

BOOK REVIEWS

**THE LONGEVITY REVOLUTION:
THE BENEFITS AND CHALLENGES
OF LIVING A LONG LIFE**

By Robert N. Butler. 553 pp. New York, PublicAffairs, 2008.
\$30. ISBN 978-1-58648-553-5.

THIS BOOK ABOUT THE ONGOING REVOLUTION in human longevity and its implications for society was written by Robert Butler, a professor of geriatrics who is still working at the age of 80. The book is unique in that Butler not only describes the medical and social problems that can be anticipated in the United States when baby boomers reach retirement age but also suggests bold and radical solutions for these upcoming problems. Butler was the founding director of the National Institute on Aging of the National Institutes of Health from 1976 to 1982, and given his impressive background, his extraordinary plan of action should be considered very seriously.

The main premise of the book is that the anticipated catastrophic increases in rates of disability and the cost of health care among older people could be avoided if the United States committed itself to a large-scale scientific project akin to NASA's Apollo program of flights to the moon. Butler states that his proposed program "could be dubbed the Apollo Program for Aging and Longevity Science" and goes on to explain that "the present level of development of aging and longevity research justifies an Apollo-type effort to control aging. . . . Now we have both past work as a foundation and new scientific tools offering hope that we may soon have a more prolonged, vigorous and productive life and added longevity. During the twenty-first century, the century of the life sciences, longevity science should truly come of age." Butler believes that "it may soon be possible to delay both aging and age-related disease in humans" but that "an orbital jump in financing of science is required to advance longevity and health as well as national wealth."

Today, less than 1% of the entire federal budget is spent on medical research. Butler pro-

poses that to improve health and control costs, 3% of the federal government's annual spending on health care should be made available to the National Institutes of Health for medical research. He also proposes that of Medicare expenditures, 1% should be earmarked for the National Institute on Aging. This investment should increase in line with the Medicare budget, but according to Butler, scientific research could lower Medicare expenditures. Butler concludes that "while the numbers I am suggesting may seem extraordinary, I believe the level of scientific progress in the field since the 1950s justifies such a program. . . ."

As a former director of the National Institute on Aging, Butler understands well where the main wasting of scientific potential currently takes place. As many as 80 to 85% of all research proposals that are peer reviewed and approved (scored) by the National Institutes of Health cannot be funded. This is a tremendous loss of intellectual potential and research opportunities. With his suggested increase in funding, Butler believes that "at least 30 percent of approved grants (if not more) should be funded." In short, to meet the challenges of the aging population, we need a scientific revolution in the science and medicine of longevity. Butler writes, "Science will find new ways to extend life and its quality. Evidence suggests that morbidity can be further compressed, and society can adapt to the growing numbers of older persons."

Other, more traditional topics discussed in this book include intergenerational dependency, age discrimination, changes in family structure and family planning, diseases of older age (with a special emphasis on Alzheimer's disease), the biology of aging, health care reform, preservation of Social Security, and potential threats to longevity such as poverty and the obesity epidemic. This book has the potential to change the future of this country for the better if its ideas reach members of Congress and other representatives of the U.S. government. The general public and medical experts will also benefit

from reading this book because it provides a broad overview of upcoming health care problems as well as possible solutions.

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FUNDAMENTALS OF THE STEM CELL DEBATE: THE SCIENTIFIC, RELIGIOUS, ETHICAL AND POLITICAL ISSUES

Edited by Kristen Renwick Monroe, Ronald B. Miller, and Jerome Tobis. 218 pp., illustrated. Berkeley, University of California Press, 2008. \$50 (cloth); \$19.95 (paper). ISBN 978-0-520-25210-3 (cloth); 978-0-520-25212-7 (paper).

HUMAN EMBRYONIC STEM CELLS WERE ISOLATED 10 years ago with the use of knowledge that had been gained from more than 20 years of research in rodents and nonhuman primates. The scientific goalposts have changed constantly since then, and each change has sent ripples through the religious, ethical, and political issues that are related to stem-cell research. This book is drawn from conference presentations that were made in May 2004 by 13 faculty members and students, mostly from the University of California at Irvine. It now serves as a marker in what has been a turbulent 10-year period. Yet it contains some valuable material that demonstrates the fundamentals of the research, the pace of change, and the constantly evolving debate.

The book's eight chapters provide clear definitions and an account of the scientific and clinical knowledge in 2004, with some partial revisions and references as recent as 2006. I found the chapters on ethics and religion to be useful factual summaries, and the chapters on politics — although largely focused on California — were instructive. Stronger editing could have removed some duplication among chapters, but the chapters do stand alone in their individual interpretations and represent the range of opinions of the authors.

New discoveries have been made in several areas of stem-cell research since the book went to press. More is now known about the regulation of the transdifferentiation of cells; it is now possible to produce a stem-cell line from a single cell taken from an 8-day-old human embryo;



Color-Enhanced Scanning Electron Micrograph of a Human Embryonic Stem Cell Growing on a Layer of Fibroblasts.

Amie Cavanagh, Wellcome Images.

and the startling finding has been made that a few genes, carried on a viral vector, can reprogram an adult cell to the equivalent of a pluripotent stem cell. Alongside these positive developments are some that may be negative, such as the questionable, costly, and high-risk emergence of “stem-cell tourism,” the practice of traveling to distant countries for stem-cell treatments; and prospective egg donors advertising the sale of their ova on Web sites. A plethora of ethical issues comes with each of these developments. Rigorous clinical trials are essential to prevent stem-cell therapy from becoming the snake oil of our times.

The new achievements change the ongoing debate about the sources, ethics, and regulation of stem-cell science and therapeutics and provide hope that tailored stem cells from selected adult or neonatal cells can be developed for regenerative therapies, so that it will no longer be necessary to use human embryos. The complication of viral vectors must still be overcome, and the road to turning these new findings into clinical treatments remains unpredictable. Is the stem-cell debate over? Certainly a new era is under way, and the debate will regenerate around the new issues.

This book is a valuable compendium of the various dimensions of the story of stem-cell research, in which the science continues to outpace any attempts at fixed religious, ethical, or political positions. This is not surprising, because it is impossible to resolve differences that derive from incompatible religious and ethical views of the status of the human embryo. Plenty of challenges lie ahead in the drive toward the regeneration revolution, but a consensus may be possible as the alternatives to embryos are de-