

Regenerative Neurobiology N232

Winter 2020

Course Objective: This course will introduce students to the latest research on regenerative neurobiology. Both basic stem cell discoveries and their potential clinical application to brain disorders will be examined. The goal is to discuss the opportunities and pitfalls in the potential application of neural stem cells to brain repair. The course will be relevant to those interested in this exciting new field of brain research as well as those concerned with its distinctive policy and regulatory implications.

Lecture Time and Place: Wed. 1:00 – 3:50 in McGaugh Hall 1201

Course Code: 11512

Prerequisites: Completion of the neurobiology graduate core or permission of the instructors.

Instructors:

Dr. Mathew Blurton-Jones, mblurton@uci.edu

Dr. Sunil Gandhi, spgandhi@uci.edu

Class Notes: Lecture notes or slides will be made available for download on the course web site. The assigned readings will also be posted to the web site.

Office Hours: By Appointment.

Add & Drop Policy: Drops are handled exclusively through WebReg and the deadline is January 15th. The course can be added via WebReg until January 15th.

Grant Proposal and Review: By the end of the second week, you will select a grant proposal idea that pertains to stem cells and brain repair and submit a summary paragraph and three or so brief aims. In consultation with the instructors, you will develop a five-page, single spaced research plan. Following the format of the NIH NRSA F31 application, develop your proposal in three sections: significance, innovation and approach. The instructors will return the proposal with comments and you will prepare a final draft. Make use of figures or cartoons to convey your ideas. Each proposal will be assigned to multiple reviewers for evaluation. Assessments will be written up conforming to the format of NIH study section critiques and then discussed in class. The written proposal is worth two thirds of your final grade.

Participation: You are expected to come to class prepared to discuss the

assigned readings. Also, you are expected to take part actively in the mock study section review of the grant proposals. Overall, class participation is worth one third of your grade.

Lecture Schedule and Writing Deadlines

Date	Topic
Wednesday Jan. 8	Intro to neuroscience of stem cells Brain development and plasticity (article 1)
Wednesday Jan. 15	Rewiring of the adult brain Adult neurogenesis (Aims due)
Wednesday Jan. 22	Stem cells as therapeutic agents Replacement strategies
Wednesday Jan. 29	Survival and integration (article 2) Stress and exercise (First draft due)
Wednesday Feb. 5	Retinal repair (article 4) Autism and schizophrenia
Wednesday Feb. 12	iPS cells and reprogramming (article 3) Stem cell niches
Wednesday Feb. 19	Stroke and brain trauma Xenotransplantation (Final draft due)
Wednesday Feb. 26	Alzheimer's Parkinson's (Submit grant reviews)
Wednesday Mar. 4	Mock study section Mock study section
Wednesday Mar. 11	Rare pediatric disorders Clinical translation

Reading List:

- 1. Southwell DG, et al. Intrinsically determined cell death of developing cortical interneurons. Nature. 2012;491:109-113.**
- 2. Nicholas CR, Chen J, Tang Y, et al. Functional maturation of hPSC-derived forebrain interneurons requires an extended timeline and mimics human neural development. Cell Stem Cell. 2013;12(5):573-86.**
- 3. Takahashi K, Yamanaka S. Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors. Cell. 2006;126(4):663-76.**
- 4. Pearson RA, Barber AC, Rizzi M, et al. Restoration of vision after transplantation of photoreceptors. Nature. 2012;485(7396):99-103.**