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Class : Room 465 T/Th 10:00am- 11:40am
Office: Room 460, 65 West 11th Street **Office Hours:** Thurs 3:00-4:00pm/Wed by appt

"We are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline

--"(Popper, K. R. Conjectures and Refutations: The Growth of Scientific Knowledge. New York: Routledge and Kegan Paul, 1963, p. 88. 1963).

Course Description:

Though news stories highlight the societal implications of scientific advances, they sometimes skim over the basic science or take it out of context while college biology textbooks rarely explore the dynamic interplay between science and society. Not surprisingly, most students today acquire a vast sum of information but may not know how to piece it altogether; I hope this course will rectify this problem.

Here we will use a spiraling approach to teaching stem cell biology; the same topic will be revisited at different points in the course to allow for an unraveling of the complexity over time and space. Using an interdisciplinary approach we will integrate the biological, ethical, legal, and social dimensions of embryonic stem cell research. Periodically, you will be asked to apply what you have learned using real world **case studies** that address challenges at the state, national, and international level so that you can make connections between what you learn in the classroom and what is portrayed in everyday life. Because the curriculum is part of an educational initiative funded by NYSTEM (The New York State Empire Fund for Stem Cell Research), I encourage you to view NYSTEM activities by attending, or viewing, The Ethics Committee and/or the Funding Committee meeting or other local events designed to highlight stem cell research. At the culmination of this course, there will be a capstone activity involving decision-making based on recent current events.

Part of your work will revolve around a self-designed project that informs the public about a stem cell or a stem cell related phenomenon. The project can be based on one of the outside events associated with the course, and take the shape of a newspaper column, web site, a blog entry, radio show, student chapter for stem cell research, advertising campaign, book review, info graphic, or educational workshop. It may also be a creative work coupled with an artist's statement about the design process. We will be viewing artwork by scholars and alumni of the ArtSci movement (Hela Covert; Haseltine; PS; Epigenetics Dance; Frankel; Briganti').

Learning Outcomes

1. Differentiate the various methods of developing stem cell lines and the implications for research and therapy. (biology, scientific method, disease and therapy)
2. Categorize and summarize evidence-based arguments for and against the liberalization of hESC and the ways in which policy has been shaped by these competing positions. (policy & advocacy)
3. Recognize the dominant narrative in which scientific research is positioned as progress and question the benefits and dangers associated with SCR as compared to other approaches used to promote social good. (values, feminist approaches, disability rights)
4. Recognize and correct basic errors in representations of the scientific, ethical, and social dimensions of stem cell research (communication)
5. Trace the history of: cell; human subjects research; the forms of compensation that have been used in the past to balance the risks and benefits of research participation; and the formation of new regulatory structures designed to provide oversight of emerging practices.(history)

**Semester at a Glance: The context is not visible in this one-page overview
Full syllabus with context on page 5.**

Jan 25	Stem Cell Research Promise and Hype
Jan 27	Science the Endless Frontier?
Feb 3	Film Screening of Eggsplotation by Jennifer Lahl.
Feb 3	Stem Cell Research: The National Level
Feb 5th	Stem Cell Research: The State Level
Feb 8	The 1 st Human Cell Line: HeLa , Race, Class, & Gender Case
Feb 10	Case #1: HeLa
Feb 12	TNS Saturday The Body and State: How the State Controls and Protects the Body
Feb 15	How Do Cells Work: Cell Proteins and Genes
Feb 17	How Do Cells Regenerate? Planaria Lab
Feb 22	What Influences Cell Fate: Genes in Time and Space
Feb 24	Natural Stem Cells: Embryos, Umbilical Cord, Adult
Mar 1	Artificial Stem Cells: Clones, Parthenotes, iPS
Mar 3	Genetics and Genetic Reprogramming
Mar 8	Genetics and Genetic Reprogramming
Mar 9	Rebecca Skloot Book Signing and Reading Barnes and Noble Union Square
Mar 10	**Midterm Exam
Mar 15	Spring Break
Mar 17	Spring Break
Mar 22	Chimera, Hybrids, and Cybrids
Mar 24	Female Bodies and Stem Cells: The Egg /Womb/ Fat/ Breasts
Mar 29	Egg Retrieval: The Risks and Benefits
Mar 31	Commodification of Female Bodies
Apr 1-3	NYAS International Conference on Ethical Issues on Biomedical Engineering
Apr 5	Case #2 NY Compensation for Oocytes
Apr 7	Religious, Moral, and Political Philosophies
Apr 7	NYSCF Public Event on Stem Cell Research and Parkinsons
Apr 12	Advocacy & Policy: Birth, Death, & Clones
Apr 14	Case #3 FDA and Regenerative Sciences Injunction: Moral or Economic Reasoning
Apr 19	Private Sector SCR Advances
Apr 21	Disability & Advocacy
Apr 26	Patents and Protections
Apr 28	Biobanks and Public Access
Apr 29	Social Text Volume 106: Interspecies Launch Party
May 3	Final Assessment /Exam
May 5	Outreach Project Presentations
May 10	Outreach Project Presentations
May 12	Case #4 NYSTEM Capstone

Portfolio

All of your work for the semester will be collected in a **BB portfolio** so that we can monitor your progress. To maximize your understanding of the assigned reading material, I will provide review questions, assignments, guidelines, and rubrics for interpreting the literature, and encourage you to bring questions to class. Get comfortable taking notes and bringing the readings to each class.

Special Events:

BB will have science-related events that take place in NYC. Some are listed below.

- NYSTEM Committee Meetings (Ethics, Funding) <http://stemcell.ny.gov/events.html>
- NYU Kimmel Center for Stem Cell Biology Seminars:
http://www.med.nyu.edu/kimmelcenter/seminars/stemcell_club.html
- Columbia U Stem Cell Seminars: <http://stemcell.columbia.edu/current-seminars.html>
- Rockefeller Events: <http://featuredevents.rockefeller.edu/>
- Feb 3- 8 ReelAbilities Disability Film Festival <http://www.reelabilities.org/schedule>
- Feb 3: Film Screening of Eggsplotation: Documentary by Jennifer Lahl.
- Feb 12: The Body and State: How the State Controls and Protects the Body focused on egg trafficking, reproductive technologies, and the patenting and ownership of cells and tissues
<http://www.newschool.edu/cps/body/>
- February- The Way of All Flesh Film Screening by Adam Curtis. TBD
- March 9: Rebecca Skloot Book Tour Event Barnes And Noble Union Square
<http://rebeccaskloot.com/events/>
- April 7: The New York Stem Cell Foundation will be hosting a conference on Parkinson's
<http://www.nyscf.org/events/upcoming-events/item/701-parkinson's-disease-how-stem-cell-research-will-make-a-difference>
- April 8 Felice Frankel Artist Scientists Parsons Guest Lecture in Hybrid Culture Class
- April 1-3 The New York Academy of Sciences Int Conference on Ethical issues in Biomedical Engineering . <http://www.nyas.org/Events/Detail.aspx?cid=6a4fb53f-9b09-41c0-b787-42cbc242d14c>

BOOK: Degette, D.2008. Sex, Science and Stem Cells: Inside the Right Wing Assault on Reason. Lyons Press. 272. Can be purchased at Bluestockings bookstore for \$25.00 or at the Strand. Book Sellers will be on campus the second day of class <http://bluestockings.com/>. All other readings on Bb.

Recommended Books: A list of Recommended books will be available as a separate document and posted on Bb with price, availability and brief synopsis. In addition, journals, websites, and societies with a focus on situating science in context will also be included. For more on this see www.situsci.ca.

COURSE EXPECTATIONS:

Policy on Attendance and Lateness Policy: Participation is key to seminar pedagogy. Students are expected to attend classes regularly and promptly. For this course it is imperative to attend all classes. If you miss class it is your responsibility to check with me and Blackboard for changes or updates, obtain class notes and obtain information from the session from another person in class. For courses that meet twice a week, more than 4 absences will result in a failing final grade. If a student is more than 10 minutes late to a class, this will count as an absence. In case of personal and medical emergencies, students should contact their instructors as well as the Director of Academic Advising. Due to the accelerated nature of this course, students should miss no more than one class.

