DIETITIANS' NEWS

Flax Effects on Estrogen Metabolism Are Modified by Genes

By Dr. Diane H. Morris

Researchers from the United States and Italy collaborating on a study of flax, estrogen metabolism and genetic polymorphisms found that variations in hormone-related genes could modify the effect of flax lignans on estrogen metabolism.[1] The researchers concluded that the effect of exposure to flax lignans among postmenopausal women was modified by polymorphisms in two genes associated with estrogen metabolism. The findings underscore the growing realization that variations in our genetic profiles may explain some inconsistencies in the findings of epidemiologic studies and also our individual susceptibility to chronic disease. Such findings may eventually point the way to individualized treatment for breast cancer based on our individual genetic profile.

Polymorphisms are variations in DNA sequences that occur too frequently to have arisen by mutation. Human blood groups are examples of polymorphisms. Each of us displays particular genetic polymorphisms passed down to us from our parents.

Flax affects the metabolism of estrogen, mainly by influencing the metabolism of estrone (commonly abbreviated E1). Estrone is derived from the oxidation of estradiol, which is the biologically active form of estrogen. Estrone can be converted to 2-hydroxyestrone (2OHE1), which has little biological activity, and 16α-hydroxyestrone (16OHE1), which has strong estrogenic activity and increases tumour cell proliferation.[2] The risk of breast cancer is lower in women with a high urinary level of 2OHE1 and a higher ratio of 2OHE1 to 16OHE1 in urine.[3]

In the recent study by Susan McCann and colleagues,[1] 132 healthy postmenopausal women aged 45 to 75 years agreed to eat 10 g (about 1 heaping tbsp) of milled flax daily for 7 consecutive days. Blood and urine samples were collected at baseline and at the end of the 7-day intervention. Urinary excretion of 2OHE1 and 16OHE1, along with genetic polymorphisms in two genes involved in estrone metabolism – cytochrome P450 1B1 (CYP1B1) and catechol-O-methyltransferase (COMT) – were assessed. Both CYP1B1 and COMT polymorphisms have been associated with breast cancer in some studies.

As has been reported previously,[4,5] consumption of milled flax for 7 days resulted in a significant increase in the urinary excretion of 2OHE1 and, consequently, in the urinary 2OHE1/16OHE1 ratio. Women with the variant CYP1B1 genotypes had a significantly higher urinary 2OHE1/16OHE1 ratio than women with the common genotypes. In general, urinary 2OHE1 concentration increased with increasing numbers of variant alleles.

References

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