

P 1 . Preventive effects of mineral-balanced deep sea water on cholesterol accumulation in HepG2 hepatic cells

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Abstract

Beneficial effects of deep sea water (DSW) in lipid metabolism were shown by several investigations. Here, we showed effects of mineral-balanced DSW [Mg:Ca = 3:1] on cholesterol metabolism induced by high glucose in HepG2 hepatic cell. And, effects of hardness 1,500 high magnesium DSW [Mg:Ca = 40:1] (Mg40) were also investigated. Mineral-balanced DSW prevented the increase of total cholesterol level in high glucose-treated HepG2 hepatic cell. However, Mg40 was not affected cholesterol accumulation in high glucose-treated HepG2 hepatic cell. The hypocholesterolemic effect of mineral balanced-DSW was closely related to down-regulation of 3-hydroxy-3-methylglutaryl-CoA reductase (HMGCR) expression and the increase of AMP-activated protein kinase (AMPK) phosphorylation, leading to the decrease of cholesterol synthesis in high glucose-treated HepG2 hepatic cell. Also, mineral balanced-DSW enhanced low-density lipoprotein receptor (LDLR) transcription and inhibited proprotein convertase subtilisin/kexin

type 9 (PCSK-9) gene expression, implicating that hypocholesterolemic effects of mineral balanced-DSW are mediated with the increase of LDLR transcription and the suppression of PCSK9 mRNA synthesis in high glucose-treated HepG2 hepatic cell. Taken together, present investigation suggests that hypocholesterolemic effects of mineral balanced-DSW in HepG2 hepatic cell are mediated with preventing cholesterol synthesis through the inhibition of HMGCR expression and the activation of AMPK and the effects are also correlated with enhancement of LDLR transcription and suppression of PCSK9 gene expression. In conclusion, present investigation supports that mineral balanced-DSW has beneficial effects on lipid metabolism-related metabolic disorders.

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