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*Commentary*

# Functional foods: A market potential in need of evidence

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It is common practice for modern day individuals to consume a less-than-optimal which, combined with less-than-optimal lifestyles, and has led to an increase in the incidence of serious metabolic imbalances. These in turn augment the likelihood of developing chronic conditions including obesity, type 2 diabetes, hypertension, food allergies and intolerances, and gastrointestinal and inflammatory disorders.

Eating well is vital for health, optimal growth and development, and for the avoidance of disease (Liang et al., 2005). It is now widely accepted that nutrients, in addition to other compounds found in a diversity of foods, not only help meet energy requirements but also play a key role in health promotion and metabolic homeostasis. Still, because of the large degree of variation in human genetics and socio-cultural practices, there is still no optimal diet to fit everyone. For this reason, it is so important for food and nutrition scientists to determine the relationship between an individual's metabolome and their food selection.

Because of its role as the link between what is eaten and the reactions that take place in the body, the GI tract is a preferred target for functional foods. Key physiological processes related to digestion and metabolism that can be altered by modifying eating practices include:

- Satiation
- Macronutrient breakdown rate and extent
- Nutrient absorption
- Metabolic rate
- Gastrointestinal microbiota composition
- Internal pH levels
- Composition and working conditions of the mucosa
- Bowel movements
- Immune system.

Resent research has identified several large non-nutrient molecules in food. Among these we find secondary plant metabolites that seem to have a defence function, but which have not till date been considered essential nutrients. Until recently, these secondary metabolites (phytochemicals) were mostly ignored due partially to a lack of identification methods and strong evidential studies. Today, their possible metabolic effects are much more largely appreciated for their potential role of disease prevention and health optimization.

As perhaps the best know example there are flavones. These phytochemicals have been found to protect against heart disease and other inflammation-related conditions. The biological activity of numerous non-nutrient compounds in foods including red wine, coffee, fish, fruits and vegetables are been looked into to establish their effects on human biochemistry and metabolism as well as to pinpoint those with potential health benefits.

Probiotics are perhaps the best well-known category of functional foods. Scientist initially observed marked differences in the microbiota of the gastrointestinal tracts of healthy versus diseased individuals. The microbiota found in the healthy individuals was termed probiotic. While several different strains have now been identified, most probiotics fall into the group of organisms known as lactic acid producing bacteria. These are most often consumed in the form of yogurt, fermented milks, or other fermented foods. Many companies in the functional food world begin with a probiotic product and diversify from there. Likewise, traditional cuisine and medicinal practices have made ample use of fermented food products favouring the microbiota through probiotics.

An accurate understanding of the processes of digestion and absorption are key to understanding how functional foods may affect human health. While the human gastrointestinal tract is indeed an absorption system, it is widely selective and precise. It is also one of the most important feedback systems responsible for significant information exchange

within the body. The gut acts as a translator of signals, a neuroendocrinology sensor, and a recognition system for immunity. The biological activity of current and future functional foods work because of the effects on such systems. For these reasons, the understanding of how food works in the body is extremely complex.

Any potential health outcomes of functional foods require comprehensive scientific evidence. However, there is currently no consensus as to what constitutes “emerging evidence” and “significant scientific agreement.” Hence, to reach a point of achieving comprehensive scientific evidence requires effort. This includes having a body of consistent, relevant evidence from well-designed clinical, epidemiologic and laboratory studies that support health outcomes deriving from the implementation of functional foods. Sadly, too often the basis for marketing some functional foods or their components rely only on “emerging evidence”.

Key opportunities for the development of functional foods require a combination of market readiness, the scientific evidence to validate suggested benefits, a regulatory body, and the technical tools to develop and commercialise the product. The challenge stands on developing actual synergies between science, technology and food product development for the benefit of the consumer.