

飲食與健康 ~ 功效及分子機制

張素瓊^{1,*}、詹吟菁²、劉宏文³、張雲晶⁴、吳淑靜⁵

摘要

飲食對人體的健康無比重要，除了提供有益健康必需營養素之外，許多食品中的植化素為具有生理活性的成分，對健康有顯著的助益。食物中的機能性成分與基因的交互作用，直接影響到人體健康與疾病風險，如維生素 E 的活性形式 -Alpha 生育醇，具有抑制血小板凝集 (platelet aggregation, PA) 的作用，可減少血管栓塞的發生，維生素 B-6 也呈現抗血小板凝集作用，可維持內皮細胞的結構與功能。近年來研究顯示，植化素在許多動物細胞組織也展現分子調節作用，可促進健康與預防生理失調。本文回顧富含植化素的保健作物與成分，闡明其作用之分子機制與功效，包括山藥 (*Dioscorea alata*)、香椿 (*Toona sinensis* Roem (TS))、兒茶素 (-)-Epigallocatechin-3-gallate (EGCG)、荔枝寡酚 (Oligonol®，荔枝萃取之低分子量多酚)、ETAS® (蘆筍莖之標準化萃取成分) 等，這些食物成分具有特定的保健功效，例如改善胰島素阻抗、糖尿病及肥胖；減少發炎與氧化壓力並改善男性生殖功能障礙；可減少腦部澱粉樣蛋白堆積、延緩認知功能障礙、調節晝夜節律及預防肌少症發生等，此外，稻米是全球最普遍的主食，有色米如黑米、紫米等除了提供營養素之外，也含有豐富的植化素，是極具保健潛力的食物。本文將回顧不同機能食品與素材在抗代謝症候群與抗老化相關疾病的效果與作用機制。

關鍵詞：植化素、荔枝寡酚、蘆筍萃取、黑米、胰島素阻抗、肌少症、認知功能、抗肥胖、抗糖尿病

¹ 成功大學生命科學系

² 靜宜大學食品營養系

³ 臺灣師範大學體育與運動科學系

⁴ 義守大學醫學院

⁵ 嘉南藥理科技大學保健營養系

* 通訊作者：sjchang@mail.ncku.edu.tw; Tel.: +886-6-2757575 ext.58131

Diet and Health - functions and molecular mechanisms

Sue-Joan Chang^{1,*}, Yin-Ching Chan², Hung-Wen Liu³, Yun-Chin Chang⁴
and Shu-Jing Wu⁵

Abstract:

Diet has an enormous impact on our health. Beyond the nutrients that are essential for health, phytochemicals in foods are physiologically active compounds and provide significant health benefits. Interaction between our genes and food compounds directly affect our health and disease risk. Alpha-tocopherol, the active form of vitamin E, has been found to inhibit platelet aggregation (PA), contributing to decreased thrombosis. Vitamin B-6 exhibits anti-PA and maintains the function and ultrastructure of endothelial cells. Recently, phytochemicals have been shown as molecular modulators in many tissues to promote health and prevent disorders. Here, the efficacies and the molecular mechanisms of phytochemicals-rich Chinese Yam (*Dioscorea alata*), Toona sinensis Roem (TS), (-)-Epigallocatechin-3-gallate (EGCG), Oligonol[®] (a low molecular weight polyphenol derived from lychee) and ETAS[®] (a standardized extract of *Asparagus officinalis* stem) on attenuating insulin resistance, diabetes, obesity, sarcopenia, cognitive impairment, amyloid deposition, circadian rhythm disorders, inflammation, oxidative stress and male reproductive dysfunction will be presented. Rice (*Oryza sativa* L.) is a popular staple food consumed worldwide. Different pigmented rice cultivars, including black rice (BR), red rice, and brown rice are considered as the potential health-enhancing functional foods because of their good source of nutrients and high contents in phytochemicals. In this review, the anti-obesity and anti-diabetic effects of BR and the underlying mechanisms will be discussed.

Keywords: Phytochemicals, Oligonol[®], ETAS[®], black rice, insulin resistance, sarcopenia, Cognitive Impairment, anti-obesity, anti-diabetes

¹ Department of Life Sciences, National Cheng Kung University, Tainan; sjchang@mail.ncku.edu.tw

² Department of Food and Nutrition, Providence University, Taichung; ychan@pu.edu.tw

³ Department of Physical Education, National Taiwan Normal University, Taipei; hwliu@ntnu.edu.tw

⁴ School of Medicine, I-Shou University, Kaohsiung; viyanchang@gmail.com

⁵ Department of Nutritional Health, Chia-Nan University of Pharmacy and Science, Tainan; wsj268@mail.cnu.edu.tw

* Correspondence: sjchang@mail.ncku.edu.tw; Tel.: +886-6-2757575 ext. 58131