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Keynote Address: Engineering Eden: Investigating the Legal and Ethical Dilemmas of Modern Biotechnology

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KEYNOTE ADDRESS: ENGINEERING EDEN: INVESTIGATING THE LEGAL AND ETHICAL DILEMMAS OF MODERN BIOTECHNOLOGY

JOHN D. MURNANE, ESQ.*

Good afternoon. Thank you very much, Professor. I compliment St. John's Law School and the University for hosting this program. I am grateful to Eleanor Hynes and Paul Maier, and the staff of the St. John's Journal of Legal Commentary for inviting me to speak here this afternoon at their twelfth annual symposium. It is good to be back in the neighborhood. Twenty years ago last month, my wife Terri and I moved to this neighborhood with our then-infant son Austin. He is now twenty years old and in his third year at the United States Naval Academy at Annapolis, Maryland. Thank you. I'll tell him you gave him that round of applause.

While we lived in nearby Holliswood between 1985 and 1992, our other three children were born. When we first moved into our home on 191st Street it needed painting, so I started doing it. One day while I was painting the top of the front of the house I heard a woman call, "Young man." I turned and saw a beautifully dressed older woman, across the street, on the arm of a nicely dressed younger woman. The older woman curved her finger beckoning me as she once again said, "Young man." I climbed down the ladder, crossed the street, and said, "Hello." She asked, "Young man, what are you getting for painting that house?" I told her, "I get to stay with the lady inside." The younger one then said, "You're hired."

I learned to paint when I was a teenager in Albany, New York, where I grew up. During high school and college vacations, I

* Partner, Fitzpatrick, Cella, Harper & Scinto. These remarks are an actual transcript of the author's comments at the St. John's Journal of Legal Commentary Symposium on Feb. 25, 2005.

painted houses. One summer, I got a job painting the bridges on those new superhighways which lead into downtown Albany. On my first day on the job, while I was way up underneath one of the bridges, I heard a voice calling me, "John Murnane, get off that bridge this instant." I looked down and there was my grandmother, standing in construction rubble in her high heels, pocketbook on her arm, wearing white gloves. She yelled again, "John Murnane, get off that bridge." I explained to her that I could not get down because I had to wait for ropes and a ladder to be delivered and she said, "I'll pay you what they're paying you not to do that." I responded that they were paying me eight dollars an hour. She paused and replied, "Be very careful up there."

Painting was something that I enjoyed, but I thought that practicing law may be easier - so I went to law school. I have been a patent attorney for about twenty-six years. For seven of those years, I was an adjunct professor, first at Hofstra Law School, and then at Fordham Law School. I may have enjoyed my teaching more than my students did. One time a student wrote on her evaluation of me that, if her doctor told her that she had fifteen minutes to live, she wanted to spend all of that time in Professor Murnane's class because it would seem like an eternity. Eleanor said that I am supposed to speak for thirty minutes today, so you will receive a double dose of eternity this afternoon.

Today's biotechnology conference topics made me dig out my old college science textbooks. In doing so, I thought about the hereafter. I went into the attic and wondered, what am I hereafter, I went down to the basesment and said what am I hereafter? This morning's symposium was terrific and I applaud the panel members and organizers for shedding light on such important topics. I am going to speak in a few moments about stem cell research but before I do, I want to note that the views that I am about to express are my own. They are not the views of the New York Intellectual Property Law Association (NYIPLA),[1] an organization of which I am now the president. They are not the views of the New York State Task Force on Life and the

[1] *See About the NYIPLA*, www.nyipla.org/public/01_about.html (last visited Nov. 15, 2005) (elaborating upon the group, via which patent lawyers voice opinions and concerns to judiciary).

Law,[2] of which I am a member. They are not the views of my law firm or any of our clients.

