

COURSE READINGS
Biology 532B Winter 2020
DEVELOPMENTAL NEUROBIOLOGY SEMINAR

Wednesday and Friday, 10:00-11:30am
Rm S3/4 Stewart Biology Bldg.

Instructors

Dr. Don van Meyel (Coordinator)

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Jan 8

Introductory Lecture and Course Overview: Dr. van Meyel

Unit 1: Dr. van Meyel

Jan 10

Lecture: Births, Migrations and Deaths

Background reading:

Pinson et al. Malformations of human neocortex in development - their progenitor cell basis and experimental model systems. Front Cell Neurosci. 13:305 (2019).

Kyrousi and Cappello. Using brain organoids to study human neurodevelopment, evolution and disease. Wiley Interdiscip Rev Dev Biol. 9(1):e347 (2019).

Tasic. Single cell transcriptomics in neuroscience: cell classification and beyond. Curr Opin Neurobiol. 50:242-249 (2018).

Jan 15

Student Presentation:

Wang et al. ZEB1 represses neural differentiation and cooperates with CTBP2 to dynamically regulate cell migration during neocortex development. Cell Rep. 27(8):2335-2353 (2019).

Jan 17

Kostic et al. YAP activity is necessary and sufficient for basal progenitor abundance and proliferation in the developing neocortex. Cell Rep. 27(4):1103-1118 (2019).

Unit 2: Dr. Kania

Jan 22

Lecture: Specification and Diversification of Neurons

Background reading:

Lai et al. Making sense out of spinal cord somatosensory development. Development 143, 3434–3448 (2016).

Hernandez-Miranda et al. The dorsal spinal cord and hindbrain: from developmental mechanisms to functional circuits. Dev Biol. 432(1):34-42. (2017).

Wamsley and Fishell. Genetic and activity-dependent mechanisms underlying interneuron diversity. Nat Rev Neurosci 18: 299–309 (2017).

Jan 24

Student Presentation:

Oberst et al. Temporal plasticity of apical progenitors in the developing mouse neocortex. *Nature* 573: 370–374 (2019).

Jan 29

Student Presentation:

Paixão et al. Identification of spinal neurons contributing to the dorsal column projection mediating fine touch and corrective motor movements. *Neuron* 104: 749–764 (2019).

Unit 3: Dr. van Meyel

Jan 31

Lecture: Neuronal Polarity, Neurite Outgrowth, and Dendrite Morphogenesis.

Background reading:

Takano et al. Neuronal polarization. *Development*. 142(12):2088-93 (2015).

Lefebvre et al. Development of dendritic form and function. *Annu Rev Cell Dev Biol*. 31:741-77 (2015).

Feb 5

Student Presentation:

Dupraz et al. RhoA controls axon extension independent of specification in the developing brain. *Curr Biol*. 29(22):3874-3886 (2019). (also see **Comment on Dupraz**).

Feb 7

Student Presentation:

Stürner et al. Transient localization of the Arp2/3 complex initiates neuronal dendrite branching in vivo. *Development* 146(7). pii: dev171397 (2019).

Unit 4: Dr. Cloutier

Feb 12

Lecture: Axon Guidance.

Background reading:

Comer et al. Commissural axon guidance in the developing spinal cord: from Cajal to the present day. *Neural Dev* 14:9 (2019).

Feb 14

Student Presentation:

Gorla et al. Ndfip proteins target Robo receptors for degradation and allow commissural axons to cross the midline in the developing spinal cord. *Cell Rep* 26:3298-3312 (2019).

Feb 19

Student Presentation:

Harada et al. Extracellular phosphorylation drives the formation of neuronal circuitry. *Nat Chem Biol* 15:1035-1042 (2019).

Unit 5: Dr. Ruthazer

Feb 21

Lecture: Topographic map formation: activity-dependent plasticity of developing circuits.

Background reading:

Kutsarova et al. Rules for shaping neural connections in the developing brain. *Front Neural Circuits*. 10:111 (2017).

Priebe and McGee. Mouse vision as a gateway for understanding how experience shapes neural circuits. *Front Neural Circuits* 8:123 (2014)

Feb 26

Student Presentation:

Sun et al. Experience-dependent structural plasticity at pre- and postsynaptic sites of layer 2/3 cells in developing visual cortex. PNAS 116(43): 21812-21820 (2019).

Feb 28

Student Presentation:

Wong et al. RNA docking and local translation regulate site-specific axon remodeling in vivo. Neuron. 95:852-868 (2017).

Mar 4 and Mar 6 - No classes – Study Break

Unit 6: Dr. van Meyel

Mar 11

Lecture: Formation of Synapses and Neural Circuits.

Background reading:

Südhof. Towards an understanding of synapse formation. Neuron 100(2):276-293 (2018).

Allen and Eroglu. Cell biology of astrocyte-synapse interactions. Neuron 96(3):697-708 (2017).

Mar 13

Student Presentation:

Fossati et al. Trans-synaptic signaling through the Glutamate Receptor Delta-1 mediates inhibitory synapse formation in cortical pyramidal neurons. Neuron 104:1081-1094 (2019). (also see **Comment on Fossati**).

Mar 18

Student Presentation:

Nagai et al. Hyperactivity with disrupted attention by activation of an astrocyte synaptogenic cue. Cell 177:1280-1292 (2019). (also see **Comment on Nagai (1) and Comment on Nagai (2)**).

Unit 7: Dr. Fournier

Mar 20 (On-line course evaluation now open)

Lecture: Axon Regeneration

Background reading:

Chew et al. The challenges of long-distance axon regeneration in the injured CNS. Prog Brain Res. 201:253-94. (2012)

March 25

Student Presentation:

Tedeschi et al. ADF/Cofilin-mediated actin turnover promotes axon regeneration in the adult CNS. Neuron. 103(6):1073-1085 (2019).

March 27

Student Presentation:

Palmisano et al. Epigenomic signatures underpin the axonal regenerative ability of dorsal root ganglia sensory neurons. Nat Neurosci 22(11):1913-1924 (2019).

Unit 8: Dr. van Meyel

Apr 1

Lecture: Neural Stem Cells in Adults, and for Biomedical Research

Background reading:

Bond et al. Adult mammalian neural stem cells and neurogenesis: five decades later. Cell Stem Cell. 17(4):385-95. (2015).

Kempermann et al. Human adult neurogenesis: evidence and remaining questions. Cell Stem Cell 23(1):25-30 (2018).

Ardhanareeswaran et al. Human induced pluripotent stem cells for modelling neurodevelopmental disorders. Nat Rev Neurol 13, 265–278 (2017).

Apr 3

Student Presentation:

Berg et al. A common embryonic origin of stem cells drives developmental and adult neurogenesis. Cell 177:654-668 (2019). (also see **Comment on Berg**).

Apr 8

Student Presentation:

Moreno-Jiménez et al. Adult hippocampal neurogenesis is abundant in neurologically healthy subjects and drops sharply in patients with Alzheimer's disease. Nat Med. 25:554-560 (2019). (also see **Comment on Moreno-Jiménez (1)** and **Comment on Moreno-Jiménez (2)**).