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Anti-inflammatory effect of Korean propolis in LPS-induced RAW 264.7 macrophages

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Propolis has been used as natural remedies in folk medicine and therapies since ancient times. It has various pharmacological potentials and biological activities including antibacterial, antioxidant, and anticancer properties. In this study, we investigated the effect of propolis extracts (PE), collected from 6 different geographic regions of Korea, on the inflammatory response in RAW 264.7 macrophage cells stimulated with lipopolysaccharide (LPS). The Propolis samples from 6 different regions (P1: Uijeongbu, P2: Ansan, P3: Hongcheon, P4: Iksan, P5: Gwangju, and P6: Sangju) were collected, and extracted with ethanol. All PE samples dose-dependently inhibited production of nitric oxide (NO) and prostaglandin E2 (PGE2), which have been implicated in the process of inflammation and the multiple stages of carcinogenesis. Suppressing of these major inflammatory mediators was caused by reduction of LPS-induced overexpression of inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) by PE treatment. In addition, we evaluated the acute anti-inflammatory effect of Korean propolis in animal model. Pretreatment with PE samples inhibited ear edema induced with topical application of 12-O-tetradecanoylphorbol-13-acetate (TPA) in ICR mice. In these results of both *in vitro* and *in vivo* studies, anti-inflammatory effects of propolis were no significant differences in each region in Korea. Taken together, Korean propolis has benefits in protecting against inflammatory reactions, and this property may contribute to its chemopreventive potential.

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