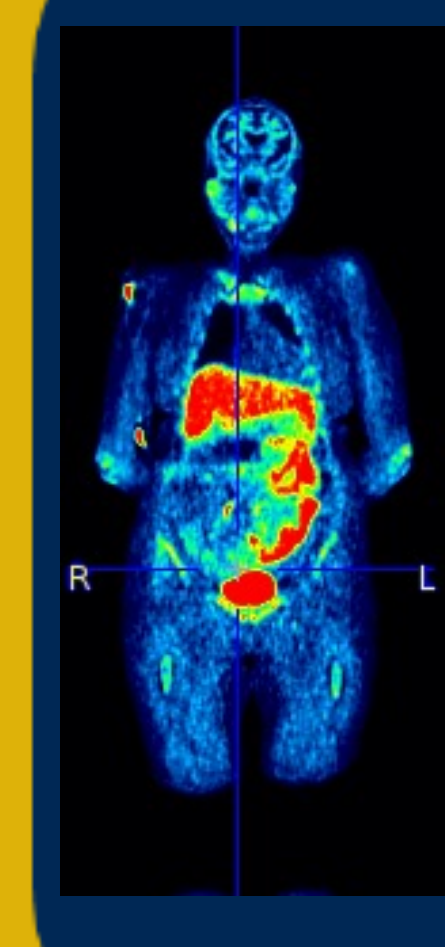




# Non-invasive quantification and SUVR validation of [18F]-florbetaben with total-body EXPLORER PET



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## INTRODUCTION

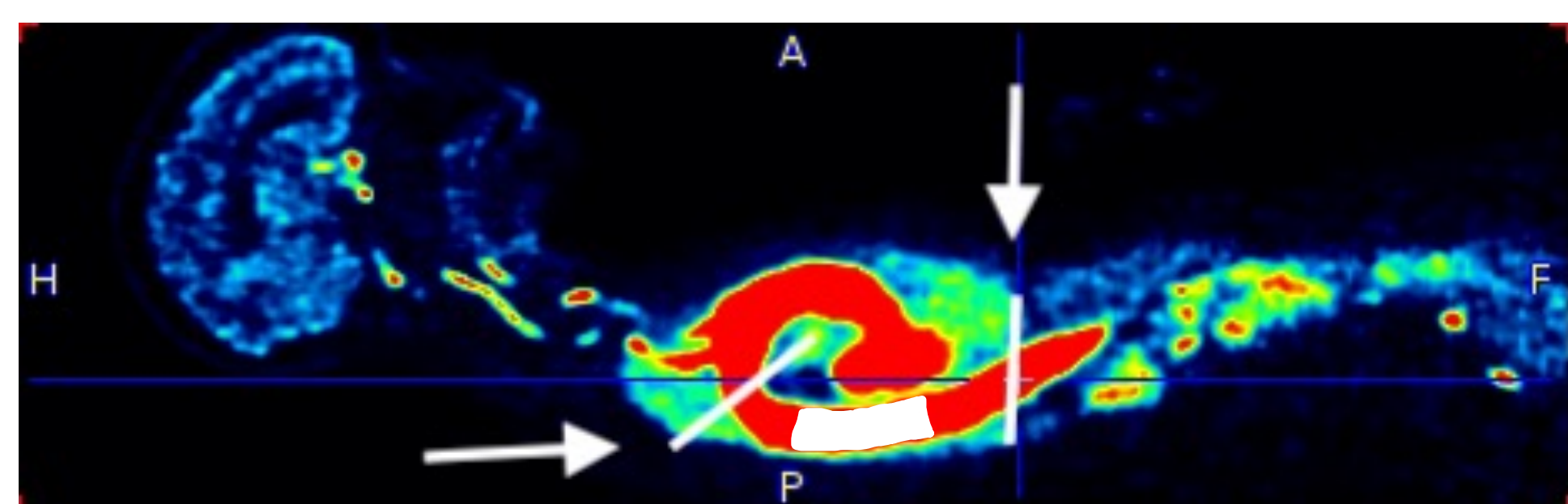
- Kinetic modeling of brain amyloid deposition with [18F]-florbetaben more accurately quantifies the binding density to amyloid plaques compared to standardized uptake ratios (SUVR) (Becker, JNM2013).
- The total-body EXPLORER PET scanners permits noninvasive Image-Derived Input Functions (IDIFs) for quantitative dynamic modeling.

