

Commentary

Could Diet Influence the Jumpiness of Jumping Genes? What Implications Might this Have?

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A recent study suggested that a healthy diet – one rich in vegetables, fruit, whole grains, nuts, low-fat dairy, and fish – may help support the maintenance of brain volume in the elderly [1]. This diet, a Mediterranean-type diet, is rich a variety of nutrients that have been shown to support brain health via a multitude of mechanisms, including epigenetics, curbing systemic inflammation, and reducing oxidative stress [2,3,4,5,6,7,8,9, 10,11,12,13,14,15]. For this commentary, let us focus on one very highly speculative hypothesis to one of the possible ways that these nutrients might help to support brain volume, that is, by possibly regulating of transposable elements (jumping genes).

Dysregulation of transposable elements may play a role in age-related cognitive decline with environmental factors having a possible role in this process [16,17,18]. Both the environment and aging impact the epigenome [19,20, 21, 22,23]. One aspect of transposable elements is that they are delimited by multifaceted epigenetic processes, making regulation of them vulnerable to environmentally induced epimutations [17,22, 24,25,26,27,28,29,30]. A related thread of speculation involves transposon element activation by oxidative stress (due to mitochondrial dysfunction), leading to apoptosis, and resulting in brain shrinkage [31,32,33,34,35]. Various nutrients in Mediterranean-type diets may reduce epimutations and oxidative stress, which raises the question as to what possible role this might have in regulating transposable element activation in the brain so as to promote brain health. [36,37,38, 39]. Much more research is needed to tease out the numerous pathways by which a Mediterranean-type diet may promote healthy aging and attenuation of brain shrinkage.

These cogitations also point to importance of solving the problem of food insecurity among older adults, many of whom also face age-related physical limitations [40,41,42]. Older women often suffer the most financially [43]. Over half of older women in the U.S. do not have the financial ability to fully cover basic expenses such as nutritious food [43]. Women usually earn lower wages over the course of their careers and thus have far less retirement income. Part of this is due to unconscious bias; from school to the workplace, males are perceived as the ambitious leaders and are called on to speak while women are forced into the background – resulting in a lower, less rewarding career trajectory for the women [44,45, 46,47,48,49]. Another part of this problem is that is the corporate work structure was

originally designed to accommodate the needs of men not women [50]. One of the solutions to this problem is entrepreneurship. Technological advances can facilitate the launching of profitable businesses as encore careers; these home businesses can be designed to work-around physical limitations and also provide greater opportunities and autonomy for women [50,51, 52,53,54]. Continual efforts are needed for creating a more favorable environment for entrepreneurs [55,56]. This is an elder rights and women's rights issue. It is also a public health issue.

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