Alzheimer's disease: we can overcome bad genes

Richard Béliveau

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People who are genetically predisposed to develop Alzheimer's disease can considerably reduce their risk by adopting a healthy lifestyle, including a diet rich in plant-based foods and regular physical activity.

With few exceptions (e.g. pediatric cancer and genetic diseases), most diseases are the results of complex interactions between our genes and the environment in which we live. Not all is decided by birth; one can be born with a gene which predisposes for a cancer, for example, but this mutated gene only represents one of the aspects involved in the development of this disease. One of the best examples is the oncogene BRC-ABL, the principal cause for chronic myeloid leukemia; while this type of leukemia is a very rare disease which only affects a tiny proportion of the population, one third of all adults in good health carry this oncogene but the very large majority of these individuals will never be affected by the disease during their lifetimes. In other words, even in the presence of a genetic predisposition to develop a disease, the risk remains nevertheless strongly influenced by a host of external factors, particularly our lifestyles.

HEALTHY LIFETSYLE, HEALTHY HEART

This role of lifestyle is particularly well established regarding cardiovascular diseases. It has long been known that there is a genetic disposition to coronary disease: if one parent dies prematurely of a heart attack, the risk for the offspring of experiencing a coronary event is higher than for the general population. However, a study recently published in the *New England Journal of Medicine* showed that, even in the presence of genetic variations which double the risk of cardiovascular diseases, the adoption of a healthy lifestyle (no smoking, moderate physical activity and eating an abundance of fruits, vegetables and whole grains) leads to a considerable reduction (50%) in this increased risk[1]. The inverse is also true, i.e. that people who possess cardioprotective genes, but who have poor lifestyle habits (poor diet, sedentary nature and smoking) have a 50% elevated risk of developing a cardiovascular disease.

ALZHEIMER'S DISEASE, TOO

A recent study suggested that lifestyle choices can also influence the risk of developing Alzheimer's disease, even for people who already have genetic variants that predispose for this disease[2]. The researchers spent 8 years following 196,383 individuals aged (on average) 64 years, who exhibited no signs of cognitive problems at the beginning of the study, and examined their adherence to four aspects of lifestyle known to diminish the risk of dementia

1. Refrain from smoking.
2. Perform a minimum of 150 minutes of moderate physical activity (or 75 minutes of vigorous physical activity) per week.
3. Adhere to a diet rich in certain foods, which have been associated with a reduced risk for Alzheimer's (green vegetables, berries, nuts, whole grains, fish and olive oil).
4. Adopt moderate consumption of alcohol, between 0 and 14 g (maximum of 1 glass) for women and between 0 and 28 g (maximum of 2 glasses) for men.

Unsurprisingly, they found that Alzheimer's disease preferentially affected the people who were genetically predisposed to it, with an incidence about twice that found in people at low genetic risk. However, and this was the most important finding in the study, this increased risk can be significantly reduced by incorporation of a healthy lifestyle: the people at risk who adhered most strongly to the lifestyle choices mentioned above had 32% less risk of developing Alzheimer's disease than did those whose lifestyle was not optimal. This protection offered by a healthy lifestyle is not exclusive to people at risk because a similarly decreased risk was also observed for individuals at low genetic risk.

We must therefore not be defeatist in the face of Alzheimer's disease nor to chronic diseases in general. It is possible to significantly reduce the risk of developing these diseases by adopting certain very simple lifestyle choices, regardless of the basic genetic predisposition.

(1) Khera AV et al. Genetic risk, adherence to a healthy lifestyle, and coronary disease. N. Engl. J. Med. 2016; 375: 2349-2358.

(1) Lourida I et al. Association of lifestyle and genetic risk with incidence of dementia. JAMA, published online July 14, 2019.

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