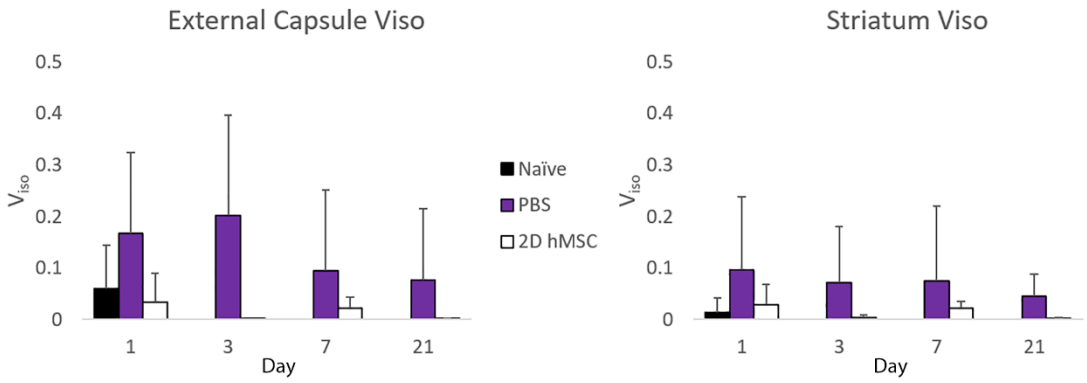
Supplementary Material

V_{iso}

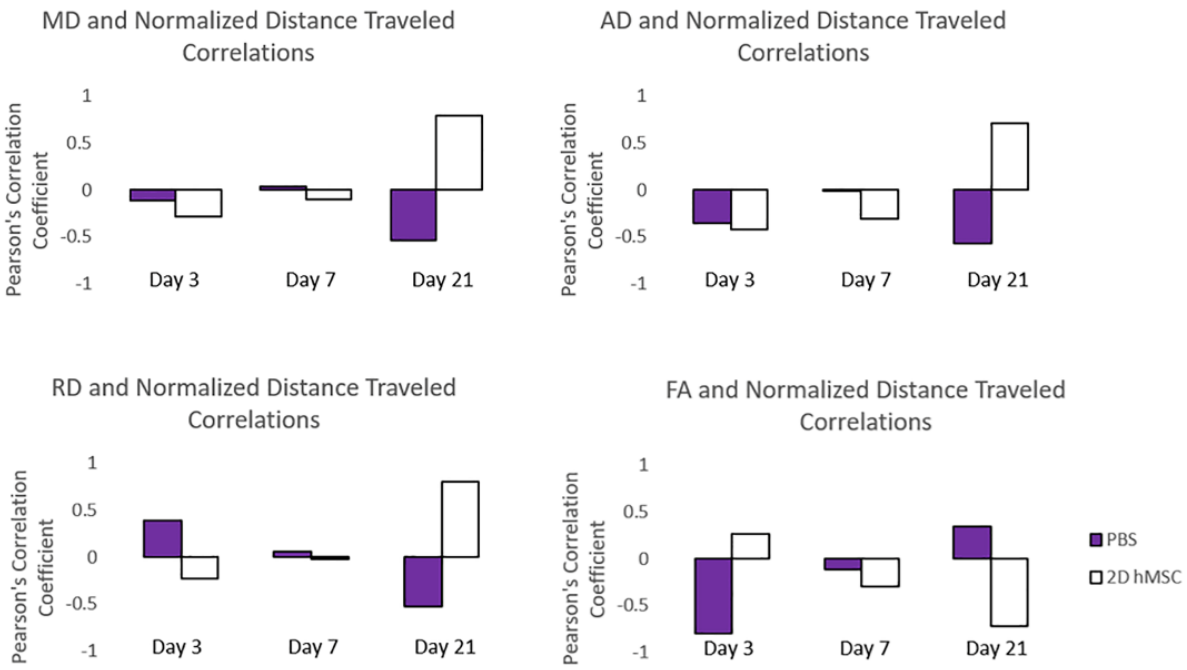


Supporting Information Figure S1: Isotropic compartment from NODDI fit in the ipsilateral external capsule and striatum. Data displayed as means and standard deviations across all specimens in each group.

The isotropic volume fraction (V_{iso}) from the NODDI model was calculated to probe the CSF compartment. Though confirming trends are apparent, this data is not included in the main text as V_{iso} is reported to have low reproducibility in high-field MRI studies of the rat brain with limited sample sizes compared to ICVF and ODI. This high variability was observed in this study as well, as evidenced by high standard deviations and lack of significance between groups, hemispheres, and longitudinally at each time point.

