

Immunosenescence of Peripheral Immune Cells and Its Association With Cognitive Function and Brain Structure

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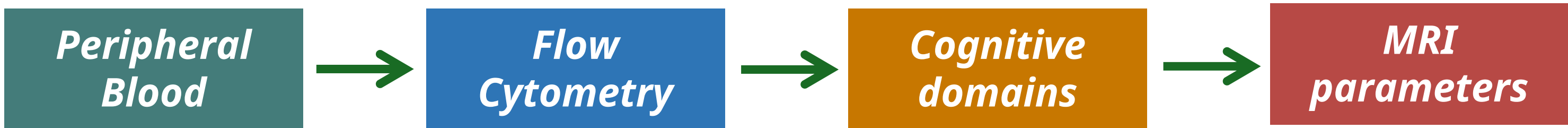
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Background & Objective

- Immunosenescence** may contribute to neuroinflammation, brain structural degeneration, and cognitive decline.
- Objective:** associations between **peripheral immune-cell phenotypes**, **cognitive function**, and **AD-related brain structures in older adults**.

Methods

- Study population:**
 - ✓ *N* = 73 community-dwelling older adults.
 - ✓ Cognitively normal: *n* = 50 (68.5%); MCI: *n* = 23 (31.5%).
 - ✓ Mean age: 71.4 ± 5.8 years; male: 63.0%; education: 9.3 ± 4.9 years.



- Cognitive domains:** global cognition, memory, attention, and executive function.
- MRI parameters:** total brain, gray matter, white matter, ventricles, hippo campus, amygdala, entorhinal cortex, and AD-signature cortical thickness.
- Statistical analysis:** ① Spearman partial correlation with age, gender, and education adjustment ② ROC analysis for MCI discrimination ③ GGM.

