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## Evaluation of plant phenolic compounds as anti-inflammatory agents

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### Objectives

Flavonoids constitute a group of natural polyphenols that occur widely in fruits, vegetables, wine and tea. The average daily intakes of flavonoids and similar polyphenols are known to exceed that of antioxidative vitamins and provitamins. Epidemiological studies have shown that the increased intake of flavonoids is associated with the reduced risk of many chronic diseases. The presumed beneficial effects of flavonoids are mainly ascribed to their inherent capacity to scavenge reactive oxygen and nitrogen species, thus counteracting conditions of oxidative stress that accompany disorders such as inflammatory diseases including cancer. TNF- and IL-6 are major proinflammatory cytokines, which is involved in the production of toxic nitric oxide and PGE<sub>2</sub>, an inflammatory eicosanoid.

### Materials and Methods

In this study, we attempted to identify potent anti-inflammatory flavonoids using murine macrophages which the best example to study the regulation of NO, PGE<sub>2</sub>, TNF- $\alpha$ , and IL-6 production. RAW 264.7 cells were stimulated with LPS and incubated for 24 hrs in the presence of one of the following phenolics at concentrations of 0.1, 1 and 10 $\mu$ M: quercetin(QU), kaempferol(KA), hesperidine(HE), delphinidin(DE), cyanidin(CY), pelargonidin(PE), piceatannol(PI), chlorogenic acid(CH), carnosic acid(CA), cinnamic acid(CI), luteolin(LU), apigenin (AP), catechin(CT), EGCG (EC), indole-3-carbinol(IC), eugenol (EU). The concentrations of total nitrite, PGE<sub>2</sub>, TNF- and IL-6 in culture medium were measured by enzyme linked immunoassay assay.

### Results and Discussion

Results showed that CA significantly inhibited production of all of the inflammation markers used. AP significantly decreased the production of IL-6, NO, and PGE<sub>2</sub>. EU decreased the concentration of both cytokines and PGE<sub>2</sub>. KA, LU, and PT significantly inhibited the production of PGE<sub>2</sub> and IL-6, NO and PGE<sub>2</sub>, NO and IL-6, respectively. On the basis of possible daily intake, apigenin is rated as the most important dietary anti-inflammatory agent.

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