Policy on late Assignments: Assignments guide you through new material. Some questions will be thought provoking and many will involve writing and you are encouraged to meet with your science fellow for this course Joe Maloney. Your weekly assignments make up the majority of your final grade. If LATE, they will be corrected but your score will drop 5% per class session. Late assignments will be allowed only due to extenuating circumstances and will require prior approval. I discourage late homework, because it does not allow me or you to assess your learning in a timely and effective manner and prevents us from addressing those aspects that are unclear or confusing from the beginning. In case of personal and medical emergencies, students should contact their instructors as well as the Director of Academic Advising.

Statement on Plagiarism: Plagiarism is the unacknowledged use of someone else's work as one's own in all forms of academic endeavor (such as essays, theses, examinations, research data, creative projects, etc.) which may be derived from a variety of sources (such as books, journals, Internet postings, student or faculty papers, etc.). Plagiarism goes beyond use of quotes, and even paraphrasing someone else's ideas, words, or work needs be reference appropriately with in text citations and a complete bibliography. Students should refer to the Policy on Academic Honesty in the Eugene Lang College catalog for full information on the consequences of plagiarism.

You must have a current student I.D, use the internet and electronic databases for research, and use Blackboard, and best if you also ue Refworks, the bibliographic software on campus.

Students with disabilities. In keeping with the University's policy of providing equal access for students with disabilities, any student requesting accommodations must first meet with Student Disability Services. Jason Luchs or a designee from that office will meet with students requesting accommodations and related services, and if appropriate, provide an Academic Adjustment Notice for the student to provide to his or her instructors. The instructor is required to review the letter with the student and discuss the accommodations, provided the student brings the letter to the attention of the instructor. This letter is necessary in order for classroom accommodations to be provided. Student Disability Services is located at 79 Fifth Avenue - 5th Floor. The phone number is (212) 229-5626. Students and faculty are expected to review the Student Disability Services webpage. The webpage can be found at <http://www.newschool.edu/studentaffairs/disability/> and the office is available to answer any questions or concerns.

Course Grading: Subject to Change

<u>Course Grading: Subject to Change</u>		<u>Grading Scale:</u>	
Class participation-Case Studies(3)	275 points	100%-93%	A
HW#1 SAGL 3 Questions	50 points	92%-90%	A-
HW#2 Policymaker Summary	50 points	89%-87%	B+
Quiz	50 points	86%-83%	B
HW#2.5 Outreach Project Proposal	50 points	82%-80%	B-
HW#3 Progress Report	75 points	79%-77%	C+
HW#4 Controversial Quote Essay	100 points	76%-73%	C
Final Exam	100 points	72%-70%	C-
HW#5 Project Written	75 points	69%-67%	D+
HW#6 Project Presentation	75 points	66%-63%	D
Capstone	100 points	59%-	F

Deadline Calendar	Assignments Due
Jan 27	HW#1 SALG and Three Questions about Course/Syllabus (BB disc)
Feb 3	HW #2 Policymaker summary (7.5%)
Feb 10	Case Study #1 Hela
March 22	Quiz (5%)
March 29	HW #2.5 Outreach Proposal Due (5%)
April 5-12	Case Study #2 Oocyte
April 19	Case Study #3 Regulations Clinical Trial/ \$/FDA/ Patents
April 21 -26	HW #3 Progress Report 20 Questions on Project Due (7.5%)
April 28	HW #4 Controversial Quote Response Paper on Ethics (10%) Can be submitted anytime during the semester but this will be the last day it will be accepted
May 3	Exam/Assessment (10%)
May 5	HW #5/6 Written Outreach Project (7.5%) Oral Presentation (7.5%)
May 10/12	Capstone (10%) Whose voice was not heard?

CALENDAR BY DAY: Readings completed BY the day they appear

Jan 25 Stem Cell Research: Promise and Hype

Introduction to the course- see Bb First Day Folder

Websites in the NY Stem Cells Folder on BB: NYSTEM, NYSCF, CIRM, CGS, ISSCR

In Class Video: Nova Science Now. Stem Cell. 2005. (15 min)

<http://www.pbs.org/wgbh/nova/sciencenow/3209/04.html>

In Class Video: Religion & Ethics Weekly. Embryonic Stem Cell Controversy. April 2, 2010. (7min) <http://www.pbs.org/wnet/religionandethics/episodes/april-2-2010/embryonic-stem-cell-controversy/5995/>

Jan 27 Science the Endless Frontier?

HW #1 Due SALG Online Survey and Three Questions about Course/ Syllabus Bb Discussion

This series of readings includes two very short news pieces about the state of New York, the longer seminal report authored by Vannevar Bush, the Director of The Office of Scientific Research and Development in 1945, and two responses to the Bush Report in 1994; both of which look critically at the report. There are a series of guiding questions on Bb. Pay close attention to the letter exchange between Roosevelt and Bush, as well as Chapter 3: Science and Public Welfare. It is of note, that in February 2011, the "Two Cultures" continue to vie for public support and funds; a new blue ribbon commission of made of up of 41 members from the social sciences and arts (humanities) has come been formed to place these disciplines on equal footing with the natural sciences and math in the U.S. Interestingly, as the commentary on the Inside higher Education thread indicates some are concerned that the commission is not made up of those who may in fact be close to the best practices of undergraduate education, a complaint that also comes out of the natural sciences community with regard to approved funding for educational efforts in the sciences.

Readings:

1. Nelson, Libby. June 26, 2009. New York State Allows Payment for Egg Donations for Research. New York Times. A20. (1 ½ page)
<http://www.nytimes.com/2009/06/26/nyregion/26stemcell.html>
2. Fouhy, Beth, Dec 22, 2010. New York Growth Ebbs, State to Lose 2 Seats in Congress. Associated Press. (1page)
<http://observertoday.com/page/content.detail/id/125928/NY-growth-ebbs--state-to-lose-2-seats-in-Congress.html?isap=1&nav=5025>
3. Matthews, Cara. Jan 12 , 2011. Group says more stem cell funding would create more jobs. VoteupNY.com. (½ page)
<http://blogs.democratandchronicle.com/voteup/2011/01/12/group-says-more-stem-cell-funding-would-create-more-jobs/>
4. Bush, Vannevar. 1945. Science: The Endless Frontier. Original letter from Roosevelt to Bush and his report. Focus on Letter Exchange (1-5) and Chapt 3 (9-13)
<http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm#transmittal>.
5. Cozzens, Susan. Social Sciences: Shunned at the Frontier. In Science the Endless Frontier: Learning from the Past, Designing for the Future. Highlights from a conference series held between 1994-1996. P101-105.
<http://www.cspo.org/products/conferences/bush/fulltexthighlights.pdf>
6. Crow, Michael. Beyond the Endless Frontier. In Science the Endless Frontier: Learning from the Past, Designing for the Future. Highlights from a conference series held between 1994-1996. P-114-118
<http://www.cspo.org/products/conferences/bush/fulltexthighlights.pdf>
7. Berrett, Dan. Feb 2011. Yanked from the Margins. Inside Higher Ed. Online.
http://www.insidehighered.com/news/2011/02/18/new_commission_to_advance_the_cause_of_the_humanities_and_social_science

Feb 1: Stem Cell Research: National Level

Diane Degette is a staunch advocate for the expansion of the stem cell research and she invokes Vannevar Bush's call for more science on page 136. As you read her memoir, you will get a glimpse at the workings of Congress and the ways in which public interest groups can influence legislation and policy. Consider her arguments and method of story telling; then imagine yourself as an opponent of Degette. What would you do or say to challenge her position? Though Degette operates through Congress, Professor and bioethicist Alta Charo tackles some of the same issues from a different position. What kind of charge does she leave to scientists, interest groups, and politicians? There are guiding questions on Bb.

