Phosphatidylserine inhibits inflammatory responses in interleukin-1β-stimulated fibroblast-like synoviocytes and alleviates carrageenan-induced arthritis in rat.

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OBJECTIVE: Recently, phosphatidylserine (PS) has received attention for its anti-inflammatory effect; however, the molecular mechanisms of its action have not been fully understood. Thus, we hypothesized that PS might have antiarthritic and anti-inflammatory effects.

METHODS: To test this hypothesis, the in vitro anti-inflammatory effect of soybean-derived PS was tested on interleukin (IL)-1β-stimulated fibroblast-like synoviocytes from rheumatoid arthritis patients (RA-FLS) by measuring the levels of IL-6, IL-8, prostaglandin E2, and vascular endothelial growth factor by enzyme-linked immunosorbent assay. The analgesic and antiarthritic activities of PS were investigated in rat models of carrageenan-induced acute paw pain and arthritis. The former was evaluated with a paw pressure test; the latter, by measuring paw volume and weight distribution ratio. In addition, the participation of mitogen-activated protein kinase signaling in the anti-inflammatory and antiarthritic effects of PS was investigated in RA-FLS.

RESULTS: Phosphatidylserine inhibited the production of inflammatory mediators IL-6; IL-8; vascular endothelial growth factor; and, in particular, prostaglandin E2 in IL-1β-stimulated RA-FLS. These effects were associated with abrogation of inhibitor of nuclear factor-κB phosphorylation and suppression of p38 and c-jun amino terminal kinase but not extracellular signal-regulated kinase 1/2 phosphorylation. In rats, PS also showed a significant inhibitory effect on arthritic and nociceptive symptoms induced by carrageenan.

CONCLUSION: These findings suggest that PS has anti-inflammatory and antiarthritic effects in vitro and in vivo animal models; thus, PS should be further studied to determine its potential use as either a pharmaceutical or dietary supplement for alleviating arthritic symptoms.

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