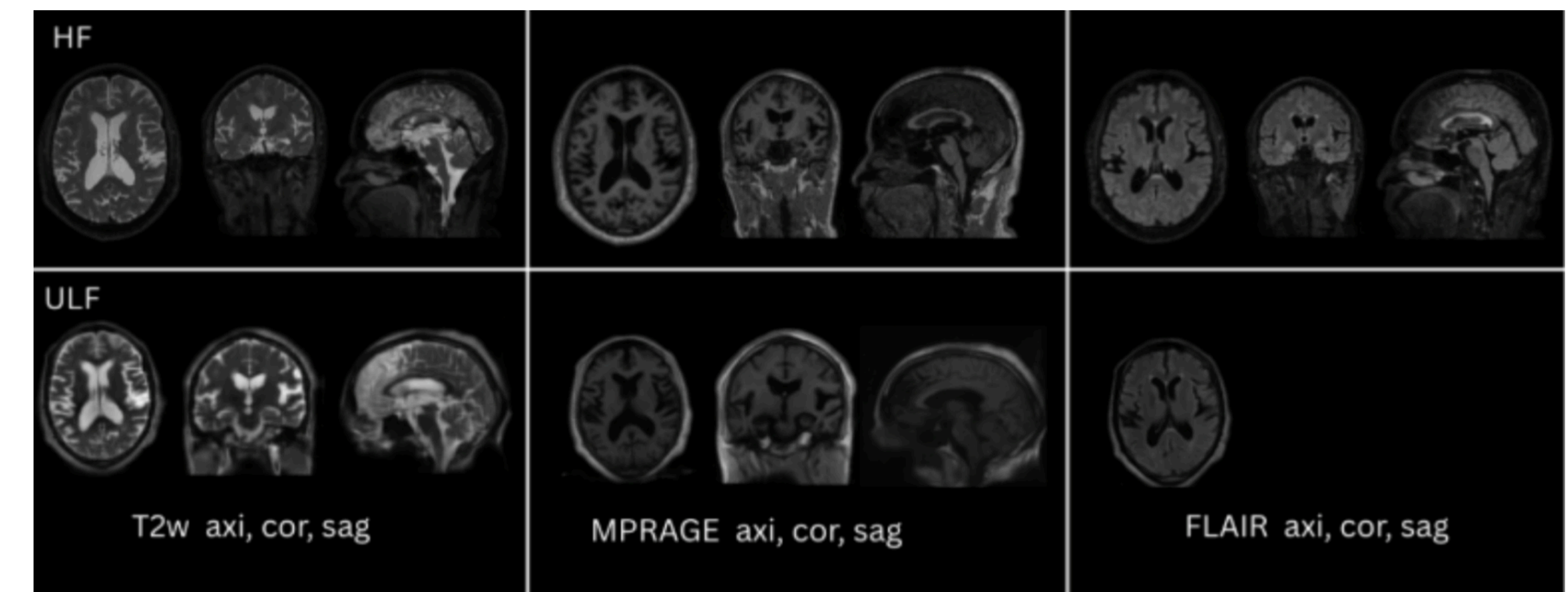
Magnetic Resonance Imaging (MRI) is key to assess regional vulnerability to neurodegeneration and inform about dementia subtypes and exclude confounding intracranial pathology.¹ However, accessibility to MRI is limited, leading to the development of ultra-low field (ULF) portable MRI. This study investigates the correspondence of brain scans acquired from **64mT ULF MRI** (Hyperfine Swoop®) and **matched** conventional high field (HF) **3T MRI scans**, in a diverse and representative sample recruited from South London and Maudsley (SLaM) NHS Trust **Memory Services**.