Figure 1. Gating strategies of immune cells

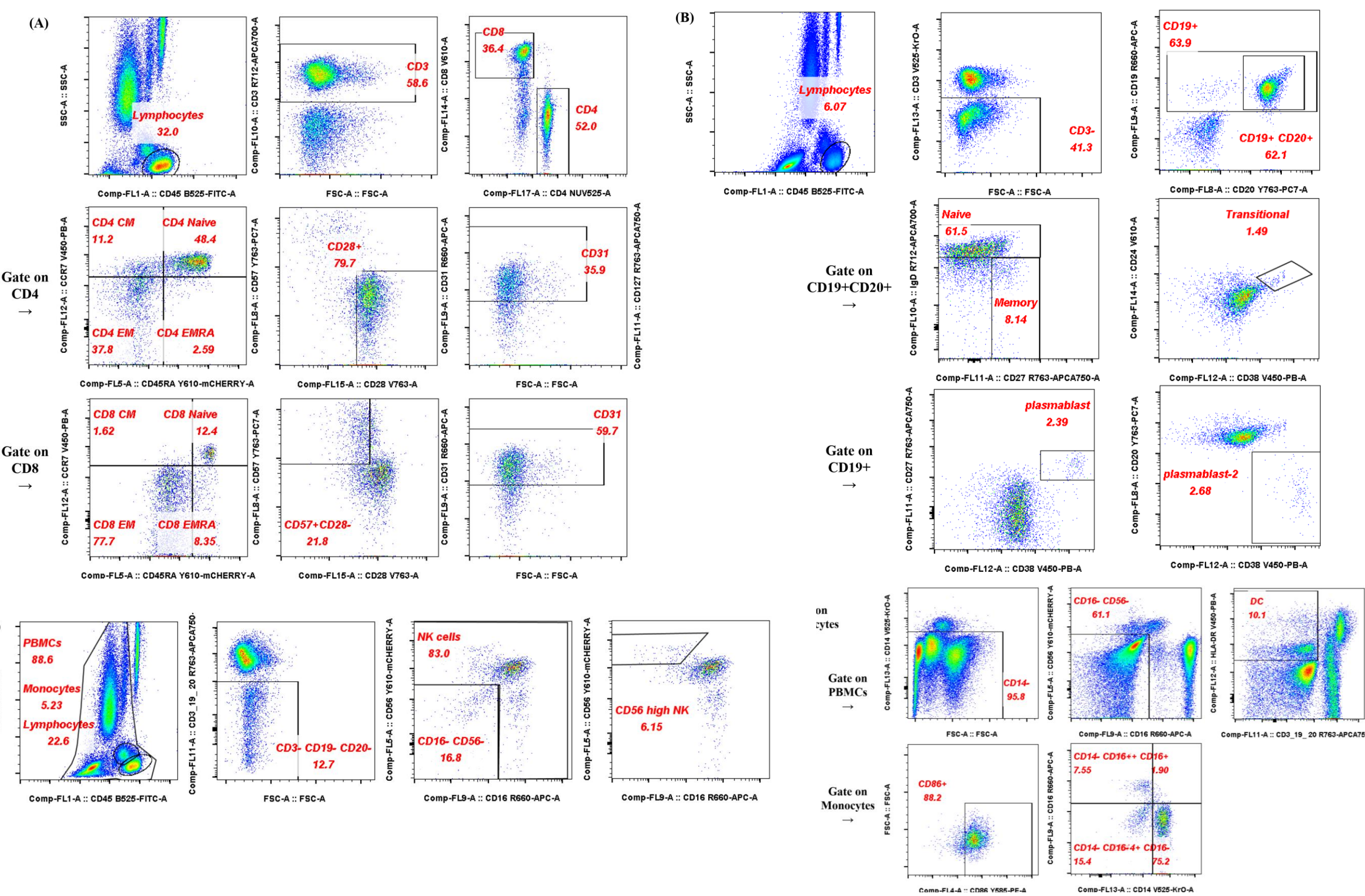


Figure 2. Spearman correlation matrix of immune subsets and age.

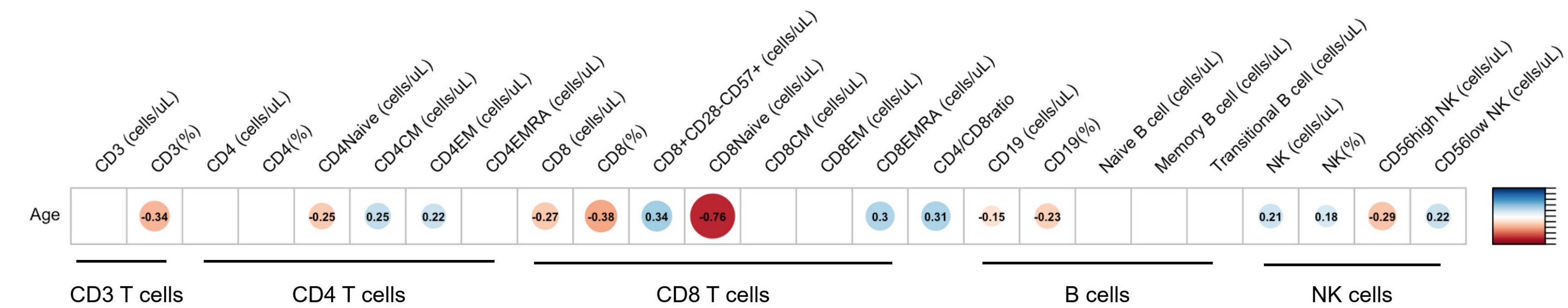


Figure 3. Correlation Heatmaps of immune cells and Cognitive Functions/Brain Structure.

