

Focus on Alzheimer's Disease

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1. Overview

Alzheimer's disease (AD) is the fifth leading cause of death in developed countries and affects as much as 5-10% of people over 65 and 40% of people over 80. It is the leading cause of dementia and occurs around the world with incidence and prevalence doubling every five years after the age of 65. Because of the widespread aging of the world's populations it is a major healthcare problem for the 21st century (1).

2. Risk and Protective Factors

- The disease risk is enhanced by advanced age, family history of the disease, low levels of education, head injury, smoking, hypertension, diabetes, obesity, heart disease, stroke, high fat diet, hyperlipidemia and physical and mental inactivity.
- Protective factors include diet high in antioxidants and fruit and vegetables and fish and B vitamins.
- These risk and protective factors are potentially modifiable and operate throughout the life-course, beginning in childhood (2).

3. Disease Mechanisms

Three important genes are known to be responsible for familial early-onset autosomal dominant AD. However, these mutations are responsible for only less than 1% of the cases. The most important risk factor gene is apolipoprotein E-e4 which is responsible for about 40% of the inherited risk. Important disease mechanisms include production and clearance from the brain of a normal protein called Amyloid Beta. These processes are influenced by genes, diet, mental and physical activity, oxidative toxicity, inflammation and immune factors (3).

4. Ongoing Research at the University of Louisville

- A collaborative group including members of the Departments of Neurology, Biochemistry, Physiology, Anatomy and Neuroscience are working on uncovering crucial disease mechanisms and discovering why people get the disease, as well as why many old people do not get the disease and how the disease can be effectively treated.
- We are searching for new AD gene in studies in Israel with collaborators at Tel Aviv and Boston Universities (4).
- With collaborators at the Univ of Texas, Houston, and Univ of Kanazawa in Japan we have discovered novel antibodies that are protective against the disease. These antibodies are being developed for therapeutic use and vaccination studies are underway in AD model mice with colleagues at CWRU (5).

References:

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