Intranasal administration of enteric glia is safe and promotes neural tissue reconstruction in a rat model of brain injury

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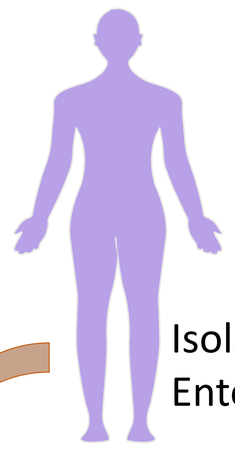
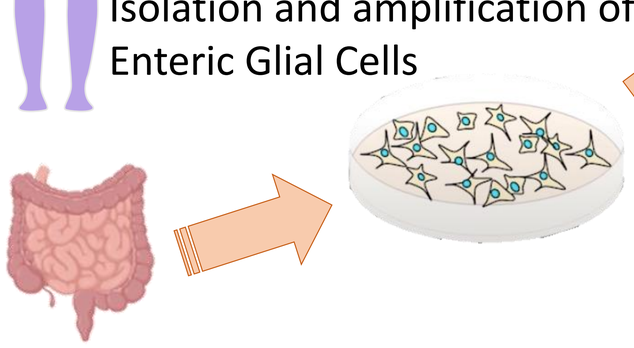
Introduction

After stroke, recovery essentially relies on rehabilitation and cerebral reorganization. The lesion leaves a cavity where tissue regeneration is limited. The therapeutic potential of glia in the enteric nervous system is appealing because of their plasticity and neurogenic ability. We sought to verify the effect of intranasal glial cells administration in a preclinical model of brain injury.

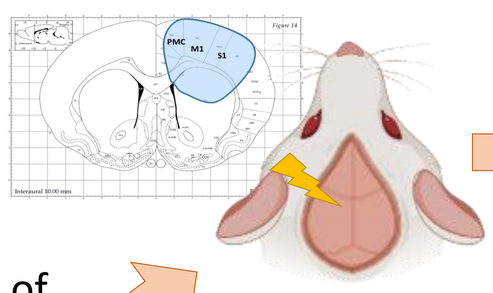
Materials & Methods



Isolation and amplification of Enteric Glial Cells

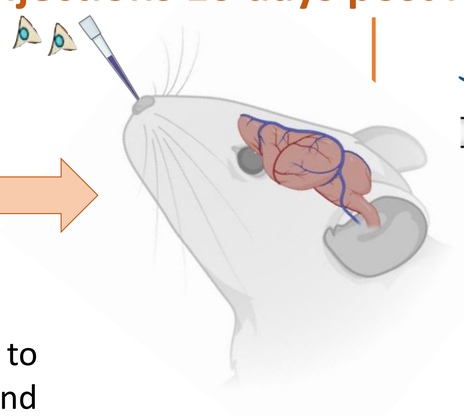


Lesion



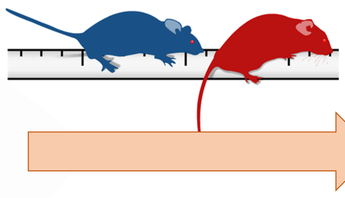
Malonate was used to induce M1 cortex and adjacent structure lesion in rats

Injections 10 days post lesion

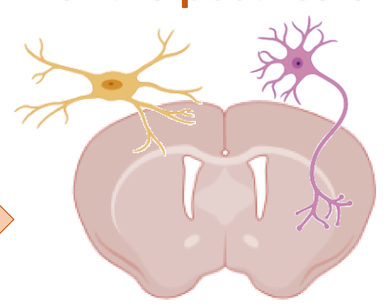


Enteric Glial Cells (EGC) or vehicle (PBS) were given intranasally 4 times in a month, ($5*10^5$ cells/administration) n=7 per group