First, permit me to tell you about the New York Intellectual Property Law Association, also called "NYIPLA," and the task force. The NYIPLA is a professional association of more than 1,300 attorneys whose interests and practices lie in the areas of patent, trademark, copyright, trade secret, and other intellectual property law.[3] NYIPLA members include in-house attorneys working for businesses that own, enforce, and challenge patents, as well as attorneys in private practice who represent both patent owners and accused infringers.[4] NYIPLA members represent both plaintiffs and defendants in infringement litigation, and also regularly participate in proceedings before the United States Patent and Trademark Office, including representation of applicants for patents. A substantial number of NYIPLA members participate actively in patent litigation. Due in part to the concentration of a large number of pharmaceutical and biotech firms in the New York metropolitan area, significant numbers of NYIPLA members participate regularly, as representatives of both traditional research-based "branded" firms and their newer generic competitors in litigation, involving claims of infringement. The association's membership includes attorneys who represent at least four different types of firms that conduct pharmaceutical and related research and development at different levels of the industry: first, the major developers of branded pharmaceuticals; second, the biotech firms; third, the generic companies; and fourth, the public and private universities.[5]

Now, a few words about the Task Force. The New York State Task Force on Life and the Law was convened in 1985 under

[2] *See* New York State Department of Health, *Task Force on Life and the Law*, www.health.state.ny.us/nysdoh/taskfce/ (last visited Nov. 15, 2005) (describing Task Force's ability to develop public policy on issues arising from medical advances).

[3] *See About the NYIPLA*, *supra* note 1 (stating that NYIPLA maintains twenty-four active committees, of which almost 1500 intellectual property lawyers are members).

[4] *See id.* (noting how the group "was conceived as an organization through which patent lawyers in New York could make their views known in Washington and provide support for the judiciary").

[5] *See id.* (adding that the group counts 1500 attorneys amongst its membership).

then governor Mario Cuomo.[6] The Task Force has a mandate to develop public policy on a host of issues arising from medical advances, including: the withholding and withdrawal of life-sustaining treatment, assisted suicide and euthanasia, assisted reproductive technology, and organ and tissue transplantation.[7] The Task Force members include leaders in the fields of law, medicine, nursing, philosophy, and bioethics, as well as patient advocates and representatives of diverse religious communities.

For each issue that the Task Force addresses, it recommends policy for New York State in the form of proposed legislation, regulation, public education, or other measures. The Task Force reports are designed to explain the bases for its recommendations and to facilitate public discussion and understanding of the ethical, social, and legal questions posed by medical advances. Task Force recommendations have provided the bases for New York's laws and regulations on the determination of death, do not resuscitate orders in hospitals and community settings, the health care proxy, organ and tissue transplantation, and surrogate parenting.[8] Recommendations by the Task Force have also been embraced as a model for legislation in *other* states. Task Force members are appointed by the governor of the State of New York.[9] As my introduction mentioned, Governor Pataki appointed me to the Task Force in 1997, while I was a pro bono appointee of the late John Cardinal O'Connor to the public policy committee of the New York State Catholic Conference.

The Task Force's assisted reproductive technologies report was issued during my first year there. One of the issues considered was cloning. The majority report from April of 1998, in which I did not join, said,

[6] *See* Exec. Order No. 56, 9 N.Y. Codes R. & Regs. Exec. Dep't. § 4.56 (1984) (establishing Task Force by Governor Cuomo's Executive Order); Edward A. Adams, *New Law on Medical Treatment Decisions Urged by Task Force*, N.Y.L.J., Mar. 24, 1992, at 1 (describing origin of Task Force).

[7] *See* New York State Department of Health, *The History of the Task Force*, http://www.health.state.ny.us/nysdoh/taskfce/taskbio.htm (last visited Nov. 15, 2005) (stating that Task Force is currently only standing state government commission in United States with mandate to recommend public policy on a range of medical and ethical issues).

[8] *See* New York State Department of Health, *Task Force on Life and the Law Fact Sheet*, http://www.health.state.ny.us/nysdoh/taskfce/factsht.htm (last visited Nov. 15, 2005) (stating that Task Force recommendations have been influential in enactment of important health related legislation).

[9] *See* Exec. Order No. 56, 9 N.Y. Codes R. & Regs. Exec. Dep't § 4.56 (1984) (stating that members of the Task Force shall be appointed by the Governor).

