Transcription factor PRRX1 regulates human OPC differentiation, proliferation and migration
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Abstract
Multiple Sclerosis results in damage of the myelin sheath, oligodendrocytes and nerve cells. Consequently, proper conduction of electrical signals in the nervous system is hindered. Implantation of human oligodendrocyte precursor cells (hOPCs) can help to reverse the process and restore normal function. Our previous research identified specific expression of transcription factor PRRX1 mRNA by hOPCs in the developing human brain (Wang et al., 2014). In order to understand the role of PRRX1, we infected CD140a+ hOPCs in vitro with lentivirus expressing PRRX1a, PRRX1b or mCherry as a control. We assessed the effects on differentiation by immunocytochemistry for oligodendrocyte (O4) and astrocyte (GFAP) markers. We discovered that both PRRX1a and PRRX1b promoted differentiation into oligodendrocytes, and decreased migration of hOPCs in a transwell assay. We also observed that PRRX1 reduced proliferation of hOPCs. Therefore, PRRX1 is involved with OPC function and needs to be considered in OPC remyelination therapies.

Background
Remyelination of Damaged Nerve Cells

Origin and Development of Human Oligodendrocytes

Transcription Factors Responsible for Oligodendrocyte fate from Oligodendrocyte Precursor Cells

PRRX1a and PRRX1b promoted hOPC differentiation into O4+ oligodendrocytes rather than GFAP+ astrocytes

Results
PRRX1a and PRRX1b decreased proliferation of hOPCs

PRRX1 reduced hOPC migration in a transwell assay

Conclusions
• PRRX1a and PRRX1b promoted differentiation of hOPCs into O4+ oligodendrocytes rather than GFAP+ astrocytes.
• PRRX1a and PRRX1b reduced hOPC proliferation.
• PRRX1 decreased migration of hOPCs in a transwell assay.

Future Plans
• Does over-expression of PRRX1 improve remyelination in injected mice?
• What are the effects of PRRX1 over-expression in adult mice?
• What is PRRX1’s role in human development?

References

Future Plans

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