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Letter to the Editor

Why do Cranberries reduce incidence of urinary tract infections?

Dear Sir,

Cranberry juice is commonly prescribed as a prophylaxis for recurrent infections of *Escherichia coli* in the urinary tract (Avorn et al., 1994). Recently there have been several reports demonstrating that proanthocyanidins (MW 1300) isolated from cranberries decrease adherence of *E. coli* bacteria in cell culture (Foo et al., 2000a,b; Howell et al., 1998). The authors suggest that proanthocyanidins from cranberry juice function in the bladder to prevent urinary tract infections in a manner similar to the in vitro results.

Extrapolating from cell culture to the human body is rather implausible in this case. The large size of proanthocyanidins and the improbability of hydrolysis at digestive pH suggest that proanthocyanidins are not absorbed by the gut in their original form. Thus, the concentration of dietary phenolics in plasma may be lower than necessary to achieve the same results in vivo (Scalbert and Williamson, 2000). Even if proanthocyanidins were hydrolyzed to sizes small enough to be absorbed by the gut (monomers–trimers), these products are generally metabolized by biotransformation enzymes in the liver (Scalbert and Williamson, 2000). Any compounds in the urinary tract initially derived from proanthocyanidins in cranberry juice would be vastly different than the original proanthocyanidins. Thus, the relevance of the in vitro studies of tannins in cranberry juice in reducing bacterial adherence to the in vivo outcome of decreasing urinary tract infections is questionable.

The salutary effect of cranberry juice on the bladder (Avorn et al., 1994) may indeed be due to phenolic metabolites, including those derived from proanthocyanidins, but there are many alternative mechanisms to be considered. These include interference with bacterial growth or enzyme activity, formation of bactericidal oxygen radicals, and inhibition of inflammatory processes, as well as blocking bacterial adherence (Dillard and German, 2000). Identifying and testing metabolites or compounds in urine of humans consuming cranberry juice is a more realistic approach to characterizing the mechanism(s) involved in the beneficial effects of cranberry juice. Given the standard human physiological parameters characteristic of digestion and detoxification, cell culture experiments that test the effects of original compounds in cranberry juice on bacterial adherence are unlikely to shed a great deal of light on the beneficial effects of cranberry juice consumption by humans.

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