SLaM Memory services sample

Sample	N = 47	Post-scan diagnosis, n(%)
Age, mean (SD), (range)	72.7 (8.1), (60-88)	
Sex, n (%)		
Female	30 (63.8%)	Pending or no diagnosis 13 (27.7%)
Male	17 (36.2%)	Mild Cognitive Impairment 12 (25.5%)
Ethnicity, n (%)		Dementia in Alzheimer's Disease 8 (19.1%)
White or any white background	26 (55.3%)	Other (psychiatric) 6 (12.8%)
Black or any black background including Caribbean	17 (36.2%)	Mixed Dementia 5 (10.6%)
Asian or any Asian background	1 (2.1%)	Vascular Dementia 1 (2.1%)
Other	3 (6.4%)	Frontotemporal Dementia 1 (2.1%)



MTA score 4- 82M, White British background, ICD10 post-scan: F00.1 Dementia in AD with late on-set. HF (top) - ULF (bottom).



MTA score 1- 76M, Black British background, Age-related changes. HF (top) - ULF (bottom).

Conclusions and Key findings

- Very high HF-ULF correlations (**r=0.960-1**) when aggregating GMC, GMS, white matter and CSF; more variable **CCC (0.37-0.82)**.
- High regional correspondance **r: median = 0.908, IQR = [0.770]** **CCC: median = 0.694, IQR = [0.195]** between HF and ULF.
- The results support the possibility of implementing ULF-MRI in standard clinical care for dementia.
- Our sample’s demographic and diagnostic diversity favours generalisability of results.

