

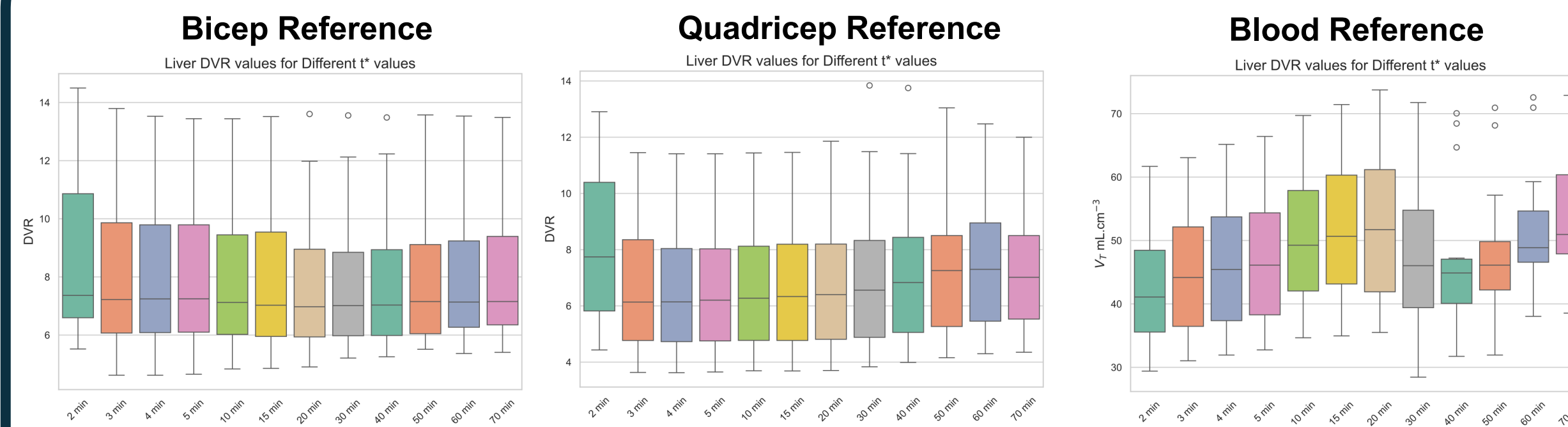
INTRODUCTION

- Alzheimer's Disease (AD) is increasingly recognized as a systemic disorder involving amyloid-beta ($A\beta$) dysregulation in peripheral organs, particularly the liver, which contributes to $A\beta$ clearance and metabolism¹⁻⁴.
- The liver has high uptake of ^{18}F -florbetaben ($A\beta$ tracer), but it is unclear what the signal represents.
- Simultaneous kinetic quantification of the brain and liver is feasible with total-body PET.
- Reference tissue modeling has been well developed for brain, but not for liver.

Goal: To characterize ^{18}F -florbetaben liver signal using reference tissue-based kinetic quantification.

RESULTS

Fig. 1 Effect of Start Time (t^*) on DVR/ V_T Values



Bicep and Quadriple produce stable DVR values as early as 10 minutes and correlate well with Standard Uptake Value Ratio (SUVR).

