A Unified Stem Cell Curriculum for Higher Education

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PROGRAM ON STEM CELLS IN SOCIETY
STANFORD CENTER *for* BIOMEDICAL ETHICS

Abstract

Developing, implementing and teaching stem cell biology courses in higher education presents special challenges and opportunities. These include:

- institutional appetite
- departmental turf
- multidisciplinary topics
- subject matter expertise
- student demand
- need for public outreach
- a young and rapidly evolving field

Here we describe a successful approach to undergraduate and citizen stem cell education developed by the Stanford University Program on Stem Cells in Society with assistance from The Program in Human Biology and the Program in Continuing Studies

Course Detail

Human Biology 157

- Winter quarter 2006 and 2007
- 10 weeks, 3 upper class credits
- 20, 90' lectures
- 10, 60' discussion sections

- topics based on assigned reading of one research paper discussed during lecture

- Average enrollment: 36
- Average audit/guest: 15
- 15 instructors

- eight departments, three schools and two universities represented

Continuing Studies 053

- Winter/summer quarter 2006-07
- 10 weeks, three credit hours
- Average enrollment: 25

- students include Stanford faculty, staff, biotech executives and other professionals

- 10, 110' sessions
- 7 instructors

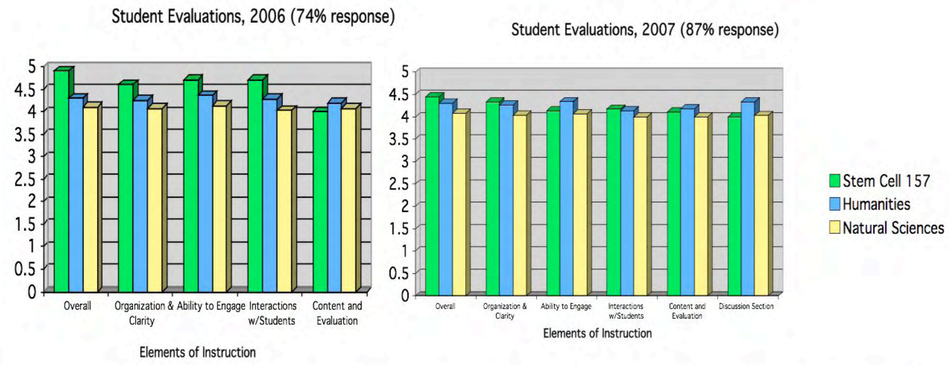
- includes Stanford faculty, biotech scientists and executives from the California Institute of Regenerative Medicine

Curriculum

Major Topic Areas

1. Gene expression and signaling
2. Introduction to stem cells
3. The niche
4. Neural stem cells
5. Hematopoietic stem cells
6. Cancer and the cancer stem cell
7. Imprinting and gametogenesis
8. Embryology and Reproduction
9. Embryonic stem cells
10. Derivation and nuclear transfer
11. Reprogramming
12. Ethics: moral status of the embryo
13. Ethics: research and clinical trials
14. Law: IP, regulation and oversight
15. Policy: national and international

Student Evaluations & Testimonials



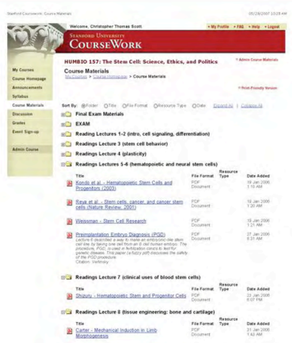
- "K.P. was an excellent section leader, the best I ever met in my educational career"T.Y.
- " This was by far my most interesting class this quarter, and perhaps even at Stanford. I had come into the class expecting more of a focus policy and ethics side, but I've come to see that a strong grasp of the biological concepts are essential to inform both policy and ethics." K.K.M.
- "It was easily one of my favorite academic experiences at Stanford and quickly sparked my interest in the area of stem cells. I am a student advisor for the Human Biology program and have strongly encouraged students to take the class next year." L.R

Sample Discussion Readings

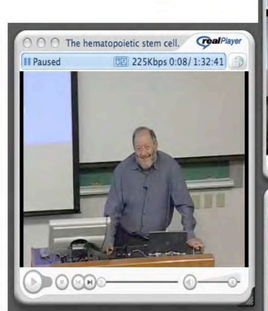
Rideout, et al. "Correction of a genetic defect by nuclear transplantation and combined cell and gene therapy." *Cell, 2002.*
Hochedlinger, K. and Jaenisch, R. "Nuclear programming and pluripotency."*Nature, 2006.*
Meilanender, G. "The point of a ban, or how to think about stem cell research." *The Hastings Center Report, 2001*

CourseWork web tool includes lecture notes, videos, syllabus, readings, exams, enrollment information and grades

Announcements include course information, stem cell events, seminars and symposia held on campus and in the Bay Area

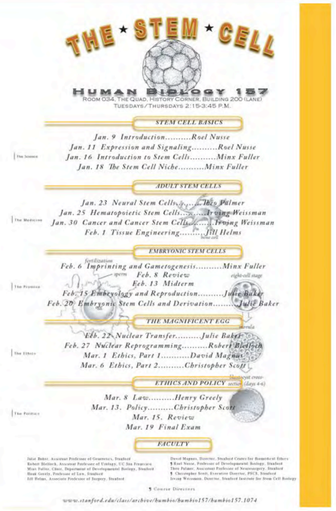


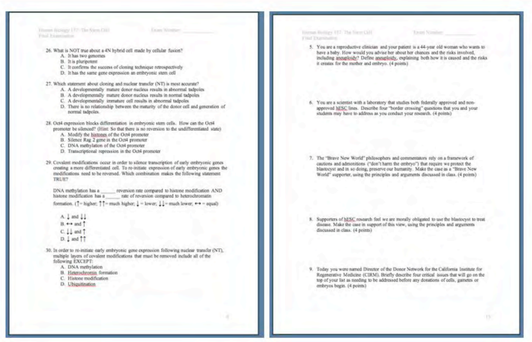
Course materials include lecture notes, required readings, video streaming links and exams



Video streaming available after each lecture

Interactive approach, with journal-club style discussion sections





- Sections test the understanding of concepts presented in class
- Multiple choice, fill-in, T/F and short essay questions form the basis of midterm and final examinations
- Citizen classes require an 8-10 page paper