

Where Did MS Come From?

As part of my MS literature research I have tried to answer big questions such as “what causes MS?” and “where did MS come from?”. It has always seemed to me that answers to such questions would be very helpful for developing effective therapies for both the prevention and treatment of MS. In this column I will summarize my answers to these important, yet rarely addressed, questions.

Most researchers agree that MS was probably very rare before 1800 and, previous to that time, there are only a very few records of a person having the rather distinctive symptoms and disabilities that we now label as MS. By the early 1800s MS seems to have affected enough people in France and Britain that many more records are available. By the mid part of the 19th century MS was recognized as a distinct disease and, as the population of the first world grew, MS prevalence grew with it and today it is estimated there are perhaps as many as two million people with MS.

So why did MS start to become so common about 200 years ago such that it was seen as a distinct disease? The answer to this lies in understanding the environmental factors that drive MS onset and progression and when and why such factors started to affect large parts of the population.

It is widely accepted that MS is an autoimmune disease which means the disease process is driven by one's own immune system. Autoimmune disease involves the activation of immune cells that are sensitized to one or more self-proteins as well as the failure of the regulatory side of the immune system to suppress such potentially harmful reactions. In MS, the immune system becomes sensitized to and attacks proteins in the myelin sheath that protects the axons of the central nervous system. Such attacks on the myelin are not well controlled by immune suppression such that substantial damage often occurs and clinical symptoms become apparent. Given this understanding of the MS disease process, the obvious questions become “what environmental factors cause the activation of the myelin-sensitive immune cells?” and “which factors ensure that such attacks are not well controlled through immune suppression?”.

Research has revealed that fragments from foreign proteins derived from infectious agents and foods can activate myelin-sensitive immune cells through cross-reactions. Notably, many new foreign proteins were introduced into the human environment by the agricultural revolution, 10,000 to 5000 years ago. Such new proteins came from numerous infectious agents that crossed over to humans from domesticated animals (eg Epstein Barr virus) and from completely new food types such as dairy, grains and legumes. These new proteins had a great potential to cause autoimmune reactions because of the lack of any evolutionary experience with them.

However the introduction of these new proteins by agriculture apparently did not cause widespread MS and other autoimmune diseases because most people still had adequate immune regulation and were able to suppress any potentially harmful autoimmune reactions caused by the new proteins. Most people had adequate immune regulation because of an adequate supply of vitamin D and omega 3 EFA, established immune regulators, and also the occurrence of many chronic infections in childhood related to the unhygienic conditions of those times. Such infections result in well-educated immune system capable of optimal immune suppression.

Notably, in the early 1800s there was a substantial reduction of vitamin D supply due to the industrial revolution and there was also a major reduction in common childhood infections due to the establishment of hygienic conditions. These reductions resulted in many people no longer having

an adequate capacity to suppress autoimmune reactions. This reduced suppression capacity within the population, combined with the already common presence of foreign proteins that could initiate autoimmune reactions, resulted in some of the people who were genetically susceptible to MS actually contracting it. Hence MS started to affect a large enough number of people that it was seen as a distinctive disease during this time.

The situation has gotten even worse over the last 100 years. Vitamin D intake has continued to decline due to more and more people having urban office jobs rather than outdoor, rural ones. The specter of skin cancer and the development of sunscreens have added to widespread vitamin D deficiency. Hygienic conditions have been improved such that most first world people live in an ultra-hygienic world. Children have only rare infections and consequently also have an undereducated immune system that has a greatly reduced capability for immune suppression. Finally, even omega 3 EFA intake has been greatly reduced due to a change from grass-fed domesticated animals to grain-fed ones.

In summary, the loss of immune regulation capacity over the past 200 years, in combination with the already present, cross-reactive antigens introduced earlier by agriculture, unleashed the MS monster in first world populations. This analysis leads to the insight that MS rates can be greatly reduced if first world societies either remove the problematic foreign proteins or substantially increase the immune suppression capacity of the population. It would be next to impossible to remove most of the foreign proteins so the obvious solution is to boost immune suppression capacity. Ensuring that all children receive adequate vitamin D and omega 3 EFA can readily do this and such a strategy would likely reduce MS to a very rare disease. For those with MS, the obvious strategies are to both remove the potentially cross-reactive food proteins and to boost immune regulation capacity through supplements of vitamin D and omega 3 EFA.