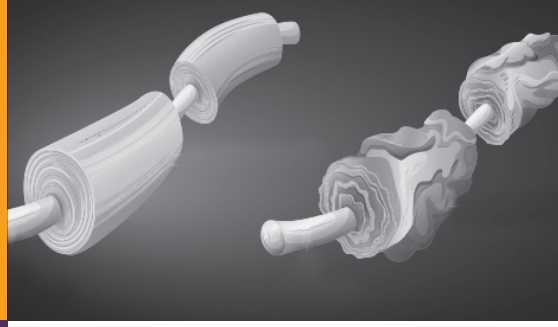
Multiple Sclerosis



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Multiple sclerosis (MS) is an autoimmune response that destroys the myelin sheath that protects the nerves in the brain and spinal cord. The resulting nerve damage leads to sensory disturbances and an inability to control muscles.

A progressive disease, the associated consequences of MS can be partial paralysis in addition to complications with communication and feeding – all of which has a negative impact on patient quality of life. Current research indicates a possible genetic predisposition coupled with environmental triggers as the cause.

MS affects approximately 1 in 1,000 people, with a familial history reducing these odds to 1 in 50. It can be associated with other illnesses and disease such as type 1 diabetes, leukodystrophies and osteoporosis. There are currently 100,000 people in the UK with MS, costing £1.34 billion per year to treat.

Clinical Trials

A phase IIa study was performed on a small patient cohort. This showed some improvement in vision, but limited impact on disease progression, measured by disability worsening.

Animal Studies

Research using mice models of the disease have shown that mesenchymal stem cells (MSC) can inhibit the pathogenic immune response. This response was not mediated by stem cells being incorporated into the central nervous system, but by the MSCs triggering an anti-inflammatory response.

Patient Studies

There are four reported patient trials, all using autologous MSCs isolated from bone marrow. The methods of administration were intrathecally, intravenously plus intrathecally or just intravenously. The most efficacious route was intravenously only, which resulted in peripheral tolerance of myelin antigens, axon formation and remyelination. This is also the least invasive route of administration with fewest possible adverse side effects. A mean dose of 1-2 x106 cells per kg bodyweight was used. These are all phase I open label safety studies.

Future Clinical Trials

A further study using a randomised cross-over placebo-controlled design is scheduled for 2013 under the acronym MESEMS. Again using autologous bone marrow-derived MSCs, the studies will be carried out in multiple countries and the results pooled to provide a larger patient cohort. There are 10 centres already in the EU, with USA and Canadian centres currently obtaining funding and local permission to participate.

Summary

Currently there is no cure for MS, and existing results of stem cell work indicate that MSCs may possibly provide an alternative treatment option. The aim is to understand how tissue repair can be mediated, although replacing damaged neuronal tissue with functioning tissue is some way off.

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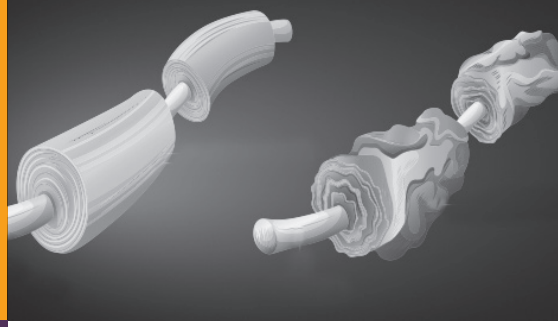

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