

**Class Meeting:** Tuesdays and Thursdays 1:10-2:25pm, in T-P4

**Instructor:**

**Tatiane Russo-Tait**  
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**Office:** T-P 2B  
**Office Hours:** M 10:00-11:00AM, TH 2:30-3:30PM

**Course Description:** This course is not intended for Biology majors. BIOL 176 provides a foundation for understanding concepts in stem cell biology as well as the historical, social, ethical and political issues surrounding stem cell research. 3 units.

**Prerequisites:** None

### Student Learning Outcomes

On completing this course, you will be able to:

1. Explain the steps in the scientific method of inquiry, which involves gathering observable, empirical and measurable evidence subject to specific principles of reasoning and recognizing that reproducible observation of a result is necessary for a theory to be accepted as valid by the scientific community.
2. Gather and interpret scientific information from a variety of sources and use that information to articulate well-reasoned responses to scientific concerns in the field of stem cell biology.
3. Describe ethical, moral and philosophical dilemmas arising out of scientific research and applications of stem cell research, which relate to social justice and may have implication for local and or global communities.
4. Discuss the relevance of major scientific theories and/or research on stem cell biology and the ways in which policy has shaped the field in today's world.
5. Trace the history of stem cell research, human subjects research, and the formation of regulatory structures designed to provide oversight of emerging practices and their impact on different ethnic groups.
6. Identify value systems by which you and/or ethnic minority groups can contribute to social justice in scientific issues, including stem cells, within local and national communities.
7. Develop decision-making abilities and political awareness of the role of stem cell research in the context of a diverse society.

### Class Culture

I strive to create a supportive and collaborative learning environment in my classroom. While you need to be responsible for your learning outside of class by keeping up with readings, assignments and researching information on your own, I believe that it is very important for you to work with others to supplement your understanding of the material and, in the process, develop your critical thinking and communication skills. To this end, this class will involve lots of group work and discussions- and you are expected to participate. That being said, the very nature of this class means discussing controversial issues that will instigate different and, at times, polarized opinions. Inappropriate or disrespectful behavior towards your peers or myself will not be tolerated under any circumstance.

As a science educator I recognize that every individual learns differently and I try to incorporate different teaching strategies in my classroom to accommodate various learning styles. Some of these teaching methods may be new to you and take you out of your comfort zone- I ask that you be understanding and open to learning that way.

### REQUIRED MATERIALS

**1) Reading materials:** Links to articles, websites etc. will be posted on iLearn the week before that reading is due.

**2) iClicker:** available for purchase at SFSU bookstore.

**3) 3x5 Index Cards:** 1 pack of 100 white, lined index cards (\$1 at SFSU Bookstore).

**4) Computer Access:** to access the iLearn BIOL 176 website (<http://ilearn.sfsu.edu>) for course materials, to turn in assignment and take *quizzes*. Check this site **often** as it will contain most of the lecture materials and due dates for assignments and quizzes. See [www.library.sfsu.edu/services/](http://www.library.sfsu.edu/services/) for the location of campus computer labs available to all students, including 24-hour computer labs (student ID required).

**COURSE GRADES AND POLICY**

Your BIOL 176 final course grade is based on the following breakdown of points:

iClicker/ Class Participation/ Index Cards:	100 points
Pre and Post Assessment/Quiz:	60 points
Bio in the News:	50 points
Midterm:	50 points
Case Studies (4 @ 30pts):	120 points
Class Presentations:	80 points
Presentation Critiques (4 @ 10pts):	<u>40 Points</u>
 Total points =	 500 points

Your final course grade will be roughly based on the following standard percentages:

A = 93% or greater; A- = 92-90%; B+ = 89-87%; B = 86-83%; B- = 82-80%; C+ = 79-77%; C = 76-73%;  
C- = 72-70%; D+ = 69-67%; D- = 62-60%; F = 59% or less.

**iClicker:** During each lecture period, I will ask questions that you will immediately answer using your clicker. The number of questions asked each lecture will vary. The clicker will be used to make a real-time assessment of your understanding of the material being presented in class, and to record class participation/attendance. If you are present and use your clicker during class, you will receive the full points allotted for that particular day (i.e. you will not be penalized for giving an incorrect answer as long as you submit an answer). *Please note: operating a classmate's iClicker is considered cheating!*

**Quizzes:** Quizzes will be given during the course of the semester. Each quiz is worth 10-20 points for a total of 60 points. Quizzes will consist of matching, multiple choice, and short answer questions and will be administered on iLearn (see class schedule).

**"Bio in the News":** Throughout the semester you will be asked to find news articles relating to topics we have been discussing in class and write a summary (specific directions/rubrics to each assignment will be posted on iLearn).