In Class Video:

1. Aug 2010. Degette Wants to Reintroduce Embryonic stem cell bill. 9News.com.
<http://www.9news.com/video/default.aspx?bctid=595231897001>
2. Proposition 71: In Lines That Divide. <http://linesthatdivide.com/> (4th clip Prop 71/Keirstead/ Lahl)
3. Sean Morrison. Ibiomagazine. Michigan Stem Cell Prop.
<http://www.ibiomagazine.org/index.php/issues/december-2010-issue/sean-morrison>
4. NYSCF promotional video

Readings

1. Degette, D. 2008. Sex, Science, and Stem Cells: Inside the Right Wing Assault on Reason. Lyons Press. Please read the introduction, and chapters through Snowflake Babies (p1-137). I know it seems like a lot, but I read the whole book in one day, as it is very conversational and in the genre of memoir.
2. Charo, A. Sept Oct 2006. Fear and the first amendment. Hastings Center Report. 12-13.
3. Van Eyck, Masarah. 2006. Political Science: Bioethicist R. Alta Charo Blends Science with Activism. UW School of Medicine Quarterly.
<http://www.scribd.com/doc/9666838/Alta-Charo-PDF>
4. Please take some notes on each chapter and bring the book to class.
5. Review Questions on Bb.

*******Feb 3: Film Screening of Eggsplotation by Jennifer Lahl. 2010.**

<http://www.eggsplotation.com/> (40 min film and 30 min discussion with director)

Fordham Law School will host the film Thursday Feb. 3rd at 12:30 pm in rm 312

Columbia Law will host the film Thursday Feb. 3rd at 6:30 pm in Jerome Greene Hall rm102

Empire State Building City Room Friday Feb 4th at noon- free registration required at

info@eggsplotation.com

Feb 3: Stem Cell Research: New York State

*******HW#2 Due:** Summary and Response to policymaker's stance on stem cell research.

See BB for assignment and associated readings and links

Feb 8:**Planaria Lab (first 30 minutes)****The First Human Cell Line: Case Study on Race, Class, and Gender**

In this collection of readings, we will use the case based approach to learning- **SO ALL READING IS DONE IN CLASS. DO NOT READ AHEAD.** The case is the HeLa cell line and the ways in which this cell phenomenon intersects with race, class and gender.

In Class Video: Excerpts from Curtis, A. 1998. " Modern Times: The Way of the Flesh" .

Produced by BBC. This documentary is based on the history of Henrietta Lacks and the emergence of human cell lines. The documentary was aired in BBC's Modern Times series in 1998, and won Best Science and Nature Documentary at the San Francisco International Film Festival. At position 18.58 the video begins to discuss the racial aspects of the HeLa cell line. <http://tenpercent.wordpress.com/2009/02/08/adam-curtis-the-way-of-all-flesh/>

Readings:

1. Ehrlich, R. (1997). In Memory of Henrietta Lacks. Congressional Record. <http://0-www.gpo.gov.library.colby.edu/fdsys/pkg/CREC-1997-06-04/pdf/CREC-1997-06-04-pt1-PgE1109.pdf>
2. ErinC. Jan 30, 2009. The Story of Henrietta Lacks: A Lesson in Biology and Ethics. Spittoon. 23andme blog. <http://spittoon.23andme.com/2009/01/30/the-story-of-henrietta-lacks-a-lesson-in-biology-and-ethics/> AND
3. Skloot.R. (April 16, 2006). Excerpt:Taking the Least of You. New York Times Magazine. New York.: 38,(full article is 11 pages).

4. Culliton, B. J. 1974. HeLa cells: contaminating cultures around the world. *Science*. 184:1058-1059.
5. Katsnelson, A. June 2010. Biologists tackle cell's identity crisis. *Nature*. 465: 537.
http://www.nature.com/news/2010/100602/full/465537a.html?s=news_rss

Feb 10: The First Human Cell Line: HeLa Case Study on Race, Class, and Gender

****HeLa Case Study Role Play - see BB CASE STUDIES FOLDER

This collection of readings introduces the ethical oversight and marketability of human subjects research. Landecker provides us with two cases studies; that of the Mo cell line and the HeLa cell line. She poses these question: What are cell lines? How did they come into being? Is the cell line continuous with the organism from which it came of separate, and invention? What scientific, legal, economics, and rhetorical practices maintain the conditions of their existence? Weasel provides feminist critique of the lack of ethical training in the research community while Lantos revisits the sentiment in Vannevar Bush's *Science the Endless Frontier* by juxtaposing a fictitious story with the real life HeLa one. Both Keiger and the GAO report suggest that the evolution of the institutional review board process may not go far enough given the unusual nature of cells as propagating entities or "biologics". Not surprisingly, in the era of stem cell research new oversight committees have emerged such as ESCROs (Embryonic Stem Cell Research Oversight Committees) and SCROS. Though some progress has been made it seems that for the time being we may still have a need for reparations. What do you make of Palmer's criticism in the context of the Cohen article.

In Class Video: Skloot, Rebecca. <http://rebeccaskloot.com/book-special-features/audiovideo/>

Timeline: Biba, Erin. Feb 2010. Henrietta Everlasting: 1950s Cells Still Alive, *Helping Science*. *Wired Magazine*. http://www.wired.com/magazine/2010/01/st_henrietta/

******Guest Reading:** Charnell Covert. Alumni of Lang, and Building Leadership in Black Women's Health Fellow, Suffolk University

Readings:

1. Landecker, H. 1999. Between beneficence and chattel: The human biological in law and science. *Science in Context*. 12 (1): 203-225
2. Weasel, Lisa H. 2004. Feminist Intersections in Science: Race, Gender and Sexuality Through the Microscope. *Hypatia*. 19(1) Winter:183-193. Note that Weasel has written extensively on cell biology, equity, and values (cloning as well). http://www.lisaweasel.com/LisaWeasel.com/Academic_Work.html
3. Lantos, John. July August 2010. A Better Life Through Science? *Hasting Center Report*. 40 (4):22-25.
4. Keiger, D. June 2, 2010. Immortal Cells, Enduring Issues. *John Hopkins Magazine*:1-6. (informed consent history and reach through).
5. GAO.March 26, 2009. Human Subjects Research. Undercover Tests Show the Institutional Review Board System is Vulnerable to Unethical Manipulation. Government Accountability Office. <http://www.gao.gov/products/GAO-09-448T> (1/2 page summary).
6. Palmer, L. November December 2010. Private Reparations. *Hasting Center Report* 40 (6):4. (1 page)

7. Skloot, Rebecca. April 6, 2010. Immortal Life of Henrietta Lacks FAQ#2: Did Skloot really flunk high school. (1 page).
http://scienceblogs.com/culturedish/2010/04/immortal_life_of_henrietta_lac.php Note that more information about this project can be found here at Rebecca Skloot's website <http://rebeccaskloot.com/the-immortal-life/>
8. Skloot, R. Chapters 1,3 and 4 *In* The Immortal Life of Henrietta Lacks. (14 pages).
9. Cohen, Patricia. Feb 5, 2011. Returning the Blessing of an Immortal Life. New York Times. C1. <http://www.nytimes.com/2011/02/05/books/05lacks.html>

Saturday Feb 12: The Body and State: How the State Controls and Protects the Body Feb 12th is focused on egg trafficking, reproductive technologies, and the patenting and ownership of cells and tissues <http://www.newschool.edu/cps/body/>

Feb 15: How Do Cells Work? Cells, Proteins, and Genes

Check on Planaria

In this chapter from the trade book that arose from a series of front page news articles in the *Washington Post* Rensberger reminds us of the diversity of cell types and their ability to communicate and influence each other's behaviour whether a single celled organism or a multicellular one. Rensberger also traces the history of cell biology and the emergence of the first human cell line; a cell that has become immortal and regenerates in a petri dish forever.

