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Medical Update Memo

May 10, 2010

Study Suggests that Smoking and Exposure to Epstein-Barr Virus May Interact as Risk Factors for Developing MS

Summary

In a new study, researchers show that two individual factors that were previously identified as increasing the likelihood of developing MS – exposure to Epstein-Barr virus and tobacco smoking – may interact and multiply to substantially increase the risk of developing MS in those with both risk factors. **Neurology (early online publication, April 7, 2010).**

Details

Background: MS is thought to occur when people whose genes make them susceptible encounter something in their environment that triggers this immune-based neurological disease. Although many genes probably contribute to susceptibility, a specific gene that has been shown to confer higher susceptibility to MS is called HLA-DR15, which helps control how the immune system identifies targets for destruction. Although many infectious agents have been investigated at various times as possible triggers of MS, no single virus or bacterium has been proved to cause the disease. However, previous studies have suggested that the risk of MS is increased in persons who have had a history of infectious mononucleosis (caused by the Epstein-Barr virus, or "EBV") or who have high levels of blood serum antibodies against EBV, which indicate past exposure to the virus. Smoking has been associated with an increased risk of developing MS, as well as the rate of MS progression.

In 2008, the Harvard team found that people who had both the HLA-DR15 gene and high levels of antibodies to the Epstein-Barr virus in the blood serum were nine times more likely to develop MS than those without that gene and with low levels of viral antibodies. (Neurology 2008;70:1113-18) Exploring such interactions between genes and the

environment may help us understand what triggers MS and also may point to ways to interfere with the development of the disease.

The Study: The Harvard research team gathered information on people with MS enrolled in the ongoing Nurses' Health Studies (a questionnaire-based longitudinal study that track risk factors for chronic diseases in female nurses); the Tasmanian MS Study (a study that identified people with MS in Tasmania); and the Swedish MS Study (in which people with MS were identified in a national health registry). They looked at smoking history, presence of EBV antibodies in blood serum, presence the HLA-DR15 gene, and their relationship to MS risk in the combined group of 442 people with MS and 865 controls without the disease.

By pooling results from each of the three studies, the researchers found that each of the factors raised the risk of developing MS at levels consistent with previous studies: those with the HLA-DR15 gene were about three times more likely to develop MS than those without this gene; those with serum EBV antibodies were about two and a half times more likely to develop MS than those without EBV antibodies; and those who ever smoked were about one and a half times more likely to develop MS than those who never smoked.

However, when EBV exposure was taken into account, smoking only increased MS risks among those with high levels of serum EBV antibodies. Current or previous smokers with low levels of EBV antibodies had no increased risk for developing MS, whereas current or previous smokers with the highest levels of EBV antibodies were 70% more likely to develop MS than those with neither risk factor. The presence of the HLA-DR15 gene variation did not appear to modify any of these effects.

With information from the National MS Society (USA)

National Research and Programs

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