

# speaking to

## Anna Rita Bilia



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By the editorial staff

*Natural 1 interviewed Professor Bilia, president of various international scientific associations that deal with research in the field of phytochemistry and phytonutrients to talk about the present and the opportunities that open up for the future*

I am in the last year of the second three-years term as a President of The **Italian Society of Phytochemistry and Sciences of Medicinal, Food and Fragrant Plants**, but still I am in the beginning of the second term of the Presidency of the **Society for Medicinal Plant and Natural Product Research (GA)**. This year I am participating to the Vitafood with a presentation “Reviewing how to best approach initial research on new botanical extracts” with special emphasis to the identification of functional extracts, the development of new technologies and how to explore the role of nanotechnologies in bioavailability of botanicals. New functional extracts can be selected from raw materials exploring the genetic variation, including under-utilised and unconventional plants or introducing genetic changes in common crops. The content of functional ingredients in raw materials and primary products can also be influenced by agricultural practices, biotechnological approaches (using enzymes and microorganisms) and separation processes, which led to refined products. Purification of components or fractions can be optimised using molecular separation technologies, like subcritical and supercritical extraction.

Nowadays, diverse modern approaches can be used to demonstrate the efficacy of the constituents of the selected extracts, namely their interaction with genes, a field called nutrigenomics, the integration of genomic science with nutrition. Although genes are critical for

determining function, nutrition modifies the extent to which different genes are expressed and thereby modulates whether individuals attain the potential established by their genetic background.

New proteomic and metabolomic methods are now emerging that offer exciting opportunities for identifying the multiple molecular targets for components of the extracts and thus for determining mechanisms by which they influence the quality of life. These opportunities will necessitate the characterization of phytochemical-gene-protein dynamics that requires the application of these new analytical technologies that enable scientists to more fully explore the regulation of RNA transcription (transcriptomics), the profile of proteins encoded by these genes (proteomics), and ultimately the metabolic consequences of such changes (metabolomics).

A further step is assessing stability and bioavailability of bioactive substances in botanical matrices. Processes such as coating, microencapsulation, emulsification, and more recently, nanocarriers may optimise absorption and bioavailability of the bioactives. In particular, nanocarrier systems such as micelles, vesicles, polymeric nanoparticles, solid lipid nanoparticles, nanosized emulsions have been successfully applied as promising delivery systems for many bioactive constituents and essential nutrients in order to improve their uptake, absorption, bioavailability and slow release compared to bulk equivalents.

*Dear Prof. Bilia, we know you are involved in a new scientific society, the Global Phytonutrient Society: can you report some detail concerning origin, purpose and history of society?*

The **Global Phytonutrient Society** (GPS, [www.globalphytonutrient.org](http://www.globalphytonutrient.org)) was formed in Tokyo in November, 2016. Founders include 12

leading scientists from around the world (Asia, EU, USA), chaired by Professor Teruo Miyazawa, Ph.D. (Tohoku University, Japan). Aims of the society include establishing research standards for phytonutrient studies and furthering scientific research on the usefulness of phytonutrients for health promotion. The GPS serves as a forum to bring together experts in the field of phytonutrient research and collaborate with government and scientific organizations to advance the understanding of phytonutrients' role in optimal health.

Despite government efforts over the past several decades to increase the public's consumption of fruits and vegetables, diets still fall short of recommended servings, leaving a substantial gap in desirable or optimal levels of some or even most phytonutrients.

#### **What are phytonutrients?**

Phytonutrients are constituents naturally present in fruits, vegetables, grains, legumes, nuts and teas and other edible plants. Unlike the classic micro and macronutrients

(protein, fat, carbohydrates, vitamins, minerals), phytonutrients are not "essential" for life, but can confer health properties to food. Some are widely distributed in a range of plants, while others are specific to a botanical family, genus or species. Among the most well-known are the carotenoids (alpha-carotene, beta-carotene, beta-cryptoxanthin, lutein/zeaxanthin, lycopene), present in many fruits and some coloured vegetables (carrots, tomatoes), flavonoids (anthocyanidins from blueberries and other berries, epigallocatechin 3-gallate or "EGCG" from green tea, hesperetin from Citrus species and quercetin derivatives in onions), isoflavones from soy, phenolics (ellagic acid from pomegranates, resveratrol from peanuts, curcuminoids from Curcuma species), isothiocyanates (Brassicaceae species), and allicin (Allium species, such as garlic). Emerging evidence suggests these substances may play a role in prevention of many chronic diseases because of their specific antioxidant and anti-inflammatory activities.

Phytonutrients may also enhance immunity

and intercellular communication, repair DNA damage and protect the human health.

#### **What are the present and future goals of GPS?**

A diverse array of projects are now under consideration. An area of strong interest is the scientific basis for recommended intakes or dietary guidance for phytonutrients. This topic has received substantial attention by many stakeholders in the nutrition community for over 10 years. However, little progress has been made in developing or proposing a scientific framework on which to base recommendations. While some authoritative groups have proposed recommended intakes for select phytonutrients, details on the scientific approach used to arrive at these values are not clear or well established. A key challenge is the lack of a set of standards focused on how to appropriately conduct and interpret phytonutrient studies both in vitro and in humans. Establishing suitable guidelines will represent one of the first important goals of GPS in the near future.

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di Patrizia Zampiero

Oppure  
vieni a trovarci in  
Via Newton, 11 PERO (MI)

Tu pensi al contenuto,  
NOI PENSIAMO AL CONTENITORE!!!