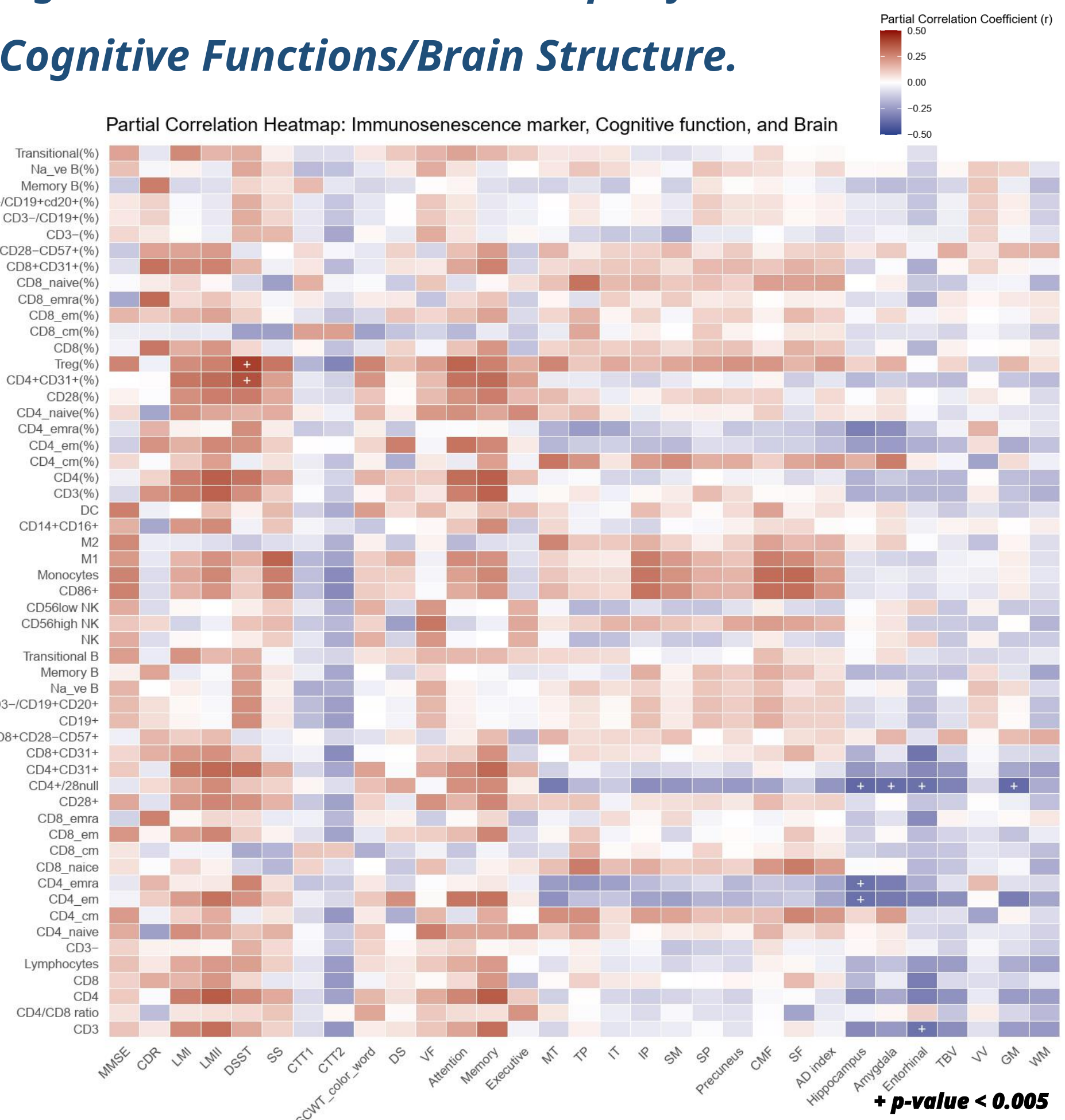