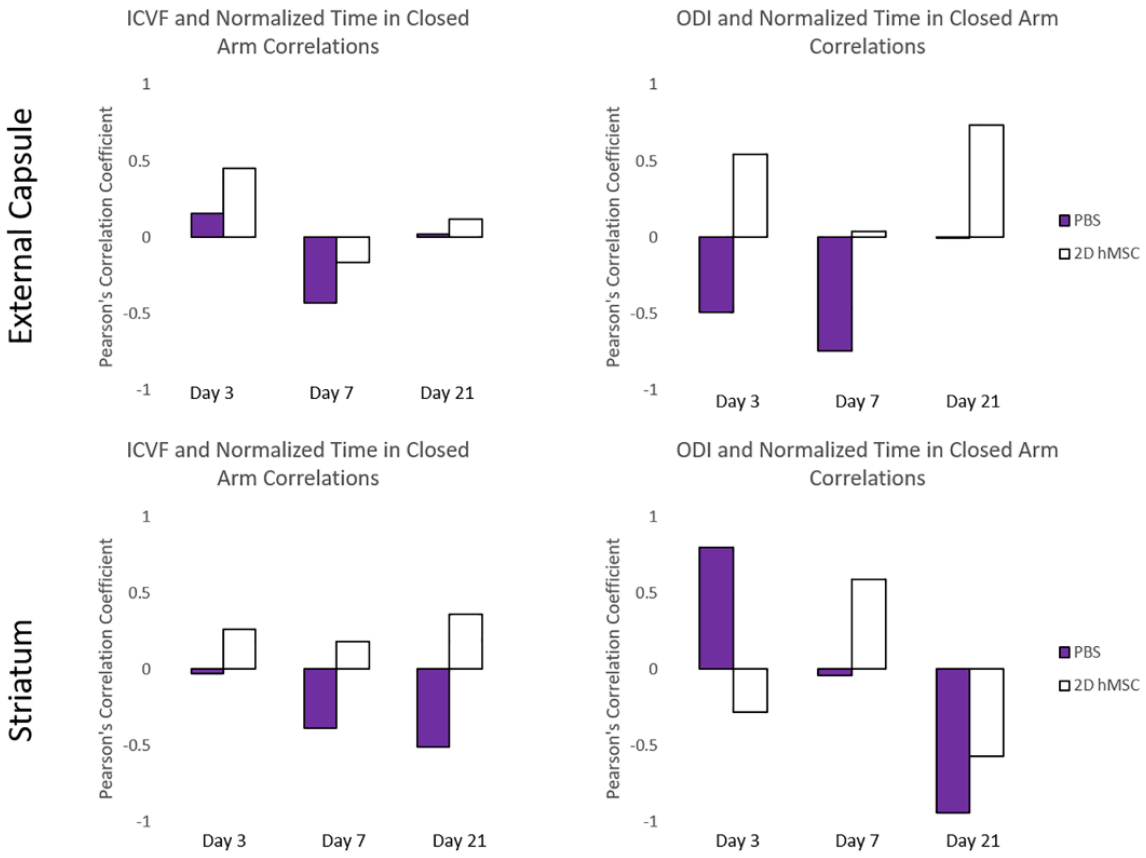
Pearson's Correlation Coefficients

For overlapping experimental days between MRI and behavioral experiments (day 3, 7 and 21), Pearson's coefficients were calculated. Although animal numbers are low for behavioral characterization given their dual use for MRI scans, the following correlations were generated for diffusional metrics that showed group differences between hMSC and PBS for any time point.



Supporting Information Figure S2: Pearson's correlation coefficients for MD, AD, RD and FA in the external capsule. Coefficients were calculated by comparing DTI biometrics to the normalized distance traveled in the EPM.

For DTI metrics and the normalized distance traveled in the EPM, longitudinal Pearson's coefficients for MD, AD and RD in the external capsule for the hMSC treatment display progressively more positive correlation trends with time, becoming highly positively correlated ($r>0.7$) at the last time point in contrast to the PBS correlations, which are highly negative ($r<-0.5$) at day 21. FA correlations for these comparisons are the inverse of each other, with PBS coefficients highly negatively correlated at day 3 but increase over time while hMSC coefficients become progressively more negative over time reaching their strongest negative correlation at day 21.



Supporting Information Figure S3: Pearson's correlation coefficients for ICVF and ODI in the external capsule and striatum. Coefficients were calculated by comparing NODDI biometrics to the normalized time spent within closed arms of the EPM.

For NODDI metrics in both the external capsule and striatum, Pearson's coefficients were calculated against time spent in closed arms of the EPM normalized to baseline. In the external capsule, ICVF had weak correlations at each time point assessed, but hMSC correlations were positive and highly so ($r>0.5$) for ODI at days 3 and 21 while PBS correlations displayed negative coefficients ($r<-0.5$) for ODI on days 3 and 7. In the striatum, ICVF correlations with hMSC treatment were consistently weakly positive, while PBS correlations become progressively more negative ($r<-0.5$ at day 21). Striatal ODI correlations for PBS are highly positive at day 3 but become highly negative at day 21; striatal ODI correlations are less consistent or progressive for hMSC treatment.