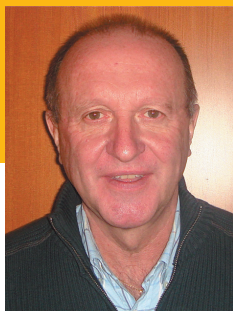


Editorial



Dietary phenolics, absorption, mammalian and microbial metabolism and colonic health

This special on-line edition of *Molecular Nutrition & Food Research* focuses on topics related to dietary flavonoids and phenolics, their absorption, mammalian and microbial metabolism and colonic health. Flavonoids and phenolic compounds in fruits and vegetables have attracted increasing interest since the 1990s owing to the growing evidence of their potential for beneficial effects on human health [1]. This was stimulated in the first instance by the pioneering epidemiology of Hertog *et al.* [2] which linked a lower mortality from cardiovascular disease in an elderly population of Dutch males with a high flavonol intake, principally from the consumption of onions, apples and tea. With the great gift of hindsight, it is now evident that in the majority of circumstances epidemiology is too blunt an instrument to link health to intake of a specific phytochemical or group of phytochemicals. Onions, apples and tea all contain a diversity of phytochemicals, some in substantially higher concentrations than flavonols [3], so what the Zutphen study [2] actually revealed was that consumption of a diet rich in apples, tea and onions is associated with lower mortality from cardiovascular disease. Nonetheless, this classic investigation acted as a catalyst, awakening interest in the role of flavonols and other flavonoids as key components in the protective effects of a fruit and vegetable-rich diet.

We now know much, although far from all, about these compounds and their fate within the body following ingestion. Most flavonoids and related phenolic compounds exist

in planta as sugar conjugates [4]. During passage through the gastrointestinal tract some glycosides are hydrolysed by enzymes in the small intestine such as lactase phloridzin hydrolase and cytosolic β -glucosidase, the released aglycones during passage through the enterocyte are subjected to glucuronidation, methylation and/or sulphation, before they enter the blood stream where they typically appear transitorily in rarely higher than nmol/L concentrations [5].

Research with subjects with an ileostomy and the analysis of components appearing in ileal fluid after acute supplementation provide a further view of what happens to dietary phenolics during their passage through the small intestine [6–9] and also provides information on what compounds, and in what quantity, pass from the small to the large intestine in healthy subjects with a functioning colon. There is increasing interest in how dietary flavonoids and related compounds that make their way to the large intestine are broken down to simple phenolic acids by the colonic microflora [10–13] and what potential impact they may have on the microflora itself and on colonic health [14, 15]. Other components of the food matrix may further influence the bioavailability of flavonoids as they pass through the gastrointestinal tract [16, 17]. For example, the impact of milk on the absorption of cocoa flavan-3-ols has been a topic of much controversy with contradictory data being obtained

by different investigators [17–24]. Interestingly, there has been a parallel debate and conflicting reports about the impact of milk on plasma flavan-3-ol and antioxidant levels associated with the consumption of black tea [25–28]. However, one recent human study clearly showed that while acute black tea consumption significantly improved flow-mediated dilation, indicating enhanced vascular function, this effect was negated by the addition of milk to the tea [29]. In the literature on cellular and physiological effects of phenolics, there are still lessons to be learned about physiological concentration and conditions, and about inter-species variations.

“There is increasing interest in how dietary flavonoids ... are broken down to simple phenolic acids by the colonic microflora and what potential impact they may have on the microflora itself and on colonic health.”

Many of these areas of interest are the subject of research described in the papers presented in this special edition of *Molecular Nutrition & Food Research* entitled “Dietary phenolics, absorption, mammalian and microbial metabolism and colonic health”.



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