

THE CONSUMER'S GUIDE TO UNDERSTANDING THE ROLE OF GENETICS IN DEMENTIA

Genetics refers to the study of how traits are passed on from parents to children. These traits are the functions that control all aspects of our body and life. Most traits are controlled by genes and environmental factors. Genes are pieces of a complex molecule that code for proteins and other factors that control how cells of your body functions. Each human being has a set of about 30,000 genes located on 46 chromosomes. Changes in these genes can occur due to many factors, for example, radiation, chemicals, and exposure to supercharged forms of oxygen called free radicals.

Errors in the code contained in genes can cause your body to malfunction by producing defective proteins, which can accumulate and reduce proper function in the brain. Some rare genetic causes of dementia, like Huntington's chorea, cause these defective proteins and these individuals will almost always have this disease. Similar to Huntington's chorea, a small number of persons with familial Alzheimer's disease (4% or less) have genes that predestine them to develop dementia. These genes cause intellectual loss early in life, usually before the age of 65.

Some common forms of dementia are more complex and may result from when an accumulation of genetic changes and certain other health problems in middle or later life. Dementia is most likely to occur in later life. Late onset dementia has certain genes that may be only risk factors for developing intellectual loss; however, some people may not get the disease even if they have some of these "risk" genes. Risk factors or risk genes increase the chance that a person will get the disease, but unlike the genes for early onset dementia, having the risk gene does not predestine them to getting the disease. The gene for the protein APOE is considered a risk gene for dementia and the presence of the "high risk" form of APOE (APOE 4) may increase a person's chance of developing intellectual loss. The "toxic" APOE may increase the rate of intellectual loss by causing symptoms 10 years earlier than others without this high risk gene. Fifty percent or less of those with this high risk marker may develop Alzheimer's disease.

Many "risk genes" can change your risk for developing dementia by worsening damage to the brain. There are also protective mechanisms that reduce brain damage, for example molecules that act as antioxidants and protect the brain cells (neurons) from damage from supercharged forms of oxygen.

Genes may explain between one-third and two-thirds of risk factors for dementia in older people. This fact means that environment and life choices may also account for one-third to two-thirds of a person's risk for dementia.

Genes are very complicated parts of the human brain cells and scientists presently lack the ability to change the code of these genes. Certain kinds of dementia, such as alcohol-induced dementia, are caused primarily by alcohol abuse with almost no effect of genes. Reducing alcohol abuse will reduce the risk for this type of dementia. Many of the risk factors for common types of dementia are similar, such as high blood pressure. Reducing blood pressure in an older person can reduce his/her risk to dementia, stroke, and heart disease all at the same time.