In Class Video:

1. **The Inner Life of the Cell** HHMI
<http://www.studiodaily.com/main/searchlist/6850.html>
2. **Treadmilling Macrophage**
<http://www.youtube.com/watch?v=O21VnOgICa8&feature=related>
3. **Human Granulocyte Kills Cervical Cancer Cells**
<http://www.youtube.com/watch?v=nJEFcNbEWQs&NR=1&feature=fvwp>
4. **John Bonner's Slime mold Movies (Dicty)**
<http://www.youtube.com/watch?v=bkVhLJLG7ug>
5. **Virtual Sea Urchin** <http://virtualurchin.stanford.edu/fertlab2.htm>

Readings:

1. Rensberger, B. "Chapter 1: A Particle of Life" *In* Life Itself. This reading will address some of our questions centered on the definition and use of cell lines. PLEASE NOTE THAT THE PDF IS BACKWARDS SO READ FROM LAST PAGE TO FIRST
2. Review questions on Bb.

Feb 17: How Do Cells Regenerate?

The textbook chapter introduces you to the basic process of cell division, reproduction, and cloning as well as walking you through some of the seminal studies conducted in cell biology to determine which is more important for cell differentiation or specialization; a cell's genes or a cell's environment. What do the experiments here suggest? Take a look in advance at some of the videos that animate the textbook chapter in the HHMI site below.

Readings:

1. Minkoff and Baker. "Stem Cells, Cell Division, and Cancer." *In* Biology Today: An Issues Approach 3rd Edition. 414-432. We will only read the stem cells and cell

division portion of this chapter. I have also included an additional pdf of one of the figures in this chapter in color so you can appreciate the diversity of potential in the stem cell lineage.

2. Please visit this link http://nobelprize.org/educational_games/medicine/2001/. This is the Nobel Prize Education site, and if you click on the Cell Cycle Game link you can play an interactive game that emphasizes the checkpoints and stages necessary for the cell to progress through cell division. Try to imagine the environmental signals that would be at play that would instruct a cell to divide.
3. Please Visit this Link University of Michigan, Stem Cell Explained and Explored. Use the Tabs at top to explore Stem Cell Defined, Nuclear Transfer ,and Drug Testing. http://ns.umich.edu/stemcells/022706_TabA.html
4. Review Questions on BB.

Feb 22: What Influences Cell Fate?: Genes in Time and Space

Check on Planaria

Today is not a day to miss class. I will be reviewing the basic biology of stem cells in a bit more detail and begin to illustrate the similarities and differences between embryonic stem cells and other stem cell types. To understand what it means to differentiate, you will need to learn a little about genetics, so use the last website in the list to gain a sense of scale . The material builds on the textbook reading in Minkoff and Baker with respect to gene expression. The SEED Magazine Crib Sheet is an essential for the remainder of the class. What we will focus on today is how cells can permanently turn genes on and off (gene regulation via nuclear reprogramming; modifications to the chromosomes) and transient control of gene expression (gene regulation via transcriptional complexes that interact with DNA). Please print the ppts for today as handouts (6 slides per page) so you can take notes. The required websites are INTERACTIVE; set aside at least 60 minutes to interact with these sites.

Readings:

1. Visit this Link: University of Michigan, Stem Cells Explained and Explored. Use the Tabs at top to Embryonic Stem Cells, Cell Specialization, and Adult Stem Cells http://ns.umich.edu/stemcells/022706_TabA.html
2. Visit this link: University of Utah. "What Is A Stem Cell?" Online. Genetics Science Learning Center at the Eccles Institute of Human Genetics University of Utah. Available in Spanish. This site has an intricate interactive animation that contains a sidebar of corresponding text. Choose the Blood Cell Niche to revisit our conversation about hemoglobin and red blood cell differentiation.
3. <http://learn.genetics.utah.edu/content/tech/stemcells/sctypes/>
4. <http://learn.genetics.utah.edu/content/tech/stemcells/scintro/index.html>
5. Journey into DNA.: Sense of Scale Nova. <http://www.pbs.org/wgbh/nova/genome/dna.html#>
6. Richli, Cybu and Lee Billings. Genetics. Cribsheet #12. SEED Magazine. 2008. This colorful handy pull out should be kept with you for the entire course and you can refer to it whenever you need to remind yourself how a cell changes behavior depending on time and place through the turning on or off of genes via the Code of Life.

Feb 24 Natural Sources of Stem Cells: Embryos, Umbilical Cord, Adult

In the last class session we discussed the role of differential gene expression and the importance of this becomes clear as we see how the timing and organization of gene expression is essential for both reproduction and the embryonic development of a new organism. Again, we revisit some of the cursory material presented in the Minkoff and Baker chapter but dive deeper into fertilization and embryonic development. In doing so, what emerges are three classes of potential stem cells: the embryonic, umbilical cord, and adult. Jennifer Kahn highlights the tricks in play for harnessing the power of stem cells for beauty; would embryonic or adult stem cells work best here? Please note that the Life's Greatest Miracle Program is about 45 minutes in length and should be viewed on campus or with a fast internet connection (it is broken up into 5 short segments)

In Class Video: HHMI Stem Cells and Development: Beautiful Primitive Streak Animation
<http://www.hhmi.org/biointeractive/stemcells/animations.html>

Readings:

1. 2001. "Appendix A Early Development. *In* Stem Cells Scientific Progress and Future Research Directions. National Institutes of Health. 1-18. This is a bit heavy in terms of GENE names, so try to focus on the big picture, only pay attention to the Oct4 gene's role, and only read from pages 1-12, and after that look for highlighted regions or sticky notes to guide your reading.
2. Gilbert. 2008. All I needed to know I learned about during gastrulation LSE. (7): **12-13**. Please note that this paper is connected to two others in a series, you only need to read pages 12-13 by Gilbert. This paper is accompanied by a visual ppt given in 2005 at the Society for Developmental Biology.
<http://www.sdbonline.org/fly/gilbert/gilbert01.htm>
3. Kahn, Jennifer. Oct 16, 2005. The Stem Sell. New York Times.
4. REVIEW this VIDEO: Stem Cells http://www.youtube.com/watch?v=mUcE1Y_bOQE
This video is a great example of environmentally regulated genes expression in early development giving rise to the placenta and the embryo (CDX2 and Oct3/4). Note that here the environment is the womb; the environmental signals are maternally expressed proteins that are in a concentration gradient in the womb, and paternally expressed RNAs that enter the cytoplasm of the egg. Both the maternal and the paternal factors influence gene expression- the former via transcriptional control (DNA → RNA) and the latter in the form of posttranscriptional control (RNA → Protein) via RNA interference.
5. Video: Rap Song on Development by College Students
http://www.youtube.com/watch?v=9k_oKK4Teco
6. Video: Programs 1-5 on Life's Greatest Miracle" PBS . Five short segments totaling 45 minutes. <http://www.pbs.org/wgbh/nova/miracle/program.html>
7. Humphreys, Ciaran. 2008. The Primitive Streak Dress Collection by the Helen and Kate Story. Belfast. <http://www.helenstoreyfoundation.org/pro2.htm> .The Story sisters, one a designer and the other a developmental biologist, created this exhibit to display the first 1000 hours of embryogenesis. View the Film (link at bottom), and click through the image slide show (on the film page upper left corner).

Mar 1 Outreach Project Review : see three documents on Bb and also review the Chapter 12 PPT Revised version

Central Dogma in detail with ER Golgi and class folding

Mini quiz

March 3 Artificial Sources of Stem Cells: Clones, Parthenotes, iPS

We continue to explore the realm of pluripotency, through techniques used to generate stem cells, and to identify and mark cells as “stemmy,” or having a characteristic gene expression profile of a pluripotent stem cell. **In the Battey et al. Chapter 8** pay close attention to Fig 8.3 and 8.4, and try to overlay on these figures a timeline and names of the research labs that contributed to the protocols used in that specific approach and bring your revised chart to class. The Dunn article is a feature article about a family and a biotech company’s attempt to “clone” some cells from their diseased son to treat his disease. Lastly, as work on both embryonic and adult stem cells proceeds, the fate of iPS cells is unknown, given the new findings in genetic reprogramming differences and chromosomal abnormalities. While the Vogel and Brown article heralds this as a new field attracting young scientists such as Hochedlinger and Eggan (Williams) , both the Dolgin and the McCarthy articles point to chromosome 12 as aberrant in both reprogramming and in chromosome duplication.