**We aim to quantify amyloid buildup with kinetic models that leverage PET signal dynamics in aorta IDIFs and the brain utilizing [18F]-florbetaben.**

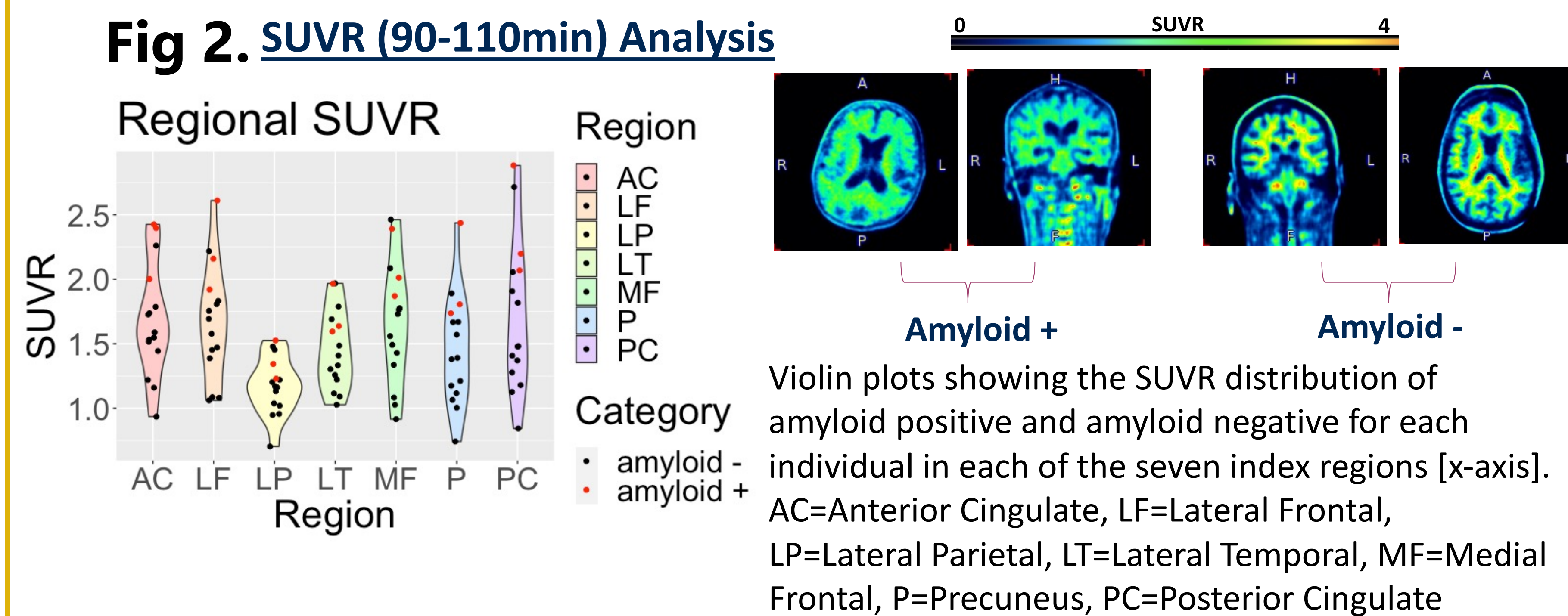
## METHODS

- 15 adults aged 66-86 underwent dynamic total-body [18F]-florbetaben PET up to 90-110min.
- Regions of interests were drawn in the middle descending aorta and eroded to derive IDIFs.
- Brain cropped PET volumes were motion corrected (**FSL-MCFLIRT**) and linearly registered (**FSL-FLIRT**) to T1W image. PET SUVR (90-110min) means were calculated from 7 brain index regions and referenced to the cerebellar gray matter.
- Dynamic time activity curves (TACs) were fit to the two-tissue compartment model (**2TCM**) using **population metabolite-corrected IDIFs**.
- Multi-linear Reference Tissue Model (**MRTM**) was used to calculate distribution volume ratio (**DVR**) with reference to cerebellar gray.

