# WHITE MATTER MARKERS FOR TREATMENT OUTCOMES IN MAJOR DEPRESSIVE DISORDER

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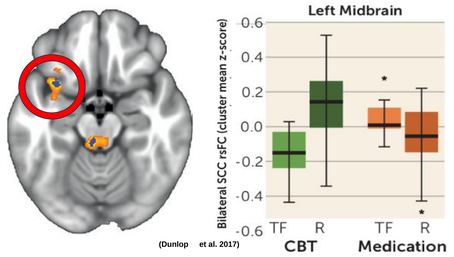
## BACKGROUND

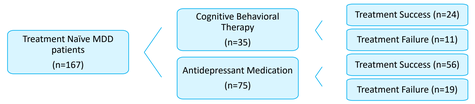
- Major depressive disorder (MDD) treatment shows variable outcomes in similar presentations by cognitive behavioral therapy (CBT) and antidepressant medications (ADM)[1,3]
- Past treatment selection biomarker studies using resting-state fMRI implicate differential subcallosal connectivity to LA insula, left ventromedial PFC, and periaqueductal gray[2, 4]
- Structural changes might mediate these functional connectivity patterns
- Goal: ID WM treatment selection biomarkers for MDD treatment



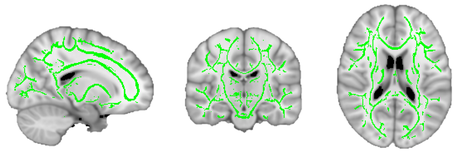

(Dunlop et al. 2017)

## METHODS

- Obtained Diffusion Weighted Imaging from 167 treatment naive MDD pts randomized to 12 weeks of CBT (n=35) or ADM (n=75).
- Subjects grouped into treatment success (HDRS17 score <7 at 12 weeks) and failure (HDRS score change <30%).




- Whole brain fractional anisotropy (FA) map calculated from using Fdt toolbox in FMRIB and TBSS for statistical comparison.
- WM changes correlated with HDRS score changes from 0 to 12 weeks for All, CBT, and ADM treatment groups (**Fig 1**).
- Voxel-wise 2x2 ANOVA: treatment (CBT/ADM) by outcome (success/failure) performed via AFNI 3dMVM toolbox (**Fig 2**).



**TBSS Mean FA Skeleton Map**

## RESULTS

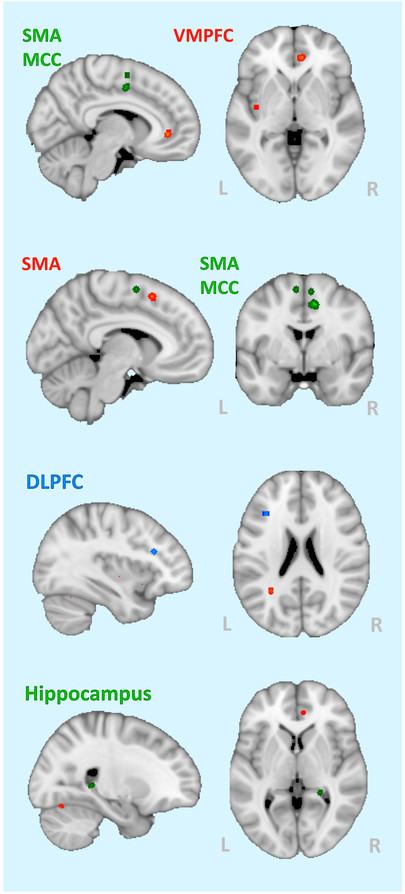



**Figure 1. Treatment Specific Positive Correlations of HAM-D Score Improvement and Baseline FA Integrity**

Significant positive correlation (p<0.005) of FA score and HAM-D % change at 12 weeks was identified for All combined treatment groups, CBT, and ADM.

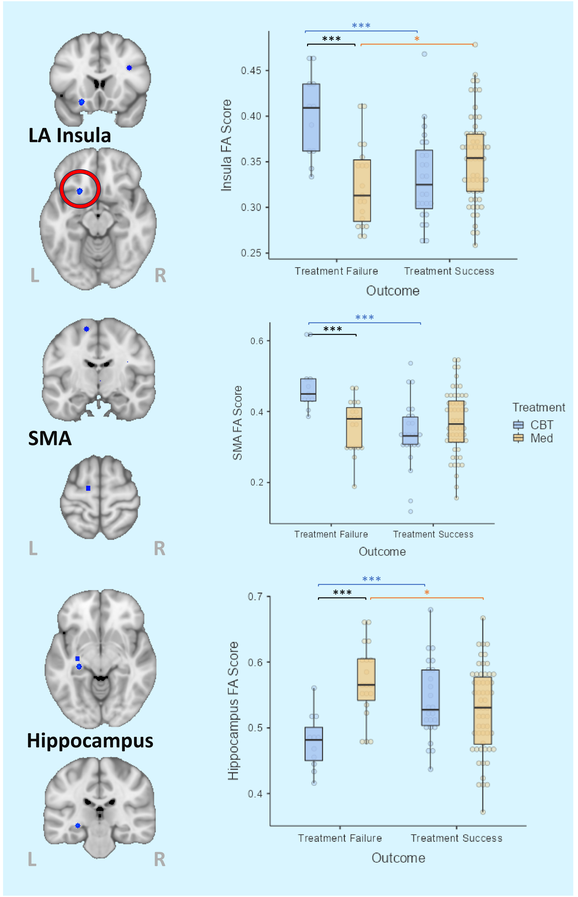
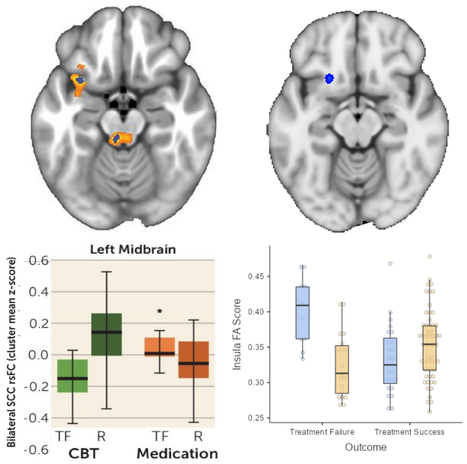



**Figure 2. ANOVA 2x2 Analysis Treatment Selection White Matter Biomarker**

A significant treatment by outcome interaction was identified adjacent to the left anterior insula, left supplementary motor area, and left hippocampus (p<0.001). (Post hoc: ***p<0.001; **p<0.005; *p<0.05)

## CONCLUSIONS

- Identified differential WM integrity in WM tracts adjacent to the insula, SMA, and hippocampus in remitters and failures to CBT and ADM.
- Findings similar to resting functional connectivity (FC) studies.
- Combined FC and WM findings could better differentiate treatment naïve MDD and triage for individualized treatment.
- Furthers evidence for brain-based measures of differentiating MDD subtype compared to clinical measures.
- Suggests relationship between structural and functional connectivity in MDD.




## REFERENCES

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2. Dunlop, et al. Am J Psych 2017; 174(6):533-545
3. Hasler G et al. Neuropsychopharmacology 2004; 29:1765–1781
4. Williams LM. Lancet Psychiatry 2016; 3:472–480

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