Molecular Biology 610- Fall 2013
Part 1

BIOETHICS IN THE MOLECULAR LIFE SCIENCES
SAN DIEGO STATE UNIVERSITY
Molecular Biology 610- Fall 2013

Instructor: Sanford Bernstein
sbernstein@mail.sdsu.edu
Life Sciences 371, (619) 594-5629

About the course
Bioethics is a term that defines many of the ethical issues facing students, faculty and those working in the biotechnology industry. These issues include rights of individuals in clinical trials, humane care of laboratory animals, the proliferation of genetically engineered foods, human genome manipulation, stem cell and organism cloning, bioweapons, delivery of genes to humans and animals, and patenting of organisms. Further, areas specific to professional ethics include ownership of data, plagiarism, authorship disputes, and scientific fraud. The goal of this course is to offer education in the broad area of bioethics. Student learning outcomes are expected to include: 1) ability to synthesize the bioethics research literature into coherent oral presentations and written materials that offer appropriate scientific background and a balanced view of the ethical issues; 2) ability to explain and discuss complex scientific and ethical issues during in-class interactions. The long-term goals of teaching bioethics to those involved in developing and implementing biotechnology are to allow them to make scientifically valid choices that consider the broader ethical issues and to permit them to be capable of advising policy makers regarding these issues.

Case Study Report
You will be assigned to a two-member team. Each team will be scheduled to report during one of the student presentation periods. The team may choose one of two options for its oral report: 1) Each team member will deliver an oral report that will consist of an eight minute presentation of a case study (a controversial specific case that falls under one of the course topics). In this option, each team member will report on a different case study. Describe the case (both the scientific basis and the ethical area), why it is controversial, the contrasting views and how it has been resolved (if
it has). You may provide your own opinion. One week after the oral presentation, each team member will submit a five page written summary and analysis of the case study presented by the other team member (double spaced, references may go beyond the five page limit). Thus each team member will speak on one topic and write on a second. Team members are free to discuss topics together and share materials from the literature. However, the papers need to be written independently.

or

2) The team may choose to have a 16 minute debate regarding a case study (a controversial specific case that falls under one of the course topics). In this situation, each team member will take a different viewpoint on the subject (for instance, pro vs. con). The two students will first jointly provide an introduction to the case study. This should be followed by an argument for one point of view from one student and then an argument for the second point of view from the other student. Then each student will have a chance to rebut the other student’s argument. The debate must be carefully constructed to last only 16 minutes. One week after the oral presentation, each team member will submit a five page written summary and analysis of the case study from the point of view of the other team member (double spaced, references may go beyond the five page limit). Thus each team member will speak on one viewpoint and write on a second viewpoint. Team members are free to discuss viewpoints together and share materials from the literature. However, the papers need to be written independently.

The groups should talk to or e-mail the instructor (sbernstein@mail.sdsu.edu) with their proposed case studies (and perhaps some alternates). To avoid redundancy in the presentations, the instructor will approve, suggest modifications to or reject the proposed topic. If the topic is rejected, the group will need to choose another topic or topics. Thus, please submit your topic choices in a timely fashion. Good sources for topics include the journals Science, Nature and The Scientist (http://www.the-scientist.com/).

Reading
Two texts are listed for the course

The first text can be purchased at Aztec Shops Bookstore or is available online for free at http://www.nap.edu/catalog.php?record_id=12192.
The second text is available for purchase at Aztec Shops Bookstore. It also can be purchased directly from Oxford University Press (http://global.oup.com/academic/product/the-oxford-handbook-of-bioethics-9780199562411?q=Steinbock&lang=en&cc=us)

The course web site contains links to relevant scientific and ethical articles. In addition, instructors in the course will provide reading materials that must be read prior to attending class. These will serve as background and as a basis of course discussion.

**Grading**

Your final grade for Bioethics (50% of the 3 unit MB 610) will be derived as follows:

- 40% - oral presentation (based on clarity of oral communication, appropriate scientific background, delineation of ethical issues and principles, highlighting of controversial points, visual aids)
- 50% - written assignment (based on clarity of written communication, appropriate scientific background, delineation of ethical issues and principles, highlighting of controversial points, appropriate literature review and use of citations)
- 10% - class participation and submission of additional short reports that may be requested in class. TAKE NOTE- based upon this grading scheme, it will be near to impossible to receive an A in this course unless you participate in class discussion. So, please participate!
- Plagiarism will be extremely detrimental to your grade (this is, after all, an ethics course).