**Midterm:** Will be worth 50pts and consist of matching, multiple choice, and short or long essay answer questions.

**Case Studies:** Four case studies, worth 30 points each, will be assigned. Each will consist of two parts: an outside-of-class component, where you will be responsible for researching a specific topic and writing a summary or reflection; and an in-class component, where you will be required to communicate your findings in a discussion, role play or presentation format.

**Class Presentations:** Class presentations will be done by groups of 2-3 students and will occur throughout the second half of the semester. Students will select a topic from class that is of most interest to them. They will then design a medium they would use to educate their community about that topic. Options include, but aren't limited to: brochures, posters, poems, songs, videos, etc. While this project will culminate with the presentations, a project proposal/outline (10pts) as well as a progress report (20pts) is expected leading up to the presentation (50pts).

**Disability Access:**

Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email ([dprc@sfsu.edu](mailto:dprc@sfsu.edu)).

**Policy on Observance of Religious Holidays**

The instructor shall make reasonable accommodations for students to observe religious holidays when such observances require students to be absent from class activities. *It is the responsibility of the student to inform the instructor, in writing, about such holidays during the first two weeks of the class each semester.* If such holidays occur during the first two weeks of the semester, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed.

**Additional Resources:**

- The Learning Assistance Center provides tutors for students who need help in math and science as well as readings, writing and study skills. See [www.sfsu.edu/~lac](http://www.sfsu.edu/~lac).

- The Student Success Program offers counseling on test-taking anxiety and other academic challenges, career planning, and many workshops and professional development opportunities. See <http://studentsuccess.sfsu.edu>

## CLASS SCHEDULE

Date	Topics	Assignments/Quizzes
Jan 29	<b>Administration, Overview of Class Structure and the Semester</b> <ul style="list-style-type: none"> <li>• Introductions</li> <li>• Class Structure and Culture</li> <li>• Registering iClickers</li> <li>• Pre-assessment</li> <li>• Preview of the semester- Stem Cells: Promise, Problems, Potential</li> </ul>	<b>In class: Pre-assessment</b>
Jan 31	<b>The Scientific Method</b> <ul style="list-style-type: none"> <li>• The Scientific Method</li> <li>• The Mystery Box</li> </ul> <b>Syllabus Discussion and Q &amp;A</b>	<b>Read Syllabus</b> and come to class with questions!
Feb 5	<b>The Cell and DNA</b> <ul style="list-style-type: none"> <li>• Size and Scale</li> <li>• Cell Structure and Function</li> <li>• DNA</li> </ul>	Reading on iLearn
Feb 7	<b>Gene Expression</b> <ul style="list-style-type: none"> <li>• From Gene to Protein</li> <li>• Mutations</li> <li>• Becoming RNA Polymerase and Being the Ribosome Worksheet</li> </ul>	<b>Due in Class:</b> Size and Scale Strips Worksheet
Feb 12	<b>The Cell</b> <ul style="list-style-type: none"> <li>• Division &amp; Signaling</li> </ul> <b>Gene expression</b> <ul style="list-style-type: none"> <li>• Differential Gene Expression</li> <li>• Genetic Engineering (Got Silk?)</li> </ul>	Readings on iLearn  <b>Due on Turn-it-in by Feb 11 at 9pm:</b> Biology in the News 1
Feb 14	<b>What we've learned so far</b> <ul style="list-style-type: none"> <li>• Jeopardy Review</li> </ul>	<b>Due on iLearn by February 15 at 11pm:</b> Quiz 2 (20 pts)
Feb 19	<b>HeLa Cells, Cell Division and Cancer</b> <ul style="list-style-type: none"> <li>• Cell Division and Cancer</li> <li>• HeLa Cells Case Study</li> </ul>	
Feb 21	<b>HeLa Cells Case Study Discussion cnt'd; and IVF</b> <ul style="list-style-type: none"> <li>• Natural Fertilization</li> <li>• Infertility</li> <li>• <i>In vitro</i> Fertilization (IVF)</li> </ul>	<b>Due in Class:</b> Case Study 1 Reflection
Feb 26	<b>Case Study 2: Stem Cells, Promises to Keep?</b> <ul style="list-style-type: none"> <li>• In Class iClicker Case Study</li> </ul>	
Feb 28	<b>Embryonic Stem Cells</b> <ul style="list-style-type: none"> <li>• Human embryonic stem cells <ul style="list-style-type: none"> <li>○ Origins, characteristics, potential, pros and cons</li> </ul> </li> </ul>	<b>Due on Turn-it-in by March 1 at 12pm:</b> Case Study 2 Reflection <b>Reading on iLearn</b>
Mar 5	<b>Analysis of "ESC Line Derived From Human Blastocysts", Jamie Thomson 1998</b> Identify the paper's hypothesis; prediction and rationale for each of the experiments performed; explain the experiment (not the technique! just what the experiment was designed to measure or prove); explain the data and conclusion drawn from it.	<b>Due on Turn-it-in by March 11 at 6pm:</b> Biology in the News 2
Mar 7	<b>Other Sources of Stem Cells, their characteristics, potential, pros and cons</b> <ul style="list-style-type: none"> <li>• Adult Stem Cells</li> <li>• Umbilical cord blood, bone marrow stem cells</li> <li>• IPS cells</li> <li>• Cloning, SCNT, ANT, Chimeras, Hybrids, Cybrids</li> </ul>	Reading on iLearn Biology in the News 2 <b>Turn-it-in by March 11 at 6pm:</b>
Mar 12	<b>Review of Stem Cell Research Vocabulary</b>	

