

Professor: Katayoun Chamany, Ph.D Cell and Molecular Biology **Class:** Rm 1009, 6 East 16th St, 2pm- 3:15pm
Telephone: 229-5100 ext 2239 **E-mail:** chamanyk@newschool.edu **Cell phone/Text :** 917-573-8458
Office: Room 460, 65 West 11th Street **Office Hours:** T 4:00pm-5:00pm and by apt

Teaching Fellow A: Ariel Merkel, merka292@newschool.edu **Teaching Fellow B:** Katie McGreevy mcgrc081@newschool.edu
Peer Science Fellow, Alexa Riggs rigga633@newschool.edu

“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.*

In considering advances in stem cell research (SCR) that could lengthen our life span or improve our quality of life, we confront our mortality and grapple with the morality of an inequitable distribution of resources. To prepare for personal decision making and the shaping of social policy, we must revisit the normative assumptions of biomedical research:

- That bodies can be sites of biological resources and sites of experimentation
- That only “healthy” people can contribute to a productive society
- That investment in science and technology is the best approach to solving societal problems

To question these assumptions and develop the cognitive flexibility necessary to address **capacious** or **wicked** problems, we will use a spiraling approach where the same topic or question is revisited at different points in the course to allow for an unraveling of complexity over time and space. Using an interdisciplinary approach we integrate the biological, ethical, legal, and social dimensions of stem cell research and more specifically, draw upon critical perspectives from disability rights, feminist thought, religious studies, and social justice in addressing the following questions:

- How does the stem cell source relate to the degree of cell plasticity or potential?
- How does the method of procurement, testing, and administration match society’s values?
- How do we shape social and health policies when values clash?
- How can we ensure distributive and procedural justice in the stem cell field?

Learning Outcomes

1. Differentiate the various methods of developing stem cell lines and the implications for research, ethics, and therapy.
2. Critically analyze evidence-based arguments for and against the liberalization of SCR and the ways in which policy has been shaped by these competing positions.
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.
4. Trace the history of: cell research; human subjects research; forms of compensation to balance the risks and benefits of research participation; and the formation of new regulatory structures designed to oversee emerging practices.
5. Identify the scientific method, the social justice principles, and any misrepresentations that relate to a particular SCR method in artwork, advertisements, film, news, scientific papers.

Assessment of Student Learning:

Case Studies. You will apply what you have learned using **case studies** that address real world 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. The cases involve role-play of various stakeholders and are designed to move from historical examples (HeLa) to more contemporary issues such as oocyte procurement practices and what governs their operation.

Exam and Activities. Exams will involve creativity, problem solving, and drawing. There will be no regurgitation or memorization. Instead, you will be asked to read or view something and respond to it using what you have learned.

Extra Credit. You may reflect on the title of the course within the context of stem cell biology or a stem cell related phenomenon to create a product using the medium of your choice (infodesign, audio, video, print, text, animation, art); the project should be accompanied by an artists/designer/ author statement. (10% or 100 points out of 1000pts)

SYLLABUS AT A GLANCE (day by day follows with framing paragraphs and readings)

Yellow: Optional special events; materials are available online for personal viewing

Blue: Days for which you are responsible for posting and viewing material

Week	Date	LECTURE	RECITATION
1	Jan 29	Immortality: Promise, Problems, & Potential Generate Questions to be Answered by Course	Science the Endless Frontier? Discussion
2	Feb 5	Life: Cells, Components, Cultures, & Communication	What is a Case Study?
3	Feb 12	The Stem Cell Niche: To Divide or Not To Divide	HeLa Case: Engagement Activity
4	Feb 19	Human Development: Divide, Differentiate, or Die	HeLa Case: Roles Assigned/Biology Review
5	Feb 26	Cancer: Intersections of Biology, Race, Class, & Gender	HeLa Case: Readings Discussion
5	Feb 26	Film <i>The Way of All Flesh</i> & Covert's <i>Healing Monologue</i>	
5.5	Mar 2		Post Position Statement/
6	Mar 5	What Influences Cell Fate? Genes in Time and Space	HeLa Case: Role Play Activity
6.5	Mar 9		Post to Group Page-Non Performers
7	Mar 12	Midterm Activity	HeLa Case: Debrief Discussion
8	Mar 19	Revisit Student-generated Questions	HeLa Case: Evidence Based Position Essay Due
9	Mar 26	*****Spring Break*****	*****Spring Break *****
10	Apr 2	IVF, PGD, & Research Embryos: Moral Status of the Embryo	Oocyte Case: Engagement Activity
11	Apr 9	Chimeras, Clones, & Cybrids	Oocyte Case: Roles Assigned/Biology Review
12	Apr 16	Female Bodies and Stem Cells: The Womb, Breasts, & Fat	Oocyte Case: Readings Discussion
12.5	Apr 20		Post to Group Page: Position Statement
13	Apr 23	Tissue Commodities FDA, NOTA, & Emerging Markets ASCs, iPSCS, and Fetal Cells	Oocyte Case: Role Play
13.5	Apr 27		Post to Group Page-Non Performers:
14	Apr 30	Public and Private Cell Banks Cord Blood & Bone Marrow	Oocyte Case: Debrief
15	May 7	Disability Justice	Oocyte Case: Evidence Based Position Essay Due
16	May 14	Advertising, News, and Research Activity/ Final Exam	The Future of Regenerative Medicine
17	May 20	Graded Rubrics will be Returned during this week	

Books and Resources

Most resources and readings will be available through Blackboard and organized by week. There is an overview document titled "Resources" to help you navigate the site and the resources.

There is one book. Skloot, R. 2010. *The Immortal Life of Henrietta Lacks* and it can be purchased through BlueStockings, a cooperative bookstore, café and activist center located at 172 Allen Street (one block south of the F train's 2nd avenue stop). Bluestockings refers to the Venetian (1400s) and European female literary scholars (1700s) that self organized in protest to the high class all-male salons of the times, The Blue Stockings name arose from the fact that rural women could not afford thin stockings and wore dark wool blue stockings.

Course Grading: (subject to change)

Class Participation (10%)	100pts
HeLa Case Analysis (30%)	
Position Statement	75pts
2Questions	30 pts
Counter Argument	75 pts
Role Play	70 pts
Evidence Based Essay	100 pts
Oocyte Case Analysis (30%)	50 pts
Position Statement	75pts
2Questions	30 pts
Counter Argument	75 pts
Role Play	70 pts
Evidence Based Essay	100 pts
Midterm Activity (10%)	100pts
Final Exam(10%)	<u>100pts</u>
	1000pts

Extra Credit Project (10%)

Scale:

A	94-100%
A-	90-93%
B+	87-89%
B	84-86%
B-	80-83%
C+	77-79%
C	74-76%
C-	70-73%
D+	67-69%
D	64-66%
D-	60-63%
F	59%

Resources

Blogs alternative news: Sites I use to stay on top of the field and its social dimensions. *The Biopolitical Times* put out by the Center for Genetics and Society is a mainstay . <http://geneticsandsociety.org/> ALSO **Alternet and Scidev.net.** Diversity in Science Carnival Blog <http://www.minoritypostdoc.org/view/bloggers.html#carnival>

Mainstream Science Sites: *Science Daily Blog, Science News,* and *The Scientist* and *Nature News* have digests of major and breaking research reports some with video interviews explaining the method etc.