> All of us agree that attempting to create a child through somatic cell nuclear transfer cloning would be ethically unacceptable at the present time given the existence of the substantial doubts about the procedure's safety. However, we hold differing positions on whether it would be ethically acceptable to use this procedure to create children if and when the safety concerns are addressed. Because of our diverse opinions, the fact that the use of this technology is not yet possible in humans and the likelihood that federal legislation in this area will soon be enacted, we do not recommend any legislative or regulatory actions for New York State at this time.[10]

Instead, I wrote a minority report, in which I said,

> I disagree. Human cloning should be banned. When a sheep was cloned in Scotland in 1997, many expressed surprise and fear that human cloning would be possible in the near future. President Clinton called for national legislation banning the practice. He urgently reiterated that request in his weekly radio address to the nation on January 10, 1998, after a Chicago physician claimed that he would soon be cloning human beings.[11]

I went on in my minority report to state that:

> Cloning is but the latest chapter in this century's treatment of human life as a commodity. For if the human winnowing cultivation practices of fetal reduction are acceptable, one would expect that human cloning cultivation techniques would follow not far behind. If the issue is only one of choice, then the possible choices are limitless. However, human life is not a commodity, and as a result, should be treated with more respect than the life of a sheep. Accordingly, I recommend passage of legislation that bans human cloning in New York State.[12]

Thus far, New York State leaders have not followed my recommendation. I was encouraged, however, to hear President Bush express in his State of the Union address earlier this

[10] NEW YORK STATE TASK FORCE ON LIFE AND THE LAW, DEPARTMENT OF HEALTH, ASSISTED REPRODUCTIVE TECHNOLOGIES: ANALYSIS AND RECOMMENDATIONS FOR PUBLIC POLICY 395 (April 1998).

[11] *Id.* at 462.

[12] *Id.*

month: "Because society is measured by how it treats the weak and vulnerable, we must strive to build a culture of life. Medical research can help us reach that goal."[13] President Bush further stated, "[Medical research can develop] treatments and cures that save lives and help people overcome disabilities."[14] He continued,

> I thank Congress for doubling the funding of the National Institutes of Health. To build a culture of life, we must ensure that scientific advances always serve human dignity, not take advantage of some lives for the benefit of others. We should all be able to agree on some clear standards.[15]

Moreover, President Bush also said, "I will work with Congress to ensure that human embryos are not created for experimentation or grown for body parts and that human life is never bought and sold as a commodity."[16] He concluded, "America will continue to lead the world in medical research that is ambitious, aggressive, and always ethical."[17] That State of the Union address was given on February 2, 2005.

Now, I do not know whether the Task Force on Life and the Law will take up the question of stem cell research - because it is controversial. The Task Force usually endeavors to study and report on topics where consensus can be reached. We are a cordial and collegial group, and members enjoy productive working relationships that have been established over the years during our monthly meetings. We each have our own perspective, however, and these different views of our many members would surely be brought to the table if we were to consider this issue. For my part, I would note that everything I have read indicates that embryonic stem cell research depends on human cloning, organ harvesting, and the destruction of innocent human life. Moreover, it is my understanding that *every* pending bill in the New York State Legislature to permit embryonic stem cell research would also authorize the cloning of human beings.

[13] President George W. Bush, *State of the Union Address* (Feb. 2, 2005), *available at* http://www.whitehouse.gov/news/releases/2005/02/20050202-11.html (last visited Nov. 15, 2005).

[14] *Id.*

[15] *Id.*

[16] *Id.*

[17] *Id.*

The Task Force usually considers background materials developed and organized by our staff including papers written by experts in the field. After considering such papers, we hear presentations during our monthly meetings. We hear a dozen or so presentations for any issue that we are going to take up. If such presentations are made to us on this issue, I will inquire where embryonic stem cell research has been successful. It is my understanding that, to date, such research has not produced a *single* medical benefit. Papers indicate that embryonic stem cells are unstable and unpredictable because of their immaturity; furthermore, studies show that they have produced troubling research results.[18]

I would also ask why we are not focusing on *adult* stem cell research. Many publications that I have considered indicate that adult stem cell and umbilical cord blood research offer a successful and ethical alternative to destructive embryonic research.[19] I understand that adult and umbilical cord blood stem cells are currently being used to repair damaged bone and tissue, reverse the effects of paralysis, treat genetic diseases, leukemia, and rare diseases affecting the liver, heart, and brain.

Often at Task Force meetings we consider how many other states are addressing the same or similar issues. Nearly everyone is familiar with Proposition 71 in California that established the California Institute for Regenerative Medicine, which will distribute three hundred million dollars in grants each year over the next decade for in-state stem cell research.[20] A coalition of movie stars, universities, venture capitalists, disease advocacy groups, medical associations, and biotech companies waged a near thirty million dollar campaign for Proposition 71, and it passed with fifty-nine percent voter approval in November,

18 *See* Robert Lee Hotz, *Study: Healthy Clones can Carry Hidden Flaws; Stem Cells Used in Cloning Also Found Unstable*, TIMES-PICAYUNE, July 6, 2001, at 6 (citing recent study that found stem cells unstable).

