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Mini Review **Open Access**

Bioactive Food Components and Metabolic Syndrome

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The rapid increase in prevalence of metabolic syndrome, which is associated with a state of elevated systemic oxidative stress, is projected to cause future increases in the prevalence of diabetes and cardiovascular diseases. Oxidation of polyunsaturated fatty acids and sugars produces reactive carbonyl species, which, due to their electrophilic nature, react with nucleophilic sites of certain amino acids leading to formation of protein adducts such as advanced glycation/lipoxidation end products (AGEs/ AGEs) resulted in cellular dysfunction. Therefore, an effective reactive carbonyl species and AGEs/ALEs sequestering agent can prevent such cellular dysfunction. We have demonstrated that the dietary histidine-dipeptides are effective sequester of cytotoxic carbonyls and prevent various metabolic risk factors in animal model. In addition, bioactive components in plant foods such as carotenoids, tocopherols and oryzanols have been continuously studied for their biological functions against oxidative damage and progression of metabolic syndrome in our laboratory. Identification and characterization of bioactive components in plant foods using state-of-the-art techniques will be introduced. Further, dietary defense strategies against progression of metabolic syndrome utilizing these bioactive food components and their action mechanisms will be discussed.
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Widespread consumer use and the potential role of bioactive components in foods and supplements in health promotion and disease prevention are of public health interest. The Office of Disease Prevention and Health Promotion (ODPHP), Office of Public Health and Science, Department of Health and Human Services (HHS), acting on behalf of an ad hoc Federal working group have undertaken the tasks of defining bioactive components and exploring approaches to evaluating their significance in health promotion and disease prevention. The ad hoc Federal working group includes representatives from HHS, The Department of Defense (DoD), and U.S. Department of Agriculture (USDA), and agencies within these departments, such as the National Institutes of Health (NIH), Centers for Disease Control and Prevention (CDC), and The Food and Drug Administration (FDA).The goal of this cross-agency effort is to stimulate discussion and research.

An important aspect to food security is ensuring that food is of sufficient nutritive value to ensure health. Many plant-based foods contain compounds that may have specific functions within our bodies that maintain health or prevent disease. We focus on a number of bioactive compounds that have to varying degrees been associated with health benefits, in particular in relation to cardiovascular disease and other chronic diseases. These are flavonoids, glucosinolates and long chain n-3 PUFAs and isoprenoids.

The ‘Food Bioactives’ research theme seeks to understand how certain bioactive compounds in foods can help keep us healthy.

Improve our understanding of how bioactive compounds work – how they are taken up by the body and how they modify processes in the body.Gather the knowledge to deliver dietary evidence to improve public health and investigate ways of developing crops or processed foods with enhanced nutritive value.

By improving our understanding of exactly how certain bioactive compounds in foods can help keep us healthy we can underpin nationwide health policy, ensuring it is based on the latest and best available science. It will also help in the production of new foods or products optimised for the delivery of these nutrients, backed by robust health claims..