Animations/Artscience/websites: associated with this class are INSTRUMENTAL, posted in the syllabus or in powerpoint presentations, but there is also the “Useful Websites” document on the Blackboard site. **Artscience highlights each day.**

Review Questions and Class Outlines posted on BB to help guide your reading- **look these over before and after reading and class sessions,** so you can focus on the important points and supplemental updated materials.

Office hours. You are welcome to come to office hours on a regular basis to discuss anything you like related to the course content; just to talk is fine. If you are having trouble with assignments or readings and would like to use office hours to work through the challenges, we will work through them together, but do this prior to the due date.

Peer Science Fellows: Alexa Riggs will be the Science Fellow for this course and her information is on the RESOURCES site on blackboard. Alexa has a strong interest biology, health, and social justice and is available to discuss any readings, current events, projects or interests you might have. In addition to Alexa take advantage of one another for peer critiques and study sessions. There is a space on Blackboard for you to construct your own Discussions.

The Learning Center should not be saved for the last minute—visit with the writing tutors often to craft your work. There are also documents on how to research and write an analytical paper on Blackboard. The online Paradigm Online Writing Assistant is also very useful- use the menu at the very top to navigate it <http://www.powa.org/>

The Libraries- Please note that the library is essential and important resource for this course. It is imperative that you attend the library tutorials and familiarize yourself with research in biology. You will use the Bobst NYU library for most of your research. <http://library.newschool.edu> **Our Science Librarian is Anthony Dellurificio and he is happy to help you one-on-one.** dellurea@newschool.edu

Course Expectations

Policy on Attendance and Lateness Policy: Absences may justify some grade reduction and a total of four absences mandate a reduction of one letter grade for the course. More than two absences mandate a failing grade for the course, unless there are extenuating circumstances, such as the following: an extended illness requiring hospitalization or visit to a physician (with documentation); a family emergency, e.g. serious illness (with written explanation); observance of a religious holiday. In case of personal and medical emergencies, students should contact their instructors as well as the Director of Academic Advising. The attendance and lateness policies are enforced as of the first day of classes for all registered students. If registered during the first week of the add/drop period, the student is responsible for any missed assignments and coursework.

Participation is key and you are expected to attend classes regularly and promptly. Missing class is going to be difficult as there is material we will review in class that will not be available in texts; If you miss class it is your responsibility to check with your peers and Blackboard for changes or updates and obtain class notes. **Due to the accelerated nature of this course, students should miss not 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 will be required to meet with the Science Fellow. If LATE, they will be corrected but your score will drop. 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.

Academic Honesty and Integrity: Compromising your academic integrity may lead to serious consequences, including (but not limited to) one or more of the following: failure of the assignment, failure of the course, academic warning, disciplinary probation, suspension from the university, or dismissal from the university. The New School views “academic honesty and integrity” as the duty of every member of an academic community to claim authorship for his or her own work and only for that work, and to recognize the contributions of others accurately and completely. This obligation is fundamental to the integrity of intellectual debate, and creative and academic pursuits. Academic honesty and integrity includes accurate use of quotations, as well as appropriate and explicit citation of sources in instances of paraphrasing and describing ideas, or reporting on research findings or any aspect of the work of others (including that of faculty members and other students). Academic dishonesty results from infractions of this “accurate use”. The standards of academic honesty and integrity, and citation of sources, apply to all forms of academic work, including submissions of drafts of final papers or projects. All members of the University community are expected to conduct themselves in accord with the standards of academic honesty and integrity. Students should refer to the Policy on Academic Honesty <http://www.newschool.edu/WorkArea/DownloadAsset.aspx?id=81698> and **Intellectual Property**. <http://www.newschool.edu/student-services/rights/other-policies/int-property/>

Bibliographic Requirements: Connected to the policy on academic honesty and plagiarism is the practice of referencing your resources in appropriate citation and bibliographic format. EVERY assignment should practice academic bibliographic format. The university has purchased Refworks, a software package that allows you to organize and customize your reference libraries see online tutorials for this software. **You must have a current student I.D., use the internet and electronic databases for research, and use Blackboard.**

Students with Disabilities. As an educator, I firmly believe in supporting all students in their educational pursuits and encourage those who seek additional support to come and see me early in the semester. The New School Students Disability Services (SDS) assists students with disabilities in need of academic and programmatic accommodations as required by the Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Federal Rehabilitation Act of 1973. 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. A designee from the Student Disability Services (SDS) will meet with students requesting accommodations and related services, and if appropriate, provide an Academic

Adjustment Notice **for the student to provide to** instructors. The instructor is required to review the letter with the student and discuss the accommodations (not the diagnosis), 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 (SDS) is located at 80 5th Avenue on the 3rd 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. A more detailed menu is available for students: <http://www.newschool.edu/studentaffairs/disability/students/>

For students interested in getting assessed, Counseling Services collaborates with the Clinical Psychology program on campus to offer psychological assessments which might be helpful for students who have trouble taking tests, concentrating, or keeping up with school projects; are worried that their emotions are interfering with academic success; feel that they are not reaching their potential; and/or concerned that they may have attention deficit disorder (ADD) or a learning disability. The assessment includes in-depth feedback about your test results and recommendations. In some cases, the test findings may be used as documentation to request academic accommodations through New School Student Disability Services.

Everyone learns differently and we think and approach learning in unique and important ways. Each of us can improve on our own learning style by sharing learning stories with one another that give us insight into cognitive organization skills that allow us to retrieve, utilize, and expand our skills and content knowledge. Anyone who feels that they may have a learning difference that has not in the past been supported by traditional linear text-based courses should inquire about accommodations that support diverse learning styles and support success. As more students step forward enriching the ways in which we teach and learn, more supports have emerged. For instance there is a student-founded advocacy and support group “Eye to Eye,” which has resources, suggestions, and mentors available for students, faculty, and administrators. <http://www.projecteyetoeye.org/index.html>

CALENDAR BY DAY: Readings completed BY the day they appear

Week 1

Jan 29 Immortality Research: Promise, Problems, and Potential

Students Generate Questions about SCR

Introduction to the course- see Bb First Day Folder

Intake Pre Assessment

PPT Immortality: Promises, Problems, and Potential

In Class Readings:

Anonymous. What is Health? The Ability to Adapt. The Lancet.

Thompson, C. Visual Thinking. Wired Magazine.

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/>

By Recitation Session Complete the following:

This series of readings questions the distribution of resources and priority setting in the context of economic and social capital as well as national security. The collection includes a mixture of news, white papers, and articles that highlight the interplay of policy, economics and stem cell science. Much of what we are seeing here builds off the original proposal that Vannevar Bush, The Director of The Office of Scientific Research and Development in 1945, put forth in his famous “Science the Endless Frontier” which took research scientists out of the military and defense sector and placed them into the newly formed National Institutes of Health (NIH). This shift moved the focus of scientific innovation from the destruction of life to maintaining “healthy lives and communities.” The Fossett white paper is an IMPORTANT reference for this course as it explains the unique position that the United States has taken relative to other countries on the moral status of the embryo with the maintenance of the Dickey Wicker Amendment (Appropriations Rider) for almost 20 years and Nelson, Matthews, and Scott/ McCormick describe the consequences of the annual signing of this rider for the stem cell research. The video about Diana Degette’s bill is from 2010 and follows up on the Fossett white

paper and argues that stem cell research (SCR) is essential for American competitiveness. Wendy Dean suggests that stem cell research is vital for national security and builds off the example of “Rebuilding Soldiers” shown in the Powerpoint.

There are a set of review questions to accompany this set of readings; review prior to reading.