19 *See* Sean J. Morrison & Stuart H. Orkin, *Stem-Cell Competition*, NATURE, July 4, 2002, at 25 (noting that recent studies have shown that adult stem cells can potentially develop into cells that are different than their tissue of origin, and use of these cells would eliminate ethical dilemmas associated with embryonic stem cell research).

20 *See* CAL. CONST. art. XXXV, § 1 (2005) (establishing California Institute of Regenerative Medicine); CAL. HEALTH & SAF. CODE § 125290.70 (a)(1)(B) (2005) (stating that no less than 90% of amount of bonds used for grants will be used for research over a ten year period).

2004.[21] Proponents predicted that stem cell research will yield California royalty revenues of between $535 million and $1.1 billion. But an article in IP LAW AND BUSINESS just three days ago said "most biotech IP lawyers say it is foolhardy and wildly optimistic to predict such royalty revenue will come to California in the uncertain area of stem cell-derived therapies.[22]

What many may *not* know is that Pennsylvania, which has a long standing ban on human embryo research, ranks high among all states in both pharmaceutical and biotechnology employment.[23] And Michigan, where there are laws banning cloning and embryo research, is rated as one of the foremost business-friendly states in the nation.[24] Michigan State University is considered a leader in biotechnology.[25]

Some people say that there are thousands of leftover embryos in fertility clinics that have no future, and that many of these embryos will ultimately die anyway. They say that it is a waste not to use these embryos to promote science. In 2002, the Rand Corporation conducted a survey of in-vitro fertilization clinics in the United States.[26] The survey found that there are about 400,000 human embryos currently frozen in fertility clinics.[27] Of

[21] Carl T. Hall, *Proposition 71: State Voters Strongly Backing Cell Research*, S.F. CHRON., Nov. 3, 2004, at B4 (reporting that celebrities such as California Gov. Arnold Schwarzenegger, Michael J. Fox, and Christopher Reeve supported proposition, and that advocates of proposition launched a "barrage" of television ads to promote proposition).

[22] Victoria Slind-Flor, *Will Prop 71 Hold Water?; California's Stem-Cell Initiative May Not Bring In Expected Patent Royalties*, IP LAW & BUS., Feb. 25, 2005, at 2 (suggesting that vague nature of proposition left uncertain how licensing deals would be structured, which would make recovering royalties difficult in a short time).

[23] PA. CONS. STAT. § 3216(a) (2005) (stating that experimentation on unborn children outside of abortion and for non-therapeutic purposes is a felony in third degree). *See* JUNGHOON KI, ET AL., BIOPHARMACEUTICAL INDUSTRY CONTRIBUTIONS TO STATE & U.S. ECONOMICS 9-10 (Milken Institute, 2004) (stating that Pennsylvania is one of several states with high rate of biopharmaceutical employment that is expected to exceed national average over next decade).

[24] RAYMOND J. KEATING, SMALL BUS. SURVIVAL INDEX 2004: RANKING THE POLICY ENVIRONMENT FOR ENTREPRENEURSHIP ACROSS THE NATION 12 (Small Bus. & Entrepreneurship Coun. 2004) (noting that, in terms of State government public policy, Michigan ranks as sixth most friendly state to entrepreneurs in country).

[25] Chris Andrews, *MSU Wins $3.7 Million to Boost Technology*, LANSING STATE J., June 30, 2004, at 1B (noting that Michigan State University received $3.7 million dollars in grants in order to encourage development in biology and chemical engineering).

[26] David I. Hoffman, et. al, *Cryopreserved Embryos in the United States and Their Availability for Research*, FERTILITY & STERILITY, May 2003, at 1063 (stating that objective of study is to "determine the number of embryos stored at assisted reproductive technology clinics in the United States").

[27] *Id.* at 1066–67 (finding that 391,000 frozen embryos were held in storage at clinics on-site, 4,685 embryos were held off-site, with 340 out of 430 clinics responding to the survey, and remaining sixty clinics having an estimated embryo count of 51,753).

the four-hundred-thousand embryos, only a small fraction, 2.8 percent, have been authorized for research.[28] Thus, only about eleven thousand out of the original four-hundred-thousand frozen embryos are *actually* available for research and experimentation. Of those eleven thousand embryos available for research, it is likely that only a small number would actually yield stem cells. The process of freezing, storing and thawing leave the majority of embryos unable to yield a workable stem cell line.[29]

Some say that an embryo is just a bunch of cells, no larger than the size of a pinhead. The fact is that an embryo is a living human being. If it were not, it would not be capable of making human stem cells. Moreover, each and every one of us in this room was, at one time, just a bunch of cells not larger than the size of a pinhead. That is how we all start.