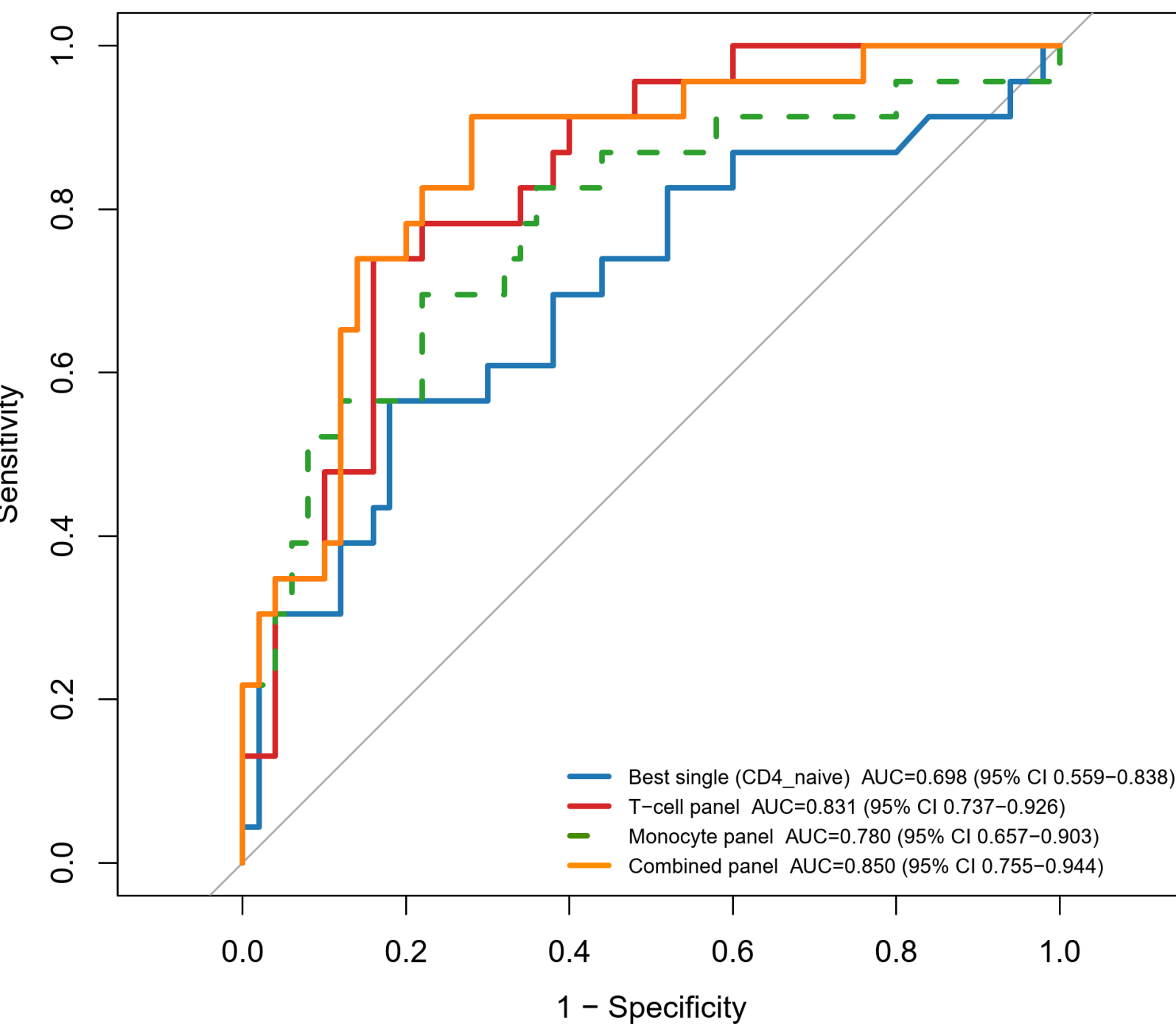


