

Stem Cell Research and Multiple Sclerosis
The National MS Society's Commitment to Pursue all Promising
Research leading to a World Free of MS

The National MS Society's Position Regarding Stem Cell Research

Multiple Sclerosis (MS) is considered an autoimmune disease where the body attacks itself resulting in damage to the nervous system. MS can cause paralysis, blindness, cognitive dysfunction, mobility impairment and many other serious symptoms. To find new ways to prevent, slow or repair the devastating effects of MS, the National Multiple Sclerosis Society supports the conduct of scientifically meritorious medical research, including research using human cells, in accordance with federal, state and local laws and with adherence to the strictest ethical and procedural guidelines.

Deliberations Supporting Society's Position

This long-standing position was confirmed in 2005, when the National MS Society convened a Task Force on Stem Cell Research, representing volunteers, people with MS, basic and clinical researchers, MS neurologists and staff. The Task Force considered presentations from stem cell researchers, legal and regulatory experts, bioethicists, and representatives from voluntary health agencies. The Task Force concluded that research using all types of stem cells holds great promise, potential, and hope for people affected by MS. There is a high likelihood that research on all types of stem cells will improve our understanding of the MS disease process and lead to new pathways for therapeutic intervention.

For these reasons, the Task Force recommended that the Society reiterate its commitment to supporting and encouraging research utilizing all human cells and that the Society advocate more publicly for state and federal policies conducive to stem cell research.

The Task Force also recommended that the Society hold a scientific symposium in early 2007 involving leading stem cell experts from around the world to further explore the viability of all types of stem cell research for the treatment, prevention and cure of MS. This meeting was held on January 16-19, 2007 in San Francisco, California. Over 75 experts in the areas of stem cells and MS participated in the Summit. A series of podcasts covering topics discussed at the meeting were recorded and distributed throughout the conference. In addition, a scholarly review of this meeting along with e-recommendations on priorities for moving this important research forward will be published by the journal Multiple Sclerosis in 2008.

Research On All Types of Stem Cells Holds Promise

Research on all types of stem cells is critical because we have no way of knowing at this point which type of stem cell will be of the most value in multiple sclerosis. Stem cells – adult or embryonic – could have the potential to be used to protect and rebuild the brain tissues that are damaged by MS, and to deliver repair and protection molecules to sites of injury. Stem cells can become human brain cells in lab dishes and these can be used to find new drugs and to discover new genes and molecules with the potential to stop MS or repair its damage. In addition, stem cells created with the DNA of persons with MS may help answer questions about the cause of MS and may help us model and treat MS once the underlying cause of MS is better understood.

Currently, there are technical limitations that embryonic stem cells may help overcome. For example, brain cells are difficult to cultivate in lab dishes, so there are no good tissue models for MS – meaning that researchers cannot attempt to “treat” MS in lab dishes. It is not possible to make the quantities of cultured nerve tissues needed for drug screening and other model systems. It is also not feasible to use current cell sources to make sufficient quantities of cells for future cell transplantation research.

Unlike stem cells from adult tissues, such as cells from bone marrow or brain biopsies, embryonic stem cells are not yet committed (differentiated) to becoming a specific type of cell. As such, they can be coaxed into becoming different types of cells targeted by the MS disease process, such as specialized brain cells, can be expanded to unlimited quantities, and can be maintained in lab dishes for extended periods of time. These properties make them a unique and invaluable tool that can be applied to understanding MS and finding new treatments.

Researchers are also exploring the potential of adult stem cells, such as those derived from bone marrow, as well as stem cells derived from the umbilical cords of newborns. Because these cells are more mature, they are more specialized, and the successes reported with them so far largely relate to their ability to replace specific blood cells. Researchers are attempting to reprogram these cells into becoming less specialized so that they might serve as a resource for other cell types that might be suitable for research into experimental therapies. So far, researchers have not been able to get these cells to produce the quantities that would be needed for transplantation experiments.

Some cell therapy experiments in animals have had some success in taking adult stem cells from parts of the brain and transplanting them to restore myelin, the insulating material which is attacked and damaged in MS. In humans, small

numbers of these adult neural stem cells have been obtained during brain surgery for other disorders. However, gathering sufficient sources of such cells without harming individuals is not yet feasible, but work continues toward finding ways to expand the number of cells for this purpose.

More research is needed to understand which stem cells, from what sources, hold the greatest promise for each line of inquiry and for repair in MS.

Restrictions Threaten Important Research

In the face of the rapid progress being made involving stem cells in understanding and treating MS, current federal regulations are having a negative effect on the conduct of human embryonic stem cell research. Of over 70 cell lines originally approved for federal research funding by the Bush Administration, only 22 are available to researchers. Those 22 approved cell lines are contaminated by nutrients from mouse cells, and they will probably never be viable for clinical use in humans.

The National MS Society is concerned that federal regulations are having a negative effect on the conduct of human embryonic stem cell research. Current regulations could (a) force this type of research into the private domain and thus limit its accessibility to the broader research community; (b) compel researchers to relocate their laboratories to countries with more favorable regulatory environments; and (c) increase the administrative costs for public and private funders of such research. Furthermore, by forcing this type of research to be performed outside of the federal domain, it prevents the government from providing the type of oversight that it provides for other forms of research.

Recent Developments

The news that researchers have succeeded in turning adult skin cells into what appear to be embryonic stem cells is without a doubt an advancement that may one day in the future have implications for the treatment of neurological disease like MS. However, the researchers themselves point out that they have a great deal more work to do to overcome some issues before their method could produce cells suitable for therapeutic use in people and therefore stress the importance on continuing other types of stem cell research, including embryonic. The researchers noted that their methods involved inserting genes into the cells, including some that cause cancer, and that they also introduced a retrovirus that could be harmful to humans. Nevertheless, this is a hopeful step forward, but it would be premature to stop research using embryonic stem cells because of all the technical and safety issues that must be overcome before researchers will know whether this new stem cell method will be a viable alternative.

Legislative Action

To remedy the flaws in the current federal policy, the Society supported the Stem Cell Research Enhancement Act of 2007 (H.R. 3/S. 5).

The bipartisan Stem Cell Research Enhancement Act expands the number of human embryonic stem cell (hESC) lines that are eligible for federally funded research, thereby accelerating scientific progress toward treatments and cures for a wide range of diseases and debilitating health conditions including MS.

Under the current federal policy on human embryonic stem cell research, only those stem cell lines derived before August 9, 2001, are eligible for federally funded research. This bill lifts that restriction. Stem cell lines shall be eligible for federally funded research regardless of the date on which they were derived.

The bill also institutes stronger ethical requirements on stem cell lines that are eligible for federally funded research.

On January 11, 2007, the U.S. House of Representatives passed H.R. 3, legislation to expand embryonic stem cell research, by a vote of 253-174, with eight Members not voting. The Senate voted on the companion bill, S. 5, on April 11, 2007, by a vote of 63-34 with three Senators not voting. S.5 passed the House of Representatives June 7, 2007 by a vote of 247-176 with ten members not voting. The president vetoed S. 5 on June 20, 2007.

A Complex Issue

We recognize and respect the beliefs of those who may oppose the Society's stance on embryonic stem cell research. This is a very complex issue. And while we respect individuals' personal beliefs, we believe that all promising avenues that could speed us to a cure for multiple sclerosis must be explored.