

## LETTER TO THE EDITOR

**Apple, Nutrition and Health**

Oxidative stress in humans is associated with damage to DNA, proteins, and biological membranes. Oxidative stress, which often arises as a result of an imbalance in the human antioxidant status, has been implicated in aging and a number of human diseases such as cancer, Alzheimer's disease. Apple juice prevented Abeta-induced calcium influx and apoptosis, each of which results in part due to increased reactive oxygen species. These findings suggest that the antioxidant potential of apple products can prevent Abeta-induced oxidative damage. Consumption of apple is considered important for preserving a healthy and relatively disease-free population. Apples contain a variety of phytochemicals, including quercetin, catechin, phloridzin and chlorogenic acid, all of which are strong antioxidants. Flavonoids from fruits and vegetables probably reduce risks of diseases associated with oxidative stress, including dementia. Apples contain significant amounts of flavonoids with antioxidative potential. Accordingly, it has been showed that apple procyanidins alter intracellular signaling pathways, polyamine biosynthesis and trigger apoptosis in tumor cells. These compounds antagonize cancer promotion in vivo. In contrast with absorbable drugs, these natural, non toxic, dietary constituents reach the colon where they are able to exert their antitumor effects. Accordingly, a recent experimental study showed that the impairment of brain functions during aging could be prevented by an increase in antioxidative defenses and diet rich in annurca apple (1–3). Apples play an important role in the American diet. They are among the most popular fruits consumed in the United States (30 liter per capita in a year) and are well recognized for their flavor and nutrition. In the last three decades, per capita consumption of processed apples has increased. Similarly, apple is popular and consumed in considerable amount in Turkey (32 kg fresh fruit per capita) (4). This may be because of that the leading apple growing countries are China, followed by the United States and Turkey (4, 5). In contrast, some other European countries such as England (19 liter per capita), Belgium (19 liter) consumes relatively low amount of fresh fruit and apple (4,5). For example, the National Diet and Nutrition Survey, published in July 2000 in England, reported that children don't consume enough apple in Great Britain (6). In Hungary, domestic consumption of fresh apples decreased from

25–30 kg/year per capita in the early 1990s to about 12 kg in 2002. Reasons include the increased competition from tropical and off-season fruit, as well as weaknesses in the Hungarian domestic fresh apple supply (7).

The diet habits generally are not expected to be changed unless enough policy for good nutrition is done. And, because of advanced age related problems, such as poor dentition; fresh fruit consumption may decrease while aging. Population in developed western countries is getting to be old during last decades.

I believe that apple and dementia relationship not only provides further data in the scope for future clinical studies in prevention of Alzheimer's disease, but also offers development of new strategies by public health planners and governments, especially in well-developed western countries with relatively low apple consumption.

**References**

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**Levent Filik, MD**

*Ankara Teaching and Research Hospital  
Gastroenterology Division  
Ankara, Turkey  
Phone: +903124256808  
E-mail: leventfilik@yahoo.co.uk*