

51. Intake of Dissolved Organic Matter from Deep Seawater inhibits Cyclooxygenase-1 activity, P-selectin Expression and thereby suppresses Atherosclerosis Progression

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Background: Expression of P-selectin and increased cyclooxygenase-1 (COX-1) activity plays a major role in platelet-endothelium interactions during atherosclerosis. Dissolved organic matter (DOM) in seawater can be defined as the fraction of organic matter that passes through a filter of sub micron pore size. In this study, we examine the effect of DOM of deep seawater (DSW) from Pacific Ocean on platelet aggregation and atherosclerosis progression.

Study Design: DSW was passed through a series of filters and then through an Octadecyl C18 filter; the retained substance in ethanol was designated as C18 extractable DOM (C18-DOM). Platelet aggregation analysis was performed in rabbit plasma. P-selectin expression was examined by flow cytometry. The activity of COX-1 was evaluated by ELISA method. Heme oxygenase-1 was quantitatively measured by western blot. Rabbits whose right common carotid artery (RCCA) had been balloon injured were fed a high cholesterol diet (1%) with or without C18-DOM for 4 weeks and after sacrifice neointimal thickness was evaluated in RCCA sections.

Results: Our studies showed that C18-DOM treatment inhibited platelet aggregation, P-selectin expression and activity of COX-1 significantly ($p < 0.05$). C18-DOM increased the expression of anti-atherogenic molecule namely heme oxygenase-1 (HO-1) in endothelial cells and all these data showed that C18-DOM is exhibiting aspirin-like effects. Moreover our *in vivo* studies showed that C18-DOM feeding slowed remarkably the progression of atherosclerosis ($p < 0.05$).

Conclusions: Our study demonstrated a novel biological effect of oceanic DOM, which has several important implications, including a possible therapeutic strategy for atherosclerosis.