Healthcare Innovations
How practice has changed

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Investigation into the effects of placental stem cells as an adjunctive therapy for hypoxic-ischaemic encephalopathy

F.Nooru-Mohamed[1], S.M. Miller [1,2], K.K. Chand [1,2], J.A. Wixey [1,2], E. Teo[1], L. Jones [1,2], J. Luff [1,2], S.L. Sim [3], J. Patel [3,4], K. Khosrotehrani [3], P.B. Colditz [1,2], S.T. Bjorkman [1,2]

[1] UQCCR, Faculty of Medicine, UQ | [2] Perinatal Research Centre, RBWH | [3] UQ Diamantina Institute, UQ | [4] Faculty of Health, QUT

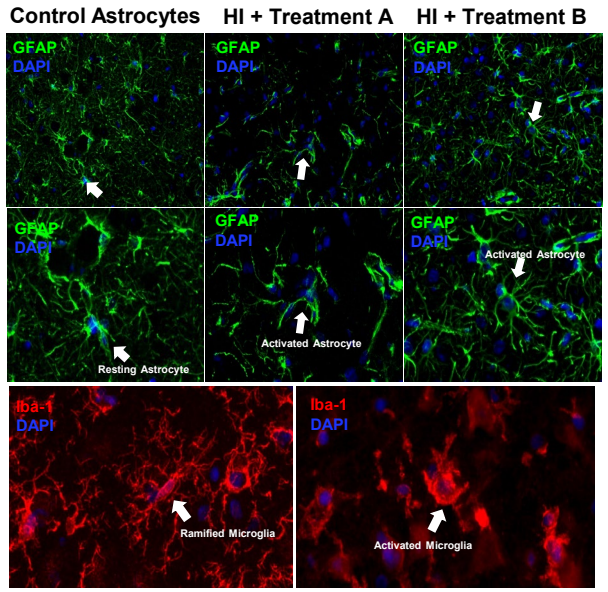
Background:

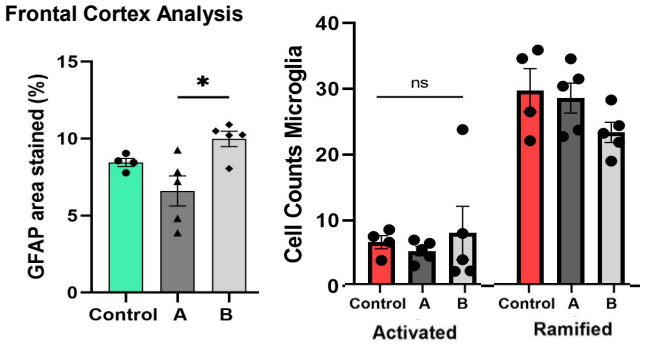
HIE is caused by an insufficient blood and oxygen supply to the fetal brain. It has a prevalence of 2.5/1000 live time births with many survivors developing an increased risk of lifelong disabilities like cerebral palsy. Therapeutic hypothermia (TH) is the only clinical standard of care for HIE, yet neurodevelopmental deficits continue to persist in 40-50% of treated patients. We believe that through a combination of placental stem cell (SC) therapy with TH, we can provide further neuroprotection and improve upon neonatal outcomes. Particularly through a modulation of inflammation.

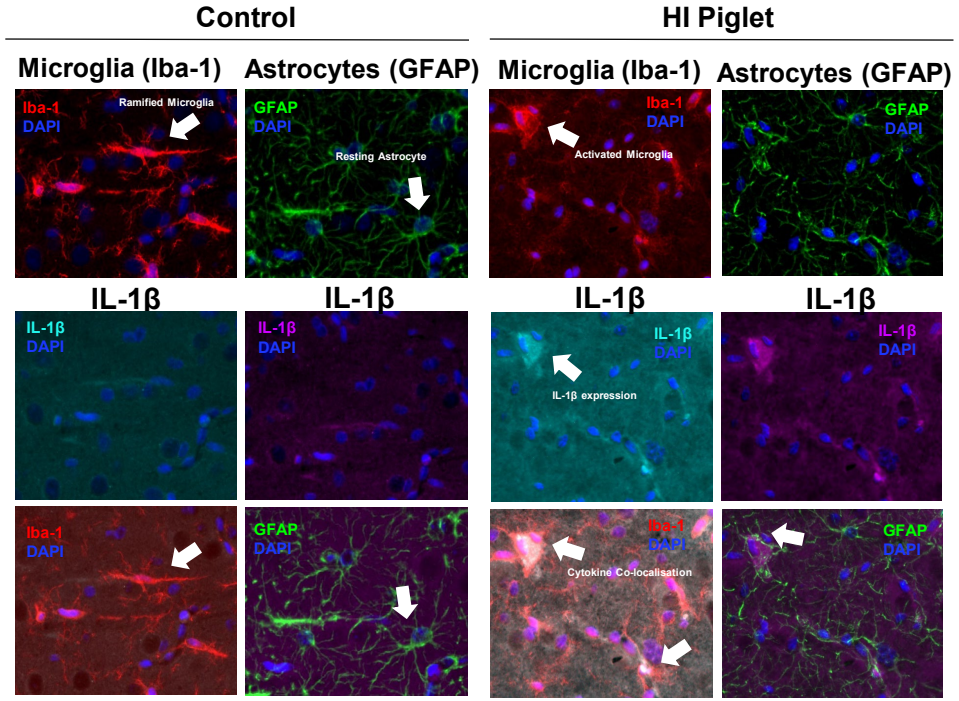
Primary aim: To observe combined TH and SC therapies effect on alleviating inflammation in the HIE brain.

Methods:

Following moderate HI-brain injury, piglets were administered placental SCs (1.000.000 cells; i.v) 2 h post-HI and immediately before TH treatment (33.5°C; 24h + 10h rewarm). 4-days post insult brains were extracted for analysis. Comparisons were made between HI + TH + SC and HI + TH + vehicle (VEH) labelled as treatment A and B against control shams. Stem cell treatments were randomized and blinded.







Significance:

Preliminary data shows a qualitative activation of an inflammatory response in the HI groups. HI Treatment A appears to have less astrocyte coverage, yet conclusions cannot be pulled as data is not yet unblinded. HI piglets show cytokine expression of 1L-1β in activated microglia providing evidence of an inflammatory response that requires treatment

Acknowledgments:

Thank you to the women who kindly donated their placenta, without whom this study would not be possible.