Protocatechuic acid and human disease prevention: biological activities and molecular mechanisms.

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Abstract

Epidemiological evidence has shown that a high dietary intake of vegetables and fruit rich in polyphenols is associated with a reduction of cancer incidence and mortality from coronary heart disease. The healthy effects associated with polyphenol consumption have made the study of the mechanisms of action a matter of great importance. In particular, the hydroxybenzoic acid protocatechuic acid (PCA) has been eliciting a growing interest for several reasons. Firstly, PCA is one of the main metabolites of complex polyphenols such as anthocyanins and procyanidins that are normally found at high concentrations in vegetables and fruit, and are absorbed by animals and humans. Since the daily intake of anthocyanins has been estimated to be much higher than that of other polyphenols, the nutritional value of PCA is increasingly recognized. Secondly, a growing body of evidence supports the concept that PCA can exert a variety of biological effects by acting on different molecular targets. It has been shown that PCA possesses antioxidant, anti-inflammatory as well as antihyperglycemic and neuroprotective activities. Furthermore, PCA seems to have chemopreventive potential because it inhibits the in vitro chemical carcinogenesis and exerts pro-apoptotic and anti-proliferative effects in different tissues. This review is aimed at providing an updated and comprehensive report on PCA giving a special emphasis on its biological activities and the molecular mechanisms of action most likely responsible for a beneficial role in human disease prevention.

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