Alzheimer's disease, the Alzheimer's Association and stem cell research

This document provides background information and addresses common questions about stem cell research and Alzheimer's disease.

What are stem cells?

Stem cells occur at the earliest stages of development through to adulthood. Two broad classifications of stem cells are "pluripotent" stem cells and adult stem cells.

- Pluripotent stem cells potentially can develop into any kind of cell in the body. They are isolated from hollow balls of embryonic cells a few days old. They can be used to create pluripotent stem cell "lines" – cell cultures that can be grown indefinitely in the laboratory.
- Adult stem cells are found in a few organs and in bone marrow. They have less ability than pluripotent stem cells to differentiate into other types of cells.

Stem cells have several unique characteristics. They have the potential to develop into many different types of cells, and they can theoretically divide without limit to replenish other cells. They can become other types of cells that have more specialized functions, such as muscle cells, blood cells, or brain cells. In addition, under certain conditions stem cells can be stimulated to become cells with particular functions such as heart muscle cells or insulin-producing cells in the pancreas.

What is stem cell research?

Stem cell research is a relatively new area of scientific inquiry. Many scientists believe that stem cell research offers great promise. They believe it could be used to develop new procedures, techniques and therapies. Researchers are working now with both human and animal stem cells to learn about a variety of diseases, and possibly improve treatments for, prevent or even cure some of them.

According to the National Institutes of Health (NIH): "Stem cells have potential in many different areas of health and medical research. To start with, studying stem cells will help us to understand how they transform into the dazzling array of specialized cells that make us what we are. Some of the most serious medical conditions, such as cancer and birth defects, are due to problems that occur somewhere in this process. A better understanding of normal cell development will allow us to understand and perhaps correct the errors that cause these medical conditions. Another potential application of stem cells is making cells and tissues for medical therapies."

What does stem cell research mean for Alzheimer's disease?

Currently, there is great enthusiasm in the scientific community for the potential of stem cell research to help in the fight against type 1 diabetes, Parkinson's disease, and spinal cord injury, where cell repair can be narrowly directed to a defined target.

For instance, researchers are developing a number of strategies for developing dopamine-producing nerve cells from human stem cells for transplantation into people with Parkinson's disease. In the case of juvenile diabetes, efforts are underway to coax stem cells to become insulin-producing beta cells that could be transplanted into patients.

While some scientists believe stem cell research may one day help people with Alzheimer's disease, they generally feel that such a day is far off in the future. Several issues complicate the applicability of stem cell treatments to Alzheimer's. For example:

- Alzheimer's is highly complex and the related cell damage spreads to large areas of the brain as the disease progresses. The potential of stem cell therapy to correct this widespread destruction is unclear and will require longer-term investigation.
- While newly implanted cells may be able to process and create new memories, they would not have the extensive network of connections built up over a lifetime by older cells nor would they retain previously stored memories.

What does the Alzheimer's Association say about stem cell research?

The Alzheimer's Association's policy, adopted in June 2004 by our National Board of Directors, states that: "In keeping with its mission to eliminate Alzheimer's disease, the Alzheimer's Association opposes any restriction or limitation on human stem cell research, provided that appropriate scientific review, and ethical and oversight guidelines are in place."

A primary goal of the Alzheimer's Association's is to eradicate Alzheimer's through the advancement of research. We therefore support any legitimate scientific avenue that offers the potential to advance this goal within appropriate boundaries.

Is the Alzheimer's Association actively promoting stem cell research?

Currently, the Association is not funding any human stem cell research, and it is not a current research priority for the Alzheimer's Association. To date, in the more than $165 million that the Association has committed to research, we have not funded a grant involving human stem cells. This is largely because this avenue of investigation is not a priority in the Alzheimer research community.

The Association supports all legitimate scientific avenues that offer the potential to effectively treat, prevent and cure Alzheimer's disease, and improve care for those with the disease, within appropriate boundaries. This is why the Association is supportive of human stem cell research, even though it is not a current research priority.

What, then, are the most promising areas of Alzheimer's disease research?

There are many areas of Alzheimer's disease research that are very promising. These include:

- Understanding the role of amyloid protein in the brain.
- Risk factors related to cardiovascular disease and metabolic disorders.
- Risk factors related to genetics and lifestyle.
- Treatments to slow or stop the progression of the disease.
- Brain imaging for early diagnosis and improving drug testing.

To find out more about Alzheimer's Association funded research studies, visit our Web site at http://www.alz.org/Research/Funded/overview.asp.

How can I help in the fight?

There are many ways you can help us in the fight against Alzheimer's disease:

- Advocate for improvements in federal funding, and local, state and federal policy.
- Donate to the Alzheimer's Association for research.
- Participate in local events and programs.
- Volunteer your time.