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Functional foods and bioactive molecules with relevance to health and chronic disease

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EDITORIAL

In recent years, food scientists have published several articles which state how functional foods contain known, effective biologically-active compounds [1]. Some of these biologically-active, non-toxic compounds have advantageous physiological effects [1] and could play an important role in current global chronic disease epidemics. Functional food science [2] has become essential to the treatment strategies for various diseases, such as obesity, diabetes, and neurodegenerative diseases (Parkinson's disease and Alzheimer's disease) [3]. These diseases have significantly increased in this century. For example, the incidence of diabetes has been predicted to increase to 21% and non-alcoholic fatty liver disease (NAFLD) to 40% of the global population by 2050.

Nutritional science provides functional foods with the required amount of natural antioxidants, vitamins, fats, proteins, carbohydrates, and other components required to maintain the immune system and for the survival of cells [4-6]. The majority of health benefits and physiological activities attributed to various functional foods and nutrients such as polyphenols which are important for brain health [7-9] require more scientific research to understand the role of caffeine as a dietary supplement [10, 11]. Defective caffeine metabolism [12-14] with relevance to the global NAFLD epidemic is linked to the defective adipose tissue-liver cross talk [15] and brain interaction (Figure 1). Furthermore, caffeine may interfere with novel functional food therapy [1-4] with relevance to brain function and the adipose tissue crosstalk [16, 17].

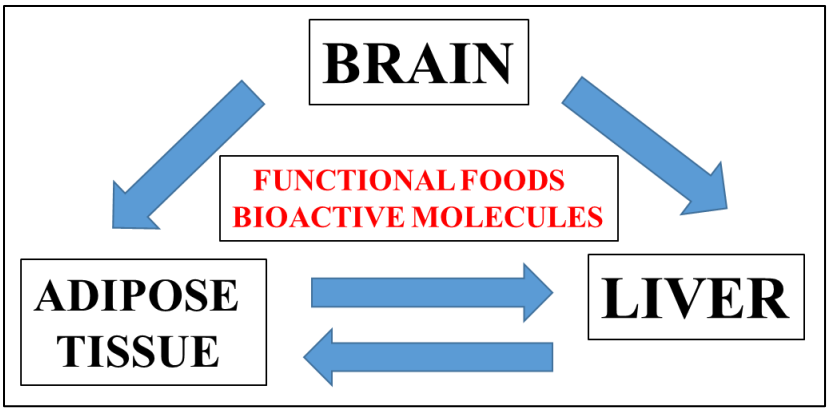

Figure 1. The use of functional foods and bioactive molecules to maintain connections between the brain and the adipose tissue-liver crosstalk has accelerated with relevance to the global NAFLD and diabetes epidemic. Nutritional science has become important to the brain and liver function with caffeine metabolism important to the function of bioactive molecules with relevance to the global NAFLD and diabetes epidemic.

Appetite control [18] with nutritional therapy has become of central importance, as early nutritional therapy that may assist to delay mitochondrial apoptosis connected to liver and brain disease (Figure 1) associated with diabetes and aging. A high fibre diet [19] that is low in fat and improves glucose regulation [20] activates the calorie sensitive gene Sirtuin 1 (Sirt 1) that is a NAD(+) dependent class III histone deacetylase protein linked to various chronic diseases [21]. Consequently, major unsolved challenges to advances in biology may now provide evidence to reverse Sirt 1 dysfunction which is connected primarily to mitochondrial apoptosis [22, 23]. Consumption of Sirt 1 activators [12] are essential to maintain Sirt 1 function in various tissues and to prevent Sirt 1 inhibitors such as food bacterial lipopolysaccharides that are associated with programmed cell death [24-28]. Novel and critical elements of scholarly peer review provide information of how the Sirt 1 is the heat shock gene and its repression is relevant to mitochondrial apoptosis in multiple organ disease syndrome, diabetes, and neurodegenerative diseases [21].

Biological active compounds/functional foods are essential to restore mitochondrial function [29] in the treatment of health and chronic disease strategies. Over-nutrition, defective caffeine metabolism, and food quality induces Sirt 1 repression [24-28] and overrides the beneficial effects of biological active food components [1, 3, 5, 29] that are essential in the treatment of global chronic disease (Figure 1).

List of Abbreviations: NAFLD, non-alcoholic fatty liver disease; Sirt 1, Sirtuin 1.

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