Choose one of the 8 Review Questions that captures your interest and prepare a short 1 paragraph response to be shared in your recitation section to generate discussion participation.

Readings: (~22 pages in total)

The Local:

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. 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/>

The National

1. Fossett, J. Aug 2, 2007. Federalism by Necessity: State and Private Support for Human Embryonic Stem Cell Research. Rockefeller Institute Policy Brief. 1-13. http://www.rockinst.org/pdf/health_care/2007-08-09-federalism_by_necessity_state_and_private_support_for_human_embryonic_stem_cell_research.pdf
2. **Video:** Aug 2010. Degette Wants to Reintroduce Embryonic stem cell bill. (5 min) 9News.com. <http://www.9news.com/video/default.aspx?bctid=595231897001>

The International

3. Scott, C. and J. McCormick. May 3, 2006. Vantage Point. United States losing its competitive edge in stem cell research. Stanford news. <http://news.stanford.edu/news/2006/may3/med-vantage-050306.html> (1/2 page)

U.S. National Security

4. Dean, W. Dec 2011. The armed forces institute of regenerative medicine: a collaborative approach to the department of defense- relevant research. *Regenerative Medicine* 6 (6 Suppl):71-74. *This piece has good visuals and should be viewed in color.*

Week 2

Feb 5: Life: Cells, Components, Cultures, and Communications

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 traces the history of cell biology, and shows us that although cells adopt different functions and shapes, there are some characteristics that are central to all cells (Cell Theory). We will review a timeline of the technologies that led to Cell Theory and the establishment of the first human cell line; a cell that has become immortal and regenerates in a petri dish forever. One important reoccurring theme is the concept of self-assembly, but remember that molecules can self assemble but cells often need a scaffold of protein molecules to adhere to “to know where they are” and how they should behave. The environment is what triggers cells to access different genetic information and regulate protein activity. You are introduced to genetics here, but we will spiral this in the coming weeks, so just get the overview with the interactive site Learn Genetics.

PPT: What is Life?

Review questions on Bb.

Readings and Resources:

1. Rensberger, B. “Chapter 1: A Particle of Life” *In Life Itself*: 1-26. This reading will address some of our questions centered on the definition and use of cell lines. GOOGLE BOOKS http://books.google.com/books?id=tPD8AkvqERMC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
2. **Interactive Genome.** Learn Genetics U of Utah: 6 sections **15 min** <http://learn.genetics.utah.edu/content/begin/tour/>. Please note that the use of the word “normal” is not how we will refer to the most common genotype in the population, rather we will use the word “wildtype” or non-sickle, to refrain from judging a genotype.

3. **Infographic:** 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. <http://seedmagazine.com/images/uploads/12Cribsheet.pdf>
4. **Interactive:** Why do Fireflies Glow? Learn Genetics. <http://learn.genetics.utah.edu/content/begin/dna/firefly/>
5. **Gene Switches.** HHMI http://www.hhmi.org/biointeractive/evolution/Gene_Switches/01-vid.html

Optional :

1. **INTERACTIVE TEXT w/GLOSSARY: (spend at least 15 minutes with this) Your Genome** Click on “Flash” and then Click Through “The Basics” and the 7 short sections. Though the text is factual, the interactives are good, so be sure to click on Code Cracker in the “ Making Proteins” subsection in “ The Basics”
http://www.yourgenome.org/dgg/general/genomes/genomes_1.shtml
2. Dance, Amber. Sept 2012. Enter the Third Dimension. The Scientist. <http://the-scientist.com/2012/09/01/enter-the-third-dimension/> . This article reviews all the high tech techniques for three dimensional cell culture.

Week 3

Feb 12: Stem Cell Niches : To Divide or Not to Divide?

The textbook chapter introduces you to the basic processes of cell organization, cell division, reproduction, and cloning. We are going to move slowly through this chapter and spread the material over a couple of weeks. Consider the ways in which cells must respond to external and internal signals to organize and maintain a particular size and shape for a specific tissue. How do the cells know when to divide and when to stop? Which macromolecules need to reorganize and for what purpose and in which stage of the cell cycle? Why don't your organs continue to grow as you age? Why do some cells divide indefinitely while others have a shorter life span? Dolly the first cloned mammal, was a sheep that experienced largeness syndrome (oversized organs); might the regulation of cell division and growth of organs have gone awry in the cloning process? Consider this in light of Jennifer Kahn's piece concerning the cosmetic application of stem cells overseas and the growth of a rejuvenation cream industry in the United States by leading cosmetics companies such as Loreal, Lancome, and others as described in the Jabr piece. If a cytokine is considered a signal molecule, why might beauty creams containing cytokines be thought of as more safe than stem cell treatments? Can you argue against this knowing what you do about cell signaling? What might be a downstream consequence of using a cream with cytokines as ingredients?

Review Questions on BB.

Readings and Resources:

1. Minkoff and Baker. “Stem Cells, Cell Division, and Cancer.” *In Biology Today: An Issues Approach 3rd Edition.* 414-422 AND 432-436. We will only the first few pages of this chapter regarding cell division, differentiation, cell signaling and the last few regarding cancer. Page 419-422 (gene expression) will be revisited again in two weeks, so try to obtain a conceptual understanding and we will try to act it out in class.
2. Powell, K. 2005. It's the ecology stupid! *Nature* 435: 268-270.
3. Wehrwein, P. Dec 6, 2012. Repeat to fade. *Nature*. 492: S12-S13.
http://www.nature.com/nature/journal/v492/n7427_supp/pdf/492S12a.pdf
4. Kahn, Jennifer. Oct 16, 2005. The Stem Sell. *New York Times*. (5 pgs)
http://www.nytimes.com/2005/10/16/style/tmagazine/t_b_2136_2141_stemcell.html?pagewanted=all&r=0
5. Jabr, F. Dec 17, 2012. In the Flesh: The Embedded Dangers of Untested Stem Cell Cosmetics. *Scientific American*. (2 ½ pgs) <http://www.scientificamerican.com/article.cfm?id=stem-cell-cosmetics>
6. **Interactive Animation:** HHMI. 2003 The Cell Cycle Animation and Checkpoints and Cell Cycle Control. Scroll on right frame to “Biology of Cancer” and Select “Scientific Animations.” Then select “Cell Cycle” and “ Checkpoints and Cell Cycle Control” These animations take about 20 minutes.
<http://outreach.mcb.harvard.edu/materials.htm>

Week 4

Feb 19 Human Development: Divide, Differentiate, or Die

As we continue to move through the textbook chapter, we revisit the concept of cell signaling, the ability of cells to respond to external signals in their environment by regulating cellular processes such as protein synthesis. As you review the materials you will see that what emerges are three classes of potential stem cells in the human body: embryonic, umbilical cord, and adult. The HHMI Embryonic Development animation is essential and only 2 minutes in length. 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). The required websites are INTERACTIVE; set aside at least 60 minutes to interact with these sites. What we will focus on today is how cells can turn genes on and off for the long term (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. To understand what it means to differentiate, you will need to learn a little about genetics, so we return to the colorful SEED Magazine Crib Sheet as an essential for the remainder of the class to help remind you how genes are expressed and what their products are. You may want to start reading the Skloot book for Week 5 as there are quite a few pages to read.

Review Questions on BB.

