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A Shelf of Stem Cells

Reviews of: **Stem Cells and Cloning** *by David A. Prentice*, Benjamin Cummings. 39 pp. ISBN 0-8053-4864-6 ($6.75)

Stem Cells and the Future of Regenerative Medicine *by National Research Council, Institute of Medicine.* National Academy Press. 94 pp. ISBN 0-309-07630-7 ($19.95)

Stem Cells: Scientific Progress and Future Research Directions *by Department of Health and Human Services*

Human Embryonic Stem Cells *by Ann A. Kiessling, and Scott Anderson*, Jones and Bartlett. 222 pp. ISBN 076372341X ($39.95)

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When teaching undergraduate biology classes, it is exciting to relate class material to national events. Few topics are more relevant, interesting, or challenging than the current debate on cloning and stem cells. I have incorporated discussions of these topics in all three of the courses I teach: Introductory Biology, Advanced Developmental Biology, and a senior seminar course on cloning and stem cells. I therefore need references at many different levels. For the introductory students, I want a source that will give clear definitions and have excellent illustrations. Advanced students with a good background in cell and molecular biology want detail: I find they are hungry for up-to-date research results, and don't mind ambiguous findings. Seminar students want this scientific information put into context. They ask "what are the biases of the authors? Who sponsored this research? What agenda is being pushed by this pamphlet?" Luckily, there are a growing number of resources out there for our students. All have something different to offer.

David Prentice has written a small, easy-to-read booklet entitled "*Stem Cells and Cloning*" that students will find useful if their current introductory biology text does not cover this material. He starts with "Why is everyone so interested in stem cells?" and gives the basic biology of embryonic and adult stem cells. Reproductive and therapeutic cloning are covered, and there are brief sections on bioethics and politics. The writing style is chatty, and many students will enjoy the well-placed exclamation marks! Unfortunately the illustrations consist of fairly crude black and white diagrams, a couple of tables, and a grainy photograph of Dolly. The annotated list of websites and additional readings at the end of the booklet will allow a student to find quite a number of resources. During the weeks that we were discussing this topic in my introductory biology course, I placed several copies of this in the student laboratories, and encouraged students (and lab instructors) to use them for reference. Perceptive students came away recognizing that the author strongly supports *adult* stem cell research, while questioning the potential usefulness of embryonic stem cells for regenerative medicine. While not too heavy-handed about it, Dr. Prentice is also quite negative about both reproductive and therapeutic cloning.

In June 2001, two branches of the National Academy of Sciences (the National Research Council and the Institute of Medicine) convened a meeting to discuss the potential of stem cell research. The report of this workshop, "*Stem Cells and the Future of Regenerative Medicine*" is available free online, or as a slim paperback for purchase. Students have appreciated the clear, readable information on the basic biology of embryonic and adult stem cells. The writing is more formal than in the Prentice book, and the level of detail is greater. The few diagrams are excellent, and there is a brief but useful glossary. One of the strengths of this publication is that it cites original research literature in the text and has a full reference list. Students have thus been able to use Medline or Web of Science search engines to find more current publications by cited researchers, and follow the specific lines of inquiry that most interest them. This publication had a clear agenda: "to assess the scientific and therapeutic value of stem cells". It opens and ends with sections on "Findings and Recommendations," strongly supporting public funding for human stem cell research. This information may be distracting for the intro student wanting to look up what the inner cell mass is, but others will be interested in how scientists work within a political arena.

The website maintained by the NIH contains a report called *Stem Cells: Scientific Progress and Future Research Directions*. This is an excellent resource for faculty and students, and one I have

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used extensively. It covers embryonic and adult stem cells in detail, presents information on many diseases, and discusses how stem cell therapies might eventually be useful. The appendices are exceptionally informative, covering early mammalian development, mouse model systems, stem cell markers, and a useful glossary. The report is very well illustrated with brightly colored diagrams, and students have commented on how much the artwork adds to the report. I have not assigned this in full for my students (at more than 200 pages it is quite a lot of reading), but certain chapters can be used as standalone essays. Students particularly liked "Can stem cells repair a damaged heart?" because it gave them the scientific data behind newpaper headlines, diagrammed specific experiments, discussed mouse models for heart damage, and ended with a daunting, but exciting, list of questions still needing answers. Students can also use the NIH website on stem cells to update this report (http://stemcells.nih.gov/).

Kiessling and Anderson have produced a very good book, *Human Embryonic Stem Cells*, subtitled "An Introduction to the Science and Therapeutic Potential." Filled with detail, this is the stem cell textbook I will use for my seminar class this coming semester. The book is divided into five parts: The Basics; Egg Specific Functions; Embryonic Stem Cells; Stem Cell Therapies; and Human Embryonic Stem Cells and Society. It has a thoughtful and lively writing style, and the authors have written it for a wide audience. I think it is just right for advanced undergraduates who have had cell biology. It is well illustrated, and contains diagrams covering everything from crossover events in meiosis to the construction of mouse chimeras. It is unfortunate that many of the figure captions are so brief as to be misleading (i.e., "human chromosome pairing during mitosis"), though the explanations in the text are accurate. I particularly like the highlighted sidebars throughout the book, giving historical context to techniques and experiments. These range from early reports of human egg activation in the 1940's to the development of tissue culture media The authors' strong enthusiasm for the potential of embryonic stem cell therapies comes through (in contrast to Prentice's view, above), and their mission in writing this book is to make the case for public support of embryonic stem cell research.

Students who type "stem cells" into Google will retrieve close to 2 million entries. Luckily, the first one listed on my screen was the NIH website noted in this review. There is excellent material out there, though it can be hard to find sources that maintain a level of impartiality scientists are thought to desire. In my classes I try to take full advantage of this, teaching that what goes on in a petri dish is embedded in a world of human endeavor.