

Effect of 1-O-Alcylglycerols from sea hydrobionts on the metabolic status of rats with alimentary dyslipidemia

Yulia K. Karaman¹, Tatyana P. Novgorodtseva¹, Tatyana A. Gvozdenko¹, Sergey P. Kasynov²

¹Vladivostok Branch of the Far Eastern Center of Physiology and Pathology of Respiration of SB RAMN - Institute of Medical Climatology and Rehabilitative Treatment, 73-g Russkay St., Vladivostok 690105, Russia ²A.V. Zhirmunsky Institute of Marine Biology of the Far Eastern Branch of the Russian Academy of Sciences, 17 Palchevskogo St., Vladivostok 690059, Russia

Corresponding Author: Karaman Yulia, PhD, Head of the laboratory of biomedicine researches Vladivostok Branch of the Far Eastern Center of Physiology and Pathology of Respiration, SB RAMN, Institute of Medical Climatology and Rehabilitative Treatment, Vladivostok 690105, Russia

Submission date: March 12, 2013; Acceptance date: April 29, 2013; Publication date: April 30, 2013

ABSTRACT

Objective: Sea hydrobionts are a rich source of biologically active lipid compounds. Search for new biologically active substances to determine their pharmacological effectiveness is of current interest.

Background: In recent interest held pharmaceuticals from marine hydrobionts containing 1-O-alkyl-diacylglycerol (ADG). Significant amounts of ADG found in the tissues of some marine organisms of Pacific ocean - squid *Berryteuthis magister* (up to 50% in the lipids of the liver), crab *Paralithodes camtschatica* (10% lipids of the hepatopancreas). This makes it possible to use these aquatic animals as new sources of dietary supplements. In rats with alimentary dyslipidemia (DLP) examined the effect of nature 1-O-alkyl-glycerol (AG) on the metabolism of lipids, the state of the hepatobiliary, antioxidant systems and hematological parameters of blood.

Method: Alimentary model DLP caused high-fat diet of beef fat and cholesterol. Were injected AG in rats with DLP a dose of the 0.4 g/kg for 30 days. 1-O-alkyl-glycerol were obtained by hydrolysis of the lipids of the liver ADG squid *Berryteuthis magister*. Biochemical parameters of lipid and carbohydrate metabolism, and liver enzymes measured in blood serum. Investigated the total antioxidant activity (TAA) of blood plasma, the activity of catalase in erythrocytes, glutathione reductase (GR) and glutathione peroxidase (GP) activity, glutathione (GSH) lever. The content of initial and final products of lipid peroxidation – hydroperoxides of lipids (HPL), malondialdehydes (MDA) in the blood were

investigated. Determination of hematological parameters is carried out on «Abacus» (USA). Statistical significance of differences was calculated by Student's t-test.

Results: Introduction AG resulted in a reduction in triglycerides in the blood serum of rats by 24.2% compared with rats with DLP ($p < 0.05$), increase in HDL-C by 63% ($p < 0.001$). There was an increase in blood glucose concentration by 21.3% ($p < 0.001$), and lactate dehydrogenase (LDG) activity by 30% ($p < 0.05$), ALT – 24% ($p < 0.001$) compared with rats with DLP. After use AG in rats showed an increase in the activity of catalase, reduction of lipid hydroperoxides in plasma. Showed normalization of the TAA and the trend to reduce the concentration of MDA. In the glutathione-redox system under the influence of AG increased activity GR, GP, GSH levels. After use AG an increase in the total number of red blood cells in the blood by 40% ($p < 0,001$), total hemoglobin by 38% ($p < 0.001$), platelet count by 30% ($p < 0.001$), lymphocytes - 43% ($p < 0.001$), blood clotting time increased by 57%.

Conclusion: The study showed that the use of AG causes increased protective functions - hematopoietic, immune-stimulating and antioxidant. These data suggest the widespread use of AG from lipid liver squid *Berryteuthis magister* in rehabilitation practice of various pathologies.

Keywords: natural 1-O-alkyl-glycerols, dislipidemia, metabolic status