Fig. 2 Correlation of DVR/ V_T with SUVR for Each Reference Region

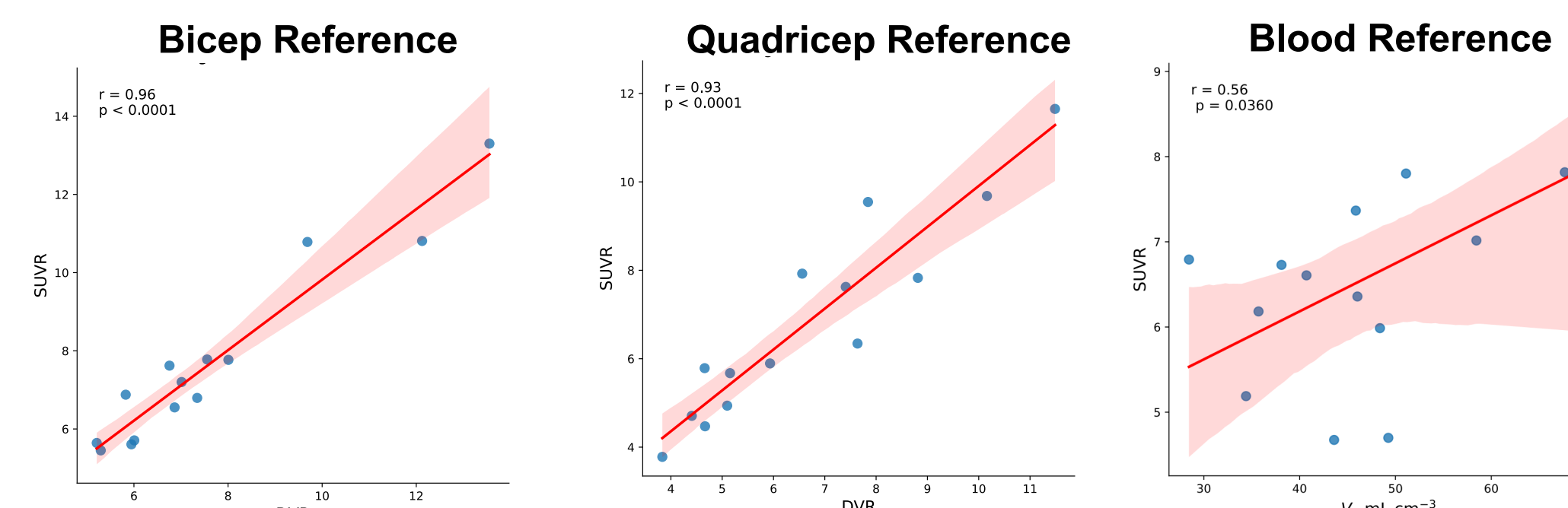
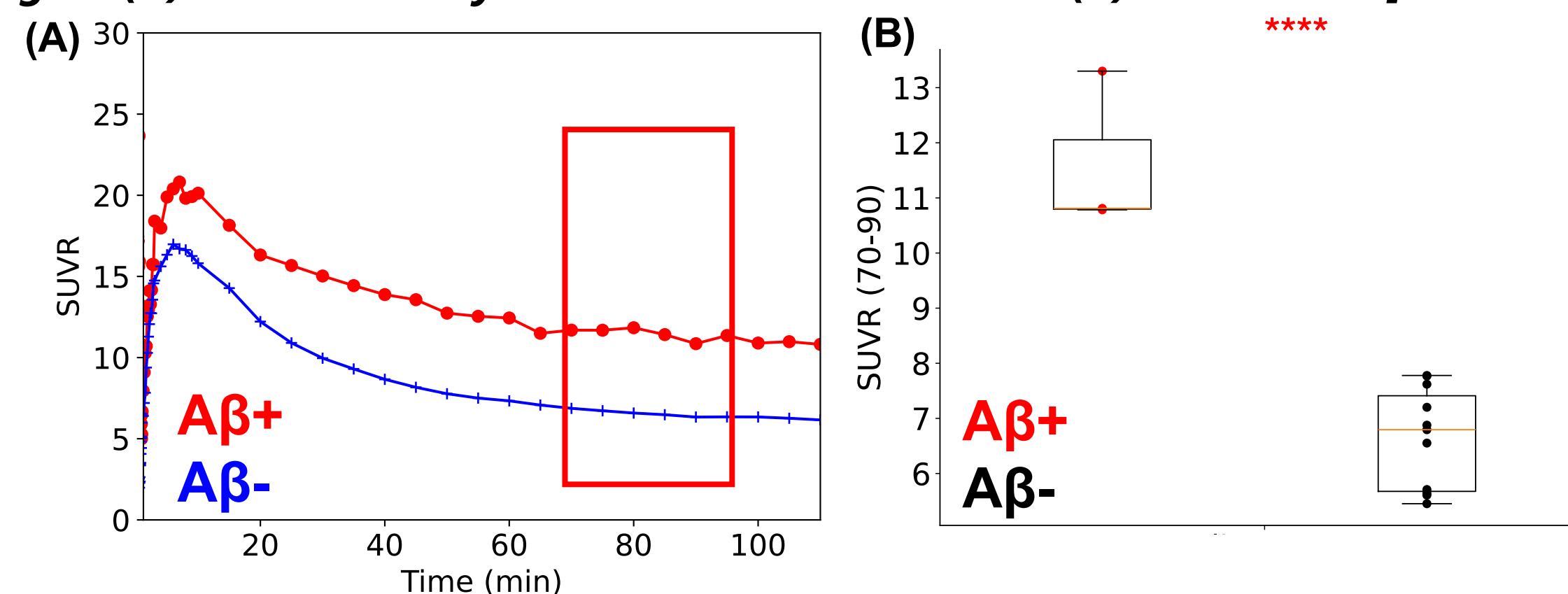


Fig. 3 (A) Liver SUVR Dynamics over 0-110min and (B) Liver SUVR [70-90min]



There is higher liver SUVR in $A\beta^+$ individuals compared to $A\beta^-$ individuals.