Everyone Reads:

1. Battey et al. 2008. “Chapter 8: Alternative Methods For Preparing Pluripotent Stem Cells. *In* Regenerative Medicine. National Institutes of Health. 1-12
<http://stemcells.nih.gov/staticresources/info/scireport/PDFs/Chapter8.pdf>
2. Dunn, K. (2002). Cloning Trevor. *Atlantic Monthly*, 289(6): 31-48.
<http://www.theatlantic.com/issues/2002/06/dunn.htm>
3. Vogel, G. Dec 19, 2008. Breakthrough of the year: Reprogramming cells . *Science*. 322 (5909): 1766-67.
4. Scripps Research scientists develop new test for ‘pluripotent’ stem cells March 2011 Scripps
5. ICSP: A New Stem Cell Enters the Mix. Induced Conditional Self Renewing Progenitor Cells March 4, 2011 published online.
6. Review Questions to guide your reading on BB.

Students CHOOSE ONE of the articles below to review for the class- pay attention to author, year, place of publication, and summarize the article. Together they trace the trajectory of the field. See PPT on Stem Cell Trajectory, choose the articles that speaks to you, all are 1-2 pages in length see if you can draw what you are reading.

7. Brown, Aug 29, 2008. Developmental Biology: Neuron research leaps ahead. *Science*. 321(5893): 1169-70. Breakthrough article about neuronal patient specific stem cells.
8. Williams, R. Sept 24, 2007. Konrad Hochedlinger: The new kid of nuclear reprogramming. *Journal of Cell Biology*. 178(7):1098-1099. Interview with a young stem cell researcher.
9. Dolgin, Elie. April 2010. Gene flaw found in induced stem cells. *Nature*. 464:633. A recent article that points to some of the shortcomings of using adult stem cells that

have been induced to be “stemmy” ; Konrad’s work in article number 6 is extended here.

10. McCarthy, Nicola. Nov 2010. Out for the count. Nature Reviews Cancer. 10: Another article that points to some differences between ASCs , iPSC, and ESCs. This one has some genetic language that may be foreign, but chromosomal abnormalities like trisomy refer to more chromosomes; in the case of trisomy 18 it would be three copies of chromosome 18 rather than the two (one from mom and one from dad).

Mar 8 Chimeras, Hybrids and Cybrids

Though most people find the idea of a human animal merger at the cell or organismal level “creepy” or “yucky,” some countries have moved forward with such research in hopes of better understanding the intricate processes involved with cloning and embryogenesis; though all countries prohibit the implantation of such a creation in the human uterus, Canada, the UK, Japan allow for some hybrid creations , while China and Germany explicitly forbid it. Where does the US stand on this? Perhaps what is most interesting in this realm, is that if a state forbid chimeras, they essentially have blocked the ability to prove that in fact a cell can truly behave as a stem cell as is routinely done in teratoma formation of human cells in post blastocyst of rodent--- did someone miss a science class or is no one paying attention?

In Class Video: Vincent on Nip Tuck

Readings:

1. Landecker, H. “Hybridity” and “ Epilogue” *In* *Culturing Life*. 180-235
2. September 5, 2007. The Chimeras are Coming (uh wait, they’ve arrived). The Stem Cell Blog. <http://thestemcellblog.com/2007/09/05/the-chimeras-are-coming-uh-wait-theyve-arrived/>
3. Scott, C. Sept 6, 2007. The difference between cybrids and chimeras. Stem Cell Blog <http://thestemcellblog.com/2007/09/06/differences-between-cybrids-and-chimeras/>
4. Bonner, J. July 13, 2006. Human stem cells can contribute to a developing mouse embryo, despite evolutionary differences. Rockefeller University Newswire. <http://newswire.rockefeller.edu/index.php?page=engine&id=510>
5. **Optional** NYSTEM May 3 2010 Meeting Minutes.

*******WEDNESDAY March 9: Rebecca Skloot author of The Immortal Life of Henrietta Lacks will be on book tour, signing, etc. at Barnes and Noble Union Square. See this link for Details <http://rebeccaskloot.com/events/>**

Mar 10 Catch Up Review for Exam / Review of new syllabus and creative projects deadlines- DO NOT MISS CLASS

March 15-17 Spring Break

March 22 ***QUIZ ***** (5% of your grade)**

**March 24 Female Bodies as Sources of Stem Cells (4 days)
Guest Discussants: Ann Snitow, Professor of Literature and Gender Studies**

Chelsea Briganti, Alumna of Parsons Product Design, Mademoicell

<http://www.thewayweseetheworld.com/>

This collection of readings span the important role that female biology plays in the field of stem cell research and how feminist action can protect a woman's right to make informed choices about how she might want her cells to be used in stem cell research. Women's bodies provide two unique cell types necessary for stem cell research: the egg and menstrual blood cells. But who gets to decide how these cells be obtained, regulated, marketed? Are there ethical concerns about equity, diversity, access, and exploitation? Why has NY state adopted legislation that goes against all other states and international norms regarding payment for eggs destined for research? How do feminist critiques of cell biology resurface here as discussions about power and authority play out? The readings span the benefits and risks associated with egg "donation", the laws and practices currently in place for egg retrieval for research purposes, and the issues surrounding the private and public sector management of both payment for these cell sources as well regulation of access to the potential stem cells made from these sources. Please note the timeline of the publications for each subtopic as the field is moving fast with many different lenses through which the practice is being scrutinized.

The Egg and the Womb: Sources of Stem Cells

Emily Martin in her famous essay "The Egg and the Sperm" published in 1991 challenges the status quo of what is normally considered the "weaker" sex. "...by extolling the female cycle as a productive enterprise, menstruation must necessarily be viewed as failure. Medical texts describe menstruation as "debris" of the uterine lining, the result of necrosis, or death of a tissue. The descriptions imply a system that has gone awry, making products of no use, not to specification, unsalable, wasted, scrap. An illustration in widely used medical text shows menstruation as a chaotic disintegration of form, complementing the many texts that describe it as a 'ceasing', 'dying', 'losing', 'denuding', and 'expelling,' "...biologists have lent their support to the notion that the human female, beginning with egg, is congenitally more dependent than the male." (Martin, E. , 1991).

Readings:

1. Schatten G, Schatten H. 1983. The energetic egg. *The Sciences* 23(5): 28–35.
2. Beldecos, A. et al. (The Biology and Gender Study Group). March 1988. The Importance of Feminist Critique for Contemporary Cell Biology. *Hypatia*. 3 (1): 61-76.
3. Martin, E. Spring.1991. The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male- Female Roles. *Signs*. 16(3): 485-501.
4. Teisha Rowland,.March 27, 2009. Stem Cells Discovered in Menstrual Blood: Endometrial Regenerative Stem Cells. Allthingsstemcell.com.
<http://www.allthingsstemcell.com/2009/03/endometrial-regenerative-stem-cells/>
5. Briganti, Chelsea. 2010. Mademoicell Design Process. Stem Cells from Menstrual Cells http://a.parsons.edu/%7Etraviss/koln/Chelsea_Briganti_Mademoicell.mov

Mar 29 Egg Retrieval: The Risks and the Benefits

**** HW#2.5 Outreach Project Proposal DUE *** See Bb for template under OUTREACH PROJECT (5% of grade)

In Class Video OHSS. In Lines that Divide (Calla Papademas 7th clip)

<http://linesthatdivide.com/> Payment for Oocytes In Lines that Divide (Kierstead 5th clip)

<http://linesthatdivide.com/>

Readings:

1. Pearson. 2006. Health effects of egg donation may take decades to emerge. *Nature*. 442(7103): 607-608.
2. Keissling, A. Oct 2007. Human Eggs: The Need, The Risks, The Politics. *Burrill Stem Cell Report*.38-45.
3. Linda Giudice, Eileen Santa, and Robert Pool, eds, National Research Council, EXECUTIVE SUMMARY of "Assessing the Medical Risks of Human Oocyte Donation for Stem Cell Research: Workshop Report," National Academies Press, 2007. This report is the result of a contract put forward by the CIRM (Prop 71) to NAS to identify what is known about risk, what needs to be known, and what can be done to minimize risk via a Committee on Assessing the Medical Risks of Human Oocyte Donation for SCR and workshop on Sept 28, 2006 in San Francisco. (7 pages). Please scroll through the entire document to learn about membership and expertise on this committee, both the exec summary and the preface.
4. Reynolds, Jesse. Jan 23, 2009. NY Stem Cell Research Nears Dangerous Line. *Newsday.com*. on the Genetics and Society News Feed.
5. Introduction of Case Study on NY STATE- Stake Holder Symposium one week from today.