If we have an opportunity as Task Force members to consider this issue, I will ask presenters their views about research at the University of California in San Diego where patients' adult skin cells have been used to cut in half the progression of the mental decline from Alzheimer's disease.[30] Other published research shows that bone marrow stem cells could be useful in treating neuro-degenerative disorders.[31] I will also ask about the reports of German doctors that have grown a new jawbone from bone marrow stem cells to replace a man's lower jaw lost to cancer.[32] I understand that bone marrow stem cells are also being used by doctors to construct cartilage in damaged and arthritic joints.

28 *Id.* (concluding that 3% of the embryos in storage at participating clinics were held for research, with almost 4% for unknown or miscellaneous reasons, and less than 2.5% of embryos that were stored off-site were held for medical research and experimentation, with none being held for miscellaneous reasons).

29 *Id.* at 1068 (stating that even if all embryos were available for stem cell research, only 275 stem cell lines would be created, using conservative estimates).

30 Betsy Mason, *New Approach on Stem Cells: Researchers Say Use Of Adult Cells Bypasses Ethical Obligations*, TIMES UNION, Nov. 22, 2004, at A6 (stating that one University of California bioengineer has discovered method to use protein called "Sonic hedgehog" in mice brains to speed division of brain stem cells, which can potentially enhance functions of those brain damaged by Alzheimer's Disease).

31 Karen J. Chandross, et al., *Turning Blood into Brain: Cells Bearing Neuronal Antigens Generated in Vivo from Bone Marrow*, SCIENCE, Dec 1, 2000, at 1779, 1781 (suggesting that experiments involving mice indicate that bone marrow stem cells can supply alternative sources of neural cells, which can provide accessibility and compatibility for its host).

32 *Transplant Medicine: German Doctors Grow New Jaw Bone in Man's Back Muscle for Transplantation*, MED. & L. WKLY., Sept. 17, 2001, at 310 (stating that doctors used patient's bone marrow, a growth chemical, and one mesh cage to grow his new jaw bone in his back muscle and transplant it to his mouth).

Further, I have read that researchers use stem cells from human fat to grow human bone cells and heal large cranial defects in animals.[33]

Umbilical cord blood stem cells have been shown to reduce brain damage in stroke victims.[34] Skin cells and bone marrow cells have also shown promise in treating stroke victims. Bone marrow and umbilical cord blood transplants are being successfully used to treat and cure leukemia and other fatal cancers.[35] Researchers have used adult stem cells to cure diabetes in mice and are currently working to apply the treatment in humans.[36] Adult stem cells can improve vision in eyes damaged by retinal disease. Doctors in Japan have succeeded in restoring the sight of patients by using the patient's own oral mucous membrane.[37] And in research promising to millions of people with hearing loss, scientists have regenerated hearing in mature mammals using adult stem cells.[38]

To continue, bone marrow stem cells can be used to repair the heart from heart attack damage and blocked arteries. Doctors have used bone marrow stem cells to completely repair the heart

[33] Anjana Ahuja, *A Good Fix From Fat*, TIMES (ENG.), May 13, 2004, at 14 (reporting that adipose-derived adult stromal cells repaired cranial defects of mice as well as bone marrow, seven times as fast).

[34] *Medical College of Georgia: Umbilical Cord Blood-Derived Stem Cells Given Intravenously Reduce Stroke Damage*, L. & HEALTH WKLY, Oct. 23, 2004, at 216 (noting "[s]tem cells taken from umbilical cord blood, then given intravenously along with a drug known to temporarily breach the brain's protective barrier, can dramatically reduce stroke size and damage, Medical College of Georgia (MCG) and University of South Florida (USF) researchers say").

[35] *See Funding (NIH): Grants for Umbilical Cord Blood Transplants and AIDS Gene Therapy Awarded*, AIDS WKLY, Oct. 20, 1997, at 13–14 (quoting Walter C. Ogier, Vice President Marketing at Aastrom as saying "[t]he umbilical cord blood transplant grant marks recognition of the Aastrom CPS' potential expanded utility for stem cell therapy in treating patients with leukemia and related types of cancer").

