

Comparative gene expression analysis of human and mouse neural stem cells in the developing cortex

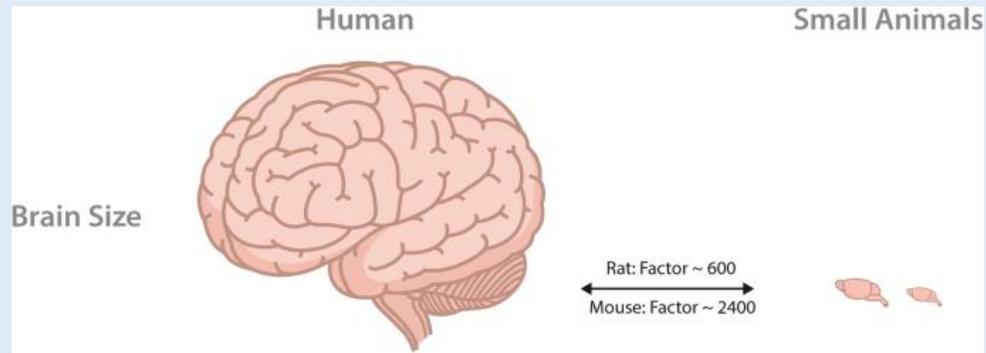
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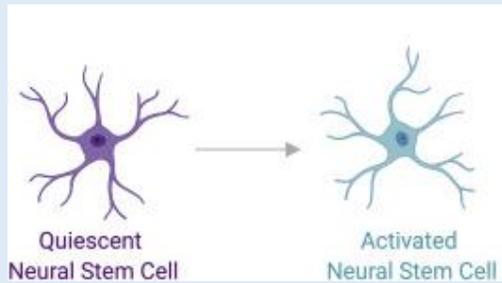
Background and aims

- 1) We would like to understand the human neocortex expansion which is critical for human specific brain functions (Lui, Hansen, & Kriegstein, 2011).
- 2) To understand the human cortical development, we investigated gene expression of neural stem cells and other brain cell types in the developing human cortex
- 3) To identify the genes specifically expressed in the human neural stem cells and other cell types, we compared gene expressions between developing human and mouse cortex using bioinformatic analyses.

Methods



Herfert et al., 2019



Negredo et al., 2020



Results – human data

- Compared to neural progenitor cells (NPCs), expression of a group of genes (STMN2, SYT1, DCX, SOX4, RTN1 and MLLT11) was markedly reduced in neurons and GABAergic neurons.
- Further expression differences can be found in the Figure 1 (below)