In Class Video:

HHMI Stem Cells and Development: Beautiful Primitive Streak Animation

<http://www.hhmi.org/biointeractive/stemcells/animations.html>

HHMI Stem Cells and Development: Cell Differentiation

<http://www.hhmi.org/biointeractive/media/differentiation-lg.mov>

Readings and Resources:

1. Minkoff and Baker. "Stem Cells, Cell Division, and Cancer." *In Biology Today: An Issues Approach 3rd Edition.* 419-432. (Note that the animations on embryogenesis below really make this come alive and much easier to understand, and we will return to the Gurdon and Spemann and Mangold experiments in two weeks, so you can skim pg 424-436 and the corresponding figures.)
2. Schatten G, Schatten H. 1983. The energetic egg. *The Sciences* 23(5): 28–35.
3. **Artwork:** 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). Or look for the tab "The Collection."
4. ***Narrated Animation:** University of Michigan. Use the Tabs at top to view "Stem Cells Explained and Explored" "Embryonic Stem Cells," "Cell Specialization," and "Adult Stem Cells." Reviews umbilical cord, bone marrow transplants and the ethical issues around consent and moral status of the embryo and grading of embryos. http://ns.umich.edu/stemcells/022706_TabA.html
5. **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>
6. **Animation:** HHMI Stem Cells and Development: Beautiful Primitive Streak Animation in the body <http://www.hhmi.org/biointeractive/stemcells/animations.html>
7. **Animation:** HHMI. 2007. Scroll on right frame to "Regenerative Biology" and Select "Scientific Animations." Then select "Embryogenesis and the Origin of Stem Cells." This animation takes about 15 minutes and does a very nice overview of embryogenesis with invagination and migration while comparing embryos, fetal/ pregnancy tissues/ and adult stem cell potential and provides an early example of what needs to be addressed in Parkinsons Disease and the risks of graft vs. host disease. <http://outreach.mcb.harvard.edu/materials.htm>
8. **Animation:** HHMI Stem Cells and Development: Cell Differentiation Germ Layer lineage in body <http://www.hhmi.org/biointeractive/differentiation-and-fate-cells>
9. **Animation:** Bennett, Tara and Susan Johnson. 2007. HHMI Nuclear Stem Cells Differentiation: A Chromosome View. This animation takes about 5-10 minutes and reviews nuclear reprogramming in detail. <http://www.hhmi.org/coolscience/resources/SPT--FullRecord.php?ResourceId=53>

Week 5

Feb 26 Cancer: Intersections of Biology, Race, Class, & Gender

SPECIAL EVENT Feb 26 FILM SCREENING: 8-10pm Curtis, A. 1998. "Modern Times: The Way of All 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/>

This collection of readings introduces the ethical oversight and marketability of human subjects research but also highlights the essential components of the scientific method. Why was the HeLa line established? What research questions were biomedical researchers asking and what was the leading cause of death at that time? How did they go about testing their hypotheses and establish the growth of a human cell outside the body? How did they know that HeLa cells were mixed in with other cell lines? Landecker provides us with two cases studies; that of the Mo cell line and the HeLa cell line. She poses these questions: 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. 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 as a means to avoid the kind of medical injustices inflicted upon the marginalized or uninformed as described in the Nature editorial "Justice for All." Though some progress has been made it seems that for the time being we may still have a need for reparations. In the case of Jimmy Sarkett, it took a 50th anniversary event surrounding the Polio vaccine to reveal that his contributions were not recognized in ways that addressed his health needs. Does Sarkett embody the Disability Rights perspective? What do you make of Palmer's criticism in the context of the Cohen article? What do you think of Rebecca Kumar's call to action in response to the inclusion of the *The Immortal Life of Henrietta Lacks* written by Rebecca Skloot in first year programs across the country? Though the Henrietta Lacks case happened over 50 years ago at a time when human research subjects practices were just being put into practice as outlined in the University of Nevada site, Troug suggests that biomedicine is again at a crossroads in terms of human subjects research; is the argument for non-payment of biological tissue problematic and unjust or practical and well evidenced? How does the recent decision in Flynn vs. Holder reviewed in the Los Angeles Times article align with Truog's proposal?

Readings and Resources: (~160 pages, many are short and 107 are from the Skloot book, easy read)

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. Keiger, D. June 2, 2010. Immortal Cells, Enduring Issues. *John Hopkins Magazine*:1-6. (informed consent history and reach through). <http://archive.magazine.jhu.edu/2010/06/immortal-cells-enduring-issues/> Reviews Mary Kubicek's, McKusick and Hsus' participation in the establishment of the HeLa cell line and contemporary cases of human tissue research such as that of the Havasupai in Arizona.
4. University of Nevada. History of Research Ethics. Research and Graduate Studies UNLV. (1pg) <http://research.unlv.edu/ORI-HSR/history-ethics.htm> . This site is a short overview of the history of human subjects used in research and the guidelines that regulate federally funded research in the United States.
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. Anonymous. April 19, 2012. Justice for All. *Nature*. (1 page) <http://www.nature.com/nature/journal/v484/n7394/full/484287a.html>

8. 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>
9. Kumar, Rebecca. An Open Letter to Those Colleges and Universities that have Assigned Rebecca Skloot's The Immortal Life of Henrietta Lacks as the "Common" Freshmen Reading for the Class of 2016. Brown Town Magazine. <http://itsbrowntown.blogspot.com/2012/08/an-open-letter-to-those-colleges-and.html>
10. Skloot, R. TBD. Chapters 1, 3,4, 7,8, 13,14,17, 20,21, 27,32,33 and 35 and the afterward *In* The Immortal Life of Henrietta Lacks. (107 pages).
11. Fabregas L. and J. Balis. April 3, 2005. A Lasting Link to Discovery. The Tribune-Review. TribMedia. http://triblive.com/x/pittsburghtrib/news/regional/s_319392.html
12. Truog, R. et al. 2012. Paying patients for their tissue. The legacy of Henrietta Lacks. Science. 337: 37-38.
13. Anonymous. Jan 18, 2012. Court Asked to Reconsider Ruling on Bone Marrow Compensation. Los Angeles Times. Nation Now. <http://latimesblogs.latimes.com/nationnow/2012/01/bone-marrow-compensation.html>
14. Kaiser, J. Feb 7, 2013. Did sperm and egg donors donate unwittingly contribute to NIH-approved stem cells. ScienceInsider. <http://news.sciencemag.org/scienceinsider/2013/02/did-sperm-and-egg-donors-unwitti.html>

Artworks, Designs, Video

15. **Timeline:** Biba, Erin. Feb 2010. Henrietta Everlasting: 1950s Cells Still Alive, Helping Science. Wired Magazine. http://www.wired.com/magazine/2010/01/st_henrietta/
16. **Artwork:** Versapaget, C. 2004. The Anarchy Cell Line. Biodifference- The Political Ecology as part of BEAP'04. The Lawrence Wislon Art Gallery. http://members.westnet.com.au/moth/t_art/antext.htm
17. **Poem:** Davis-Faulkner, Sheri. For Elsie. May 20. 2010. <http://crunkfeministcollective.wordpress.com/2010/05/20/for-elsie-lacks/>
18. **Video** Skloot, Rebecca. <http://rebeccaskloot.com/book-special-features/audiovideo/>
19. **Student Work:** Covert, Charnell. 2010. Healing Play: See Blackboard Courseware site
20. **Video:** Curtis, A. 1997. Modern Times: The Way of All Flesh. Aired on BBC. Modern Times Series, Editor Stephen Lambert. 52 minutes. <http://www.archive.org/details/AdamCurtisTheWayofAllFlesh/>
21. **Video:** Sugarman, J., Zoloth, L. & Hempel, C. October 4 2010. The Immortal Life of Henrietta Lacks - lessons for stem cell researchers and patients. World Stem Cell Summit, Pasadena, CA. 60 minutes, but 30 minute excerpt of Zoloth is of relevance and requires free registration to view. Retrieved January 1, 2011, from <http://www.worldstemcellsummit.com/2010-summit-webcast> .