**Lecture Schedule**

See [Reading list](#) for additional required and optional readings and for lecture notes

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READING</th>
<th>SPEAKER</th>
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<tbody>
<tr>
<td>Aug 26</td>
<td>An introduction to bioethics and research ethics</td>
<td>Steinbock Chapter 1</td>
<td>Sanford Bernstein, Ph.D. SDSU Biology</td>
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<td></td>
<td>Philosophical underpinnings of bioethics</td>
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<td>Peter Atterton, Ph.D., SDSU Philosophy</td>
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<td>Aug 28</td>
<td>Authorship issues; Plagiarism and falsification of scientific data; Ownership of scientific data</td>
<td>NAS Booklet</td>
<td>Sanford Bernstein, Ph.D. SDSU Biology</td>
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<td>Sept 4</td>
<td>Patenting molecules, devices and organisms</td>
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<td>Michael Rondelli, J.D., Director, SDSU Research Foundation Technology Transfer Office</td>
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<td>Sept 9</td>
<td>Dealing with animals in an ethical manner</td>
<td>Steinbock Chapter 27</td>
<td>Kent Osborn, DVM, Ph.D., UCSD</td>
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<td>Sept 11</td>
<td>Human subjects: Controversial studies; Regulations &amp; ethical principles; Risks vs. benefits</td>
<td>Steinbock Chapters 25, 26</td>
<td>Dena Plemmons, Ph.D., Director, SDSU Division of Research Affairs, Grad &amp; Research Affairs</td>
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<td>Sept 16</td>
<td>Animal cloning and genetic engineering</td>
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<td>Oliver Ryder, Ph.D., Institute for Conservation Research, Zoological Society of San Diego</td>
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<td>Sept 18</td>
<td>Designing ethical pharmaceutical studies; Informed consent; Pharmacogenomic testing</td>
<td>Steinbock Chapter 23</td>
<td>Joe Tami, Pharm. D., Director of Scientific Affairs, Therapeutics Incorporated</td>
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<td>Sept 23</td>
<td>Human stem cells and cloning</td>
<td>Steinbock Chapters 18,19</td>
<td>Karl Willert, Ph.D., Cellular &amp; Molecular Medicine, UCSD</td>
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<td>Date</td>
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<td>Lecturer/Chapter(s)</td>
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<td>Sept 25</td>
<td>Gene delivery and therapy</td>
<td>Steinbock Chapters 21,22</td>
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<td>Sept 30</td>
<td>Student reports</td>
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<td>Oct 2</td>
<td>Student reports</td>
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<td>Oct 7</td>
<td>Student reports</td>
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<td>Oct 9</td>
<td>Ethics of agricultural biotechnology</td>
<td>Alan McHughen, Ph.D., Botany and Plant Sciences, UC Riverside</td>
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<td>Oct 14</td>
<td>Biological warfare</td>
<td>Steinbock Chapter 30</td>
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<td>Oct 16</td>
<td>Student reports</td>
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<td></td>
<td>Bioethics wrap-up</td>
<td>Sanford Bernstein</td>
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**Relevant web sites**

[Example of high quality case study written report](#)
[Another example of high quality case study written report](#)
MB 610: MOLECULAR BASIS OF DISEASE
FALL 2013, LS 365, MW 5:00-6:15

Course Objectives: An appreciation of how the molecular basis of disease is determined will be gained through lectures, analysis of the scientific literature and student assignments. Students will be expected to read and analyze scientific review papers and primary publications. Students will have an opportunity to develop oral presentation skills and writing skills for non-scientific and scientific audiences.

Instructors:
S. Bernstein (coordinator), sberstein@mail.sdsu.edu
D. Aguilar, dcaguilar@ucsd.edu
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T. Frey, tfrey@mail.sdsu.edu
D. Skarra, dskarra@ucsd.edu
D. Smith, dasmith08@gmail.com
M. Thoman, mthoman@sciences.sdsu.edu

Assignments: The course content is available on the Blackboard System (https://blackboard.sdsu.edu/webapps/login). Please consult with the coordinator or a fellow student if you need advice on using this system.