Fig. 5 (A) Liver DVR & V_T Values and (B) Total-body Parametric Images

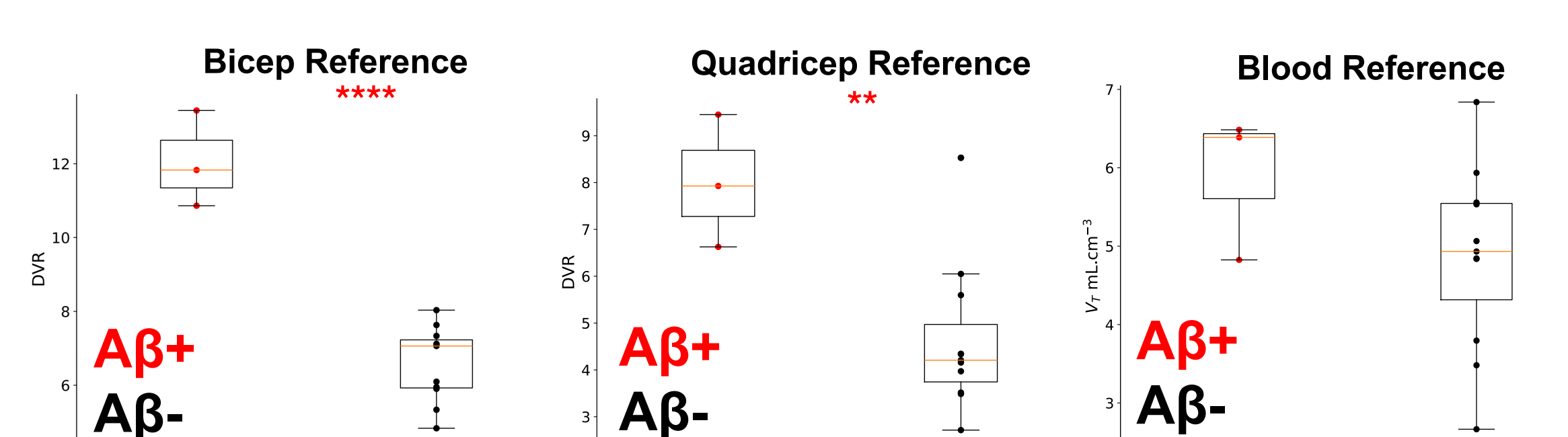
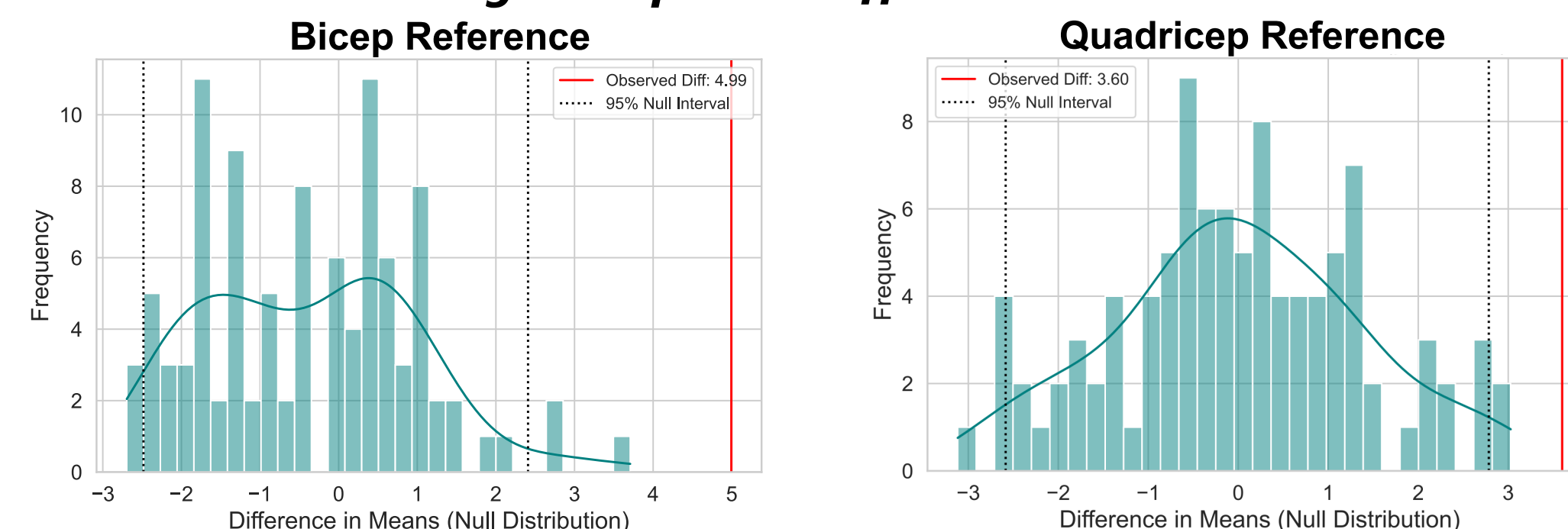


