The pathology of multiple sclerosis

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Multiple sclerosis (MS) is a disease which affects the nervous system, namely the brain and spinal cord. It causes damage the myelin sheath, the material that surrounds and protects nerve cells (Marieb, 2012). This damage slows down the process in which the brain relays messages to the rest of the body, leading to a variety of symptoms. Some of the most common include pain and numbness; fatigue; walking, balance, and coordination problems; bladder and bowel dysfunction; vision problems; cognitive dysfunction; emotional changes anddepression(National Multiple Sclerosis Society, n. .).

Though the exact cause of MS is unknown, it’s widely thought to be an autoimmune disease. Autoimmune diseases arise from an overactive immune response of the body against substances and tissues normally present in the body (Marieb, 2012). In other words, the body actually attacks its own cells. The immune system mistakes some part of the body as a pathogen and attacks it. The disease affects women more than men, often beginning sometime between the ages of 20 to 40.

Recently, a study found that the incidence of MS appears to be higher in African American women than in caucasians, contradicting previous findings (Langer-Gould, Brara, Beaber, & Zhang, 2013). The disease is usually mild; however, some people lose the ability to write, speak and/or walk. No cause or cure for MS has been found. It remains a mysterious disease with no known pathogen or even known determinants of its severity and course.

Three recently published studies say that salt may play a role in MS and other autoimmune diseases, although no study has found a direct link between high salt intake and increased incidence of MS. On a more peculiar

note, researchers in England have been investigating how the month of birth (May and November) affects the chances of having MS later in life. It’s thought that it could have something to do with climate, sunlight, and intake of vitamin D (Disanto et al. , 2013). Many of the medicines available for use by MS patients only slow the progress of the disease.

The most common treatments involve interferons. Interferons are a group of natural proteins (beta, alpha, gamma) that are produced by human cells in response to viral infection and other stimuli (NMSS, n. d.). The FDA has approved three treatments in the form of beta interferon called Avonex, Betaseron, and Rebif. Beta interferon has been shown to reduce the number of exacerbations and may slow the progression of physical disability (National Institute of Neurological Disorders and Stroke, 2012). When attacks do occur, they tend to be shorter and less severe.

A synthetic form of myelin basic protein, copolymer I, has also been approved and it has few side effects. For more severe or chronic cases, an immunosuppressant treatment (mitoxantrone) has been approved. While steroids do not affect the course of MS over time, they can reduce the duration and severity of attacks in some patients. Spasticity, which can occur either as a sustained stiffness caused by increased muscle tone or as spasms that come and go, is usually treated with muscle relaxants and tranquilizers (NINDS, 2012).

Patients can also help control symptoms through adequate physical activity and occupational therapy. Exercise, especially stretching exercises, helps relieve stiffness and promote flexibility and mobility. With advances in the

understanding of the brain come advances towards developing a cure for Multiple sclerosis. Improved ability to create images of the living brain and spinal cord, new understanding of the brain's capacity for repair, and an overall accelerated pace of new discoveries about the cellular machinery of the brain have lead to new therapeutic strategies.

These strategies include gene therapy, stem cell transplantation, and neuroprotection strategies (Joy & Johnston, 2001). Very recently, a biotechnology company developed a new MS drug based on peginterferon beta-1a. Studies of peginterferon beta-1a show that, when injected under the skin either every two or four weeks, reduced the relapse rate significantly more than placebo in a study of 1500 people with relapsing MS (Biogen Idec, 2013).

Myelin and the cells that make myelin, called oligodendrocytes, are the main focus of many MS studies. Scientists and medical research organizations (such as The Myelin Project) are trying to find ways to stimulate myelin regeneration in patients by uncovering the mechanisms involved in myelin regeneration. Once discovered, they could eventually be translated to promising new therapeutic approaches to restore function in people with MS.