Mar 31 Commodification of Female Bodies

Class will be broken into four groups. All individuals will read 1-6. Group 1 will read Ballantyne and DeLacey, Group 2 Widdows, Group 3 Nahman, and Group 4 Dickenson and Idiakez 2008.

Readings:

1. Johnston, Josephine. 2006. Paying egg donors: Exploring the arguments. *Hastings Center Report*. 36 (1):28-31. (2 pages)
2. Papadimos, T. and A. Papadimos. 2004. The student and the ovum: The lack of autonomy and informed consent in trading genes for tuition. *Reproductive Biology and Endocrinology*. 2:56. (5 pages)
3. Carney, Scott. (Sept 1, 2010). Unpacking the Global Human Egg Trade. *Fast Company*. Downloaded from the Genetics and Society Site. (9 pages)
<http://www.geneticsandsociety.org/article.php?id=5342>
4. Almeling, Rene. 2009. Gender and the Value of Bodily Goods: Commodification in Egg and Sperm Donation. *Law and Contemporary Problems*. 72 (3): 37-58.
5. **Klitzman, R. and Mark V. Sauer. March 20 2009. Payment of egg donors in stem cell research in the USA. *Reproductive BioMedicine Online*. 18(5): 603-608.**
6. Dickenson, Donna. 2002. Commodification of human tissue: implications for feminist and development ethics. *Developing World Bioethics*. 2 (1): 55-63.
7. Ballantyne A. and DeLacey, S. Fall 2008. Wanted- Egg donors for research: A research ethics approach to donor recruitment and compensation. *IJFAB: International Journal of Feminist Approaches to Bioethics*. 1 (2) 145-164.
8. Widdows, H. 2009. Border disputes across bodies: Exploitation in trafficking for prostitution and egg sale for stem cell research. *IJFAB: International Journal of Feminist Approaches to Bioethics*. 2(1), 5-24.

9. Nahman, Michal. 2008. Nodes of Desire. Romanian Egg Sellers, 'Dignity ' and Feminist Alliances in Transnational Ova Exchanges. *European Journal of Women's Studies*. 15(2): 65-82.
10. Dickenson, D. and Itziar Alkorta Idiakez. 2008. Ova donation for stem cell research and international perspective. *International Journal of Feminist Approaches to Bioethics*. Volume 1: 125-144.

****The New York Academy of Sciences Int Conference on Ethical issues in Biomedical Engineering April 1-3. <http://www.nyas.org/Events/Detail.aspx?cid=6a4fb53f-9b09-41c0-b787-42cbc242d14c>

Apr 5 New York State Compensation for Oocytes

*****CASE STUDY**

Readings

1. ESSCB. June 11, 2009. "Statement of the Empire State Stem Cell Board on the Compensation of Oocyte Donors". (2pages) http://stemcell.ny.gov/docs/ESSCB_Statement_on_Compensation_of_Oocyte_Donors.pdf
2. Jack Fowler. June 13, 2008. "Pro-Life Dem Lawmaker Blasts Embryonic Stem Cell Research Plan,." (1 Page). This is a blog post on The Corner from the National Review Online and it pastes verbatim the letter from Senator Ruben Diaz to Judy Doesschate JD of ESSCB
3. O'Reilly. K. July 27, 2009. New York OKs Paying Women Who Donate Eggs for Research. AMN News.com (2pages) <http://www.ama-assn.org/amednews/2009/07/27/prsc0727.htm> .
4. Crowley, C. Oct 15 2009. Abortion foes challenge pay for egg donors. Timesunion.com. (1page) <http://www.timesunion.com/local/article/Abortion-foes-challenge-pay-for-egg-donors-552897.php> .
5. Eggsplotation Photos and Raves. Feminists Who Choose Life. http://www.feministschoosinglife.org/eggsplotation.php#comments_from_samuel_gorovitz Please be sure to read the entire past the photos and note the two sets of comments from ESSCB board members and the tone of the interview.
6. Hamilton, J. 2000. What are the costs? Stanford Magazine. Nov/Dec. <http://www.stanfordalumni.org/news/magazine/2000/novdec/articles/eggdonor.html>

**** April 7th The New York Stem Cell Foundation will be hosting a conference on Parkinson's <http://www.nyscf.org/events/upcoming-events/item/701-parkinson's-disease-how-stem-cell-research-will-make-a-difference>

Apr 7 Religious, Moral, and Political Philosophies Concerning ESCR

Most of the reading here address the plurality of views on stem cells research both from a philosophical and moral view as well as cultural and religious view. If you are interested in reading more in this area, let me know or visit the book list posted under Syllabus. The Nickel piece is an interesting one, because it asks us to consider the possibility of an impasse and in particular when current language is vague or ambiguous, such as the Dickey Wicker Amendment. What then when we agree to disagree? What are the consequences, procedures for the future? Who gets to decide and by what means can the opposing parties

influence others' views. The two sets of NYSTEM meeting minutes on the funding of ESCR reflect Nickel's point; note how the diverse members of this committee navigate the discussion. The Walters article is a very rich and detailed article that extends this state and local level discussion to the global and multicultural sphere. How is decision making influenced by religion or culture? How do different groups go about making statements with respect to ESCR? Walters breaks it down into 6 main points of decision that span the moral status of the embryo to the use of human tissue in research.

In Class Video:

1. **Revisit Savior Siblings** Religion & Ethics Weekly. Embryonic Stem Cell Controversy. April 2, 2010. (7min) <http://www.pbs.org/wnet/religionandethics/episodes/april-2-2010/embryonic-stem-cell-controversy/5995/>
2. Moral Status and When Life Begins (Hurlbut/Kierstead 6th clip) <http://linesthatdivide.com/>
3. Alta Charo at the Milken Institute Global Conference. May 28th 2009. Faster Cures. (13:50-20:00) (Tech as progress;ESC vs ASC; complicity fed funding) <http://www.milkeninstitute.org/events/gcprogram.taf?function=detail&EVID=1924&eventid=GC09>

Readings

1. Nickel, P. 2008. Ethical issues in Human Embryonic Stem Cell Research. *In* Fundamentals of the Stem Cell Debate. University of California Press. 62- 78.
2. NYSTEM Ethics Committee Meetings transcripts Meeting Minutes of the April 2008 Empire Ethics Committee page 3- 9, but look at the profile of the members on page 1. http://stemcell.ny.gov/ethics/minutes_fundingcomm_04_01_2008.pdf
3. NYSTEM Ethics Committee Meetings transcripts Meeting Minutes of the May 2008 Empire Ethics Committee (7 pages). http://stemcell.ny.gov/ethics/minutes_ethicscomm_05_13_2008.pdf
4. Walters, L. 2004. Human embryonic stem cell research: An intercultural perspective. *The Kennedy Institute of Ethics Journal* 14(1): 3-38
5. Freddoso, David. Feb 6, 2007. Homilist Names Names. *National Catholic Register*. <http://hfs.detmich.com/mcdonnell/mcdonnellncr.html>

*****April 9: 4-7pm Art Science Salon at Ellen Levy's Artists Studio Bionanoart Hybrid Worlds. RSVP required via Victoria Vesna**