Readings for Lectures: Each lecture will have one or more assigned articles to be read prior to the lecture. You will find these in the Course Documents folder, under the name of the particular instructor. You should be prepared to discuss the contents of these papers in class (see below).

Research Paper Oral Presentations: Each student team will make one presentation of a research article (up to 30 minutes). You will find these articles in the Course Documents folder, under the name of the particular instructor. You need to work with your team member to divide the paper equitably and plan a coherent presentation. Each person within the team will receive his/her own grade. Each presentation is worth 30% of the grade for the Molecular Basis of Disease section of the course.

Written Assignments: Each student will write two papers on research articles from two different instructors that he/she did NOT make an oral presentation for. Each written assignment is due one week after the article is presented in class.

a) Each person should choose one of the research articles (not review articles) from a section of the course they did not make an oral presentation for and write:

A "press release" of up to 3 pages (double spaced). This will be a description of the findings in the article written in terms that a layperson could understand, as you would find in a newspaper or news magazine. No scientific jargon! This is worth 20% of the grade for the Molecular Basis of Disease.

b) Each person should choose one of the research articles (not review articles) from a yet a different section of the course they did not make an oral presentation for and write:

A "grant proposal" of up to 5 pages (double spaced). This will be a scientific proposal to carry out the work that has been accomplished in this paper (not future experiments based on the paper). It should be written as if you did not know the results reported, i.e. you are proposing to do the work reported in the paper (not proposing new experiments). This is worth 30% of the grade for the Molecular Basis of Disease section of the course. This should follow the standard NIH format as to structure, which is given below (adapted from www.nih.gov):

* Specific Aims: State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List succinctly (by number) the specific aims of the
research proposed. For each aim, indicate how it will test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

* Significance: Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses. Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields. Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

* Innovation: Describe any novel theoretical concepts, approaches or methodologies, instrumentation or intervention(s) to be developed or used, and any advantage over existing methodologies, instrumentation or intervention(s). Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation or interventions.

* Approach: Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.

* References (these may go beyond the five page limit)

Note that each person will write one "press release" and one research grant for this course and they will be based on research articles from two different instructors.

Class participation and attendance: This will be worth 20% of the grade for the Molecular Basis of Disease. In addition to participating in class discussions: Be prepared to answer questions from the instructor based upon the review articles (students will be chosen in class to answer such questions). Be prepared to give a 2-3 minute overview of each research article (students will be chosen in class to provide such a summary prior to the formal student presentations).

In summary; each student will:

- make one research paper presentation (as part of a 2-3 member team) [30% of grade]
- write one non-technical “press release” summary of a research article assigned by one of the other instructors [20% of grade]
- write one "grant proposal" that could have funded the work described in a research article assigned by yet another instructor [30% of grade].
- attend class and participate in class discussion, which includes reading the review or research articles assigned for class and being prepared to answer questions or summarize these articles in class [20% of grade].

Course Schedule:

- Oct 21 Barlow Lecture: Techniques for Microscopic Analysis
- Oct 23 Frey Lecture: Mitochondrial Disease
- Oct 28 Frey Oral Reports (Group 1- paper #1F, Group 2- paper #2F)
- Oct 30 Bernstein Lecture: Contractile Protein Disease
- Nov 4 Bernstein Oral Reports #1 (Group 3- paper #1B, Group 4- paper #2B)
- Nov 6 Bernstein Oral Reports #2 (Group 5- paper #3B, Group 6- paper #4B)
- Nov 11 SDSU closed (Veteran’s Day)
- Nov 13 Smith Lecture: Prostate Cancer
- Nov 18 Smith Oral Reports: (Group 7- paper #1Sm, Group 8- paper #2Sm)
- Nov 20 Skarra Lecture: Diseases of the Pituitary
- Nov 25 Skarra Oral Reports: (Group 9- paper #1Sk, Group 10- paper #2Sk)
- Nov 27 no class (Happy Thanksgiving!)
• Dec 2 Thoman Lecture: **Immunosenescence and Pulmonary Infectious Disease**
• Dec 4 Thoman Oral Reports (Group 11- paper #1T, Group 12- paper #2T)
• Dec 9 Aguilar Lecture: **Role of Apoptosis in Cardiovascular Disease**
• Dec 11 Aguilar Oral Reports: (Group 13- paper #1A); Course wrap-up.