P.3   Effects of deep sea water on cholesterol metabolism

Kyu-Shik Lee, So Young Chun, Yun-Suk Kwon, Soyoung Kim,
○Kyung-Soo Nam

（Department of Pharmacology, School of Medicine, Dongguk University）

Abstract

High-fat/high-cholesterol diet is the major cause of metabolic diseases, such as obesity and diabetes, vascular diseases, including hypertension, stroke, and arteriosclerosis, and liver diseases, involving fatty liver and cirrhosis. In this investigation, we evaluated effect of deep sea water (DSW) in rat model fed a high-cholesterol diet and HepG2 hepatic cells. DSW decreased total cholesterol (TC), LDL-cholesterol (LDL-c) and total triglyceride in blood increased by high cholesterol-diet but recovered HDL-cholesterol (HDL-c). Additionally, we observed lower lipid droplet in rat liver fed a high cholesterol-diet with hardness 1500 DSW. In semi-quantitative RT-PCR, mRNA expression levels of fatty acid synthase (FAS), peroxisome proliferator-activated receptor gamma (PPARγ), sterol regulatory element-binging protein-1c (SREBP-1c) and tumor necrosis factor-alpha (TNF-α) in rat group fed a high cholesterol-diet with DSW were lower than their of high cholesterol-diet only group. Furthermore, DSW enhanced LDL receptor (LDLR) mRNA expression by DSW in a hardness-dependent manner in quantitative RT-PCR. Also, we confirmed the increase of LDLR mRNA expression and slightly suppression of 3-hydroxyl-3-methylglutaryl-coenzyme A reductase (HMGCR) transcription by DSW in HepG2 hepatic cells. Taken together, our data show that DSW may improve high-fat/high-cholesterol diet-induced increases of lipid in blood and liver, suggesting that DSW has protective potential in hyperlipidemia and non-alcoholic fatty acid. Moreover, this investigation demonstrated that down-regulation of lipid content in blood and fatty liver by DSW are mediated by enhancement of LDLR expression and suppression of FAS and its transcription factors expression.