Fig. 4 Permutation Testing: Group DVR Differences Persist with Muscle References



Permutation testing reveals bicep ($p = 5.4e-6$) and quadriple ($p = 3.6e-5$) remain robust reference regions for ^{18}F -florbetaben liver DVR calculation.

The bicep and quadriple may be suitable reference regions for DVR calculation and parametric maps using the MRTM₀ model in the liver.

CONCLUSION AND DISCUSSION

- The bicep emerged as the most robust reference tissue for MRTM₀ DVR.
- $A\beta^+$ individuals exhibited higher PET signal in the liver compared to $A\beta^-$ individuals, potentially reflecting reduced hepatic clearance capacity or a higher systemic amyloid burden.
- Future work focuses on simultaneous full compartment modeling in the brain and liver to investigate specific physiological differences that could be driving observed DVR trends in the liver-brain axis in Alzheimer's Disease.

ACKNOWLEDGEMENTS

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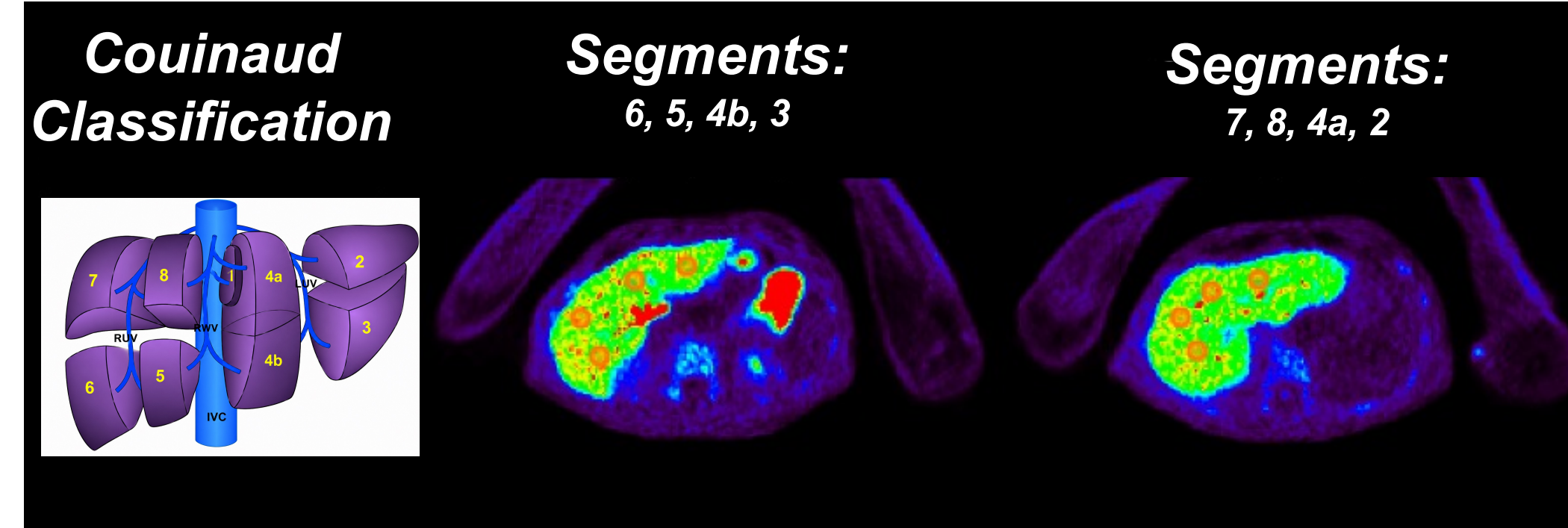
FAN Lab



