

Stem Cell Wars: Inside Stories from the Frontlines

By Eve Herold

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Americans are blessed with countless freedoms, opportunities, technological advances and state-of-the-art medical treatments, but they are also victims of debilitating diseases, tragic injuries, and the inevitable burdens and heartbreaks of aging. For the first time in history, scientists believe that they may soon be able to cure these diseases, through the use of embryonic stem cells. If embryonic stem cell research is allowed to proceed unhindered, the miracle of science will carry new, unprecedented healing powers human beings so desperately need.

A heated battle over whether to allow funding for embryonic stem cell research came into public view in 2001 when the Bush Administration cut off funding for embryonic stem cell research. This allowed research to continue only on existing embryonic stem cell lines, which are batches of cells derived from a single embryo. Bush's dramatic restrictions on embryonic stem cell research set the stage for a fierce battle among the religious right and pro-life activists versus the scientific community, legislators, and a majority of Americans, who believe in the progress of science.

In her book, Eve Herold addresses these "stem cell wars" from start to finish. She gives a detailed account of how embryonic stem cells may potentially be able to cure countless diseases and disabilities through a unique quality known as "pluripotency." She describes how embryonic stem cells are produced during a short period of time in the very early-stage embryo, and hold a blueprint for every cell, tissue, and organ of the human body. "Pluripotency" is a

term indicating that these stem cells have the ability to generate any cell type in the human body, including brain, skin and bone. Scientists can use these stem cells for therapeutic cloning, which involves removing the nucleus from a human egg cell and fusing the cell with a cell from a patient's body. The DNA in the nucleus of the patient cell then becomes the egg's DNA. By using certain chemicals and an electric shock, the egg is activated to divide, causing the resulting cell to have an exact copy of the patient's genes. These cells are considered to be the patient's own cells, returned to their embryonic state. Within a few days of cellular division, a tiny group of pluripotent stem cells will appear inside the egg cell, now referred to as an embryo. These cells can then give rise to any cell that the patient needs.

Herold contrasts these pluripotent embryonic stem cells with adult stem cells, known as "multipotent" cells. These "multipotent" adult stem cells can give rise to certain cell types, but not any cell type, as can "pluripotent" cells. This is because as the cells of the embryo divide, they become increasingly specialized until they become specific cells of the body. At this point they are adult stem cells and no longer serve as a blueprint for every cell of the human body. Herold explains how the Bush administration, while severely limiting federal funding for embryonic stem cell research, allows funding for adult stem cell research. Although useful, adult stem cells will never be "pluripotent," and thus cannot be used to create any cell in the human body.

Herold goes on to describe the strong coalition against stem cell research, made up of a very small minority of Americans, consisting of right-to-life activists and the extreme political right wing. This small minority, battling against scientists, legislators, and the majority of the American public, have managed to halt all meaningful stem cell research in its tracks through scare tactics. Such tactics include the outlandish assertion that this research would force women

to have abortions so that the fetus's body parts can be harvested and misinformation likening the use of embryonic stem cells to the removal of body parts from cloned babies. Herold, basing her assertions on scientific data, first-hand knowledge, and interviews with scientists at the forefront of this research, boldly rejects these absurd claims as "shocking and outrageous" and "pure science fiction." Herold spends a fair amount of time explaining how abortion, which is likened to embryonic stem cell research by pro-life activists, actually has nothing to do with embryonic stem cells and therapeutic cloning. She explains how the egg cell in embryonic stem cell research has no potential to become a human being, unless it is implanted into a woman's womb, and actually attaches to the wall of the uterus. Therefore, it has nothing in common with abortion.

Herold further highlights the absurdity of the argument against stem cell research by explaining that the embryonic cells used in this research are frozen embryos from in-vitro fertilization (IVF) clinics that couples no longer need. IVF requires that a large number of the woman's eggs be harvested. In most cases, a large number of eggs are left over after a couple has conceived, or very often, fail to conceive. Currently, over 400,000 embryos are frozen in IVF clinics all over the country. Couples have a choice of donating the embryos to research, donating them to another couple that cannot conceive, keeping them frozen indefinitely, or having them discarded as medical waste. Since 1980, less than 100 children have been born from embryos that were donated to couples that were not their biological parents.

Bush has suggested that all of these embryos should be put up for adoption, and yet he fails to address the reality that the majority of couples will never consent to having another couple raise their biological child. Herold adeptly highlights the sad reality that precious embryos are either thrown away as trash or frozen indefinitely. In either case, there is no

potential for them to give rise to a human life. Still, the government has decided to protect the rights of a tiny group of cells over the rights of millions of Americans that are suffering from potentially curable diseases.

Although Herold's descriptions of the arguments for and against stem cell research can be repetitive, due in part to her strong desire to relay to the reader the absurdity of the pro-life and religious extremist arguments, it is effective in emphasizing the promise of embryonic stem cell research and the ridiculous arguments against such research. Herold portrays a misguided society where a small minority of anti-research activists, who believe in God rather than science, have been able to turn the United States from the technology capital of the world into a country that is now falling far behind in this cutting edge research. She describes the exodus of brilliant American scientists from the United States to Great Britain and other countries where stem cell research is embraced, and paints a picture of a society that is at risk of back peddling through progress to a society that is "anti-research."

Although based upon hard scientific evidence, Herold crafts her work so that it tugs at the heartstrings of readers. She gives various anecdotes throughout her book about individuals who were struck by tragedy and who now see stem cells as their only hope for a cure. She emphasizes the myriad of medical problems that stem cells would be able to treat, such as cancer, diabetes, heart disease, stroke, paralysis, Parkinson's, Alzheimer's, multiple sclerosis, and scores of other debilitating conditions. Her appeal to emotion is expected due to the life-saving impact that stem cells could have on the lives of millions of individuals, but it is also necessary to highlight to the reader that the government has allowed "politics to trump the public good."

Herold also gives a reality check to disillusioned Americans who have faith in the health care system and who think that medical advances are making people healthier everyday. In reality, Herold tells us, this simply isn't true. In fact, medial breakthroughs may have provided new treatments and medicines to extend the lifespan of people with chronic illnesses, but has made no advances in finding cures for these illnesses. With the rising costs of healthcare, and the aging of the baby boomers, Herold provides evidence that points to the frightening truth that if the incidence of chronic, degenerative diseases remains statistically the same for all age groups, and if the number of Americans over 65 increases to 40 million, as is predicted, it is a very real possibility that disease and disability will create, as Herold puts it, a "national and fiscal human disaster."

This book is highly recommended for anyone interested in embryonic stem cell research or politics in the United States. Although some parts of the book are scientifically detailed, Herold does an excellent job at breaking down difficult scientific concepts so that the average person, with no scientific background, can understand how embryonic stem cell research works. Herold also writes an insightful commentary on the current political culture in the United States, bringing to light the reality that the anti-research movement in America has already taken a toll on America's place in the world of science. This is an important book for every human being, who will inevitably face disease in his or her life.