**Fig 1. Aorta Region of Interest**

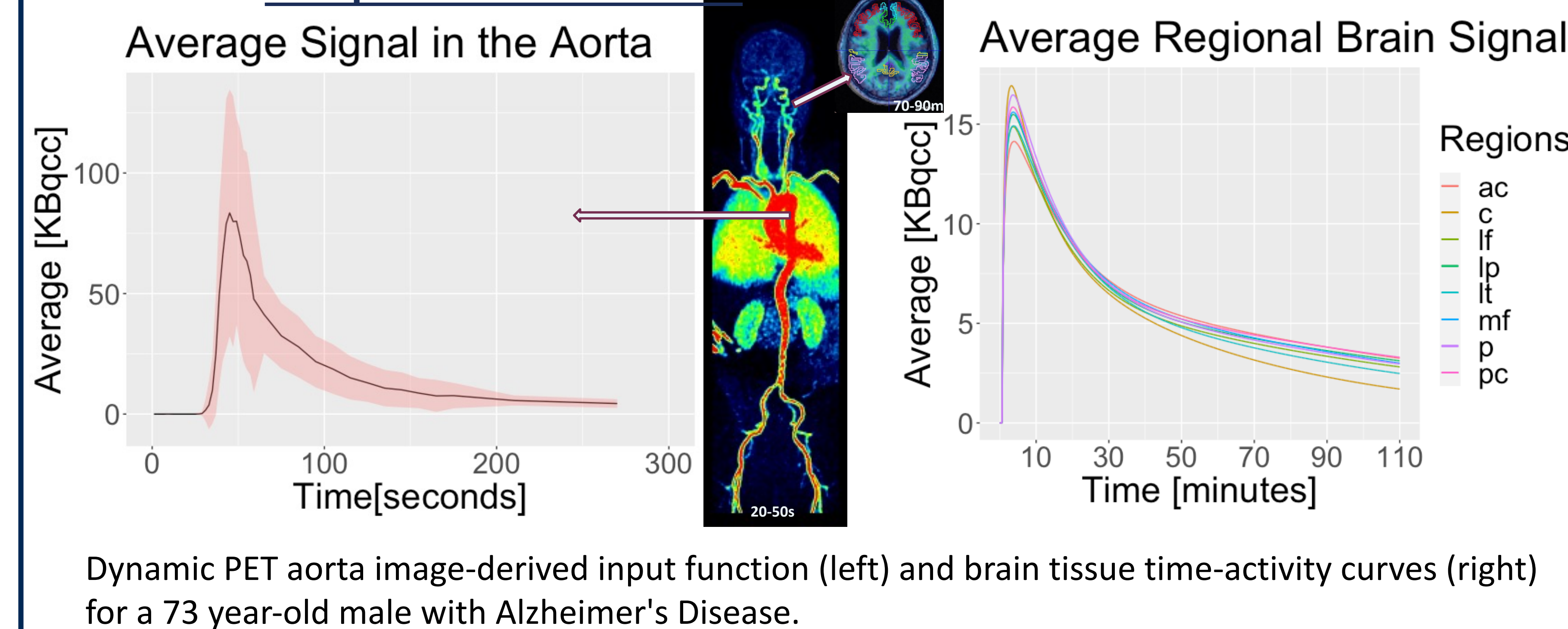


**Fig 2. SUVR (90-110min) Analysis**

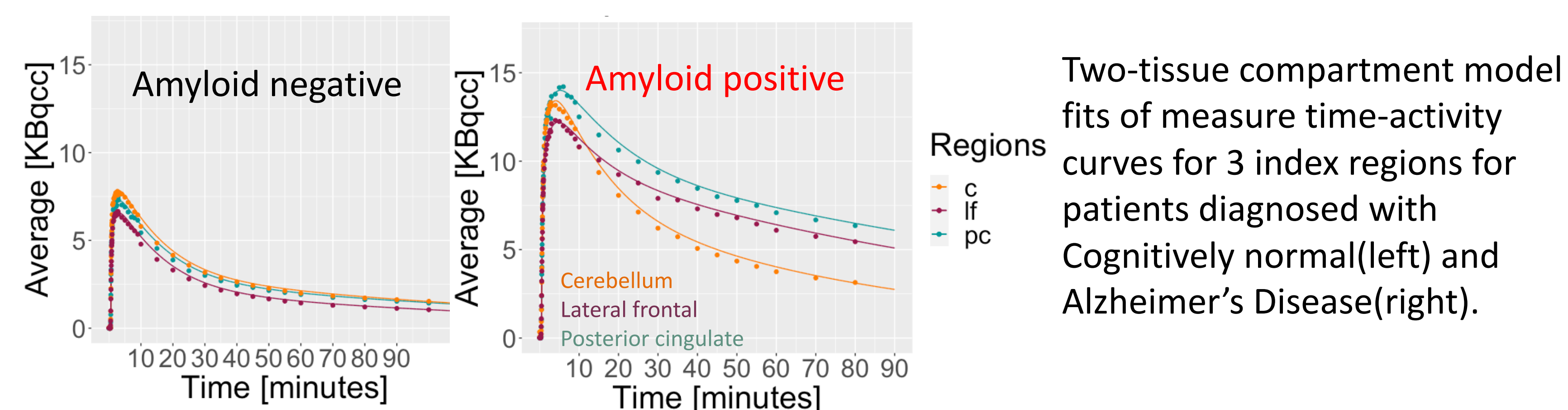


## KINETIC MODELING

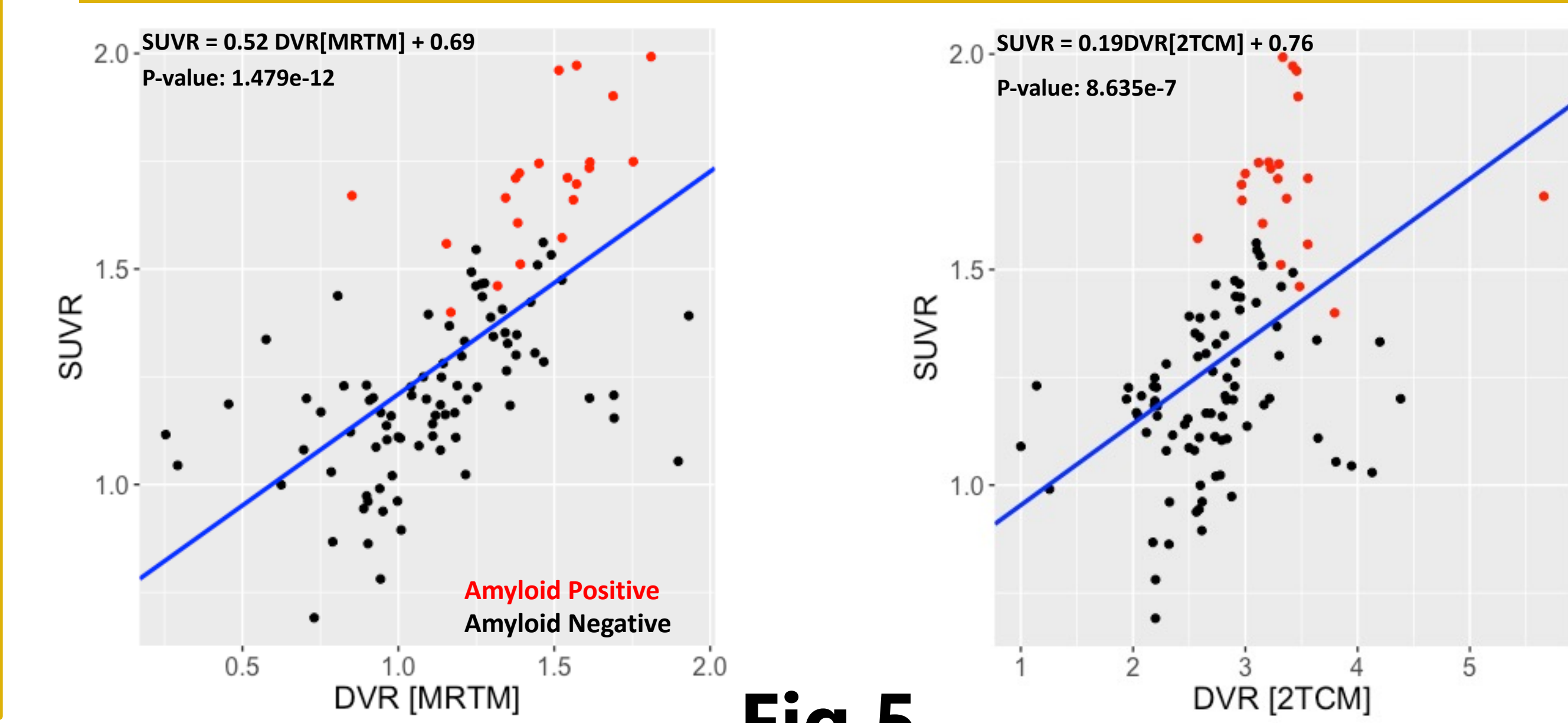
**Fig 3. Individual Aorta and Regional Brain Compartment Model Fits**



**Fig 4. Two-tissue Compartment Model Fits using Image-Derived Input Functions**



## KINETIC MODELING VS SUVR



**Fig 5.**

**Linear regression analysis of amyloid quantification in brain index regions with correction for subject clustering**

## CONCLUSIONS

- Absolute quantification of amyloid binding from total-body [18F]-florbetaben PET data is feasible using aorta IDIFs.
- There is high agreement between dynamic binding parameters compared to SUVR in discriminating positive and negative scans.

**Total-body EXPLORER PET enables high quality kinetic modeling for accurate, non-invasive measures of amyloid accumulation in clinical research of aging and dementia.**

## ACKNOWLEDGEMENTS

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## REFERENCES

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