[36] *See* Nicholas Wade, *Teaching the Body To Heal Itself; Work on Cells' Signals Fosters Talk of a New Medicine*, N.Y. TIMES, Nov. 7, 2000, at F1 (noting "in mice, researchers were able to reverse a type of diabetes by implanting cells generated from pancreatic stem cells").

[37] *See* Karen Hoy, *Miracle Op Restores Grandfather's Sight*, UK NEWSQUEST REGIONAL PRESS , Dec. 29, 2003 (reporting on procedure to restore man's sight, which his doctor learned in Hong Kong, where initial step is described as "superficial scar tissues over the cornea are removed and the whole eye surface covered with thick mucous membrane taken from inside the patient's cheek").

[38] *See Marine Biological Laboratory; Listen Up! Mice May Hold Key to Restoring Human Hearing Loss*, MANAGED CARE L. WKLY, Sept. 19, 2004, at 53 (reporting scientists have developed "new methods to expand and maintain adult stem cells isolated from the mouse inner ear to establish long-term stable cell lines. This is the first step toward the ultimate goal of creating implantable human hair cells that will grow happily, eventually repairing damaged hearing and restoring balance").

of a sixteen-year-old boy in Michigan who was shot through the heart with a nail gun.[39] Researchers at the University of Chicago have determined how to transform adult bone marrow stem cells into immune system cells, called "B cells," that produce antibodies and fight infection.[40] Researchers at the University of Michigan Health System have used bio-artificial kidneys, made of human adult stem cells, which show great potential to save the lives of people with acute renal failure in human studies.[41] Other published studies show bone marrow stem cells can likely treat acute renal failure, injured kidneys, and repair liver damage in humans.[42]

Researchers at Johns Hopkins have used adult stem cells from mice to delay symptoms and death resulting from Lou Gehrig's disease.[43] Researchers at Yale have used adult bone marrow stem cells to regenerate important nerve cells destroyed by multiple sclerosis.[44] Research shows that adult blood stem cells can contribute to muscle regeneration in neuromuscular diseases like muscular dystrophy.[45] Researchers at Jefferson Medical

39 *See generally Federal Funding of Human Embryonic Stem Cell Research – Illegal, Unethical and Unnecessary*, 18 J. CONTEMP. HEALTH L. & POL'Y 95, 131-32 (2001) (noting "researchers found that by stimulating production of stem cells in the bone marrow of adult mice, one can repair heart damage").

40 *See* Michael Greer, *Rheumatoid Arthritis: Bone Marrow Stem Cells Involved In Pathogenesis*, BLOOD WKLY, Aug. 22, 2002, at 8 (discussing proposition that "bone marrow stem cells from osteoarthritis patients differentiated into MLCs with similar effects on B cells").

41 *See Bioengineers Create Working Cow Kidneys*, MEMBRANE & SEPARATION TECH. NEWS, Aug. 2002 (noting "bioengineers at Advanced Cell Technology have created working artificial kidneys using cells taken from cloned cow embryos seeded onto polycarbonate membranes").

42 *See Stem Cell Transplantation: Bone Marrow Produces Mature Liver Cells in Humans*, HEPATITIS WKLY, July 3, 2000, at 9–10 (finding "mature liver cells in humans are generated from bone marrow-derived stem cells, a Yale University-New York University team has discovered, paving the way for improved treatment of liver damage and disease").

43 *See Stem Cell: Experiment Returns Motion to Paralyzed Rodents*, AM. HEALTH LINE, July 25, 2001 (reporting "a Johns Hopkins University study in which paralyzed rodents regained mobility after having embryonic stem cells implanted into their spinal cords demonstrates that stem cell research has 'moved beyond 'potential' to meaningful results'").

44 *See Multiple Sclerosis: Stem Cell Transplants May Be Effective Therapy*, PAIN & CENTRAL NERVOUS SYSTEM WEEK, May 6, 2002, at 16 (noting a new treatment for multiple sclerosis is "removing stem cells from the patient's blood, killing the cells that are working against the body's immune system and then returning the healthy cells back to the body").

45 *See Muscular Dystrophy: Stem Cells May Offer Cure For Fatal Muscular Dystrophy*, PAIN & CENTRAL NERVOUS SYSTEM WEEK, August 19, 2002, at 6 (noting that scientists "were able to isolate a specific type of adult stem cell from the muscles of mice.

