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## EFFECT OF COPPER IONS ON CELLULAR ELEMENTS OF THE CELOMIC FLUID OF STARFISH *ASTERIAS RUBENS* L.

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This study was conducted to evaluate the effect of copper ions in sublethal concentrations on the number and ratio of different subpopulations and functional parameters of the cells of the celomic fluid of starfish *Asterias rubens*. The experiments were conducted at Lomonosov MSU White Sea Biological Station named after N.A. Pertsov. The exposure of starfish to copper ions was carried out in aquariums for 96 h with copper chloride(II) added to a concentration of Cu<sup>2+</sup> ions equal to 0.78; 1.95; 3.91 μM. In aquariums with a maximum concentration of copper ions, a significant increase in the number of cells was observed. Also, the distribution of cell subpopulations changed: the proportion of small cells increased from 9 to 15.5%, of agranulocytes – from 61% to 75%, the proportion of granulocytes decreased from 30% to 8.5%, respectively. The expression level of stress-induced proteins 70 (Hsc70/Hsp70)

determined by immunoblotting increased in starfish in all experimental aquariums. The viability of the isolated coelomocytes, estimated by the absorption of neutral red dye (NC), increased in starfish in experimental aquariums with copper ion concentrations of 0.78  $\mu\text{M}$  and 1.95  $\mu\text{M}$  compared to the control, however, at 3.91  $\mu\text{M}$ , the absorption of NK decreased sharply. The results of the study indicate that copper ions induce cell proliferation and an increase in the number of circulating coelomocytes, lead to an increase in the phagocytic activity of cells and the proportion of subpopulation of phagocytes, which can serve as a compensatory mechanism in response to the toxic effect of copper ions.

**Keywords:** coelomic fluid, *Asterias rubens*, lethal concentration