

Research Indicates Strong Association Between APOE 4, APOCI A Genes

*By Shirley E. Poduslo, Ph.D.,
Professor
Medical College of Georgia
Institute of Molecular Medicine and Genetics
Department of Neurology*

Data analysis based on information gathered from the DNA Bank leads to the conclusion that there is a strong association of Alzheimer's disease with both the APOE 4 and the APOCI A gene forms, according to Dr. Shirley E. Poduslo, director of the DNA Bank of the Medical College of Georgia, Institute of Molecular Medicine and Genetics. Moreover, the increased risk of Alzheimer's disease is found in those with both the APOE 4 and APOCI A forms.

APOE 4 is known to be a risk factor for Alzheimer's disease. Research shows that between 40 and 50 percent of Alzheimer's patients have APOE 4, while most controls have the APOE 3 form. The gene for APOE is found on chromosome 19. Researchers under Dr. Poduslo's direction determined that a change (the presence of a restriction site) in a gene downstream from APOE is also a risk factor for Alzheimer's disease. The gene downstream is known as APOCI. Some 40 percent of Alzheimer's patients have the APOCI A form, while controls have the B form.

Research shows that APOE 4 and APOCI A are tightly linked. This means that people who are APOE 3 are probably APOCI B. The Alzheimer's patients who are APOE 4 are also APOCI A. Dr. Poduslo and her staff questioned whether this tight linkage between the two genes had anything to do with Alzheimer's disease or whether the linkage was because they were so close together on chromosome 19.

They collaborated with researchers directed by Dr. Robert Elston at Case Western Reserve University in Cleveland, Ohio. Data was examined from 154 patients and 204 spouses. Genotyping was done in Dr. Poduslo's lab. That is, technicians determined which APOE and APOCI forms each person had. Then they did an analysis called logistic regression to determine the effects of the different forms on Alzheimer's disease.

They looked at different models for the analysis. These included examining the effect of APOE 4 alone, looking at the effect of APOCI A alone, and the assessing the effects of the two combined. The results were interesting.

Only the interaction between the two was found to be of importance. The effect of APOE 4 was only present in persons in whom APOCI A was also present.

There is no question that Alzheimer's disease has a complex inheritance. Many genes are probably involved since patients present with different symptoms. A technique called segregation analysis will be used to model the transmission of the disease in families with late onset disease.

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