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Editorial

Special Issue "Dietary (Poly)Phenols and Health"

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Interest in understanding the mechanisms of the positive effects of dietary phenolic and polyphenolic compounds on human health has markedly increased in recent years. In particular, there is a clear rise of investigations related to metabolic aspects of these compounds. Specifically, a very steep increase is obvious in the case of flavonoids (Figure 1). The traditional testing of dietary compounds using in vitro models without knowing their pharmacokinetics and hence the real biological exposure to those compounds and their metabolites, has been receding, since it might give the readers misleading conclusions about the real clinical impact of these compounds. Indeed, several strong reviews have critically emphasized low bioavailability of parent dietary phenolic substances [1–4]. On the other hand, it should be mentioned, that the unabsorbable part of phenolics is metabolized by human microbiota and gives rise to a row of simpler phenolic compounds that are more bioavailable and thus could be responsible for the final effect on human organisms [5–8].

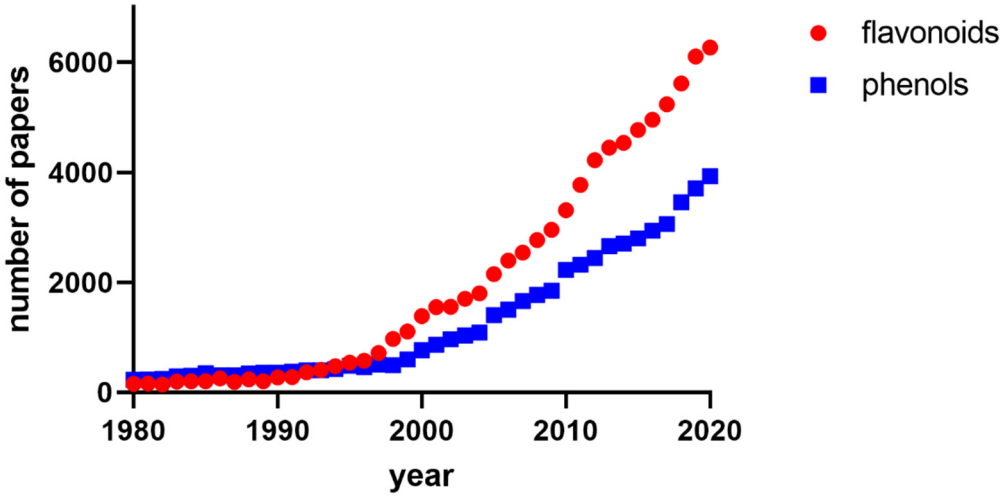

Figure 1. Increases in the number of papers investigating metabolites or metabolism of flavonoids and phenols. PubMed was used for the analysis. Keywords employed were 'flavonoid and metabol* AND ("X"[Date-Publication]: "X"[Date-Publication])' or 'phenol* and metabol* AND ("X"[Date-Publication]: "X"[Date-Publication])'.

I am pleased that 19 papers published in this Special Issue [9–27], present novel findings and adhere to the above-mentioned current trends. I personally consider the fact, that some papers in this issue also reported negative or only mild effects of the tested compounds to be very important as well. Notwithstanding that this likely represents a blind alley, it is also very important information for future research directions.

The papers in this issue also covered different experimental and scientific approaches. There are seven review papers, one meta-analysis, one epidemiological study, four clinical trials, three animal experiments, and three in vitro studies. The readers can find the following interesting information in this Special Issue: Sova and Saso's paper comprehensibly

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summarizes the current data on different biological aspects of hydroxycinnamic acids with an emphasis on bioavailability, metabolism, and possible pharmacological effects [22]. Another paper sums up the current knowledge on oil palm phenolics, which is in fact an aqueous waste produced during the milling process that can be a potential source of biologically active phenolic compounds [12]. The impact of polyphenols on stroke from both animal experimentation and human trials is summarized in other paper [20]. Yessenkyzy et al. convey an interesting and relatively novel concept of polyphenols as compounds able to induce autophagy, which is similar to caloric restriction and seems to have an impact on humans, in particular at an advanced age. The mechanism(s) of this process are also discussed by the authors of [27]. Current knowledge on sakuranetin, one of less explored flavanones, was also published in this issue [23]. Wüpper et al. summarize available data on the chemical composition, pharmacological effects, and safety of Kuding tea, which contains polyphenolic compounds and triterpenic saponins [26]. A review on the composition and pharmacological activity of garlic mentions that flavonoids are also present in garlic [10].

Human interventional studies published in this Special Issue included: (a) a study that found that riceberry rice bread rich in anthocyanins caused a significantly lower postprandial glucose peak in comparison to Hom Mali bread [11] and similarly, a polyphenol-rich functional food breakfast caused a lower glucose peak than ready-to-eat breakfast cereal [14]; (b) a comparison of the effect of beverages enriched with phenol-rich extracts from apple, blueberry, and coffee berry on cognition and mood [13]; (c) a study that found that Sakurajima radish administration did not reduce arterial blood pressure but showed a tendency to decrease heart rate [21]. An epidemiological study suggested, that intake of two groups of polyphenols (stilbenes and flavonoids) was associated with lower obesity prevalence. Additionally, the impact of these groups on the human microbiome was reported [18]. A meta-analysis of clinical trials related to supplementation with polyphenols reported a moderate effect on psychomotor function. This influence seemed to be more probable in young and middle-aged adults, and the potential impact of bioavailability was also analyzed [9].

Data from animal studies have shown: (a) combinations of colonic metabolites of quercetin can have a more pronounced effect on arterial blood pressure in rats [19]; (b) the flavonol robinin only mildly improved the effect of methotrexate in an adjuvant-induced arthritis model in rats [24]; (c) the impact of a polyphenol-rich extract from *Aronia melanocarpa* (chokeberries) on liver collagen, matrix metalloproteinases, and their tissue inhibitors in rats chronically exposed to cadmium [15].

Two papers analyzed metabolic issues in vitro. Mohos et al. reported the important interactions of quercetin and its conjugates with several transporters, some of which were found even in sub-micromolar concentrations and with cytochrome P450 isoenzymes [17]. Lněničková et al. documented that some prenylflavonoids are able to mildly modulate mRNA expression and activity of drug-metabolizing enzymes even at a concentration of 1 µM [16]. The final paper in this Special Issue reported interactions of flavonolignans from silymarin and their sulfate conjugates with zinc ions as well as with zinc-containing alcohol dehydrogenase [25].

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