

## **WILL ENVIRONMENTAL AND BEHAVIORAL CHANGES ALTER SUSCEPTIBILITY OR COURSE OF MS**

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Although genes are needed for MS to develop epidemiological studies clearly demonstrate a prominent role for the environment in determining MS risk. Factors with the strongest evidence for involvement in MS are latitude/Vit D, Epstein-Barr virus (EBV) and smoking.

There is known association between latitude and MS incidence and prevalence. This can be explained by differences in sunlight exposure. Diminished solar UVB radiation results in Vit D deficiency and can lead to immune dysregulation. Also the risk of developing MS north of the equator for individuals born in May was over 9% higher than expected and over 8% lower than expected for those born in November. Opposite situation is found on southern hemisphere. These variations in pattern of MS births may reflect differences in exposure to solar radiation during prenatal period.

Data from two large prospective cohorts of woman (Nurses' Health Study, 92.253 followed from 1980-2000) and Nurses' Health Study II (95.310 woman followed from 1991-2001) has shown that woman who used supplemental Vit D had a 40% lower risk of MS, that woman who did not use vitamin D supplements.

Also, a prospective nested case-control study among more than 7 million US military personnel has shown that high circulating levels of Vit D are associated with a lower risk of MS. The relative risk of developing MS has been found to be lower among woman born to mothers with high vit D intake during pregnancy. In a randomized double-blind, placebo controlled trial with Vit D3 as an add on treatment to interferon beta 1b in patients with MS, patients in the Vit D group have shown a significant reduction of MRI activity in comparison with group of patients only treated with interferon beta 1b.

Most of individuals with MS have been found to be infected with EBV. MS risk is extremely low in individuals who are EBV negative but increases several folds following EBV infection. Additional evidence supporting a role for EBV in MS pathogenesis includes the observations of elevated antibodies to EBV antigens (especially EBV nuclear antigen-1) prior to onset of MS and increased risk of developing MS in individuals with a history of infectious mononucleosis, caused by EBV. Inhibiting EBV infection would seem to be a potential option for preventing MS. However the implications of a preventive EBV vaccination strategy at a population level are currently unknown and would need to be carefully explored.

Studies show that smoking can be a risk factor in MS and that smoking appears to promote disease progression. Smoking affects also immune system both increasing autoimmune reactions and decreasing activity against infections. Promoting smoking cessation may reduce the incidence of MS and influence MS course. More studies are needed.