

## Complimentary Use of Antioxidant Dietary Factor is Promised in Cancer Treatment

## Tetsuya Konishi\*

Niigata University of Pharmacy & Applied Life Sciences (NUPALS), Higashijima 265-1, Niigata 956-8603, Japan

In the longevity society, maintaining Quality Of Life (QOL) is a social concern. Thus, the prevention and amelioration of age-related complex diseases is an important focus in health science research because these disorders, including cancer, diabetes and dementia, are the major cause of QOL reduction. Because Reactive Oxygen Species (ROS) are implicated in the pathogenesis of a wide variety of human diseases, antioxidant protection is implicated as a basic strategy of disease prevention and anti-aging [1]. In this sense, food function attracts much attention because foods are the major source of antioxidants, such as polyphenols [2]. It is now known antioxidant food factors, also can modulate cellular signaling molecules, typically transcription factors, either directly or through thiol-based cellular redox modulation to control cell physiology [3,4]. Moreover, epigenetic modulation of gene expression is also the target of food factors [5]. Therefore, antioxidants are not only free radical/oxidant scavengers, but they are also pharmacological molecules which function is mediated by direct binding to the target molecule like drug receptor (Figure 1), indicating that the mode of action of antioxidant molecules is variable depending on the oxidative stress level of the host or patient. Therefore more knowledge about the mechanism of action of antioxidant food ingredients at molecular and animal levels should be acquired before applying the strategy to humans although an antioxidant strategy is promising.

This basic property of antioxidant molecules partly explain alternate functional characteristics of foods or food factors such that foods and food factor functions is implicated as multi-targeted with multiple functions, and the functions are probably associated with the basic chemical properties of antioxidant molecules, as described above. A remaining question exists regarding the essential difference in the action between dietary molecules and drugs. The present trend of food factor research and its application follows the same methodology as drug development because it is based on the drug/ receptor interaction. However, other modes of food factor functions should also be investigated. Several natural products enhance cancer cell toxicity when used in combination with anticancer modalities [6]. For instance, Schisandrin B (Sch B), a lignan isolated from Fructus Schisandrachinensis, enhances cancer cell death when the cell is exposed to radiation and anticancer drug [7]. Sch B is non toxic toward the cells under normal conditions, moreover it protects cells against oxidative



damage [7]. However, it becomes active to the cells which cellular DNA is damaged by such modalities because it reacts to a specific kinase induced to repair the DNA damage [8]. This type of a sequential or stepwise mechanism may be one of the characteristic properties of dietary factors functioning in disease and cancer prevention.

Considering the functional characteristics of food factors discussed above, the health-beneficial use of food functions can be simplified into two categories. One contains food used for disease prevention and ameliorating QOL where safety is the essential requirement. Another category contains food for complementary use as an adjuvant in western medicine treatment where the mechanism of action and effective dose of the active ingredient has to be defined and medicinal consulting is required for the use.

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\*Corresponding author: Tetsuya Konishi, Niigata University of Pharmacy & Applied Life Sciences (NUPALS), Higashijima 265-1, Niigata 956-8603, Japan, E-mail: konishi@nupals.ac.jp

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