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Frontiers in Stem Cells and Regeneration Advanced Training Course Sept. 30- October 6, 2018 MBL • Woods Hole, MA

Course Directors:

Ina Dobrinski, PhD (Univ. of Calgary)

Jennifer Morgan, PhD (MBL)

Organizing Committee: Diane Carlisle, PhD; Gloria Perez, DVM; Dorianne Mebane MBA

*All lectures are in Loeb G70, unless otherwise specified. Lab exercises are held in Loeb 306.
Meals are in the Swope dining room, 2nd floor. Breakfast: 7-8:30 AM; Lunch: 11:30 AM-1 PM;
Dinner: 5-7 PM.
Coffee breaks will be served in the Loeb basement corridor adjacent to the lecture hall.*

Sunday, September 30

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| 5:30 PM | Dinner, Café Swope (first floor) |
| 7:00 PM | Lecture: Introduction to Stem Cells
Diane Carlisle, U. Pitt. |
| 8:00 PM | EEO Information and Logistics:
Biosafety, Regulatory Restrictions, MOUs, and Team Assignments
Diane Carlisle, U. Pittsburgh |
| 8:15 PM | Course Participants' Introductions |

Monday, October 1

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| 9:00 AM | MBL Welcome
Rae Nishi, MBL Director of Education
MBL Orientation, MBL Staff |
| 9:45 AM | Lecture: Introduction to iPSCs and Germ Line Derivation
Chas Easley, U. Georgia |
| 10:30 AM | Coffee Break |
| 10:45 AM | Lecture: Introduction to Regeneration / Skin Regeneration
Jeff Biernaskie, University of Calgary |
| 11:30 AM | Lab Introductions: mESC derivation
Cal Simerly, U. Pittsburgh |

11:45 AM	Lab Intro: Human iPS Derivation, Culturing, and Differentiation into Spermatogenic Lineages Charles Easley, U. Georgia
Noon	Lunch
1:00 PM	Lab 1: <i>Instructor: Chas Easley. TA: TBA (U. Georgia).</i> In this lab, students will learn procedures for deriving and culturing human induced pluripotent stem cells. Additionally students will learn how to differentiate human pluripotent stem cells into advanced spermatogenic lineages and how to isolate haploid cells for further characterization. Lab 2: <i>Instructor: Cal Simerly. TA: TBA.</i> Mouse embryonic stem cell (mESC) derivation: Students will do immunosurgery technique on mouse expanded blastocysts to isolate the ICM in order to derive mESCs.
5:45 PM	Lab 3: <i>Instructor: Diane Carlisle. TA: TBA (U. Pittsburgh).</i> Students differentiate hESC into their cell lineage of choice using an embryoid body-based method. On Day 1, trainees will make embryoid bodies to work with during the rest of the week.
6:15 PM	Dinner
7:00 PM	Lecture: Somatic Cell Nuclear Transfer Jose Cibelli (MSU)
8:00 PM	Course Participants' Introductions

Tuesday, October 2

8:30-10:00 AM	AQMHD Session 9, Regeneration (Chair: Jennifer Morgan) (Location: Lillie Auditorium)
8:30 AM	Lecture: Growth Control of Regenerating Limbs James Monaghan, Northeastern University
8:50 AM	Lecture: Drawing and Manipulating the Blueprint of the Amphibian Limb Regenerate Kate McCusker, UMass Boston
9:10 AM	Lecture: Mechanisms of Spinal Cord Regeneration in Axolotls Karen Echeverri, Univ. Minnesota
9:30 AM	Lecture: Retinal Regeneration in Zebrafish Jeffrey Gross, U. Pittsburgh
9:45 AM	Talk from AQMHD abstracts
10:00 AM	Coffee Break
10:30AM-12:00 PM	AQMHD Session 10, Stem Cells (Chair: XXX) (Location: Lillie Auditorium)

10:30 AM	Lecture: Celina Juliano (UC Davis)
10:50 AM	Lecture: Stem cells and Regeneration in Planarians David Forsthoefer, Oklahoma Medical Research Foundation
11:10 AM	Lecture: Planarians as a Model for Spermatogenesis Labib Rouhana (Wright State)
11:30 AM	Talk from AQMHD abstracts
11:45 AM	Talk from AQMHD abstracts
12:00 PM	Special Topics Lunch with Vendor Sponsors TBD
1:15 PM	Lab Introduction: James Monaghan and Kate McCusker, Salamander limb regeneration Lab 1: <i>Instructors: James Monaghan and Kate McCusker; TA: Warren Vieira, U. Mass, Boston;</i> Regeneration in Salamanders: limb regeneration Lab 2: <i>Instructor: David Forsthoefer; TA: Christina Bruxvoort (OMRF).</i> Regeneration in planarians: blastema formation, proliferation, and remodeling
6:00 PM	Dinner
7:30-8:30 PM	AQMHD Lightning Talks (Location TBD)
8:30-10:00 PM	AQMHD Poster Session and Reception (Location TBD)