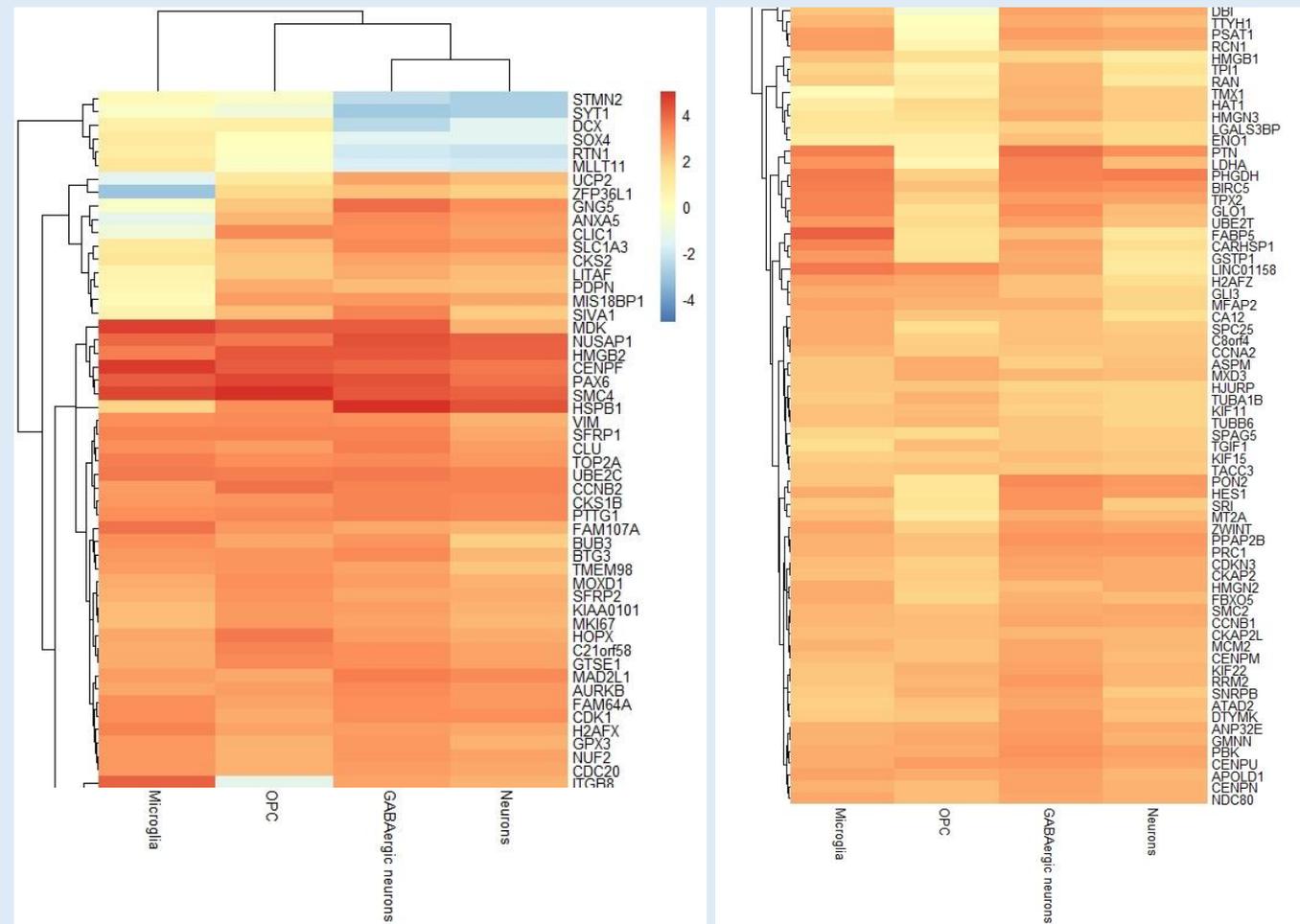


Figure 1 – gene expression levels in human brain cells (reference: neural stem cells)

Results – mice data

- Compared to neural stem cells, expression of *Tubb3* was markedly reduced in SVZ1 migrating, thalamic, striatal inh1 and inh2, Int1 and Int2 cells, as well as excitatory neurons. The expression of *Fabp7* was higher in these groups of cells than in neural stem cells
- Further expression differences can be found in the Figure 2 (on the right)

Conclusion

- Neural Stem Cells have different gene expression compared to other groups of cells in both mice and humans, which suggests involvement in different pathways during cortical development.
- Future research is recommended to directly compare the differential expression of genes in neural stem cells in mice and human.

Acknowledgements

I would like to thank Dr Eunchai Kang and Dr Thomas Hiscock for their support and guidance

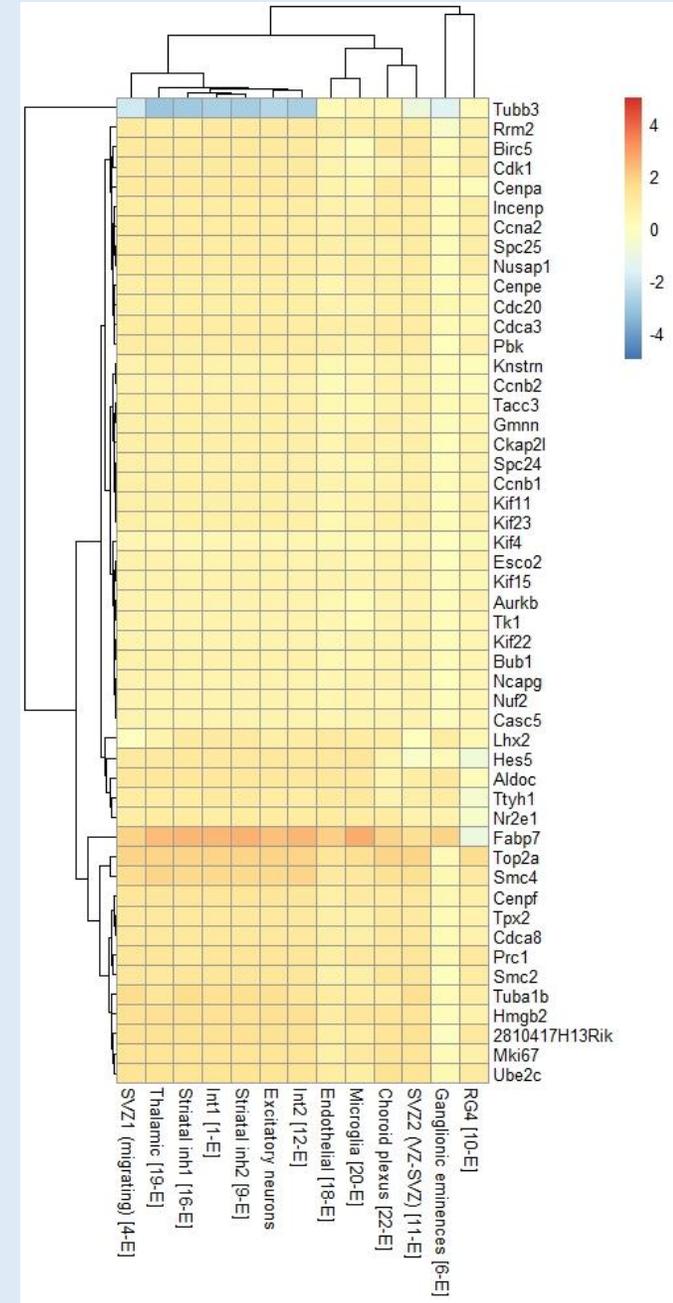


Figure 2 – gene expression levels in mouse brain cells (reference: neural stem cells)