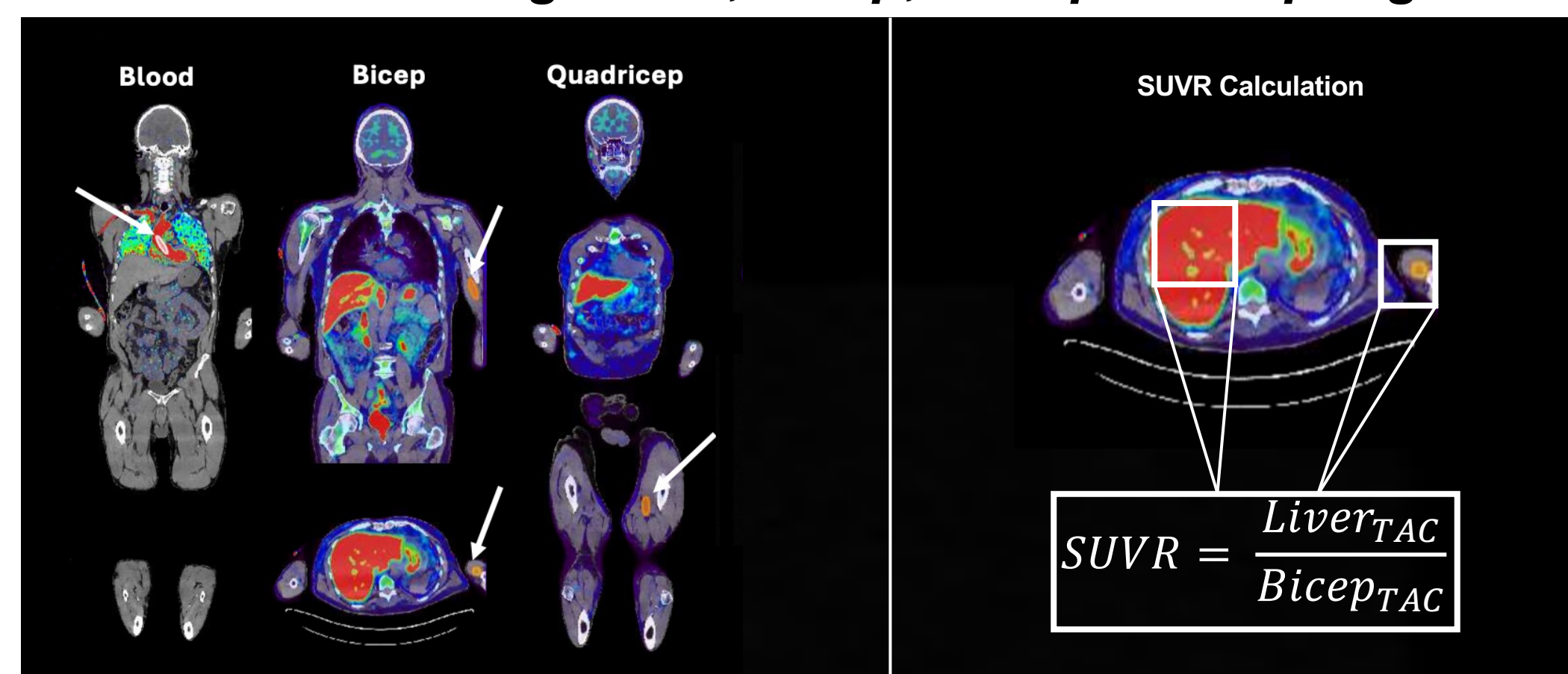
Wang Lab



Segmentation of the Liver⁵



Normalization using blood, bicep, and quadriple regions



Multilinear Reference Tissue Model (MRTM₀)⁶

$$\frac{\int_0^T C_{ROI}(t)dt}{C_{ROI}(T)} = \frac{V_T}{V_T^{ref}} \frac{\int_0^T C_{ROI}(t)dt}{C_{ROI}(T)} + \frac{V_T}{V_T^{ref} \times k_2'} \times \frac{C_{ref}(T)}{C_{ROI}(T)} + \text{for } T > t^*$$