April 12: Advocacy and Policy: Birth, Death, and Clones

In Class Activity Clones

On March 9, 2009 President Obama signed an executive order to expand SCR, and in the press conference and signing he makes note of the work of powerful advocates; patients, scientists, etc. (See Solomon and NYSCF). The President also claimed that he was pleased that policy is being based on fact not ideology. Given our last set of readings, how does that message sit with you? What most people don't know is that less than an hour afterward he also signed the Dickey Wicker Rider. The Fossett policy brief reminds us, as Nickel did, that the ambiguity in the Dickey Wicker Amendment has led to interpretations that constrain ESCR. Obama also left the guidelines for research to be determined by the NIH (recall the first week's readings on the National Research Foundation proposed by Vannevar Bush and the one here by Strode). The Anonymous news report on the hold up of Bush era stem cell lines under the new NIH Guidelines is emblematic of the hurdles that stem cell researchers

face despite the new executive order; no destruction of embryos, and no clones. The recent decision to deny 47 stem cell lines from diseased IVF embryos reported by Wadman illustrates some of the ethical oversight mentioned earlier in the course during the HeLa case study, while the Kahn and Mastroianni piece presents some of the challenges of moving across different institutions to create a stem cell donor. Though the NIH guidelines are meant to “follow” the oocyte donor, they do little to address the continuum mentioned here. The chapter by Gilkey et al. illuminates the ways in which advocacy has worked in the past, and how it might need to be restructured given the intricacies of SCR. Dolgin caps off the set, and might seem like an outlier, but consider the need for Obama to sign the executive order despite moral outcry and an economic crisis. The StemRegenin molecule, is just one of the “sustaining” products that Dolgin mentions in her piece.

In Class Videos

1. **Lines that Divide.** <http://linesthatdivide.com/> (1st clip/Hurlbut/ Lahl, 2nd clip/Reeve, 3rd clip OHSS)
2. **Connie Chung Cloning Couple 2001.**
3. **NAS 2001. C- Span**
4. Excerpt from My Sister’s Keeper TV Spot #1
<http://www.mysisterskeepermovie.com/#video>
5. Religion & Ethics Weekly. Informed Consent and Medical Research June 25, 2010
<http://www.pbs.org/wnet/religionandethics/episodes/june-25-2010/informed-consent-and-medical-research/6545/>
6. **Scientists and Engineers of America.** Mach 9, 2009. Release with links to Obama video, breakdown of the executive order and background information. Notice the mention of members of NYSTEM, Degette, and members of the Reeve family.
<http://sharp.sefora.org/issues/executive-order-on-stem-cell-research/>

Readings

1. Solomon, S. March 9, 2009. Patients Before Politics: Putting Science First. Huffington Post. (1 page).
2. Fossett, J. Aug 2, 2007. Federalism by Necessity: State and Private Support for Human Embryonic Stem Cell Research. Rockefeller Institute Policy Brief. 1-13.
3. Strode, Tom. March 25, 2009. Ethicists: Obama misrepresented his own stem cell order during a press conference. Baptist Press. (2 pages)
<http://www.bpnews.net/bpnews.asp?id=30134>
4. Anonymous. 2010. Stem Cell Funding In Sight. Nature. 464:967. (1 page).
5. Kahn and Mastroianni. Mar 2004. Creating a stem cell donor: A case study in reproductive genetics. Kennedy Institute of Ethics Journal. 14 (1);81-96.
6. Wadman, Meredith. June 15, 2010. Disease cells fail to win approval. NatureNews.com. 852:
<http://www.nature.com/news/2010/100615/full/465852a.html>
7. Gilkey, Melissa, Earp, Jo Anne, and Elizabeth French. 2007. What is Patient Advocacy? Patient Advocacy for Health Care Quality : Strategies for Achieving Patient-Centered Care. Sudbury, Mass.: Jones and Bartlett Publishers.
8. Dolgin, E. Feb 2009. Profiting from pluripotency. The Scientist. 60-61.
9. Stemregenin Molecule for Sale. <http://www.cellagentech.com/product/SR1.html>

April 14: Public Sector Injunctions: Moral or Economic Reasoning?

Shortly after Obama's executive order was put in place, two interesting injunctions emerged; one against the government's NIH and another brought forth by the government's FDA against privately funded Regenerative Sciences Company. Both injunctions reveal that the science is moving fast- perhaps faster than legislation and regulatory processes resulting in a series of litigations. Note that in the James review, there is foresight about the Dickey Wicker loophole as many of your other readings have indicated as well. The FDA injunction echoes some of the work of the watchdog ISSCR "A Closer Look at Stem Cell Treatments" <http://www.closerlookatstemcells.org//AM/Template.cfm?Section=Home>

In Class Videos:

1. **Alta Charo** at the Milken Institute Global Conference. May 28th 2009. Faster Cures. (47:00 -49:00) (FDA and SCR)
<http://www.milkeninstitute.org/events/gcprogram.taf?function=detail&EVID=1924&eventid=GC09>
2. **Video and Story:** Young, Sandra. Aug 24, 2010. Jeffrey Toobin: Government Will Appeal Injunction Against Stem Cell Funding. CNN:
<http://www.cnn.com/2010/US/08/24/stem.cell.funding/index.html>
3. **RIRC Federal Injunction Video** <http://www.reeve.uci.edu/news-stem-cell-ban-video.html>

Readings:

1. Cyranoski, D. Aug 18, 2010. FDA challenges stem-cell clinic. Nature. 466 (7309): 909.
<http://www.nature.com/news/2010/100817/full/466909a.html> - there are comments on the website that are very interesting.
2. Blevins, Jason. Aug 20, 2010. FDA Slaps Bloomfield Stem Cell Clinic with Injunction, Halting Pain Treatment. Denver Post.
http://www.denverpost.com/news/ci_15834497
3. Potter, Beth. Dec 17, 2010. Local Doctor Counters FDA Injunction. Boulder County Business Report. <http://www.bcbcr.com/article.asp?id=55149>
4. Koustas, William. Aug 10 2010. Regenerative Sciences Faced with FDA Injunction. Hyman, Phelps and McNamara FDA Law Blog.
http://www.fdalawblog.net/fda_law_blog_hyman_phelps/2010/08/regenerative-sciences-faced-with-fda-injunction.html
5. James, Frank. August 23, 2010. U.S. Judge Stops Federally Funded Embryonic Stem Cell Research. NPR.com. <http://www.npr.org/blogs/thetwo-way/2010/08/23/129384172/u-s-judge-stops-federally-funded-embryonic-stem-cell-research>
6. Boyer, Peter. Sept 6, 2010. The Covenant. The New Yorker. (11 pages)
http://www.newyorker.com/reporting/2010/09/06/100906fa_fact_boyer?printable=true#ixzz0yH8KzuLw
7. Stem Cell Ban Exposes Dangerous Judiciary. Daily Conversation Youtube.
<http://www.youtube.com/watch?v=I5FWq4vQwTM> . This is a video produced by two young men who keep up with the field.

April 19: Private Sector SCR: Advances or Conspiracy of Hype?***** FDA PATENT CASE STUDY**

As public sector funding is subject to politics, the private sector has taken the lead. In some cases industry and non-profits are working closely with the FDA, and other arms of government in a coordinated front to advance SCR. In other cases, the private sector has branched out on its own, unwilling to abide by standard peer review, and regulatory processes. Still, in other situations the lines are blurry, with academic institutes funded by private and public dollars. The first human embryonic stem cell trials are underway with FDA approval by two leading companies: Geron and Advanced Cell Technology. Each company has chosen very different kinds of targets; Geron is trying to treat acute spinal cord injuries, and ACT is looking to treat a degenerative disorder of the eye. Despite watchdog groups, there are also rogue organizations that falsely claim to have stem cell cures and commit harmful practices that exploit the vulnerable. You learned about the ISSCR's attempt to "protect" the public against such acts via the Closer Look at Stem Cells Treatments website in the last class. Do you agree with Shanks criticism here? Might there be another interpretation?

