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Name	Ming-Hung Wong
University	Research Chair Professor of Environmental Science, Hong Kong Institute of Education, Hong Kong; Chang Jiang Chair Professor of Environmental Science (Ministry of Education, China), Jinan University, Guangzhou
Title	Environmental Geochemistry of Food Contaminants (DDT, PBDE and Hg), and Health Risk Assessments, with Emphasis on South China

The major purpose of this presentation is to review sources, fates and effects of some major persistent toxic substances, with a focus on food contaminants. Food safety is one of the current major public health issues in the world. There is a close relationship between soils, health and food safety. Soils have become contaminated due to over exploitation and misuse. Rapid industrialization and urbanization in developing countries have further accelerated the problem, threatening the ability of soils to meet safety standards, and jeopardize food production. Among all contaminants, it is commonly noted that heavy metals and persistent organic pollutants (POPs) are of particular concern, as they imposed health hazards (e.g., cancers with As and dioxins; neurological damage and lower IQ with Pb, As, and Hg; kidney diseases with Pb, Hg and Cd; skeletal and bone diseases with Pb, F, and Cd). However, there seems to be data gap concerning some emerging chemicals of concern, such as flame retardants (PBDEs), which has been recently added in the control list of Stockholm Convention on POPs. It is highly essential to understand (1) soil properties and functions, for better management of contaminants and would-be soil pollutants in the soil systems, with respect to food safety; and (2) the contaminant pathways (from soil to human body), and various factors in determining how much of a contaminant is available to the human body, and for transport in the vicinity. There are sufficient evidences demonstrating the decreasing trends of certain POPs (e.g., DDTs, PCBs, and PCDD/Fs) are linked with effective control. This presentation will high light some major issues, by citing some regional case studies, focusing on Hg, DDTs and PBDEs.

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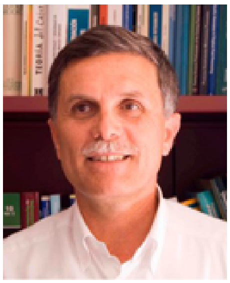

Name	Francisco A. Tomás Barberán
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Title	Interaction of dietary polyphenols with gut microbiota and effects on human health: Metabotypes, gut dysbiosis, and health status

Polyphenols present in the diet and their health effects have been the objective of active research over the last 25 years. The physiological relevance of the clinical trials has, however, being rather limited due to the large inter-individual variability observed. The absorption of these phytochemicals in the gastro-intestinal tract is limited and they reach the colon almost unaltered where they interact with the colon microbiota. The colon microorganisms have a two-way relationship with polyphenols, as these food constituents in one hand modulate the microbiota population, and on the other hand the microbiota transforms polyphenols producing metabolites that differ from the original dietary constituents. Dietary polyphenols activate the development of some bacterial groups while inhibit the growth of other. This can be associated with some health benefits. Colonic microbes can metabolize polyphenols leading to compounds that are better absorbed than the original compounds or show improved health effects. Therefore, depending on the composition of the gut microbiome, the bioavailability and biological effects of dietary polyphenols can be modulated. The identification of the bacteria responsible for the metabolic transformation of specific phenolics is an active area of research, and members of the Coriobacteriaceae and Lactobacilli and Bifidobacteria have been associated with specific metabolic transformations of polyphenols in the gut. The mechanisms through which these microbiota metabolites exert their biological effects are currently studied. This means that individuals can produce, absorb and excrete different polyphenol metabolites, and enjoy different biological effects due to polyphenols intake, depending on their microbiome, and this could partly explain the inter-individual variability observed in human intervention studies with polyphenols. This opens new opportunities for the development of drugs, nutraceuticals and functional foods. The discovery of the human enterotypes will eventually have future implications in the nutritional and medicinal plants treatments and in the development of specific drugs and food products for individuals with a specific enterotype within the field of personalized nutrition.

One excellent example of this is the gut microbiota metabolism of ellagitannins and ellagic acid to urolithins by species of *Gordonibacter*. Urolithins mainly exert anti-inflammatory and cancer chemopreventive activities in preclinical research. Interestingly, urolithins target malignant and normal colonic mucosa from colorectal cancer patients. Not all individuals produce the same amount and type of urolithins (metabotypes). Human subjects can be stratified into three urolithin-producing groups. Individuals belonging to the so-called 'Metabotype A' produced only urolithin A conjugates (around 67% of the subjects, range 25-80%). 'Metabotype B' produced isourolithin A and/or urolithin B plus urolithin A (24%, range 10-50%). In 'Metabotype 0' (13%, range 5-25), urolithins were not detected. These phenotypes were observed independently of the subjects' health status and characteristics (age, gender, BMI), and of the ellagitannin food source ingested (waltnus, pomegranates, strawberries, raspberries, etc.). Individuals belonging to Metabotype B usually present higher blood lipid levels than those from Metabotype A. Interestingly, a higher percentage of Metabotype B was observed in those subjects with chronic illness (metabolic syndrome or CRC) associated to gut microbial imbalance (dysbiosis) but also in overweight-obese individuals which was correlated to changes in gut microbiota. Our results nourish the hypothesis that links Metabotype B with gut dysbiosis. Whether Metabotype B could be a biomarker related to metabolic illness predisposition in overweight-obese healthy individuals and whether *Gordonibacter* could have a beneficial role in preventing chronic illness associated to obesity are under intensive research in our group.

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