Week 6

March 5 What Influences Cell Fate? Genes in Time and Space

As we saw with the HeLa cells, some cellular transformations and behaviors occur due to an addition of DNA information in the form of viral DNA insertion, and/or activation of previously silent genes, and the duplication of specific gene element like the TERC sequence giving HeLa the unusual immortality phenotype. As cell biologists began to investigate cell differentiation, they began to wonder if the reverse might happen: Are genes lost as cells differentiate (p 423 Minkoff and Baker)? Which experiments sought to answer this question? Which experiments supported the notion that genes are lost, and which refuted gene loss during differentiation? Some of these experiments try 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? Consider the scientific method (Observations, Questions, Hypotheses, Experiments, Results, Conclusions, More questions...) and the Experimental Heuristic (Sample, Manipulation, Detection, Trace) and try to outline this method in the context of the Spemann and Mangold explant experiments and the Gurdon nuclear cloning experiments.

1. Minkoff and Baker. "Stem Cells, Cell Division, and Cancer." *In* Biology Today: An Issues Approach 3rd Edition. 423-426. (Note that the animations on embryogenesis below really make this come alive and much easier to understand).

Week 7

March 12 Midterm Activity

For the first half of the course we have reviewed the amazing experiments that led to the ability to work with stem cells in culture. Though these experiments started in the 1950s, there are still new cell types and stem cell niches being

explored. Today, you will be asked to outline the Scientific Method and Experimental Steps (Observations, Questions, Hypotheses, Predictions, Experiments, Results, Conclusions, More questions...) and the Experimental Heuristic (Sample, Manipulation, Detection, Trace) for a very short science news piece. As I respect that some of us take longer to read, think, and digest I ask that you read the following pieces (3 pages), and come to class prepared to draw and write in response to set of questions.

Readings

1. Saey, T. April 21, 2012. The yin and yang of male patterned baldness. *Science News*. 181 (8): 11.
http://www.sciencenews.org/view/generic/id/339308/description/The_yin_and_yang_of_male_pattern_baldness
2. Gray, R. Jun 24, 2012. Balding men offered hope of waking their sleeping hair. *The Telegraph*.
<http://www.telegraph.co.uk/science/science-news/9350916/Balding-men-offered-hope-of-waking-their-sleeping-hair.html>
3. Belezina, J. April 23, 2012. Adult stem cells used to induce the natural hair growth cycle in hairless mice. *Gizmag.com* <http://www.gizmag.com/adult-stem-cells-hair-restoration-therapy/22228/>

Week 8

March 19 Revisit the Student Generated Questions from Day 1

Week 9 Spring Break

****The remainder of the syllabus will be provided the week before Spring Break and will be based on the successes and challenges of the first 1 / 2 of the course. ****

Week 10

April 2 Sources of Stem Cells: Embryos, Clones, IVF, and iPS

In 1951, the HeLa line was established and an era of cell culture followed. The next set of cells to be placed in dishes were gametes (eggs and sperm) to create embryos. This technique, In Vitro Fertilization (IVF) provides researchers with extranumerary embryos (embryos that might not be transferred into a person for reproductive purposes). The readings here will explore this technique, and others designed to create sources of stem cells. 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. In 1999, the journal *Science* named "Stem Cell Research" as the "Breakthrough of the Year" spurring growing interest in creating stem cells with particular characteristics inspiring researchers to look beyond the **extranumerary embryos** obtained from IVF clinics. In August of 2000, Britain's Chief Medical Officer chaired an advisory committee that issued a report "The Donaldson Report" that sanctioned the creation of human cloned embryos for research. The publication of the report resulted in remarks from the Council of Europe that included the following: "the UK has now left the European community in terms of moral values" referring to the 1998 Convention on Human Rights and Biomedicine: Additional Protocol on the Prohibition of Cloning Humans. In 2005, the United Nations attempted to pass an international ban on all types of human cloning, but opposition from the United States and its allies resulted in the passing of a non-binding declaration to ban human cloning, and the subsequent repositioning by the UN in 2007 to promote a ban on reproductive human cloning only. Meanwhile, researchers in industry and those in academia using private funding have made progress on human cloning research as can be seen from the series of short news pieces spanning 2002-2011. Note that in the blog by Elgin some common terms are revisited such as **teratoma** and **epigenetic memory**. The Dunn article is a feature article about a family and a biotech company's attempt to "clone" some cells from their son to treat his disease. The very short one-two pages news pieces numbered 11-14 debate the benefits and risks of using public funding to pay young people for their eggs for SCR creating strange bedfellows between **feminists and the religious right**. Lastly, 15-16 reflect on the lack of regulation across the private sector where

eggs are used for reproductive purposes and the ways in which this poses unique challenges for SCR researchers seeking to use these eggs for research purposes.

Come to class prepared to create a historical outline of IVF research and cloning.

Reading: (About 40 pages of reading)

1. Gearhart, J. et al. Jan 7 2011. In Vitro Fertilization, the Nobel Prize, and Human Embryonic Stem Cells. *Cell*.8:12-15.
2. Cervera and Stojkovic. Feb 1 2008. Commentary. SCNT- Progress and Promise. *Stem Cells*. 26 (2):494.
3. Dunn, K. 2002. Cloning Trevor. *Atlantic Monthly*, 289(6): 31-48.
<http://www.theatlantic.com/issues/2002/06/dunn.htm>
4. Vogelstein, B. et al. Feb 12, 2002. Please don't call it cloning. *Science*. 295(5558):1237.
<http://www.sciencemag.org/content/295/5558/1237> . This article suggests new nomenclature for stem cell research that does not invoke the concept of reproductive clones.
5. O'Mathuna, D. 2002. What to call human cloning. *EMBO Reports* 3 (6): 502-505. This article is in response to the Vogelstein et al. article and states that ethical issues can not be skirted by changing the vocabulary.
<http://www.nature.com/embor/journal/v3/n6/pdf/embor136.pdf>
6. Blackburn, E and J. Rowley. April 2004. Reason as our guide. *PLoS Biology*. 2 (4):1-3.
7. Cibelli. October 2, 2009. The human egg is back. *Cell Stem Cell*. 5:345-346. Preview of the Tachibana et al work of ST transfer fusion for cloning of primates.
http://pdn.sciencedirect.com/science?_ob=MiamiImageURL&_cid=274143&_user=10&_pii=S1934590909004548&_check=y&_coverDate=2009-10-02&_view=c&_gw=y&_wchp=dGLzVIB-zSkzV&_md5=e3904f5f665b90ff0790fb3400364d82/1-s2.0-S1934590909004548-main.pdf
8. Dolgin, E. Oct 5, 2011. First stem cells created from cloned human embryos- but they're triploid. *Nature Medicine*. http://blogs.nature.com/spoonful/2011/10/first_stem_cells_created_from.html
9. 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
10. 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
11. 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>
12. 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>
13. Hamilton, J. 2000. What are the costs? *Stanford Magazine*. Nov/Dec.
<http://www.stanfordalumni.org/news/magazine/2000/novdec/articles/eggdonor.html>
14. Wadman, Meredith. June 15, 2010. Disease cells fail to win approval. *NatureNews.com*. 852:
<http://www.nature.com/news/2010/100615/full/465852a.html>

