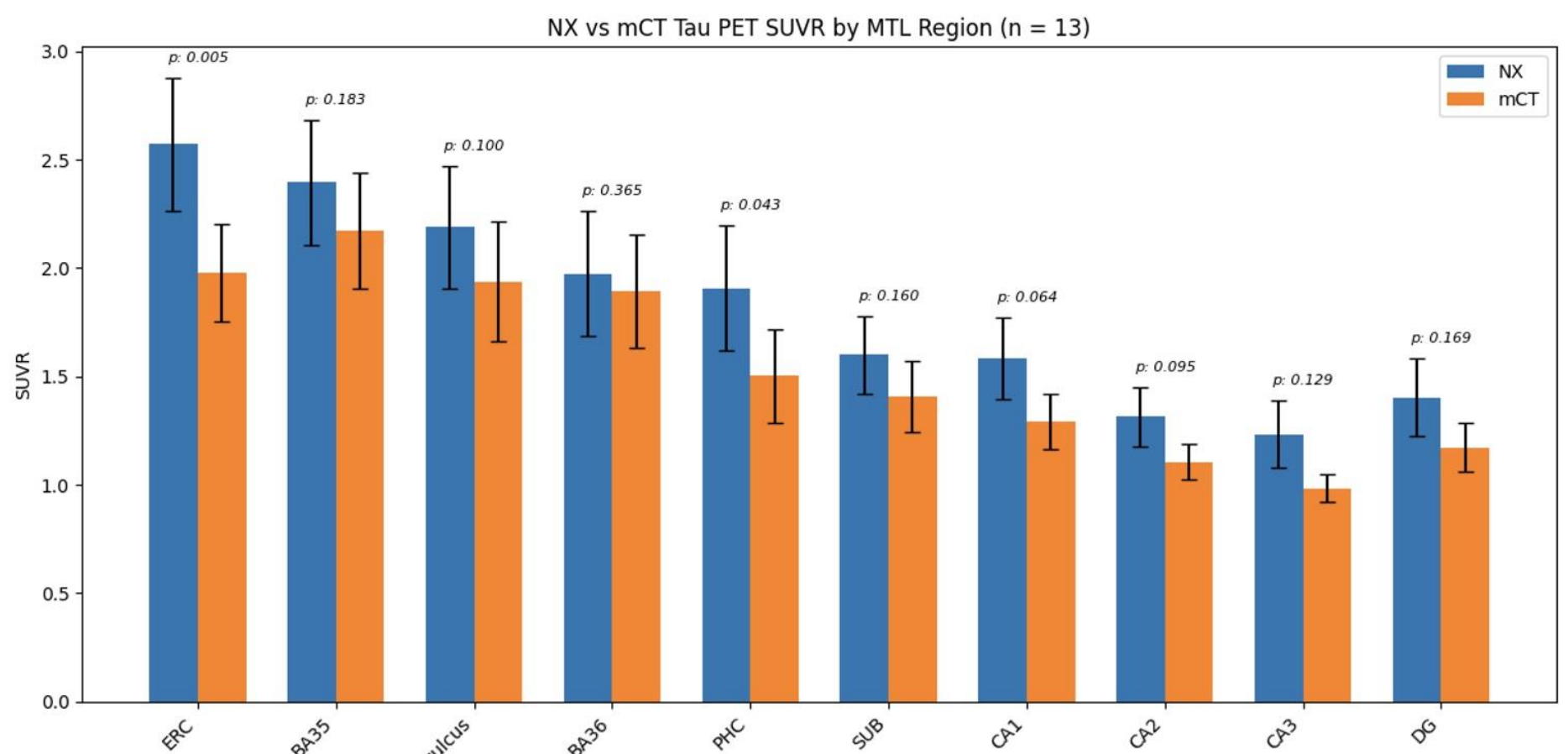
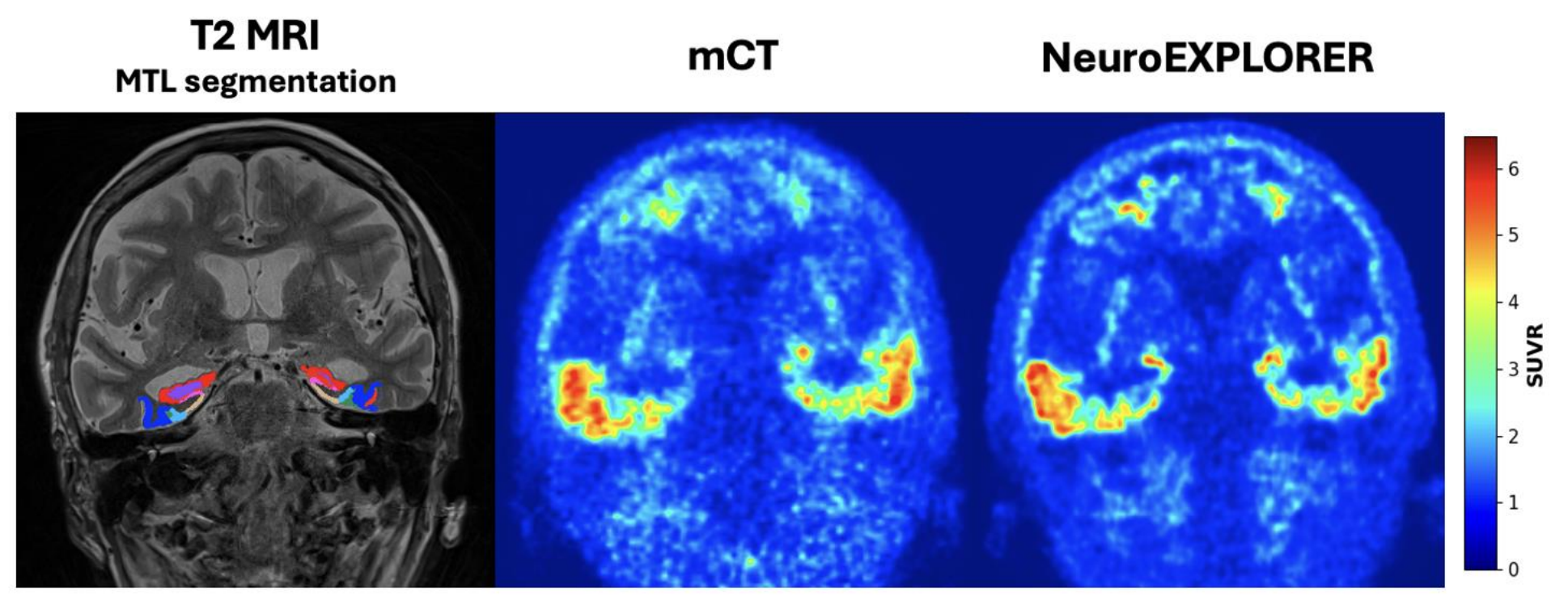
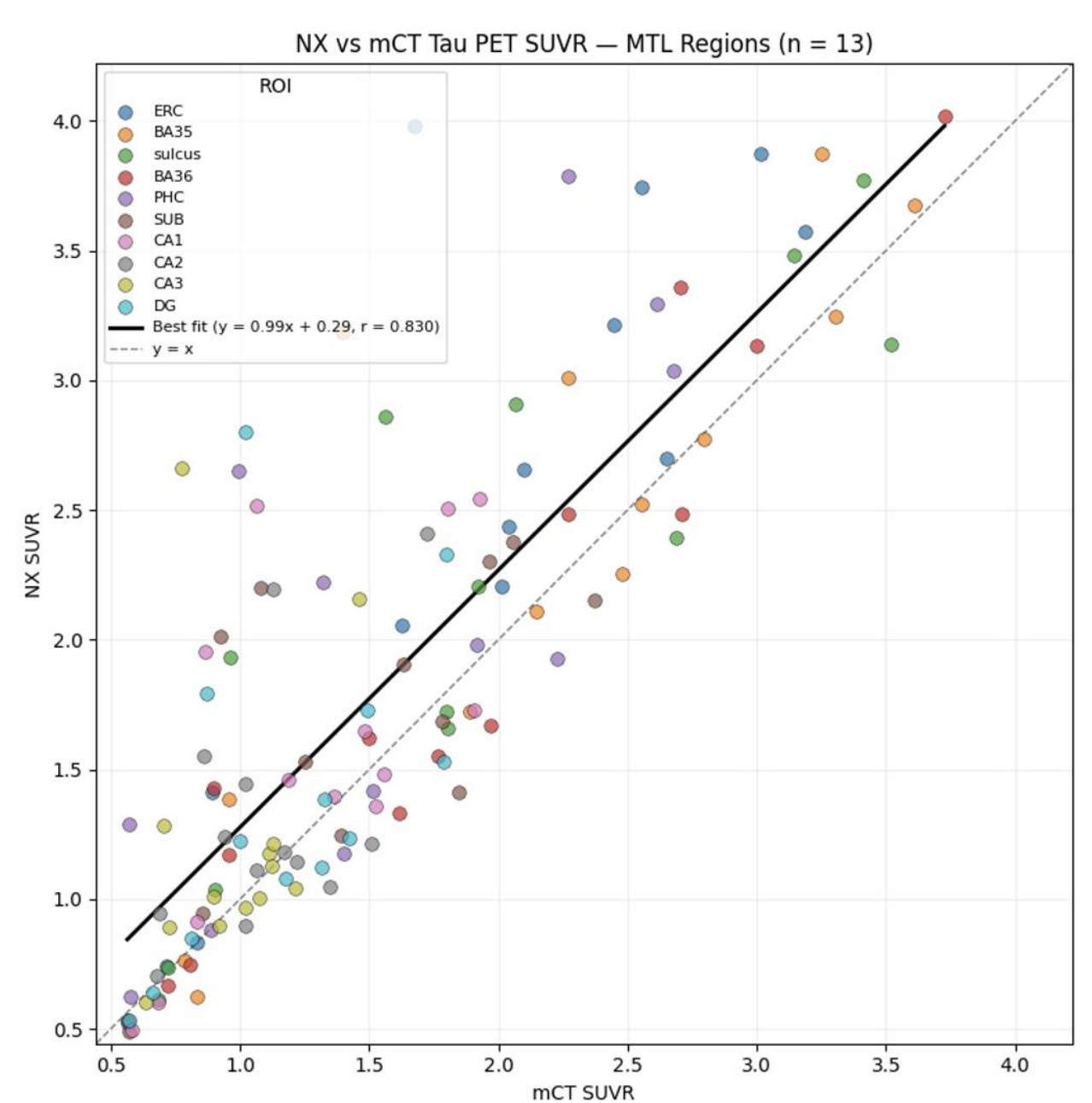


High Resolution PET Imaging Of Medial Temporal Lobe Tau Burden In Alzheimer’s Disease: Comparison Of NeuroEXPLORER And Conventional PET/CT

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NX yields higher SUVR estimates than mCT across MTL subregions and provides more precise visualization of neurofibrillary tangles

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS																																												
The medial temporal lobe (MTL) is an area of early pathological tau accumulation in Alzheimer’s disease (AD). Imaging specific neuroanatomical structures of the MTL can provide important insights into the early neurobiological processes of AD. However, conventional PET systems have had limited resolution to resolve MTL subregions. The NeuroEXPLORER (NX) is a brain-dedicated PET scanner offering ultra-high spatial resolution (~1.5mm), which reduces partial volume effects and may allow resolution of quantitative differences in tau tracer uptake between MTL subregions.	