Wednesday, October 3

9:00 AM	Lecture: Picking Your Favorite - Cell Identification and Selection Strategies in Human Neural Stem Cell Biology Jan Pruszek, U. Freiburg
9:45 AM	Lecture: Intranasal mesenchymal stem cell transplantation as a neuroregenerative treatment for the repair of brain damage: mechanisms and therapeutic potential. Cobi J. Heijnen, MD Anderson
10:30 AM	Coffee Break
10:45 AM	Lecture: Discovering Gene Regulatory Networks that drive successful CNS Regeneration in Zebrafish Ava Udvadia, Univ. of Wisc. Milwaukee
11:30 AM	Lab Introduction: Isolating and Characterizing Neural stem cells using FACS strategy. Jan Pruszek Lab Introduction: Nerve regeneration in Animal Models Ava Udvadia

Noon	Lunch
1:00 PM	Lab 1: <i>Instructor: Jan Pruszek; TA: Vishal Menon.</i> In this laboratory, trainees will learn the techniques for isolating specific PSC-derived subsets of therapeutic and scientific relevance using flow cytometry. Lab 2: <i>Instructors: Ava Udvardi, Jen Morgan. TAs: Kendra Hanslik (MBL), Maria Replogle (UW-M).</i> Students will learn to quantify functional recovery after spinal cord injury in lampreys; and will perform experiments on optic nerve regeneration in zebrafish.
6:00 PM	Dinner
7:00 PM	Lecture: Regenerative Rehabilitation: Applied Biophysics Meets Stem Cell Therapeutics Fabrisia Ambrosio (U. Pitt/AR3T)
8:00 PM	Career Mentoring Discussion Facilitated by Jennifer Morgan (MBL) and other course faculty (*Please bring a copy of your CV)

Thursday, October 4

8:30 AM	Lecture: Neuroprotective and Regenerative Stem Cell Therapy in a Pig Stroke Model Franklin West, U. Georgia
9:15 AM	Lecture and Lab Intro: Translating Spermatogonial Stem Cell Transplantation to the Clinic Kyle Orwig, U. Pittsburgh
10:00 AM	Coffee Break
10:15 AM	Lecture: Large Animal Models to Study Germ Line Stem Cells Ina Dobrinski, University of Calgary
11:00 AM	Orwig Lab Prep: SSC transplantation demo Carlisle Lab Prep: Preparing differentiated cells for IF staining
11:45 AM	Course Photo
Noon	Lunch
1:00 PM	Lab 1: <i>Instructor: Diane Carlisle. TA: Tanisha Singh (U. Pittsburgh).</i> We will use differential immunocytochemistry staining to identify enriched populations in cells after directed differentiation. We will also check the pluripotency of hESC grown in different media to look for changes.

Lab 2: *Instructor: Kyle Orwig. TAs: Meena Sukhwani (U. Pittsburgh), Chatchanan Doungkamchan (U. Pittsburgh).* We will perform hands on SSC transplantation and colony counting in mouse to mouse SSC transplants.

6:00 PM	Dinner
7:00 PM	Discussion: Stem Cell and Regeneration Research Funding Ravi Ravindranath, NIH/NICHD
8:30 PM	T-Shirt Night Celebration

Friday, October 5

9:00 AM	Bioethics Lecture: Gene Editing and Reproductive Technologies: Ethical and Governance Challenges Vardit Ravitsky, U. Montreal
9:45 AM	Coffee Break
10:00 AM	ALUMNI LECTURE: Germline Specification in Planarians Labib Rouhana, Wright State University
10:30 AM	PIONEER LECTURE: <i>In situ</i> Sequencing & Human Transcription Factor Library for <i>in vitro</i> Development George Church, Harvard
Noon	Lunch
1:00 PM	<i>Finish all ongoing experiments, ~30 min per lab:</i> Lab 1: <i>Instructors: Cal Simerly, Randa Bawadi.</i> Check on mESC derivation. Lab 2: <i>Instructors: David Forsthoefel, Christina Bruxvoort:</i> Evaluate blastema formation and intestinal remodeling
2:00 PM	Lab 3: <i>Instructors: James Monaghan, Kate McCusker:</i> Image blastemas. Lab 4: <i>Instructor: Chas Easley. TA: Alyse Steves:</i> Analysis of iPSCs using microscopy.
3:00 PM	Optional: Tour of Marine Resources Center and MBL and Free Time
5:00 PM	FOUNDER'S LECTURE: Jerry Schatten, U. Pitt.
6:00 PM	Break
6:30 PM	Banquet: Café Swope
8:00 PM	Presentation of Student Certificates Ina Dobrinski, Jennifer Morgan

Saturday, October 6

Check out of rooms before 10:00 AM

Thank you to the following course sponsors who have contributed to the course by loaning equipment and/or donating reagents and supplies: TBD