In Class Videos and Websites :

1. **60 Minutes 21st Century Snake Oil Sept. 12, 2010 :**
<http://www.cbsnews.com/video/watch/?id=6859188n&tag=mncol;lst:3>
2. **ISSCR. A Closer Look at Stem Cells WatchDog Site**
<http://www.closerlookatstemcells.org//AM/Template.cfm?Section=Home>
3. **Elizabeth Cohen. Stem Cell Trials to Begin. CNN.**
<http://www.youtube.com/watch?v=MaygWPGkPn4&feature=related>
4. **Alta Charo at the Milken Institute Global Conference. May 28th 2009. Faster Cures. (28:50-31:30) (Hype)**
<http://www.milkeninstitute.org/events/gcprogram.taf?function=detail&EvID=1924&eventid=GC09>

Readings:

1. Associated Press. Dec 2004. Stem Cells Help Paralyzed Rats Walk. (2 pages)
2. Woodbury, M.A. 2009. Hans Keirstead Can Make Mice Walk Again. Esquire.com. (1p)
3. Pollack, Andrew. January 23, 2009. F.D.A. Approves a Stem Cell Trial. (2 pages)
<http://www.nytimes.com/2009/01/23/business/23stem.html>
4. Conner, Steve. Nov 20 , 2009. Stem Cells: The First Human Trial. The Independent.
<http://www.independent.co.uk/news/science/stem-cells-the-first-human-trial-1824099.html> (2 pages)
5. Video: FDA Approves Use of Stem Cells in Humans Again. Nov 22, 2010. Daily Conversation.
http://www.youtube.com/watch?v=gxdd9Cpbimw&feature=watch_response
6. Shanks, Pete. Aug 4, 2010. Stem Cell Education and Hype. Biopolitical Times.
<http://www.biopoliticaltimes.org/article.php?id=5309> (1 page)
7. Freeman, L. March 11, 2011. Bonita doctor under restricted license schedules Monday stem cell seminar. Naplesnews.com.
<http://www.naplesnews.com/news/2011/mar/11/Zannos-Grekos-stem-cell-Regenocyte-Therapeutic/>
8. Centano, Chris. Our Patient's Autologous Stem Cells Are Drugs: The FDA Moving Down a Dangerous Slippery Slope. (2 pages)

<http://fapmmed.net/FAPM%20Centeno%20Editorial%20on%20Public%20Health%20Impacts%20of%20FDA%20Regulating%20Practice%20of%20Medicine.pdf>

April 21: Disability and Advocacy

*****HW#3 Due Progress Report 20 Questions (7.5%)

Though the last set of readings suggest that spinal cord injury might be minimized with stem cell therapy, one might argue that these treatments are decades away and do little to support a productive living environment for those who experience disability. Johnson, a disability rights scholar demonstrates the ways in which Christopher Reeve was heralded as the spokesperson for those with disabilities, despite the fact that he was a single voice in the disability rights community. Shakespeare, like Michael Crow who proposed a refreshed version of Vannevar Bush's national plan for science (Jan 27) suggests that priorities must be set in which science is measured not just by economic value, but also in contributions to social capital. The Brignall series of articles reflect on the history of disability and eugenics and this is an important backdrop and shift from patient advocacy (medicalization) to disability rights. Last year, Press Secretary Gibbs responded to a reporter that the Stem Cell Research Executive Order was signed as part of a larger effort of health care reform, but given the video below and the comments by the Secretary of Health and Human Services Kathleen Sebelius do you agree with his reasoning?

In Class Video: 20th Anniversary of the ADA . 12:00-15:00 and 24- 31

<http://www.youtube.com/watch?v=r3ok5abPhw0>

1. Johnson, Mary. 2003. "Introduction" and "Chapter 1 Clint Eastwood and Christopher Reeve." *In Make Them Go Away: Clint Eastwood, Christopher Reeve and The Case Against Disability Rights*. The Advocado Press. Louisville. p. i-10. <http://www.makethemgoaway.com/>
2. Shakespeare, Tom. 2006. "Just Around the Corner" *In Disability Rights and Wrongs*. Routledge Press. NY. 103-117.
3. Brignell, Victoria. Dec 10, 2010. The Eugenics Movement Britain wants to Forget NewStateman. <http://www.newstatesman.com/society/2010/12/disabled-america-immigration> .(audio available at website). A three part series to mark disability history month. (2 ½ pages)
4. Brignell, Victoria. Dec 10, 2010. When America Believed in Eugenics. NewStateman. <http://www.newstatesman.com/society/2010/12/disabled-america-immigration> .(audio available at website). This is the second in Brignall's series to mark disability history month "The Eugenics movement Britain wants to forget" and "When the Disabled Were Segregated" were the first and third in this series. Note that Alexis Carrel is mentioned here... Alexis Carrel's Beating Heart. (3 ½ pages)

April 26 Patents and Protections

In the last set of readings you reviewed Daylon James' and Ali Brivanlou's work which often get a lot of coverage by mainstream press due to its controversial nature and its potential for therapy; not surprisingly most of this work is privately funded., which of course brings us to patents. Try to connect the material here to the papers of the first third of the course, when we discussed sources of stem cells , and factors that can nudge cells into a different cell fate.

Readings:

1. Korobkin, R. 2007. "Stem Cell Patents." In Stem Cell Century: Law and Policy for A Breakthrough Technology. Yale University Press. New Haven.: 92-125.

April 28 Biobanks and Public Access

*****HW #4 Due Controversial Quote (10%)** You may choose a quote from any of the readings on ethics, religion, disability (Nickels, Jafari, Khan, Johnson, Shakespeare, Walters, Greene etc.)

If stem cells whether adult, cord, or embryonic prove to be useful as a form of therapy, who will have access, and how will the process and research be regulated to assure both privacy and access. Reach back in our spiraling of this course, and reconsider the article by Kreiger focused on the HeLa cell line, the informed consent process, and acquisition and scale up of this particular line within the context of the future.

In Class Video: Religion & Ethics Weekly. Embryonic Stem Cell Controversy. April 2, 2010.
<http://www.pbs.org/wnet/religionandethics/episodes/june-25-2010/informed-consent-and-medical-research/6545/>

Readings:

1. Greene, M. 2006. To restore faith and trust: Justice and biological access to cellular therapies. The Hastings Center Report. 36 (1): 57-63.
2. Robbins, S. Feb 28, 2009. New Developments in Umbilical Cord Blood Technologies; Consolidation of U.S. Family Banks. Life Sciences World.com.

May 3: Assessment/Exam (10%)

May 5: HW #5/6 Outreach Project Presentations (15%)

May 10: Capstone (10%) NYSTEM Case Study

1. Sulmasy, D. P. March 2009. Deliberative Democracy and Stem Cell Research in New York State: The Good, the Bad, and the Ugly Kennedy Institute of Ethics Journal - 19(1):63-78
2. Klitzman

May 12: Spiral in and out

TENTATIVE FIELD TRIP

Sperm to Stem Cells: Marco Seandel, NYSCF Fellow, Cornell Weill Medical College

Marco was a NYSCF fellow working in the Rafii lab. Note the timing of the article publication, the style of each article/ radio show, and the target audience. The last article is a research article, so pay attention to the abstract, the introduction, the figures and the conclusions. First try to skim and only circle words that you have across before—to help you get grounded in the paper. Pay close attention to the last sentence, Note: The LacZ fusion construct is similar to the green fluorescent protein (GFP) constructs we discussed earlier in class when we reviewed viral induced pluripotent stem cells (iPSCs), except here the Lac Z is fused to the regulatory region for GP125 (so anytime GP125 is transcribed so is the LacZ

gene- which produces a protein called Beta galactisidase which make a blue color in the presence of a substrate that the cells are grown in.

Reading

1. Tanne.J. Feb 2008. From Sperm to Stem Cells. HHMI Bulletin.:9.
2. Sept 20, 2007. Stem cells derived from adult testes produce wide range of tissue types for therapeutic organ reorganization. HHMI Research News.
3. Palca, J. Scientists Find Less Controversial Stem Cell. September 20, 2007. NPR Radio.<http://www.npr.org/templates/story/story.php?storyId=14556298>.
4. Seandel, M. et al. Sept 20 2007. Generation of functional multipotent adult stem cells from GPR125+ germline progenitors. Nature. 449- 52.

Questions

1. How did the researchers trace their cells in the various experiments?
2. How do the researchers test for pluripotency?
3. How similar are the MASCs to ESCs?
4. What are the concerns in moving this research forward?