Thirteen Aβ+ participants (2 cognitively unimpaired, 8 mild cognitive impairment, 3 mild dementia) underwent [¹⁸F]MK-6240 tau PET imaging on both the NX and the Biograph mCT PET/CT (mCT) on separate days. The NX had a 90–110-minute scanning window. The mCT had a 90–120-minute scanning window. Time difference was not added as a covariate. Standardized uptake value ratios (SUVR) with an inferior cerebellum reference region were computed to quantify region-specific tau burden. T1- and high-resolution T2-weighted structural MRI was acquired for PET-MR coregistration, and the Automatic Segmentation of Hippocampal Subfields (ASHS) software was used to generate MTL maps. Between-scanner differences in SUVR were assessed with paired t-tests across MTL regions and linear regression was performed for all regions/participants.	In all MTL subregions, mean SUVR was higher on the NX than the mCT with significant differences in the entorhinal cortex (32% higher, p=0.005) and parahippocampal cortex (33% higher, p=0.043; Figure 1). Many scans showed clear visual differences of signal intensity with the MTL structure and cortical ribbon (Figure 2). Linear regression and scatter plot visualization showed a strong linear correlation but systematically higher SUVR for the NX relative to the mCT (slope=0.99, y-int.=0.29, r²=0.689, p<0.0001; Figure 3).	