

Role of fungi and their toxins in the etiology of MS

Akbar Hossein nejad ^{*1}, Seyyed Seed Aghili ², Seyed Reza Aghili ³

1-MSc. Student of Medical Mycology, Student Research committee, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

2-Student of Medicine, Student Research committee, Faculty of Medicine, Shahid Beheshti University of Medical Science, Tehran, Iran

3-Faculty member of Invasive Fungi Research Center, Department of Medical Mycology and Parasitology, Faculty of Medicine, Mazandaran University of Medical Sciences Sari, Iran

Although there is a genetic predisposition to MS, only a third of genetically susceptible persons are sufferers. The studies show that there is a relationship between exposures to mycotoxins and fungal infection and the development of MS. Mycotoxins are substances naturally produced by some fungal growth in contaminated crops or our body.

We present list and table of brief results of literature published researchers over the past 25 years about role of mycotoxins in MS disease.

In MS, sphingolipids from the white matter in the CNS are destroyed and a heat stable toxin from the CSF is isolated. Mycotoxins, specifically gliotoxin (a heat stable chemical made by some fungi) can disrupt sphingolipid biosynthesis and induce apoptosis of nerve cell on a slightly larger scale. A protein with identical biochemical characteristics to gliotoxin was identified in the urine of MS patients. Fumonisin are a group of mycotoxins that happen to be neurotoxic as well as carcinogenic. Penitrem mycotoxins can cause tremors, convulsions, limb weakness, and ataxia similar to MS. The most common region for MS is the part of America that called cornbelt and corn is universally contaminated with mycotoxins. On the other hand, the statin drugs have proven effective in slowing the progression of MS and Vitamin D can influence the immune system and reduce mortality in MS. The Statin drugs and Vitamin D have role as antifungal or anti-mycotoxin. Diet regimen such as eating smoked sausage in childhood and overeating introduce to responsible for causing MS. Smoked and aged meats are often contaminated with mycotoxins and the fewer foods taken in, means that the fewer mycotoxins enter the body. In patients who have MS similar to systemic *Candida albicans* infections, elevation of IgG is predominantly immunoglobulin in CSF. Although no specific cause has been identified for MS, some evidence shows, continuous exposure to grain-based fungi and invasive fungal infection may triggered of MS, and contribute to the perplexing distribution of MS cases worldwide .

Keywords: Multiple sclerosis, MS disease, fungal infection, mycotoxin, fungi