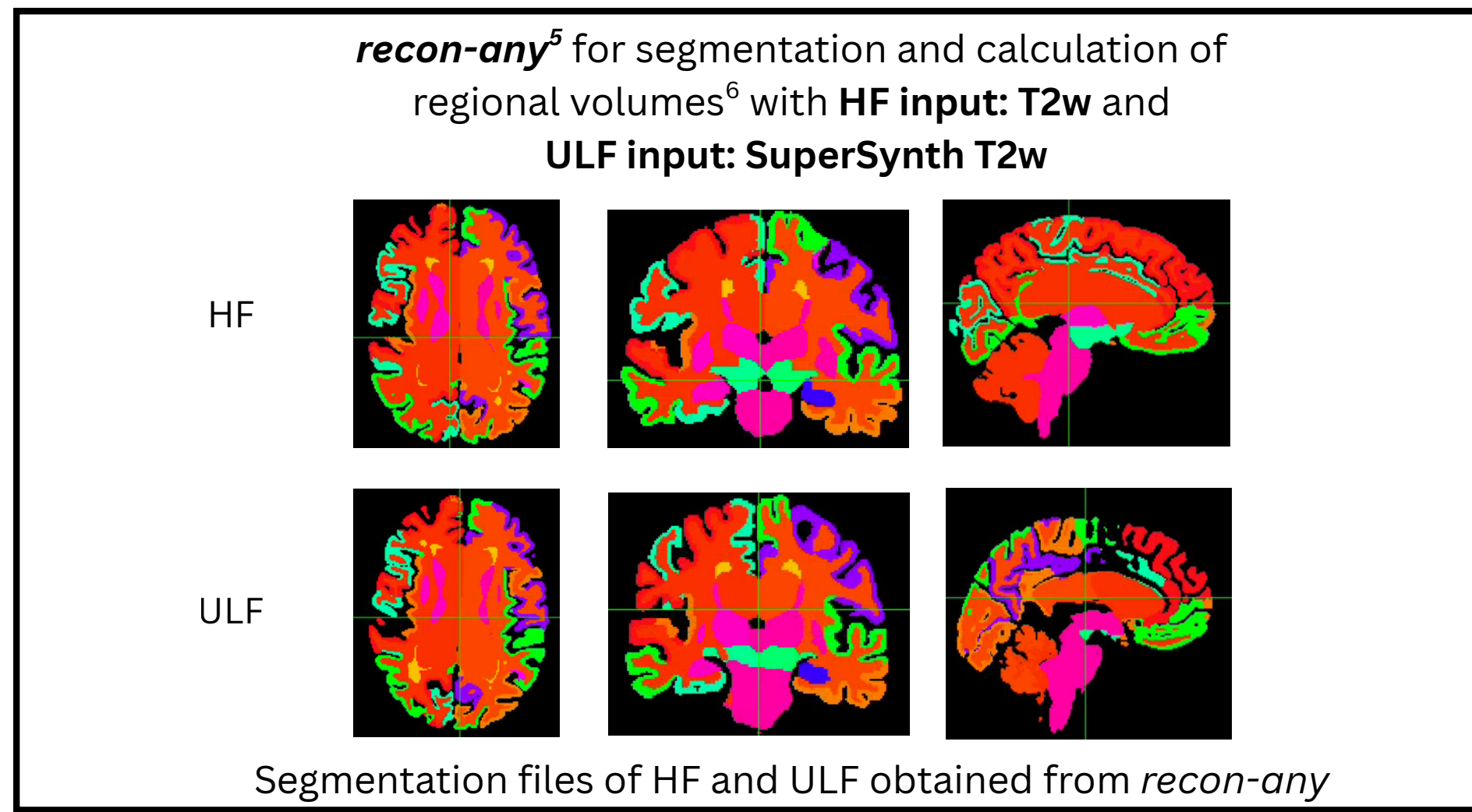
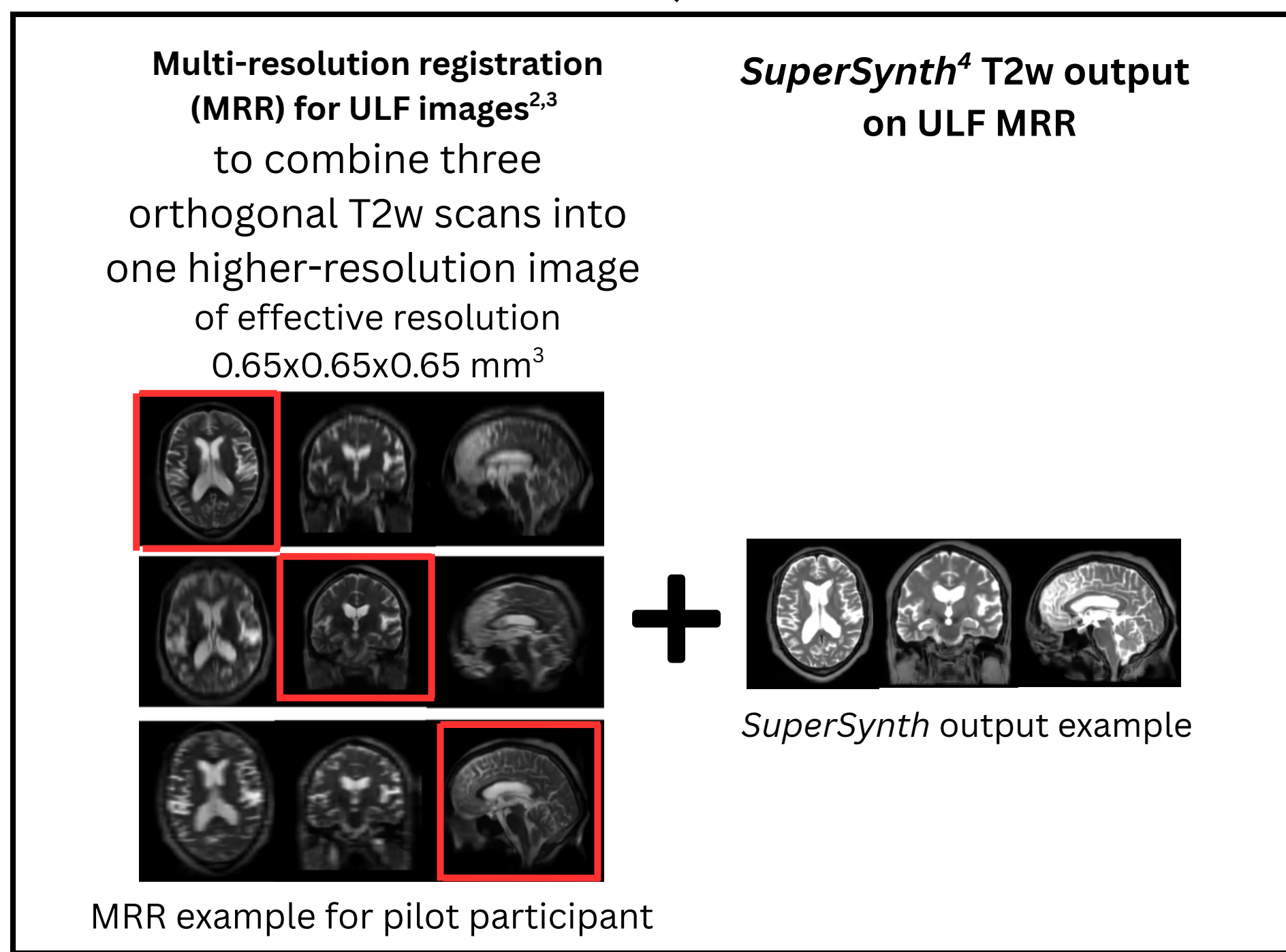
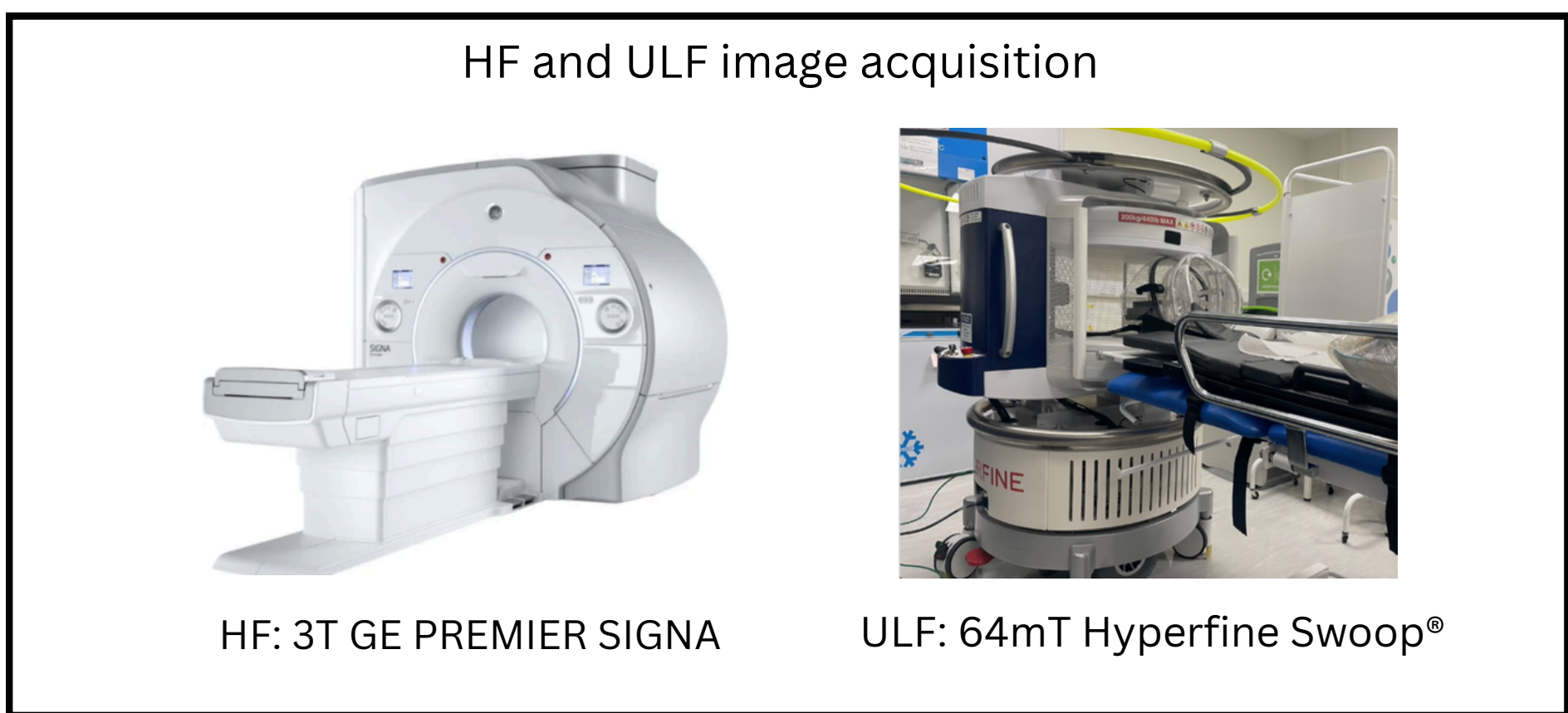
References [1]Martin Prince *et al.* World Alzheimer Report 2016. [2]František Váša *et al.* Imaging Neuroscience 3 (2025).