Optional: 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. *Excellent article that raises illustrates the challenge in conducting research across different institutions some private, some public, some for therapy, some for research and the lack of a systematic human research subject oversight protocol that ensures ethical standards are being met.*

VIDEO on your own and again in class

1. Vidali, A. April 3 2011. IVF Procedure. A Simple Explanation of the In Vitro Fertilization Cycle.
<http://www.youtube.com/watch?v=7oNg6Lm4ZJ4>
2. 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

In Class Video: Rosaryfilms. 2009 (Nightlight Adoptions). Stem Cell Research Policy of President Bush/ Adult versus Embryonic Stem Cells. President Bush's speech in 2005 Veto of the Castle Degette Stem Cell Research Enhancement Act. http://www.youtube.com/watch?v=CVV87EH6VLk&playnext=1&list=PL5A2770BBE8166D49&feature=results_m

Week 11

April 9 Chimeras, Hybrids and Cybrids

As we look toward clones, parthenotes, and cybrids we see that implantation (the process of the embryo establishing itself in the uterine lining) is being played with a bit. In the creation of alternative nuclear transfer (ANT) embryos proposed by William Hurlbut and the generation of parthenotes the genomic imprinting or nuclear reprogramming prevents the formation of a true trophoblast and thus no supporting tissues of the embryo involved in implantation nor the placenta form. The creation of an embryo INCAPABLE of implantation thus, might placate some who are concerned about the moral status of the embryo. The creation of hybrids, cybrids or chimeras appears to be more contentious as can be seen in the *Immortal Life of Henrietta Lacks* Chapter 18 by Skloot. Though countries prohibit the implantation of such a creation in the human uterus, Canada, the UK, and 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 forbids chimeras, they essentially block the ability to prove that 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? Be sure to review the Baylis piece about animal eggs as it reviews three spokes on the radial graphic (SCNT, ANT, Parthenotes and Cybrids) and the Gerrick and Chapman (short two page) responses demonstrate how counterarguments built on evidence can be presented in a scholarly space. The piece by Father Berg in the *National Review* returns to the notion of how far is too far in SCR. The Gavrilov piece has real live images of "dead" embryos that contain viable cells and is a great way to practice outlining the scientific method and understanding what "dead" means and how extranumerary embryos play a role in SCR; I placed yellow highlight and notes to guide your reading. The Bonner news piece is an example of research that was funded by NY ESSCB, as federal funding would not allow for this work creating a humanesque brain in a mouse. The Walters and Freddoso pieces bring an intercultural and religious perspective to the discussion of SCR, but given the workload that some have mentioned in the midterm course evaluation I have made these optional.

In Class Video: Vincent on Nip Tuck . Nip/Tuck Episode 5.04. Dawn Budge II . 3:07 - 5:33.

http://www.youtube.com/watch?v=YyqLH4_EF2Q . This was done in real life with bovine cartilage cells on a rodent, and the plastic surgery context is a reminder of Illinois Comptroller Dan Hynes' 2005 proposal for a 6% tax on elective cosmetic surgery to repay state bonds dedicated to stem cell research.

In Class Video: Christine O'Donnell on Fox Bill O Reilly 2007. Mice with Human Brains.

http://www.youtube.com/watch?v=FqOV_eqbkWE

In Class VIDEO: Stem Cells http://www.youtube.com/watch?v=mUcE1Y_bOQE This video is a great example of environmentally regulated gene 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, *The video touches on the work and proposal of the President's Bioethics Council headed up by William Hurlbut (from Lines that Divide Video Week 10) to create Alternative Nuclear Transfer(ANT) Clone Embryos that are incapable of human uterine implantations since they would not develop the trophoblast.*

Readings:

1. Skloot, R. 2010. Chapter 18: The Strangest Hybrid. *In* *The Immortal Life of Henrietta Lacks*.

2. Baylis, F. 2008. Animal eggs for stem cell research: A path not worth taking. *American Journal of Bioethics*. 8(12): 18-32. Target article for the short two pages responses and comments below by **Chapman et al and Gerrick**.
3. Chapman, A. 2008. Unscrambling the eggs: Cybrid research through an embryonic stem cell research oversight committee (ESCRO) lens. *American Journal of Bioethics*. 8(12): 44-46.
4. Gerrek, M. 2008. Who really causes the lady to vanish? *American Journal of Bioethics*. 8(12): 46-48.
5. Berg, Thomas. Oct 23, 2007. Of Cybrids, Hybrids, and Chimeras. *National Review Online*.
<http://www.nationalreview.com/articles/222428/cybrids-hybrids-chimeras/father-thomas-berg>
6. Gavrillov, S. et al. 2009. Non-viable human embryos as a source of viable cells for embryonic stem cell derivation. *RBMonline*. 18(92); 301-308. *In this research article, only read the yellow highlighted sections and few the images in the figures. Also see if you can outline the scientific method/ experimental protocol used to determine if "dead embryos" can be source of ESCs. There are only about three pages of yellow highlighted text and the images are BEAUTIFUL.*
7. 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>
8. **Optional** Freddoso, David. Feb 6, 2007. Homilist Names Names. *National Catholic Register*.
<http://hfs.detmich.com/mcdonnell/mcdonnellncr.html>
9. **Optional**. Walters, L. 2004. Human embryonic stem cell research: An intercultural perspective. *The Kennedy Institute of Ethics Journal* 14(1): 3-38. *This is an overview of many religious perspectives on embryonic stem cell research.*
10. **Optional** . Baylis, F. 2009. The HFEA Public Consultation Process on Hybrids and Chimeras: Informed, Effective, and Meaningful? *Kennedy Institute of Ethics Journal*. 19(1):41-62 . *A critique of the public consultation process*

Week 12

April 16: Female Bodies and Stem Cells: The Womb, Breasts, & Fat (43 pages in total)

As we continue to explore the arguments surrounding oocyte provision and payment we investigate alternatives. Last week we explored the possibility of cybrids, but Baylis (April 9) and others claim this does not eliminate a need for human eggs for ESCR (embryonic stem cell research). We continue to explore how we might be able to both compensate people for egg provision while preventing exploitation, but see new challenges emerging. Some believe the egg providers should have agency to negotiate wages (Nahman) while others are concerned about a growing bioeconomy (Waldy, Ikemoto) creating a shadow over potential health risks and lack of regulation (Fiore), while still others claim that young people are incapable of making clear decisions when distracted by money (Papadimos; Stein). Here again we see John Moore and Henrietta Lacks as reference cases (Ikemoto) as we revisit the notion of ownership and commercialization in the context of informed consent. So what are the alternatives? We turn to work of Parsons Alumna Chelsea Briganti and new sources of stem cells such as fat and menstrual blood to consider whether these sources of stem cells can either resist or reinforce gender stereotypes (Begley; Briganti; Rowland) while presenting potential alternatives to embryo creation.