<table border="1"><caption>NX vs mCT Tau PET SUVR by MTL Region (n = 13)</caption><thead><tr><th>Region</th><th>NX SUVR (approx.)</th><th>mCT SUVR (approx.)</th><th>p-value</th></tr></thead><tbody><tr><td>ERC</td><td>2.6</td><td>2.0</td><td>0.005</td></tr><tr><td>BA35</td><td>2.4</td><td>2.2</td><td>0.183</td></tr><tr><td>Sulcus</td><td>2.2</td><td>2.0</td><td>0.100</td></tr><tr><td>BA36</td><td>2.0</td><td>1.9</td><td>0.365</td></tr><tr><td>PHC</td><td>1.9</td><td>1.5</td><td>0.043</td></tr><tr><td>SUB</td><td>1.6</td><td>1.4</td><td>0.160</td></tr><tr><td>CA1</td><td>1.6</td><td>1.3</td><td>0.064</td></tr><tr><td>CA2</td><td>1.3</td><td>1.1</td><td>0.095</td></tr><tr><td>CA3</td><td>1.2</td><td>1.0</td><td>0.129</td></tr><tr><td>DG</td><td>1.4</td><td>1.2</td><td>0.169</td></tr></tbody></table>  	Region	NX SUVR (approx.)	mCT SUVR (approx.)	p-value	ERC	2.6	2.0	0.005	BA35	2.4	2.2	0.183	Sulcus	2.2	2.0	0.100	BA36	2.0	1.9	0.365	PHC	1.9	1.5	0.043	SUB	1.6	1.4	0.160	CA1	1.6	1.3	0.064	CA2	1.3	1.1	0.095	CA3	1.2	1.0	0.129	DG	1.4	1.2	0.169
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These findings underscore the potential of the NX to improve the sensitivity and precision of tau PET quantification in AD, particularly within the anatomically complex MTL.

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