# Correction of Mucopolysaccharidosis Type I (MPS I) with Multipotent Adult Progenitor Cells (MAPCs) in an Immunodeficient Mouse Model

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## Lysosomal Storage Disorder

Characterized by skeletal abnormalities, hepatosplenomegaly, and neurological degeneration.

Deficiency of α-L-iduronidase (IDUA) enzyme

Build up of glycosaminoglycans (GAGs) heparan and dermatan sulfate

Current treatments fail to correct the majority of neurological symptoms

Transplanted multipotent adult progenitor cells (MAPCs) containing IDUA gene into immunodeficient mice

Cross-correction results in uptake of IDUA by defective cells

## MAPCs injected into the ventricles at 5 days of birth

### Rotarod Test

- 24 weeks old
- 3 trials each at 5, 15, 25, and 35 RPMs
- 5 consecutive days of training

www.harvardapparatus.com

### GAG levels

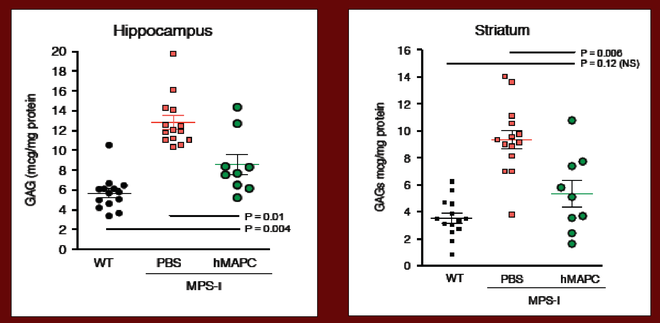
- Measure in various brain tissues
- Correlates to IDUA activity

### Immuno-histochemical staining

- Primary – mouse anti-GM3
- Secondary – goat anti-mouse
- Anti-human nuclei

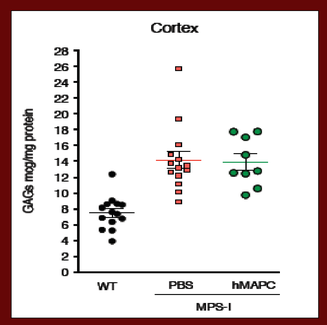
University of Minnesota's Institutional for Animal Care and Use Committee (IACUC) approved all animal-related protocols