[3]Sean C. L. Deoni *et al.* Magnetic Resonance in Medicine 2022. [4]<https://surfer.nmr.mgh.harvard.edu/fswiki/SuperSynth>. [5]<https://surfer.nmr.mgh.harvard.edu/fswiki/ReconAny>.

[6]Karthik Gopinath *et al.* Human Brain Mapping 47 № 7 (2026).

Methods

Pipeline

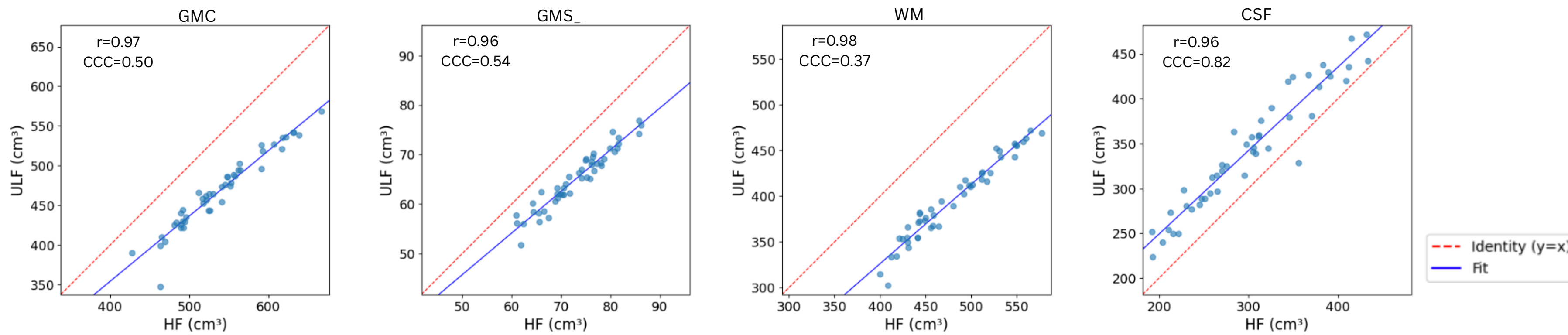


Results

Volumetric analysis of matched HF-ULF scans (N=47 patients)

