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Engineering functional ventral midbrain dopaminergic neurons in human organoids through WNT modulation and bioreactor culture

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Hariam Raji: Mechanisms and Therapy of Genetic Brain Diseases

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Protocol status: Working

We use this collection of protocols for midbrain organoid generation, handling and analysis.

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Keywords: generation of human midbrain organoid, human midbrain organoid, treatment of midbrain organoid, midbrain organoid, neuronal activity in organoid, functional ventral midbrain dopaminergic neuron, apoptosis in organoid section, organoid activity, human organoid, mea recording of organoid activity, term exposure of organoid, confocal imaging of organoid tissue, organoid, organoid tissue, organoid section, immunohistochemistry, midbrain, apoptosi, confocal imaging

Abstract

This protocol collection includes the following protocols:

- **Human iPSC Culture:** Describes feeder-free maintenance and passaging of human iPSCs to preserve pluripotency for downstream differentiation.
- **Generation of Human Midbrain Organoids:** Outlines stepwise differentiation of iPSCs into midbrain organoids using defined patterning cues and dynamic culture.
- **Immunohistochemistry and Imaging:** Provides a workflow for fixation, sectioning, antibody staining, and confocal imaging of organoid tissue.
- **Fluorometric TUNEL Assay:** Details fluorescent TUNEL labeling and imaging to quantify apoptosis in organoid sections.
- **Treatment of Midbrain Organoids with α Syn-PFFs:** Describes controlled short-term exposure of organoids to α Syn-PFFs with matched vehicle controls.
- **MEA Recording of Organoid Activity:** Provides a procedure for measuring spontaneous and drug-modulated neuronal activity in organoids using MEA systems.

Files

 SEARCH

Protocol

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Dopamine measurement by HPLC

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MEA Recording of Electrical Activity in Brain Organoids

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Dopamine measurement in midbrain organoids by HPLC

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Treatment of midbrain organoids with α Syn-PFFs

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Human iPSC Culture Protocol

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Immunohistochemistry and Imaging of Human Midbrain Organoid Sections

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Ventral Midbrain Organoids generation from hiPSCs

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Midbrain organoid dissociation for Single-cell transcriptome library preparation and sequencing

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