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Data Article

Data defining markers of human neural stem cell lineage potential

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ABSTRACT

Neural stem cells (NSCs) and neural progenitor cells (NPCs) are self-renewing and multipotent cells, however, NPCs are considered to be more lineage-restricted with a reduced self-renewing capacity. We present data comparing the expression of 21 markers encompassing pluripotency, self-renewal (NSC) as well as neuronal and glial (astrocyte and oligodendrocyte) lineage specification and 28 extracellular proteoglycan (PG) genes and their regulatory enzymes between embryonic stem cell (ESC)-derived human NSCs (hNSC H9 cells, Thermo Fisher) and human cortex-derived normal human NPCs (nhNPCs, Lonza). The data demonstrates expression differences of multiple lineage and proteoglycan-associated genes between hNSC H9 cells and nhNPCs. Data interpretation of markers and proteoglycans defining NSC and neural cell lineage characterisation can be found in "*Cell surface heparan sulfate proteoglycans as novel markers of human neural stem cell fate determination*" (Oikari et al. 2015) [1].

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Specifications Table

Subject area	***Cell biology***
More specific subject area	*Human neural stem cell (hNSC) and human neural progenitor cell (hNPC) marker characterisation*
Type of data	*Text file, graphs and immunofluorescence images*
How data was acquired	*in vitro culture/expansion and phase-contrast fluorescence microscopy data for phenotypic analysis was obtained on an Olympus IX81 inverted fluorescent microscope via Volocity Imaging package; raw Q-PCR data was obtained on* Applied Biosystems 7900HT Fast Real-Time PCR system
Data format	*Analysed*
Experimental factors	*hNSC H9 and nhNP cells were cultured under basal medium conditions*
Experimental features	*hNSC H9 cells (Thermo Fisher) were cultured as a monolayer and nhNP cells (Lonza) were cultured as neurospheres in standard maintenance medium provided by the manufacturer. RNA was harvested and transcribed to cDNA and gene expression of a panel of 49 genes examined by Q-PCR. Specific neural cell lineage markers were further detected through immunofluorescence (IF)*
Data source location	*Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Queensland Australia*
Data accessibility	*Data is provided in this article*

- The data provides an extensive panel of markers for better characterisation of human NSCs and NPCs.
- The data demonstrates significant and specific differences in expression of pluripotency, NSC self-renewal and neural cell lineage markers between hNSCs and hNPCs.
- The marker profile data could be used to identify and differentiate between the two cell types to improve their efficacy in research or therapeutic applications.
- The data provides information on the proteoglycan profile of human NSCs and NPCs providing potential new additional markers defining lineage progression of NSCs to NPCs.

1. Data

We compared the expression of 49 selected genes between human NSCs (hESC-derived hNSC H9 cells, Thermo Fisher) and normal human progenitor cells (nhNPCs, Lonza) following short-term culture under basal growth conditions. Q-PCR data was obtained for pluripotency genes, NSC, neuronal, astrocyte and oligodendrocyte lineage defining genes ($n=21$; Table 1.) (Fig. 1) with several of these markers also detected through immunofluorescence (IF) (Fig. 2) using specific antibodies (Table 3). In addition, Q-PCR data was obtained for 28 heparan and chondroitin sulphate proteoglycan biosynthesis enzymes and core protein genes (Table 2) ubiquitous to the neural niche [1–7] in hNSC H9 cells and nhNPCs (Figs. 3 and 4). The data presented provides information on self-renewal and multilineage potential as well as proteoglycan expression differences between the two neural stem/progenitor cell types.

2. Experimental design, materials and methods

2.1. Cell culture

Gibco® human neural stem cells derived from NIH-approved H9 (WA09) embryonic stem cells (hNSC H9 cells) were cultured as a monolayer on Geltrex® coated culture dishes in StemPro® NSC serum-free medium (NSC SFM) containing KnockOUT™ DMEM/F-12 supplemented with 2% StemPro® Neural Supplement, 20 ng/ml FGFb and EGF and 2 mM GlutaMAX™ (cells and culture reagents obtained from Thermo