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Stem cell now *From the experiment that shook the world to the new politics of life*

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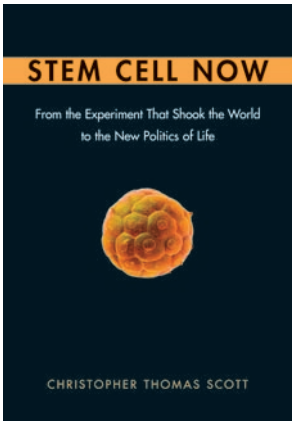
Book Review

Christopher Thomas Scott's new book, Stem cell now: from the experiment that shook the world to the new politics of life, focuses on a timely topic and provides an excellent primer for understanding the biology of stem cell growth. Many experts in the medical, political, and ethical disciplines were interviewed for the book, including Nobel laureate Paul Berg and Irving Weissman, both of Stanford University; James Thomson of the University of Wisconsin, whose experiments initiated the potential clinical use of embryonic stem cells; Laurie Zoloth of Northwestern University, a bioethics expert; and Michael Gazzaniga, a member of the President's Council on Bioethics. In his foreword, Donald Kennedy, editor in chief of the journal Science, says that Scott, director of the Stanford Program on Stem Cells and Society, provides "a reliable, balanced and thoughtful account of the biology of stem cells and the history of this remarkable new advance in our understanding of the process of development," and I would agree. The first chapter describes the first report of the isolation of human embryonic stem cells (hESCs) in Science in 1998 as a defining moment for the stem cell field. Adult stem cells in animals and humans had been studied for decades, but the potential for use of pluripotent hESCs, which might be more efficacious than adult stem cells, had become […]



Stem cell now

From the experiment that shook the world to the new politics of life

Christopher Thomas Scott
Pearson Education, Pi Press. Upper Saddle River, New Jersey, USA. 2005.
256 pp. $24.95. ISBN: 0-131-73798-8 (hardcover).

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The first chapter describes the first report of the isolation of human embryonic stem cells (hESCs) in *Science* in 1998 as a defining moment for the stem cell field. Adult stem cells in animals and humans had been studied for decades, but the potential for use of pluripotent hESCs, which might be more efficacious than adult stem cells, had become a reality. Through an interview with the primary author of the study, Scott goes beyond the facts of the published paper to describe the scientific approach that was involved in this discovery. The implications of isolating these cells for regeneration of injured tissue in multiple diseases were enormous. But, as Scott points out, in spite of this novel finding, the funding of hESC research had been banned by the US Congress for decades. Scott shows how the NIH, recognizing the importance of the finding, subsequently weighed in on lifting the ban and began to solicit grant applications to study the biology and clinical application of hESC therapy.

The next three chapters provide a rather simple but accurate primer on developmental biology, which I think would be more appreciated by lay readers than scientists but which would allow any reader to understand the therapeutic potential of hESCs. Stem cells are defined operationally, and Scott describes tests that will determine what is and what is not a stem cell. The clarity of thought revealed in Scott's discussion is enhanced by multiple artistic illustrations.

Later chapters lay out the potential uses of stem cells for human therapies. Scott goes into great detail describing the function of both adult and embryonic stem cells and the relative utility of each. I liked the discussion comparing totipotent and pluripotent stem cells (defined as master stem cells with the potential to differentiate into multiple tissue types, including kidney, heart, and bone marrow, which is characteristic primarily of embryonic stem cells) to multipotent and unipotent stem cells (defined as stem cells committed to differentiate into cells of only one tissue, for example, erythrocytes and leukocytes of blood or islet and acinar cells of the pancreas). Several times Scott emphasizes that hESC research is in its infancy; thus, it may be unfair to compare the relative merits of each stem cell type until our knowledge of hESC biology catches up with what we know of other sources of stem cells. I would go further to suggest that not until parallel studies with each stem cell type are done side by side can we ever know the relative efficacy of each.

The limits on stem cell research today revolve around a moral dilemma. The ethicists, Scott points out, have deep concerns that the generation of and misuse of hESCs could be potentially dangerous. The use of somatic nuclear cell transfer for both therapeutic cloning and reproductive cloning is opposed by many groups. Therapeutic cloning has been gaining support from many in the scientific and more recently the political and ethical communities. Scott outlines the issues with an even hand and should be commended for doing so because this debate is very emotionally charged. It is difficult to tell the parents of a child with nerve damage that cellular therapy is not ready and that governmental limitations on research and the use of hESCs make it impossible to offer those therapies to the child. The other side argues that destruction of one life to repair others is not a judgment that medical practitioners should make.

In light of the recent scandal in South Korea, in which it was alleged that an entire generation of human cell lines was faked by researchers, we need to be cautious of how we proceed in this area of research, but this experience should not deter us from moving forward. The best thing that Christopher Scott's treatise provides is a clear understanding of the history, the scientific breakthroughs so far, and the directions for the future of stem cell–mediated therapy. This book is easy reading and should allow all readers to better understand the need for additional sponsored research in this area.