EuroStemCell

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Alzheimer's disease: how could stem cells help?

What do we know?

Alzheimer's disease (AD) is the leading cause of dementia. People affected by AD commonly experience memory loss, confusion and mood swings.

The cause of AD is still unknown, but several theories focus on two proteins, called 'amyloid beta' and 'tau', which are found in deteriorating areas of an AD brain.

Clumps of amyloid beta proteins form plaques that may prevent neurons from sending signals properly.

Tau protein is important for normal cell function, but researchers think that when tau gets gnarled up into 'tau tangles' it prevents neurons from getting nutrition.

There is currently no cure for AD.

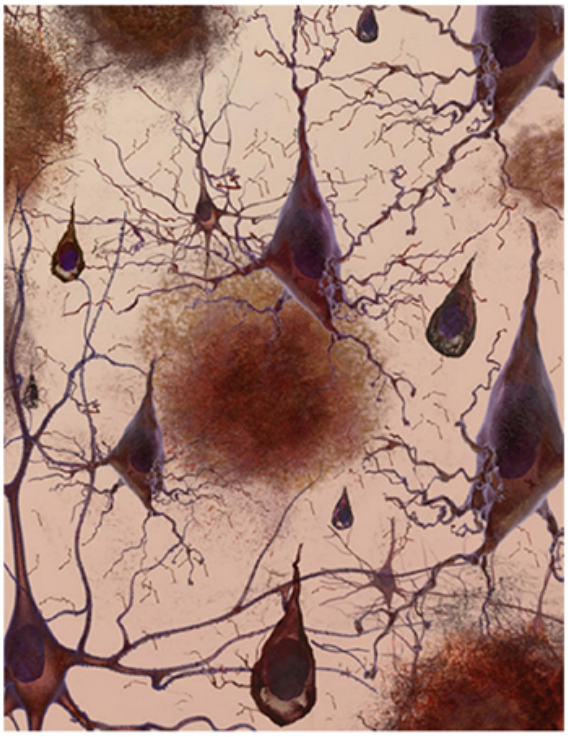

Image represents the loss of connection between neurons in the brain with Alzheimers, courtesy of the National Institute on Aging/National Institutes of Health.

What are researchers investigating?

No stem cell treatments are currently approved for AD. Positive effects have been seen with neural stem cell transplants given to mice with a disease similar to AD, but researchers are still studying what these stem cells are doing and how they might help repair the brain.

Researchers are using induced pluripotent stem cells to grow neurons that have the same genetic background as people affected by AD so they can study the disease. These neurons represent a tool to look for new drugs that can reduce amyloid and tau, and also find disease signposts that can help diagnose patients with AD earlier.

What are the challenges?

There are many different neurons throughout the brain that are destroyed by AD, making each case unique and very difficult to treat.

Successful stem cell treatments will need to distribute cells to damaged areas throughout the brain, make the correct types of neurons and other brain cells, correctly 'wire' new neurons into existing neuron networks, and, above all, be safe (e.g. not cause cancer or other complications).

Some researchers argue that using new neurons made with stem cells to study Alzheimer's disease will not accurately represent aged brain cells. Other researchers think this approach could be the best way to understand the earliest stages of AD.

If stem cell treatments are eventually developed for AD, these treatments do not stop the cause of AD, meaning treatments may not last and people could suffer relapses.

For more information visit: **www.eurostemcell.org/alzheimers**