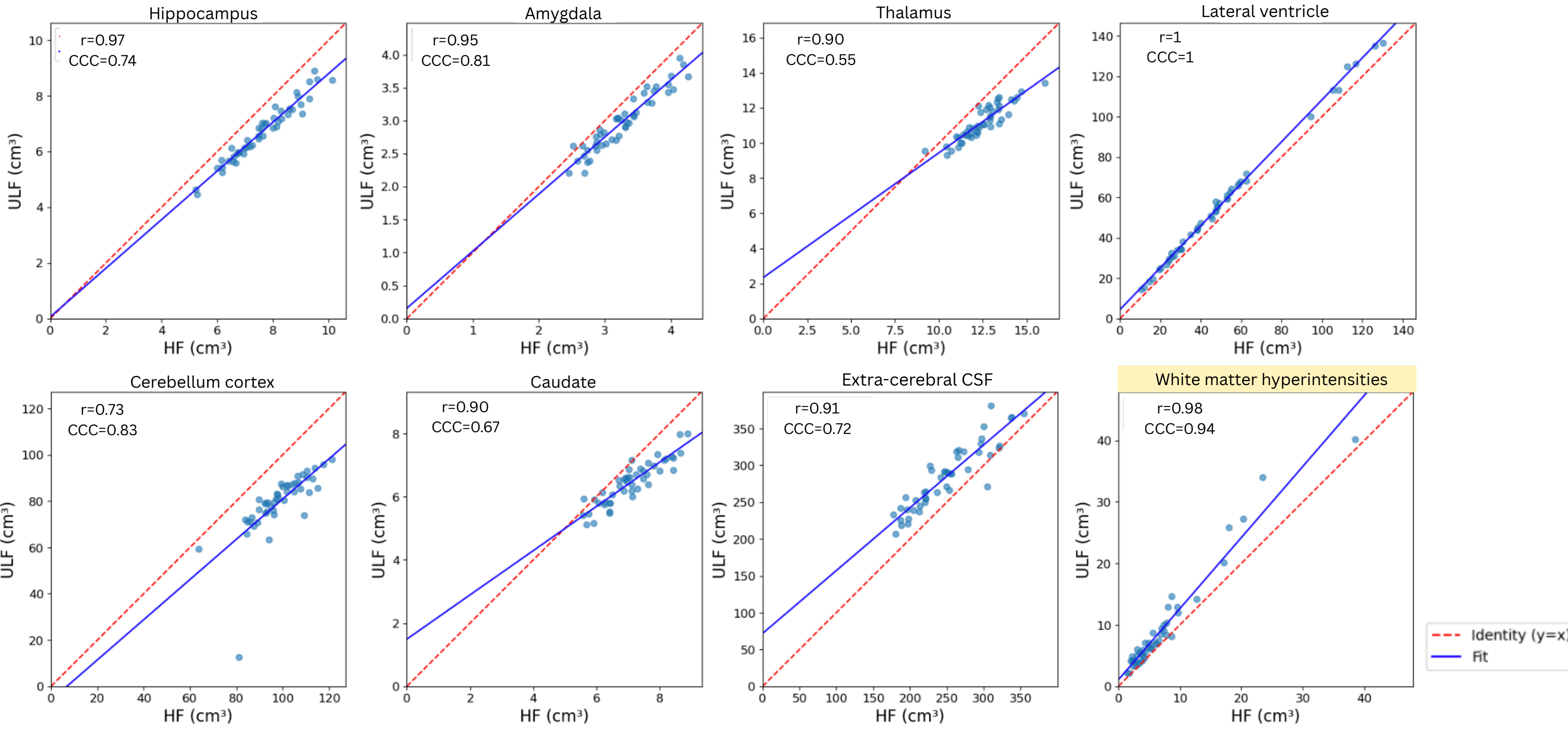
Tissue HF-ULF correspondence

- Correlations plots between ULF volumes (y-axis) and HF volumes (x-axis) aggregated by GMC (cortical grey matter), GMS (subcortical grey matter), WM (white matter) and CSF (cerebrospinal fluid), with Pearson's r, and Lin's CCC (Concordance Correlation Coefficient).



Regional HF-ULF correspondence

- Correlations of an example of regional areas between ULF and HF scans. Pearson's r and Lin's CCC reported.



- Heatmap of Pearson's r and Lin's CCC (0-1) of all brain regions, left and right calculated separately, on MNI (Montreal Neurological Institute) atlas; sagittal, coronal and axial sections preprocessed with recon-any⁵ segmentation labels.

