SOCIETY for NEUROSCIENCE

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Module 2 Resource List: Directing the Differentiation of hPSCs Toward Neuronal Identities

The resources below were selected by Gabriele Ciceri, faculty from Module 2 of Stem Cells and Reprogramming Methods for Neuroscience: An SfN Training Series. These resources supplement their presentation, "Directing the Differentiation of hPSCs Toward Neuronal Identities."

Use these resources to better understand the directed differentiation of hPSC/iPSC toward a variety of neuronal lineages for the CNS and PNS. Resources are grouped according to the generation of neuron types.

Specification of Neuronal and Glial Subtypes from Human Pluripotent Stem Cells

Is This A Brain Which I See Before Me? Modeling Human Neural Development with Pluripotent Stem Cells

Pluripotent Stem Cells in Regenerative Medicine: Challenges and Recent Progress

These reviews provide general principles on neuronal differentiations of hPSCs, an overview on available technologies, and a critical discussion on current challenges in the field.

Highly Efficient Neural Conversion Of Human ES And Ips Cells By Dual Inhibition Of SMAD Signaling

Modular Platform For Differentiation Of Human Pscs Into All Major Ectodermal Lineages

These articles describe general platforms for the neural induction of CNS and PNS cell identities from hPSCs.

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Combined Small-Molecule Inhibition Accelerates Developmental Timing and Converts Human Pluripotent Stem Cells into Nociceptors

Isolation and Directed Differentiation of Neural Crest Stem Cells Derived from Human Embryonic Stem Cells

Wnt Signaling and a Smad Pathway Blockade Direct the Differentiation of Human Pluripotent Stem Cells to Multipotent Neural Crest Cells

Deriving Human ENS Lineages for Cell Therapy and Drug Discovery in Hirschsprung Disease

These articles described the generation of neural crest derivatives with a focus on hPSCs-derived sensory, autonomic and enteric neurons.

Restoration of Auditory Evoked Responses by Human ES-Cell-Derived Otic Progenitors

Specification of Functional Cranial Placode Derivatives from Human Pluripotent Stem Cells

Generation of Inner Ear Organoids Containing Functional Hair Cells from Human Pluripotent Stem Cells

Directed Differentiation of Human Embryonic Stem Cells Toward Placode-Derived Spiral Ganglion-Like Sensory Neurons

Human IPSC-Derived Trigeminal Neurons Lack Constitutive TLR3-Dependent Immunity that Protects Cortical Neurons from HSV-1 Infection

These articles describe platforms for the generation of sensory placodes and their further differentiation into spiral ganglion neurons, inner ear cells, and trigeminal neurons.

Accelerated High-Yield Generation of Limb-Innervating Motor Neurons from Human Stem Cells

Specification of Motoneurons from Human Embryonic Stem Cells

Combinatorial Analysis of Developmental Cues Efficiently Converts Human Pluripotent Stem Cells into Multiple Neuronal Subtypes

Modeling ALS With Motor Neurons Derived from Human Induced Pluripotent Stem Cells

These articles describe platforms for the generation of spinal motor neurons from hPSCs.

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Dopamine Neurons Derived from Human ES Cells Efficiently Engraft in Animal Models of Parkinson's Disease

Specification of Midbrain Dopamine Neurons from Primate Pluripotent Stem Cells

Predictive Markers Guide Differentiation to Improve Graft Outcome in Clinical Translation of hESC-Based Therapy for Parkinson's Disease

These articles describe the generation of midbrain dopaminergic neurons from hPSCs.

Generation of Serotonin Neurons from Human Pluripotent Stem Cells

This article describes the generation of hindbrain serotonergic neurons from hPSCs.

Efficient Generation of CA3 Neurons from Human Pluripotent Stem Cells Enables Modeling of Hippocampal Connectivity In Vitro

This article describes the generation of hippocampal pyramidal neurons from hPSCs.

Human Cerebral Cortex Development from Pluripotent Stem Cells to Functional Excitatory Synapses

Impaired Intrinsic Immunity to HSV-1 In Human Ipsc-Derived TLR3-Deficient CNS Cells

Pyramidal Neurons Derived from Human Pluripotent Stem Cells Integrate Efficiently into Mouse Brain Circuits In Vivo

Combined Small-Molecule Inhibition Accelerates the Derivation of Functional Cortical Neurons from Human Pluripotent Stem Cells

These articles describe the generation of cortical excitatory neurons from hPSCs.

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Coordination of Sonic Hedgehog and Wnt Signaling Determines Ventral and Dorsal Telencephalic Neuron Types from Human Embryonic Stem Cells

Directed Differentiation and Functional Maturation of Cortical Interneurons from Human Embryonic Stem Cells

Functional Maturation of Hpsc-Derived Forebrain Interneurons Requires an Extended Timeline and Mimics Human Neural Development

Efficient Specification of Interneurons from Human Pluripotent Stem Cells by Dorsoventral and Rostrocaudal Modulation

These articles describe the generation of cortical inhibitory neurons from hPSCs.

Chemical Modulation of Cell Fate in Stem Cell Therapeutics and Regenerative Medicine

This article provides an overview on the use of small molecules in hPSCs directed differentiations.