ECRONICON OPEN ACCESS

EC NUTRITION
Editorial

Food Components Able to Increase Energy Expenditure

Wenbiao Wu*

College of Food Science, Southwest University, No.2 Tian Shengqiao, Beibei, Chongqing, China

***Corresponding Author:** Wenbiao Wu, College of Food Science, Southwest University, No. 2 Tian Shengqiao, Beibei, Chongqing, China.

Received: September 11, 2021; **Published:** October 18, 2021

In 2020, numbers of obese or overweight children with their age less than 5 years and adults were about 39,000,000 and 19,000,000, respectively while over 650 million adults in the world in 2016 were obese [1]. Increases in global prevalence of obesity is still continuing [2,3].

Obesity is generally considered to be the risk factor of such chronic diseases as cardiovascular disorders or diabetes, cancer, polycystic ovary syndrome, osteoarthritis, non-alcoholic fatty liver disease, asthma and obstructive sleep apnoea [4-6]. Obesity and overweight in the fifth rank in terms of causing global deaths among the leading risk factors [7]. Obesity and overweight are associated with at least 2.8 million annual adult deaths and burdens of 7% - 41% of certain cancer, 23% ischaemic heart diseases and 44% of diabetes [7,8]. Thus, obesity treatment or prevention is urgently demanded.

Many compounds in or isolated from foods or food materials have been found to increase energy expenditure for managing body weight or antiobesity. In summary, some monosaccharides, proteins, lipids, fatty acids, terpenoids alkaloids, phenolic compounds (such as resveratrol [9] and oxyresveratrol [9]) and minerals have the capacity of increasing energy expenditure. In addition, some mixtures from food materials can also elevate energy expenditure, such as dietary *Sparassis crispa* [10]. Physiological activities, such as basal metabolism (e.g. maintaining body temperature, heart beat) and adaptive thermogenesis (e.g. for digestion, nutrient absorption) should be associated with energy expenditure.

The mechanism of increasing energy expenditure may be associated with the activation of white adipocytes browning, via upregulation of the uncoupling protein 1, or lipogenesis may be associated with the mechanism of elevating energy expenditure (See figure 1). Increases in sympathetic nerve, hyperthyroidism and hyperadiponectinemia, may cause the elevation of basal metabolism. Increases in energy expenditure may also be caused by up-regulating glucagon and β-adrenergic receptors.

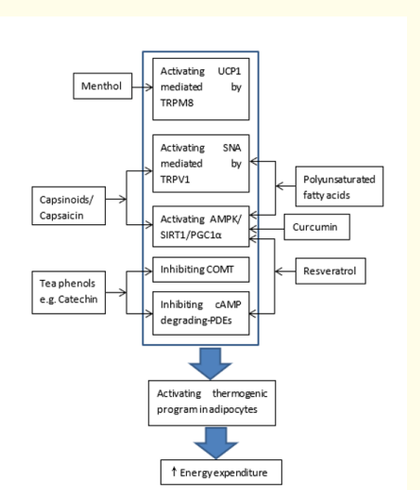

Figure 1: *One of proposed mechanism associated with brown adipose tissue activation or white adipose tissue browning by the stimulation of some compounds from foods. PDEs- Phosphodiesterases; COMT- Catechol-O-methyl-transferase cAMP (cyclic adenosine monophosphate); PGC-1α- Peroxisome proliferator-activated receptor gamma coactivator 1-alpha; SIRT1- Sirtuin-1; AMPK- Adenosine monophosphate-activated protein kinase; SNA- Sympathetic nerve activity; TRPV1- Transient receptor potential vanilloid 1; UCP1- Uncoupling protein 1.*

Bibliography

1. WHO. "Obesity and overweight".
2. Kushner RF and Kahan S. "Introduction: The State of Obesity in 2017". *Medical Clinics of North America* 102 (2018): 1-11.
3. Blüher M. "Obesity: global epidemiology and pathogenesis". *Nature Reviews Endocrinology* 15 (2019): 288-298.
4. NCD Risk Factor Collaboration. "Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128•9 million children, adolescents, and adults". *Lancet* 390 (2017): 2627-2642.
5. Wu WB. "Dietary risk factors of cardiovascular diseases". Nova Science Publishers, New York (2015).
6. Gade W., *et al.* "Beyond obesity: the diagnosis and pathophysiology of metabolic syndrome". *Clinical Laboratory Science Journal* 23 (2010): 51-61.
7. WHO. "Fact sheet No.311: obesity and overweight".
8. Springer M and Moco S. "Resveratrol and its human metabolites—effects on metabolic health and obesity". *Nutrients* 11.1 (2019): 143.
9. Choi JH., *et al.* "Oxyresveratrol increases energy expenditure through Foxo3a-mediated Ucp1 induction in high-fat-diet-induced obese mice". *International Journal of Molecular Sciences* 20 (2019): 26.
10. Takeyama A, *et al.* "Dietary Sparassis crispa reduces body fat mass and hepatic lipid levels by enhancing energy expenditure and suppressing lipogenesis in rats". *Journal of Oleo Science* 67.9 (2018): 1137-1147.

Volume 16 Issue 11 November 2021