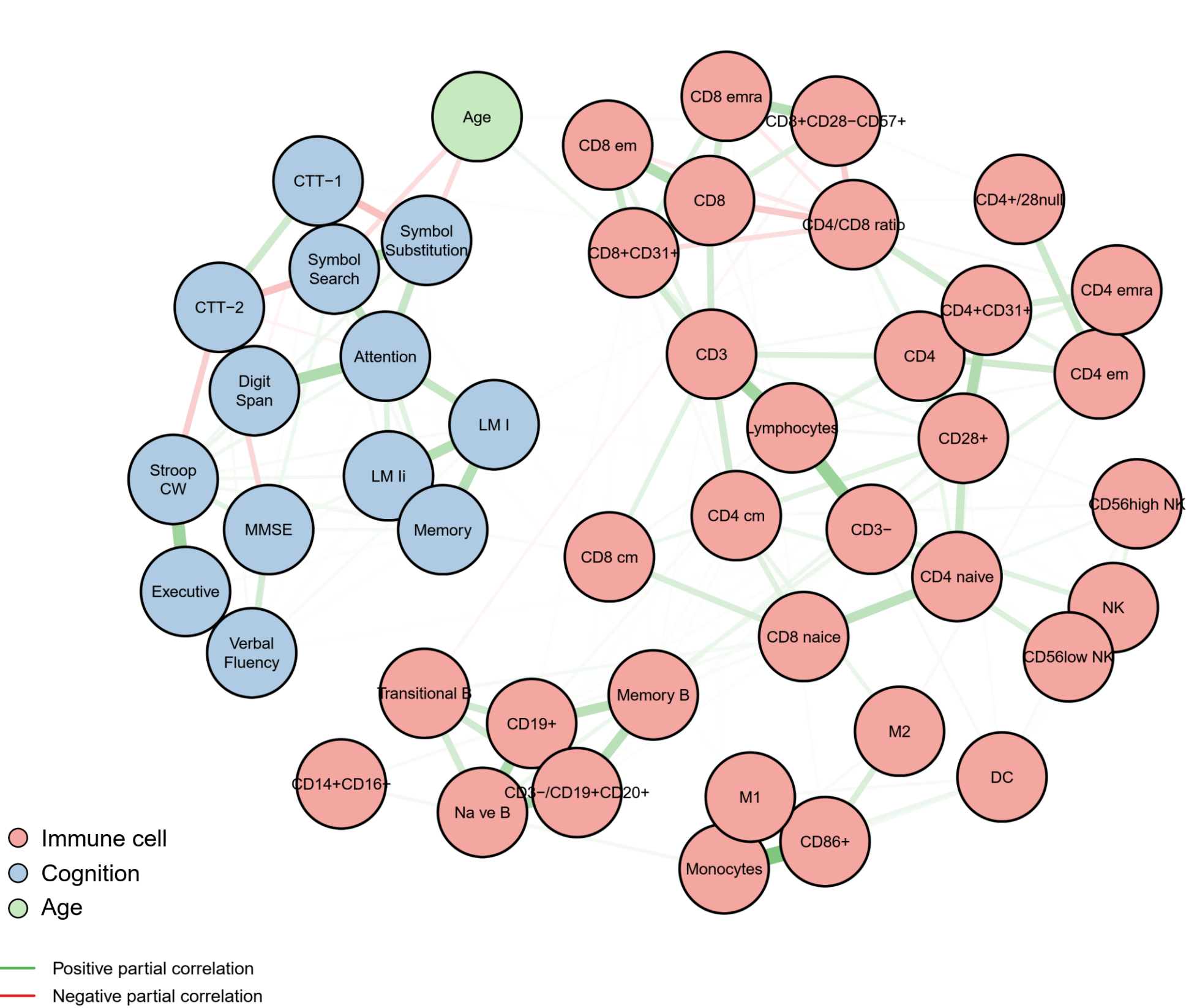
Figure 4. ROC curves for curves of immune cell subsets for distinguishing MCI from cognitively normal controls.



- Best single marker: **naïve CD4+ T cells**, AUC = 0.698 (95% CI 0.559-0.838).
- Combined immune model including Tregs, naïve CD4+ T cells, and CD86+ monocytes achieved **AUC = 0.850 (95% CI 0.755-0.944)**.

Figure 5. GGM of the interconnectivity of immune cell subsets and cognitive domain scores or brain MRI structures.

A. Immune cells and cognitive scores



B. Immune cells and brain MRI measures

