Image A

Human stem cell-derived neurons organise into efficient networks in vitro.

Image stack captured with LSM900 confocal at 10x. Neuron cytoskeleton stained with anti-beta tubulin and Alexa Fluor 488 (green) and nuclei counterstained with DAPI (blue).

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Publication link: https://www.nature.com/articles/s42003-024-06264-9

Image B

D40 wholemount Cortical Organoid showing multiple neural rosette formations (neural stem cells/early neural & glial progenitors (GREEN), early immature neuron development and organisation (PURPLE) and a population of integrated microglia progenitors (ORANGE). Taken on Miltenyi UltraMicroscope Blaze Light Sheet at 4X. Organoid is approx. 2.5mm in size.

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STEM CELL DISEASE MODELLING LAB

https://biomedicalsciences.unimelb.edu.au/sbs-research-groups/anatomy-and-physiology-research/stem-cell-and-developmental-biology/pebay-lab-stem-cell-disease-modelling#details

Image C

Close-up, z-projection of a Choroid Plexus organoid exhibiting the typical papillary protuberances of the specialised ChP epithelium (nuclei - HOECHST: BLUE, Phalloidin: YELLOW, PAX6: RED). Taken on the LSM900 ZEISS confocal at 10X, 135 steps, 2.5uM step size. (This organoid developed after an embryoid body failed to undergo proper neural induction and form cortical tissue).

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Image D

This fluorescent photomicrograph depicts a coronal mouse brain section immunostained for the dopamine marker tyrosine hydroxylase (pink) and calcium-binding protein parvalbumin (cyan). This image particularly highlights a cluster of tyrosine hydroxylase-expressing cells in the hypothalamus known as the A13 dopamine group, observed bilaterally in the middle of the image. These cells are of particular interest to our group given their role in aberrant fear expression - a hallmark of pervasive fear-related psychopathologies such as post-traumatic stress disorder.

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Image E

D40 wholemount Cortical Organoid showing spatial organisation of neural rosettes (nuclei: PINK, intermediate & glial progenitors: ORANGE), early neuron formation (neural cytoskeletons: PURPLE), early microglia/microglial progenitors (CYAN) and a centralised core of radial glia (GREEN). Taken on Miltenyi UltraMicroscope Blaze Light Sheet at 12X, using fast tiles. Organoid is approx. 2.5mm in size.

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Image F

Day 40 Cortical Organoid section showing neural rosette formation (nuclei, MAGENTA) and expression of TBR1 (CYAN) and CTIP2 (BLUE) indicitive of early deep-layer neuron and immature preplate development. Taken on the LSM900 ZEISS confocal at 10X.

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Image G

Day 40 Cortical Organoid section displaying neural rosette formation (nuclei, BLUE) and development of radial glia and early-intermediate neural progenitors (GLAST-1: YELLOW, TUJ1: MAGENTA). Taken on the LSM900 ZEISS confocal at 10X.

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Image H

Illuminating Bipolar Disorder: A Neural Symphony

A vibrant co-culture of iPSC-derived neurons (green, MAP2) and astrocytes (orange, GFAP) from participants with bipolar disorder. This dynamic network reveals the intricate cellular interplay within the brain, offering a window into the neurobiological foundations of mood disorders.

Bruna Panizzutti, Megan Ellis, Courtney Swinton, Ken Walder

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