	<ul style="list-style-type: none"> <li>Group Activity: In class vocabulary worksheet</li> </ul>	
Mar 14	<b>Debriefing on Vocab Review</b>	Reading on iLearn
Mar 19	<b>Bioethics and the Main Dilemma of Embryonic Stem Cell Research: The moral status of the embryo</b>	Reading on iLearn
Mar 21	<b>Other Important Ethical Considerations</b> <ul style="list-style-type: none"> <li>Commoditization of Female Bodies</li> <li>Lack of genetic and racial diversity in stem cell lines</li> <li>Access and costs of therapy- who will benefit from advances?</li> <li>PGD: Slippery Slope to Designer babies?</li> <li>Clones, Chimeras, Hybrids and Cybrids</li> <li>Stem Cell Tourism</li> <li>Patents</li> </ul> <b>→ Group Project Description and Assignment of Presentation Dates</b>	<b>Due on Turn-it-in by March 22 at 6pm:</b> Biology in the News 3 <b>Ex. Credit Opportunity:</b> Due on 3/22 by 11:59PM
Mar 25	<b>Spring Break</b>	
Apr 2	In Class Review Session for Midterm	
Apr 4	<b>MIDTERM</b>	<b>Midterm- In Class</b>
Apr 9	<b>SCR Policy History in the US and California</b> <ul style="list-style-type: none"> <li>Timeline: Policies from IVF to Embryonic SCR</li> <li>Assign roles for Case Study 3: The Future of CIRM</li> </ul>	Reading on iLearn
Apr 11	<b>History of Federal Research Funding/ From Basic Research to a Clinical Trials</b> <ul style="list-style-type: none"> <li>From late 1800's to WWI</li> <li>WWII</li> <li>President Roosevelt and Dr. Bush: Science, the Endless Frontier</li> <li>Pipeline: From Basic Research to a Clinical Trials</li> </ul>	<b>Due on Turn-it-in by April 14 at 6pm:</b> Bio in the News 3
Apr 16	<b>Case Study 3: Future of CIRM Debate-</b> Does your organization Support or Oppose Prop 71? <b>Return of graded exams</b>	<b>Due in class:</b> Case Study 3 Report
Apr 18	<b>NO CLASS- USE THIS TIME TO MEET WITH GROUPS. CAN USE P-4.</b>	ALL GROUP PROPOSALS DUE BY APRIL 19 <sup>th</sup> at 11:59PM via iLearn
Apr 23	<b>Midterm Debrief</b>  <b>Presentations: Groups 1-3 (50pts)</b> All other students: presentation review papers (10pts)	<b>Due on Turn-it-in by April 24 at 6pm:</b> Biology in the News 4: Looks for news articles related to a U.S. State's SCR Policy (except CA)
Apr 25	<b>SCR Policy in other states in the US</b> <ul style="list-style-type: none"> <li>Come prepared to share what you found out from Bio in the News assignment!</li> </ul> <b>Brief History of Human Subjects Research and Policy</b> <ul style="list-style-type: none"> <li>The Nuremberg Code, The Belmont Report, and Institutional Review Boards</li> </ul> <b>Intro to Case Study 4: The Tuskegee Study</b>	
Apr 30	<b>Presentations: Groups 4-7 (50pts)</b> All other students: presentation review papers (10pts)	
May 2	<b>Discussion of Case Study 4: Tuskegee Syphilis Study</b>	<b>Due on Turn it in by May 2 at 12pm:</b> Case Study 4 Report
May 7	<b>Presentations: Group 8-11 (50pts)</b> All other students: presentation review papers (10pts)	
May 9	<b>Current Stem Cell Trials</b>	
May 14	<b>Presentations: Groups 12-14 (50pts)</b> All other students: presentation review papers (10pts)	
May 16	Discussion: Hope, Hype and Realities of Stem Cell Research Analysis of news headlines: Junk DNA, Mystery Solved and First hESCs created	<b>Due on Turn-it-in by May 17 at 6pm:</b>

**BIOL 176**

**The Science and Politics of Stem Cell Biology**

**Spring 2013**

	via SCNT Teaching Evaluations	Biology in the News 5
<b>May 18</b>	Post- assessment. In class during finals time (10:45am at T P-4)	