

## A Leaky Gut – A Key Part of the MS Disease Process

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Once one is diagnosed with multiple sclerosis it is important to do everything reasonably possible to try to keep the MS disease process well controlled such that no long term damage to the central nervous system occurs. The best therapies are those which offset the adverse physiological process which comprise MS. The main disease-driver is the presence of myelin-sensitive immune cells which attack the myelin which covers the nerve axons in the central nervous system.

Most MS drugs are designed to offset this immune attack on myelin by either destroying or regulating immune cells. Strangely, the MS research community and MS clinicians have not given much thought to the question of how the myelin-sensitive immune cells keep getting activated such that damage to the CNS continues and MS keeps progressing. They simply assume that once the myelin-sensitive immune cells are activated by a virus in childhood, there is no need for further activation and the autoimmune process just keeps rolling on its own.

I agree that the pool of myelin-sensitive immune cells is probably initially produced by a childhood viral infection such as Epstein –Barr (mononucleosis) under conditions of a vitamin D deficiency. However, all the characteristics of MS and other similar autoimmune diseases indicate that the activation of the autoimmune, “attack” cells must be ongoing. Given this, one obvious way of keeping the MS disease process well controlled is to either greatly limit or even stop this ongoing activation of the myelin-sensitive immune cells.

So the big question becomes “How do the myelin-sensitive immune cells keep getting activated?” The best explanation is that protein fragments which closely resemble fragments of myelin proteins pass through the gut wall, encounter the immune system, and cause the activation of myelin-sensitive immune cells.

The phenomenon of the passage of protein fragments through the gut wall is known as a “leaky gut”. The gut wall is best seen as the interface between the outside world and a person’s inner body and it is important that it prevents the

passage of foreign proteins derived from gut bacteria and food particles. A key part of this barrier is the “tight junctures” which occur between the cells of the gut wall.

When these tight junctures break down, protein fragments from gut bacteria and food can pass through the gut wall and meet the immune system. If some of these protein fragments closely resemble myelin protein fragments, they can activate the dormant, myelin-sensitive immune cells.

Thus the MS disease process is driven to a large degree by this ongoing activation of myelin sensitive immune cells by foreign proteins passing through a leaky gut. We now have to ask what causes a leaky gut and what therapeutic options exist to heal a leaky gut

There are various factors which can cause the breakdown of the tight junctures and lead to a leaky gut. One of the main causes is a gut infection (viral, bacterial, fungal) and toxins from the infecting agent break down the tight junctures. Even changes in the composition of the gut flora from a dominance of “friendly” bacteria to one consisting of more harmful bacteria can result in gut wall problems. Another cause can be food allergies which lead to immune reactions in the gut. Some food types such as grains and legumes contain proteins called lectins and these can also have an adverse affect on the gut wall. Finally, various common drugs such as antibiotics which disrupt the composition of the gut flora and pain killers such as aspirin can also result in substantially increased gut leakiness.

Fortunately there are a number of therapeutic strategies which can help to maintain an intact gut wall and to heal it if it becomes leaky due to a random gut infection or the need for drugs such as antibiotics. The bottom line is that anyone with MS wants to do everything possible to ensure their gut wall remains an effective barrier against the many foreign proteins that always occupy the gut.

One important strategy is to try to maintain a dominance of friendly bacteria in the gut. This is best done by the use of a supplement known as probiotics which consists of millions of bacterial cells known to be good for the gut. Such bacteria include various species of lactobacillus and bifidobacterium among others. It must be noted that although yoghurt contains such bacteria, this is not a good source because of the associate milk proteins which can be very problematic for MS. The best source of probiotics is capsules or a non-

dairy liquid that contains the bacteria cells. I would suggest the daily ingestion of 6-9 capsules (2-3 per meal).

Prebiotics, which are substances which help the probiotic bacteria to proliferate, can also be of value. A commonly available, prebiotic product is inuline which is fiber from the chicory root. In general, lots of fiber from fruits and vegetables is very beneficial and helps to maintain a healthy gut flora.

Various nutrients which can be gotten from food and/or supplements are also known to help maintain an intact gut wall. These include zinc, omega 3 EFA, antioxidants and glutamine. For zinc I would recommend a 20 mg supplement every day. Omega 3 essential fatty acids are of value for MS in various ways and helping to heal a leaky gut is one more reason to take adequate omega 3 EFA (3-5 grams of DHA + EPA/day).

Antioxidants can be gotten from eating lots of vegetables and fruits and fruits such as blueberries and blackberries are very helpful. If one wants to use powerful antioxidant supplements, I would recommend alpha lipoic acid, acetyl L-carnitine and N-acetyl cysteine. Green tea also contains effective antioxidants in the form of epigallocatechins and these can also be obtained as specific supplements.

The use of glutamine has been hotly debated in the MS community because the release of glutamine in the brain can cause damage. There is no doubt that glutamine is very helpful for healing a leaky gut and thus its use can be potentially beneficial. Overall I would recommend it not be used given it might be harmful and that there are alternative therapies for healing a leaky gut.

Finally I have to mention that a recent study has shown that vitamin D also contributes to maintaining an intact gut barrier. I assume everyone reading this column is taking 6000 IU a day to ensure an optimal level of vitamin D and this is just one more reason to do so.

In summary, a leaky gut appears to be a key part of the MS disease process in that it allows the continued activation of myelin-sensitive immune cells. It is important to maintain an intact gut barrier to prevent such immune activation and this can be done by various nutritional strategies.