9 months post lesion

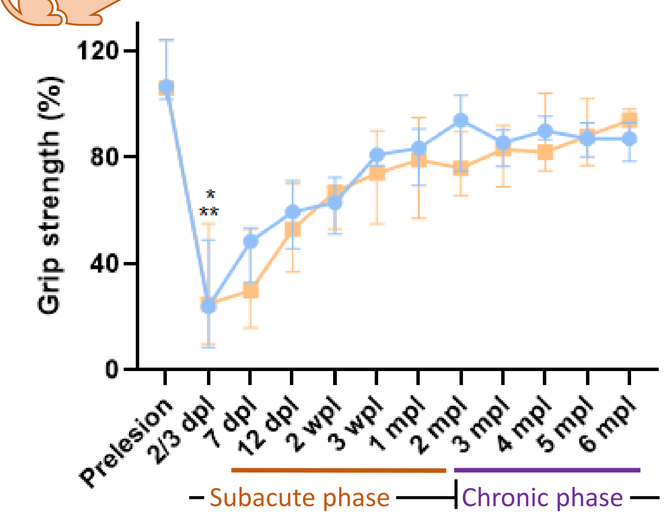


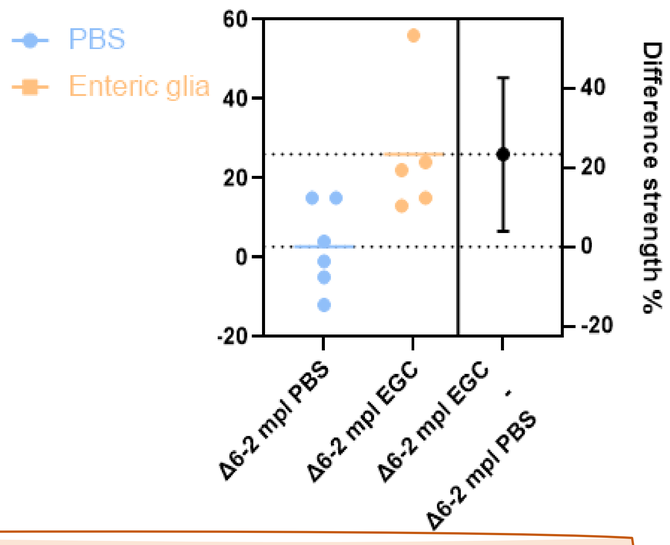
Behavior tests during 6 months



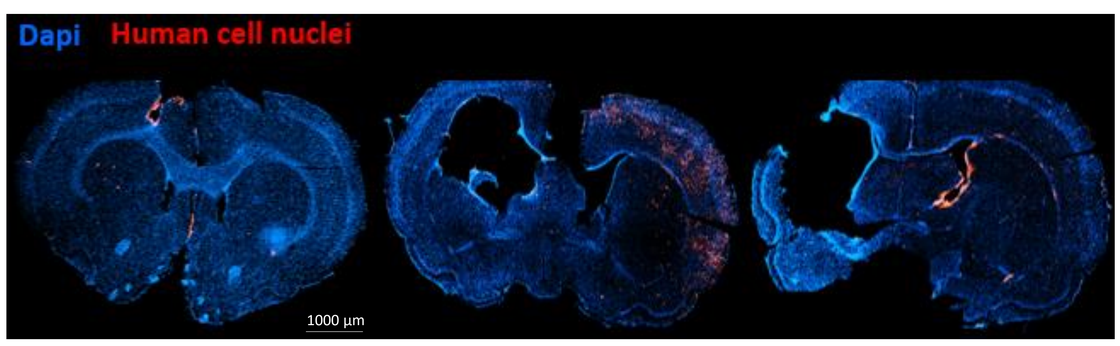
Histology

Results

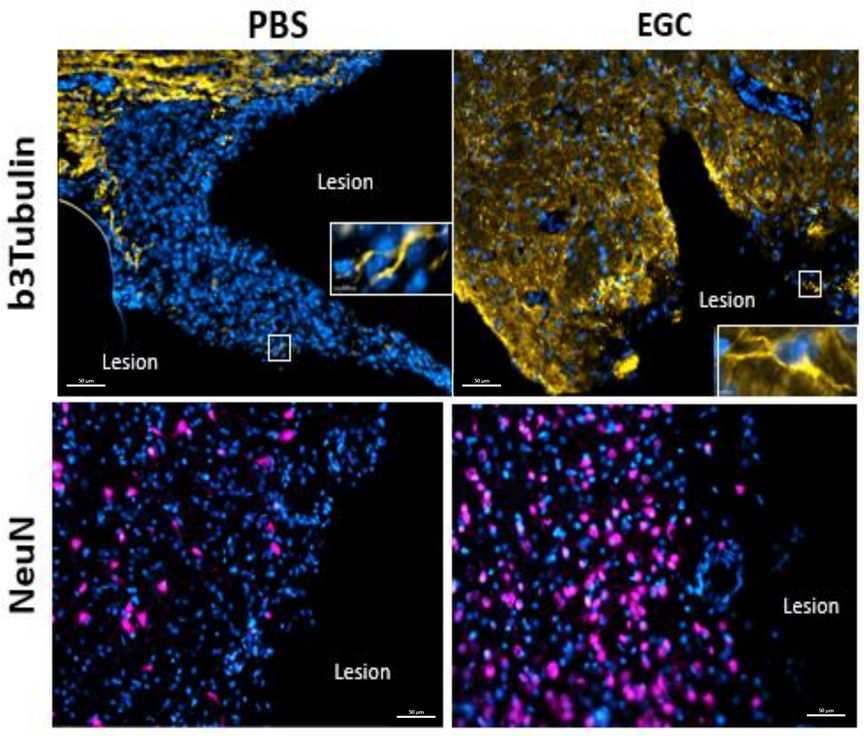


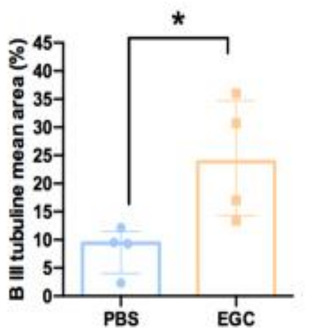


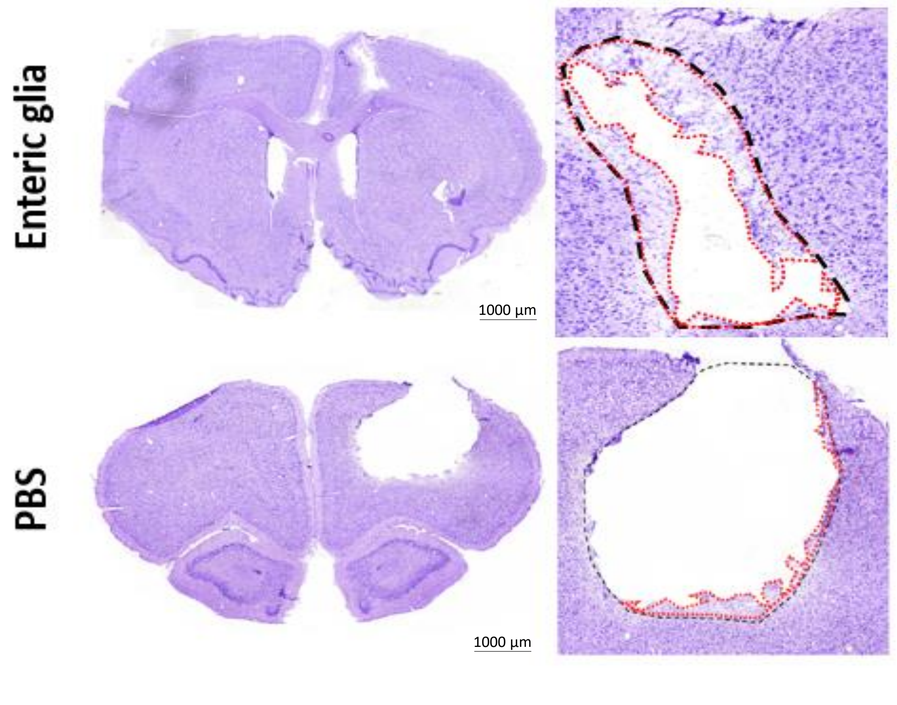
The chronic phase begins at 2 months for the control group. At 6 months compared to 2 months in the *Grip strength test* improvement was significantly increased in EGC-receiving rats (22% *vs* 1.5%, p=0.03*).

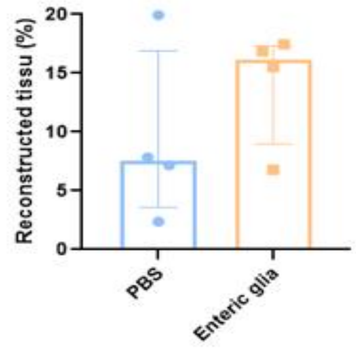


EGC administered intranasally were found in the lesion site.









At 9 months, we found an increase of mature and immature neurons in the new-formed tissue in EGC-receiving rats (35% *vs* 11%, p=0.029*; 24% *vs* 9%, p=0.028*). This new-formed tissue seems increase in EGC-receiving rats.

Conclusion

- Intranasal delivery of EGC was well tolerated by rats after acute brain injury.
- EGC have the potential to regenerate brain tissue.
- This is the first *in vivo* study that evidences the safety and efficacy of peripheral glia on tissue plasticity after brain injury.