

Proposal for a Designated Emphasis in Stem and Progenitor Cells

Administrative Home: School of Medicine

Proposed Chair: Professor Alice Tarantal

Proposal: October 26, 2009

Approved by the Graduate Council: February 22, 2010

1. Description of the Designated Emphasis in Stem and Progenitor Cells (DESC)

The Designated Emphasis in Stem and Progenitor Cells (hereafter referred to as the DESC) is organized primarily to provide graduate training consistent with a specialization in the study of stem and progenitor cells and related subjects, and in conformance with the rules and procedures of the Office of Graduate Studies of the University of California, Davis (UC Davis) campus. Successful completion of the DESC would indicate that the recipient of the chosen Ph.D. degree program has received additional training in stem and progenitor cell biology and medicine. While there are currently other designated emphasis programs at UC Davis, none address the depth and breadth of stem cell research that will be addressed in this designated emphasis program. This program will allow graduate students to fully explore and participate in formal training that will provide a broad approach on the basic biology and potential clinical applications of stem and progenitor cells, and ensure they are well-versed and educated in all relevant areas such as the basic biology, use for regenerative medicine purposes, ethical, legal, and social implications of stem cell research, and related educational experiences. These areas will provide a cohesive framework to educate the students on current and relevant issues, and to become successful investigators in the field of stem cell biology and medicine.

DESC Mission: To advance the field of stem cell biology and medicine and educate and train the next generation of investigators with expertise in this and related areas. The DESC will also provide opportunities for extended multi-disciplinary training. For example a student working toward a Ph.D. in biomedical engineering could identify a designated emphasis in stem cell biology. UC Davis also has several training grants (e.g., autism, biomolecular technology, comparative lung biology and medicine, comparative medical science, engineering approaches to molecular imaging, fertilization and early development, environmental pathology, infectious diseases, mentored clinical research, molecular and cellular biology, nutrition, veterinary student research, vision research, stem cells) from which students can be identified for a designated stem cell emphasis, and broaden the different applications of this field of research.

2. Description of the Academic Nature of the Designated Emphasis

A. Affiliated Ph.D. Programs List

Biomedical Engineering
Comparative Pathology
Neuroscience

Chairs of other graduate groups may request inclusion in the DESC by petitioning the DESC Executive Committee and obtaining approval by the Graduate Council.

B. Chairs' Letters

Attached

C. Affiliated Faculty

The faculty members listed below have expressed an interest in participating in the DESC. Letters from each faculty member are attached.

Biomedical Engineering Graduate Group

Kyriacos Athanasiou
Simon Cherry
Thomas Huser
Thomas Jue
Kent Leach
Jan Nolta
Tingrui Pan

Neuroscience Graduate Group

Robert Berman
Hwai-Jong Cheng
Elva Diaz
Qizhi Gong
Noelle L'Etoile
Paul Knoepfler
Isaac Pessah
David Pleasure
Frank Sharp
Ana Vazquez

Comparative Pathology Graduate Group

Kent Lloyd
Jan Nolta
David Pleasure
Alice Tarantal
Scott Simon

D. Admissions Criteria

A graduate student in good standing in the affiliated programs must declare an interest in the DESC program before completing the first Ph.D. year, to have an optimal career impact precisely when they are selecting dissertation mentors and formulating thesis research proposals. They will have completed basic course instruction in their chosen discipline and instruction in essential laboratory techniques. First-year graduate students will be recruited by their mentors and based on: 1) academic credentials, and 2) motivation for the study of stem and progenitor cell biology and medicine research. Students must be selected by their mentors and proposed to and approved by the Executive Committee prior to taking the Ph.D. Qualifying Examination of their degree program.

E. Curriculum

1) Required Courses for the DESC (8 units)

The curriculum for the designated emphasis will consist of the following core components, currently established courses:

- a) **Animal Cell Culture Laboratory (MCIP 200L, 4 units).** Techniques of cell culture, with emphases on cell physiology and the actions of drugs and toxicants on cultured somatic cells. Design, performance and interpretation of experiments with animal cells *in vitro*.
- b) **Basics of Stem and Progenitor Cells (CLH 220, 1 unit)** For graduate students who have experience in cell culture techniques. Current cell culture techniques and methodologies will be described, and a current text and relevant publications will be required reading. Students will participate in a laboratory class for hands-on experience in the culture of stem or progenitor cells specific to their research interests as needed. The hands-on training will be tailored to each individual student.
- c) **Ethical Issues in Stem Cell Biology (CLH 222, 1 unit).** Social, legal, and ethical aspects of stem cell research will be addressed. Upon completion, students will be able to articulate the values underlying their research, appreciate the philosophical positions regarding human embryonic stem cell research, understand leading articles in the scientific and bioethical literature on stem cell research, and pass the required on-line test "Human Participant Protection Education for Research Teams."

- d) **Hot Topics in Stem Cell Biology (CLH 290D, 1 unit)**. Seminar series with monthly presentations by guest lecturers on subjects of their own research. Speakers will interact with students in round-table discussions over lunch following the seminar.
- e) **Literature in Stem Cell Biology (CLH 221, 1 unit)**. Journal club that meets weekly in which students will critically present and analyze recent journal articles in stem and progenitor cell biology.

2) Elective Courses (variable)

Elective courses may be recommended by the Adviser and mentor. These courses would be recommended on an individual basis, after considering the student's background and particular area of research, and if more advanced study in a particular area was needed. These would not necessarily be required and depend on the courses already taken and the student's skill level. A list of related courses is attached in Appendix A.

3) Qualifying Examination (QE)

The Ph.D. qualifying examination shall include examination of knowledge within the designated emphasis. At least one faculty member of the designated emphasis program shall participate as a member of the QE committee to examine the student on the DE content. Satisfactory performance on the QE for the Ph.D. will be judged independently from the performance in the DESC. Thus, an allowable outcome of the QE is that the student's performance may be a "Pass" for the Ph.D. but a "Not Pass" for the DE. In the event that a student passes the Ph.D. portion of the QE, but receives a "Not Pass" on the DE portion, the Executive Committee of the DE will define a plan for remediation. The plan may include, but is not limited to re-examination by the DE Executive Committee, coursework, teaching, or preparation of a paper. If the student is re-examined, the outcome is limited to "Pass" or "Fail". If the student receives a "Fail", the student is disqualified from the DE program.

4) Dissertation Requirements

The dissertation topic shall incorporate study within the DESC. The dissertation committee shall include at least one faculty member of the designated emphasis.

5) Degree Conferral Process

The DESC will be awarded solely in conjunction with the Ph.D. and will be signified by the degree designation "Ph.D. in X with Emphasis in Stem and Progenitor Cells."

6) Student Advising

The Chair of the DESC or their designee will advise students, and will meet at least annually with the student. The adviser has the responsibility to confirm that the student has fulfilled all the DE requirements prior to graduation by signing the Final Verification form for a Designated Emphasis: <http://www.gradstudies.ucdavis.edu/forms/dereport.pdf>

3. Administrative Matters

A. Bylaws – Attached

B. Resources

No additional resources are required. The School of Medicine—Administration will maintain all associated administrative records and student tracking.