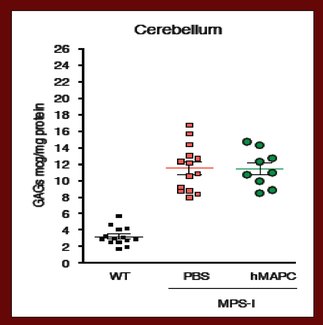
## Tissue GAG Levels Decrease



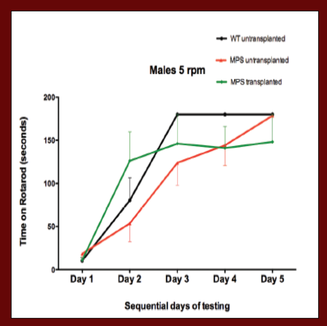


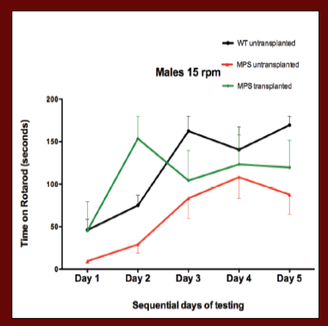


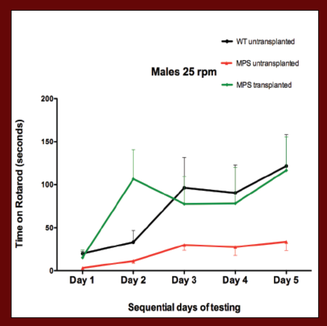


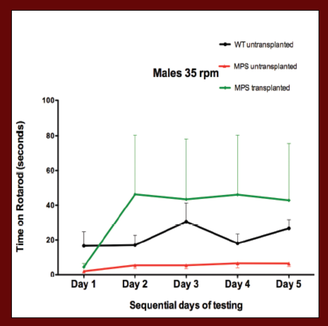




## Sensorimotor Function Improves

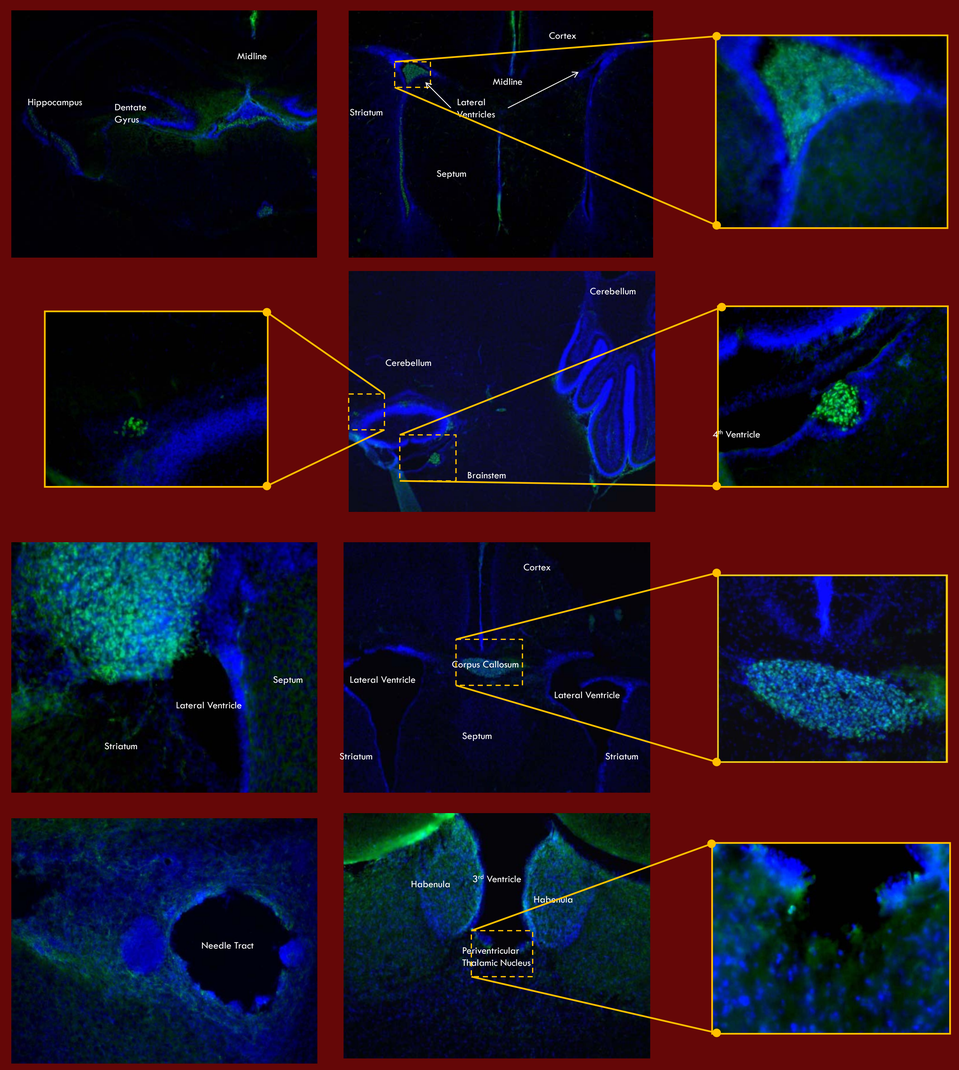



## MAPCs Diffused Throughout the Brain




Blue: DAPI Green: Anti-human nuclei

## Conclusion

Ameliorates neurological symptoms not treated by enzyme replacement and gene therapies

Promising treatment for the correction of Hurler Syndrome

Next steps: Long-term studies and trials on more complex species