In Class Videos

1. **In Class Video: Briganti, Chelsea. 2010. Mademoicell Design Process. Stem Cells from Menstrual Cells**
http://a.parsons.edu/%7Etraviss/koln/Chelsea_Briganti_Mademoicell.mov
2. **In Class Video: The Resident. 2010. Menstrual Stem Cells. YouTube.** <http://www.youtube.com/watch?v=m7wVPINUVWc>
3. **In class Abstract:** 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. **(READ ABSTRACT)**

READINGS: (44 pages in total)

Other Sources of Gendered Stem Cells

1. **Breast Fat Stem Cells.** Begley, S. 2010. All Natural: Why breasts are the answer to regenerative medicine. *Wired*. 18.11: 148-155, 188-189. (8-9 pages of text with good graphics)
2. **Menstrual Blood Stem Cells:** Rowland, Teisha. March 27, 2009. Stem Cells Discovered in Menstrual Blood: Endometrial Regenerative Stem Cells. *Allthingsstemcell.com*. (2 ½ pages)
<http://www.allthingsstemcell.com/2009/03/endometrial-regenerative-stem-cells/>

Labor and Capital

3. **Audio and Text Available PodCast:** Waldby, C. Citizenship, Labor, and the Biopolitics of the Bioeconomy: Recruiting Female Tissue Donors for Stem-Cell Research S&F Online. *The Scholar and Feminist Online* Published by The Barnard Center for Research on Women. www.barnard.edu/sfonline. Double Issue 9.1-9.2: Fall 2010/Spring 2011 Critical Conceptions: Technology, Justice, and the Global Reproductive Market. (8 pages). *This piece refers to the "Social Contract" and Marxist labor analysis to question how domestic work (family economy) and regenerative labor (tissue economy) should be recognized. ("The aspects of life that were de commodified were health, national education, social security, and the mandating of a family wage—these were all state-initiated actions to keep the relations of the family outside of the market.") The author also does not directly refer to Vannevar Bush's Science The Endless Frontier, but does discuss the ways in which SCR can be hyped up and mentions outsourcing of reproductive labor (India Surrogacy; repro labor), and redistribution of surplus vitality (generative capacity of the female body) to an aging population diverted from the generation of babies.*
4. **Ikemoto, LC. 2009. Eggs as capital:** Human egg procurement in the fertility industry and the stem cell research enterprise. *Signs*. 34 (4):763.-781. (19 pages) *First six pages is a review of class in that IVF is a technique used for two purposes, so you can skim it and I have highlighted the relevant sections. Brings up the timeline of IVF and SCR just after Roe Vs Wade (abortion being legal) that occurred just before Louis Brown the first IVF baby. Does a nice job of explaining the Informed consent judicial cases (Moore) conferring commercial rights to the owner of the process or product and she invokes Bayhe Doyle again too.*

Compensation and Commodity

5. **Oocyte Payment and Research** Stein, A. L. (2011). The conundrum of oocyte donation, human research, OHSS, and ethics. *The American Journal of Bioethics: AJOB*, 11(9), 35-37. (2 pages *cites Skloot and focuses on young college age women as targets*)
6. **Oocyte Payment and Research:** Fiore R. and K. Hirsch. Oocytes for research: Reevaluating the risks and compensation. *American Journal of Bioethics*. 11 (9): 42-43. (2 pages *CDC; healthy Phase I, risk pool, database. NYSTEM, SJ invoked by ESSCB, and refers back to the Gearhart Nobel Prize article about acknowledging and recognizing the women*)
7. **Optional : Outsourcing Risk and Payment** 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.

Week 13: April 23: Disability and Advocacy

Disability is something that affects every human at some point in their lives, but for many disability will occur later in life. This set of readings traces the history of society's view of disability using a medical model. The Generations Ahead (Asch) challenge this view and ask us to apply a social model to avoid injustices to those that live with disabilities. Note that Davis picks up on the role that higher education should play in the lives of those that live with disability and asks us to include disability in the context of conversations about diversity in higher education. Shakespeare appears to be striving for a balanced perspective, endorsing neither a "medicalized" tragedy approach, nor an entirely social approach to issues of disability. But he differentiates between what some people call "static" impairments or disabilities, such as spinal-cord injury, and what some refer to as "chronic illnesses" like Type I diabetes (Kay). He thinks, or appears to think, that the former may be more hostile to cure than the latter. He also appears to think that the stage in life at which someone acquires an impairment (early in childhood or adolescence versus later) can make a difference in how people make sense of disability. Note that this view may be in tension with his view about static versus chronic and progressive impairments. His focus on the media's skewed coverage of Christopher Reeve's response to injury and SCR advocacy demonstrates that this does represent the views of many people with disabilities and does damage to the hopes and aspirations of people with disabilities trying to live their lives. Shakespeare also connects nicely to our conversations about biotechnology being used for enhancement versus therapy. It is notable that in 2009, 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 Gibbs' reasoning?

Questions to Consider: Where does our knowledge of disability come from? What information might we need to understand how people live with disabilities? Do people attribute problems to their physical characteristics, to the social environment, or to the interaction of body and environment? How different are the frustrations of the people with disabilities from the frustrations of your own lives?

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

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

In Class Video: Video Advance Clip of “ Fixed” by Regan Brashear <http://fixedthemovie.com/watch-trailer> .

<http://www.kickstarter.com/projects/394281483/fix-the-science-fiction-of-human-enhancement-doc>

Reading: (32 pages in total)

1. Anonymous. What is Health? The Ability to Adapt. The Lancet (1 page)
2. Asch
3. as part of Generations Ahead. Disability Rights Analysis of Genetic Technologies. Next Generations. Chicago, IL. (12 pages) http://www.generations-ahead.org/files-for-download/articles/GenerationsAhead_DisabilityRightsConveningReport.pdf
4. Davis, Lennard. Sept 25, 2011. Why is Disability Missing from the Discourse on Diversity. The Chronicle of Higher Education. (3 pages)
5. Adams, R. November 6, 2011. Bring down the Barriers. - Seen and Unseen. <http://chronicle.com/article/Bring-Down-the-Barriers-Seen/129648/> (2 pages)
6. Shakespeare, Tom. 2006. “Just Around the Corner” In Disability Rights and Wrongs. Routledge Press. NY. 103-117.
7. Hahn, H.D and Todd D. Belt. 2004. Disability identity and attitudes toward cure in a sample of disabled activists. Journal of Health and Social Behaviour. 45: 451-264. (14 pages) Skim the statistical data and many pages are references.

Videos:

1. Animation of glucose and insulin pathways (4') http://molecularmovies.com/movies/etsuko_diabetes.mov
2. Interview with Doug Melton, father of children with diabetes, Harvard, SCR (only watch last segment 4') http://www.hhmi.org/biointeractive/media/melton_bio-lg.mov
3. **Ellison Project: SCI; Hope Deferred** (4') http://www.youtube.com/watch?feature=player_embedded&v=I2lCkP-hlJs
4. **Disability Rights : Advocates for inclusion, address systemic discrimination**
5. **Kessler Project: Terra Incognita** (8') <http://www.youtube.com/watch?v=nLLQnlwfxgc>

Optional

1. Wasserman, D. and A. Asch. Feb 2013. Disabilities People With. The International Encyclopedia of Ethics. Wiley Online Library Books. (available from the most university online databases).
2. Kay C. et al. 2009. An exploration of the experiences of young women living with type 1 Diabetes. Journal of Health Psychology. 14 : 242- 250. (8 pages)
3. Brignell, Victoria. Dec 10, 2010. The Eugenics Movement Britain wants to Forget. New Statesman. <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. NewStatesman. <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)

TIMELINES

- a. Smithsonian Timeline. Interactive Timeline with Audio, video, and text describing the items in the exhibit. Video of Senator Tom Harkin sign language address to Congress for the ADA 1990. <http://americanhistory.si.edu/disabilityrights/welcome.html>

