Statement of Senator Arlen Specter

Before the Committee on Health, Education, Labor and Pensions

March 5, 2002

Mr. Chairman and Members of the Committee. Thank you for letting me appear before you today.

Cloning. With the exception of flag-burning, abortion, and school prayer, few words stir as much passionate debate in this country, from kitchen tables to the halls of the U.S. Congress.

As we prepare to debate the cloning issue, I wanted to share with you what I have learned about stem cell research and cloning.

As Chairman, and now Ranking Member, of the Appropriations Subcommittee on Labor, HHS and Education, I have taken part in 12 hearings where scientists, patients and ethicists described the promise-and the challenges-associated with stem cell therapy and therapeutic cloning, or what some are calling “nuclear transplantation.” As stem cell research progresses, one of the biggest challenges that we will face is finding a way to ensure that the patient's body does not reject the implanted stem cells. A way to do that is by giving the stem cells the DNA code of the patient, so that the cells will not be rejected. This would be accomplished by a technique commonly referred to as therapeutic cloning. However, for many Americans, mere mention of the word "cloning" conjures up

grotesque images from a bad science-fiction movie: mad scientists, bubbling test tubes and row after row of zombie-like characters.

Evidently, those images were shared by members of the U.S. House of Representatives, who last year passed H.R. 2505, the Human Cloning Prohibition Act. Unfortunately, that legislation was written so broadly that it would also put a halt to promising research on therapies for a number of diseases that plague society.

The problem is that the word "cloning" is scientific shorthand for a complex process that can be used to achieve different ends--some bad and some good. But like any shorthand expression, its meaning is easily misunderstood by those who are unfamiliar with all the facts involved, the most important being that there are actually two types of cloning: reproductive cloning and therapeutic cloning. The difference between the two is like night and day. One serves no useful purpose and is ethically and morally wrong. The other holds the potential to save lives and avoid human suffering.

Reproductive cloning involves the development of a full individual from a single body cell, the same process which Scottish scientists used in 1997 to create Dolly the sheep, and Texas scientists recently used to create CC the cat. All of us abhor human reproductive cloning and agree that it should be banned. To address this issue, on January 24, 2002, Senator Harkin and I, along with Senators Boxer and Reid, introduced S. 1893, a bill that provides criminal and civil penalties for any person who performs or attempts to perform human cloning.

Therapeutic cloning, on the other hand, refers to creating embryonic stem cells that are genetic matches to the patient for the purpose of repairing damaged and diseased tissue. In 1998, scientists first reported that embryonic stem cells have the ability to transform into any type of cell in the human body. If the scientists' theories are accurate, human embryonic stem cells, or tissues derived from them, could be transplanted to any part of the body to replace tissue that has been damaged by disease, injury or aging. It is this remarkable adaptability that leads scientists to believe that one day, stem cells could be the basis for an entire field of regenerative medicine.

As an example of the way this could work, let's say that a patient has heart damage resulting from a heart attack. The genetic material from one of his mature cells would be transplanted to an egg, which has been donated by a woman and had its own genetic material removed. This nuclear transplantation would create an entity that has never before existed in nature, but is related to a "pre-implantation embryo." This pre-implantation embryo, or "activated oocyte" as others have called it, is stimulated to divide in a Petri dish. After five to seven days, it would form a ball of about 100 cells called a blastocyst. At this stage, embryonic stem cells can be derived from within the blastocyst. These stem cells continue to divide in an undifferentiated state for an indefinite period of time. Stem cells, or heart tissue derived from these cells, would then be transplanted into the damaged heart of the patient where they would take up residence and work alongside the patient's original heart cells. Because the cells are the identical genetic match of the patient, no rejection would ever occur.

Last year, President Bush announced his support for limited federally-sponsored embryonic stem cell research. While I prefer wider availability of stem cells than the President calls for, his compromise at least allows stem cell research to proceed. But scientists will never be able to explore the full potential of stem cells if legislation like H.R. 2505, the House-passed ban, is enacted into law.

Many say that we should ban medical research related to therapeutic cloning because it is unproven and may lead to unintended consequences. We have heard these arguments before, and we should heed the lessons learned. Twenty five years ago a debate raged regarding the potential of a new biotechnology called recombinant DNA. Members of Congress argued about whether to ban the use of this controversial technology completely, or to draft regulations that would allow scientists to move forward slowly. Many believed that the new technology could be used to cure diseases, and should therefore be fostered. Others believed that the technology was unproven, unsafe and would lead to Aldous Huxley's nightmarish vision of a *Brave New World*, and should therefore be banned completely. Dr. Paul Berg, who is testifying later today was an active participant in that debate, and I am certain he will fill you in on the details. A debate was engaged whose conclusion was far from certain. In the end, Dr. Berg and his fellow scientists identified ethical and safety guidelines and the Congress allowed them to create techniques using recombinant DNA. Today, this technology forms the backbone of an entire industry that has led to the development of recombinant vaccines, insulin for diabetics, drugs to fight AIDS, cancers, and many of our most debilitating diseases and afflictions. A ban on recombinant DNA 25 years ago would have resulted in the early deaths of hundreds of thousands, if not millions of Americans.

Today, we stand on the threshold of another era of scientific advances that, with the proper ethical guidelines, may revolutionize the way medicine is practiced. Dr. Bert Vogelstein, a prominent cancer researcher at Johns Hopkins University chaired a National Academies of Sciences Panel that investigated the potential of stem cells and nuclear transplantation to produce stem cells. Dr. Vogelstein's panel found that nuclear transplantation and stem cell-based therapies could be used to treat diseases and injuries that afflict over 100 million Americans. These maladies include cancer, diabetes, osteoporosis, cardiovascular diseases, autoimmune diseases, Alzheimer's disease, Parkinson's disease, burns, spinal-cord injuries and birth defects. Dr. Vogelstein estimates "that 170,000 Americans a year might be spared disease-related deaths through stem cell therapies." This is an astounding figure from an experienced cancer researcher.

Lest someone think our country's scientists have no moral compass, when news accounts first surfaced that some individuals planned to conduct human cloning experiments, the prestigious National Academy of Sciences was quick to call for a legal ban on reproductive cloning. The Federation of American Societies for Experimental Biology, which represents over 60,000 of our nation's scientists, followed suit by emphatically denouncing human reproductive cloning. But both organizations were quick to make the distinction that, unlike reproductive cloning, therapeutic cloning holds enormous life-saving potential and should therefore be pursued.

Why is all this important? Because unless we take the time to understand the distinction between reproductive and therapeutic cloning, we risk losing one of the

brightest hopes we have for treating and curing maladies like cancer, Alzheimer's, diabetes, spinal cord injury, and heart disease.

We must not tie the hands of our scientists. There are already reports of a "reverse brain drain," in which scientists are leaving the United States or choosing not to come here in the first place because of restrictions on stem cell, and now therapeutic cloning, research. More importantly, we risk delaying scientific and medical breakthroughs that can save lives.

We should ban human reproductive cloning, and the legislation that Senator Harkin and I and others have introduced will do so. But, before we close off the opportunity to save lives, we owe it to ourselves and future generations to look beyond the word cloning and engage in a substantive debate regarding regenerative therapies that could revolutionize the practice of medicine.