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Cocoa: antioxidant and immunomodulator.

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Abstract

Cocoa, a product consumed since 600 BC, is now a subject of increasing interest because of its antioxidant properties, which are mainly attributed to the content of flavonoids such as (-)-epicatechin, catechin and procyanidins. Moreover, recent findings suggest a regulatory effect of cocoa on the immune cells implicated in innate and acquired immunity. Cocoa exerts regulatory activity on the secretion of inflammatory mediators from macrophages and other leucocytes in vitro. In addition, emerging data from in vivo studies support an immunomodulating effect. Long-term cocoa intake in rats affects both intestinal and systemic immune function. Studies in this line suggest that high-dose cocoa intake in young rats favours the T helper 1 (Th1) response and increases intestinal gammadelta T lymphocyte count, whereas the antibody-secreting response decreases. The mechanisms involved in this activity are uncertain; nonetheless, because redox-sensitive pathways control immune cell function, the action of cocoa flavonoids on modulating cell signalling and gene expression deserves investigation.

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