- b. Museum of Disability and People Inc. Has a neat interactive site of History broken up by NY state and general. Has Hepatitis Experiment at Willowbrook on NY Timeline. And Architectural Barriers Act in 1976 for the Clint Eastwood Piece <http://www.museumofdisability.org/index.asp>

Week 14: April 30 Tissue Commodities FDA, NOTA, & Emerging Markets

The Hope and Hype: Adult Stem Cells and Clinical Trials

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 with some companies trying to uphold standard practices of scientific research while others appear to be unwilling to abide by 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 (hESC) trials in the U.S. began in 2010 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. Much to everyone's surprise the Geron trial partly funded by the CIRM, was abandoned in late 2011 due to financial constraints. Meanwhile, China and South Korea have begun FDA approved trials for arthritis and spinal cord injury. Back in the U.S. stem cell sources have come from unlikely sources such as adipose tissue which can be retrieved from liposuction, and Cytori Therapeutics and others have begun human clinical trials with adipose regenerative stem cells (ADSCs) abroad to test the regenerative capacity of these cells in breast tissue reconstruction, breast enhancement, and cardiac tissue repair. These cells are not required to undergo FDA evaluation, but rather Good Manufacturing Practices (GMP), yet in some instances when cells are manipulated in vitro, the FDA has brought injunctions against privately funded Regenerative Sciences Company for using autologous ASC to treat knee disabilities. The injunction and lawsuits reveal that the science is moving fast- perhaps faster than legislation and regulatory processes resulting in a series of litigations. Given the range of activities, some regulated and others not, watchdog groups are on the lookout for rogue organizations that falsely claim to have stem cell cures and commit harmful practices that exploit the vulnerable. The ISSCR attempts to "protect" the public against such acts via the Closer Look at Stem Cells Treatments website. Do you agree with Shanks criticism here? Might there be another interpretation?

In Class Videos and Websites :

1. **ESPN2. Jan 23, 2012. Outside the Lines. The Stem Cell Treatment Debate. Video depicting sports stars** going abroad to enhance their output or heal more quickly; Centeno and Andrews provide opportunities in Cayman Islands and South Korea; FDA injunction; microfracture in vivo technique. 10minutes video, and 10 minutes panel with Arthur Kaplan (bioethicist), sports star, and physician who performed stem cell transplant. 20 minutes in total. <http://www.youtube.com/watch?v=kWrwKy33Xs>
2. **60 Minutes 21st Century Snake Oil** Sept. 12, 2010 : Part 1 Patients : 13:23 minutes <http://www.cbsnews.com/video/watch/?id=6859188n&tag=mncol;lst;3>
3. **60 Minutes 21st Century Snake Oil** Sept. 12, 2010 : Part 2 Reveal : 12 minutes <http://www.cbsnews.com/video/watch/?id=6859211n&tag=segmentExtraScroller;housing>
4. **60 minutes. Stem Cell Fraud.** Jan 8, 2012. 15 minutes http://www.cbsnews.com/8301-18560_162-57354695/stem-cell-fraud-a-60-minutes-investigation/
5. **ISSCR. A Closer Look at Stem Cells WatchDog Site** <http://www.closerlookatstemcells.org//AM/Template.cfm?Section=Home>

Readings: (10 pages in total)

Stem Cell Therapies without FDA Approval

1. Centano, Chris. Our Patient's Autologous Stem Cells Are Drugs: The FDA Moving Down a Dangerous Slippery Slope. (2 pages good review of the one to one and one to many medical risks) <http://fapmmed.net/FAPM%20Centeno%20Editorial%20on%20Public%20Health%20Impacts%20of%20FDA%20Regulating%20Practice%20of%20Medicine.pdf> (3pages)
2. Cyranoski, D. Aug 2, 2012. FDA's claim over stem cell upheld. Nature 488: 14. (1 page)

Stem Cell Clinical Trials with FDA Approval

3. Varughese, A, Dec 12 , 2011. Abandoning the Stem Cell Clinical Trial Ship. Biotechniques.
<http://www.biotechniques.com/news/Abandoning-the-Stem-Cell-Clinical-Trial-Ship/biotechniques-324708.html?autnID=308862> (4 pages)
4. Anonymous. Glance at Stem Cell Report the CIRM Newsletter.
<http://californiastemcellreport.blogspot.com/2012/02/25-million-cautionary-tale-cirm-and.html> . *Note that Fossett is references here the author of your article some weeks ago on the Dickey Wicker Amendment.* (1-2 pages)
5. Shanks, Pete. Aug 4, 2010. Stem Cell Education and Hype. Biopolitical Times.
<http://www.biopoliticaltimes.org/article.php?id=5309> (1 page)

In Class Activity:

- a. Distribute and Read Gimble et. al. 2011. Taking stem cells beyond discovery: A Milestone in the reporting of regulatory requirements for cell therapy. Stem Cells and Development. 20 (8): 1295-1296.
- b. Show and read with class the abstract of Ra, J.C. et al. 2011. Safety of intravenous infusion of human tissue derived mesenchymal stem cells in animals and humans. Stem Cells and Development. 20(8): 1297-1308.

Week 15 May 7 Final Exam Distributed

Week 15 May 14: Public and Private Cell Banks & Wrap up

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 (Sugarman from the video in the HeLa case is co-author with Kurtzburg; Faden). Most of this work that we have reviewed in the course is privately funded, which of course brings us to patents and the various stakeholders (Regenberg). 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 and the ways in which science can be equated with social progress and a competitive edge in the global marketplace but also the ways in which government WAS designed to provide for the public good (Garland and Stull) but that often times it specifically marginalizes those from under represented minorities (Greene).

Readings: (19 pages in total)

1. Kurtzburg J. et al. Oct 1, 2005. Untying the Gordian knot: policies, practices and ethical issues related to banking of umbilical cord blood. The Journal of Clinical Investigation. 115 (10): 2592-2597. Co authored by Jeremy Sugarman, this piece is a great review of the debates over public and private banking, patents on process (Pharmastem), and bills requiring public banks to expand their collections to contain more ethnically diverse samples. (5 pages)
2. Regenberg, A. and D.JH Mathews. 2011. Promoting justice in stem cell intellectual property. Regenerative Medicine. 6 (6 Suppl): 79-84. (4 pages)
3. Garland, M. and Stull, J. Module 9: Public Health and Health Systems Reform: Access Priority Setting and Allocation of Resources. In Ethics and Public Health. Model Curriculum. Editors Bruce Jennings, Jeffrey Kahn, Anna Mastroianni, and Lisa Parker. 241-251 (10pages). <http://www.asph.org/document.cfm?page=782>

Optional

1. The Royal Society of London. 2003. Keeping Science Open: The effects of intellectual property on the conduct of science. **READ only the Summary (pages 1-6 in the Adobe reader)**
<http://royalsociety.org/policy/publications/2003/keeping-science-open/>
2. ****Faden, R. et al. (2003). Public Stem Cell Banks: Considerations of Justice in Stem Cell Research and Therapy. The Hastings Report. November-December. 13-27. *This is an excellent short review of the issues in terms of public access.*
<http://www.hopkinsmedicine.org/bioethics/research/pcepp/fadenHCR.pdf>
http://www.thehastingscenter.org/pdf/publications/public_stem_cell_banks_methods.pdf
3. Greene, M. 2006. To restore faith and trust: Justice and biological access to cellular therapies. The Hastings Center Report. 36 (1): 57-63.