College have coaxed bone marrow stem cells into dopamine-producing neurons, a study which shows great potential in treating neurological diseases like Parkinson's disease.[46]

Stem cells from umbilical cord blood are currently being used to cure and treat sickle cell anemia.

Doctor Carlos Lima of Peru has treated over thirty spinal cord injury patients with an experimental surgery that injects adult stem cells from the nasal cavity into the spinal cord.[47] Some patients have experienced restored bladder function, regained complete function of paralyzed arms, and can now stand and walk with the aid of braces. No patient there has displayed any negative side effects.

Researchers in Korea report that they have enabled a patient paralyzed for nineteen years to walk again with stem cells from umbilical cord blood injected into the damaged spinal cord.[48] Researchers at the University of Washington have shown that bone marrow stem cells help fight infection and permanently heal wounds.[49] British scientists have developed live bandages made from a patient's own stem cells which speed healing for burns and diabetes sufferers.[50]

The literature is filled with adult stem cell research success stories. But few of these reports appear in major newspaper, television, or radio news stories. As a Task Force member, I

The cells can replace degenerate muscular tissue in mice suffering from muscular dystrophy, doing this better than has hitherto been possible with other cells").

46 *See Neurodegenerative Disease: Human Neural Stem Cells Transformed To Dopamine-Making Brain Cells*, PAIN & CENTRAL NERVOUS SYSTEM WEEK, Dec. 2, 2002, at 8 (reporting scientists at Jefferson Medical College have discovered "mouse neural stem cells placed in rats with Parkinson disease could develop into brain cells that produced tyrosine hydroxylase (TH), the enzyme needed to make dopamine").

47 PBS, *Innovation: Life Inspired: Episode 6: Miracle Cell Summary*, http://www.pbs.org/wnet/innovation/about_episode6.html (last visited Nov. 15, 2005) ("Dr. Lima oversees a group of surgeons in the harvesting of patients' stem cells from their noses. The cells are then transplanted into the sites of the spinal cord breaks.").

48 *Paralyzed Woman Walks Again After Stem Cell Therapy*, http://www.cogforlife.org/stemcellumbilical.htm (last visited Nov. 15, 2005) (reporting that "a South Korean woman paralyzed for 20 years is walking again after scientists say they repaired her damaged spine using stem cells derived from umbilical cord blood").

49 *See Therapy: Adult Bone Marrow Stem Cells Can Become Blood Vessels*, STEM CELL WEEK, Mar. 11–18, 2002, at 5 (stating "researchers at the University of Minnesota Stem Cell Institute (SCI) have demonstrated, for the first time, the ability of adult bone marrow stem cells to expand in vitro as endothelial cells (which line blood and lymphatic vessels) and then engraft in vivo and contribute to new growth of blood vessels").

50 *See Celltran: Skin Cell Bandages For Burns Developed*, LAB BUS. WEEK, May 23, 2004, at 36 (explaining "[a] sample of the patient's skin, usually from the thigh, is taken under local anesthetic and the cells are then expanded many hundred-fold in the laboratory before being placed on the bandage").

would try to ensure that all of us considered a complete record before developing recommendations for our state. A voice far more eloquent than mine will be speaking on this subject very soon in Albany: on Tuesday, March 8th, 2005, paralyzed New York City police detective Steven McDonald will be the featured speaker at the New York State Catholic Conference's Public Policy Forum in Albany.[51] Detective McDonald, who was shot in the line of duty in 1986 and left quadriplegic,[52] rejects the use of human embryos for medical experimentation; instead, he favors research involving adult and umbilical cord stem cells. My hope is that many lawmakers hear Detective McDonald that day and that the news organizations which will be covering the event tell us what he says.

Thank you again for permitting me to speak with you today.

51 *See* Joe Mahoney, *Paralyzed Cops Split Over Bill On Stem Cells*, DAILY NEWS, Mar. 7, 2005, at 5 (noting "McDonald, 48, will be alongside Edward Cardinal Egan and a brigade of Catholic bishops lobbying for a state ban on the research because, they say, it amounts to killing human life").

52 *Id.* (explaining "[i]n July, 1986, while patrolling Central Park, McDonald was shot three times after confronting three teens stealing bikes. One bullet lodged in his spine").