THE EXPRESSION OF HSP 27, HSP 70 AND HSP 90 IN U937 SUBLINES EXHIBITING DIFFERENT PATTERNS OF SENSITIVITY TO TNF

ARKADIUSZ PIERZCHALSKI¹, DOROTA SYCHOWSKA¹, MARTA BARTCZAK¹ and JACEK BIGDA¹,²

¹Department of Cell Biology, Intercollegiate Faculty of Biotechnology UG-MUG, ²Department of Histology and Immunology, Medical University of Gdańsk, Dębinki 1, 80-211 Gdańsk, Poland

TNF is a pleiotropic, proinflammatory cytokine. It induces cytotoxic effect towards different tumor cells in vitro. Heat shock proteins are the molecules involved in the regulation of cell death. In our study, we estimated the amount of heat shock proteins in U937 sublines exhibiting a different pattern of response to the cytocidal effect of TNF. Western-blotting did not reveal any difference in the constitutive expression of Hsp 27 and Hsp 90 in U937 sublines; however, the level of Hsp 70 (inducible form) was markedly higher in the TNF-sensitive U937M subline. In cytotoxic tests, we revealed that heat shock changes the susceptibility of U937 cells to TNF. Heat shock sensitizes U937 cells to the cytocidal effect of TNF; however, all U937 sublines become more resistant to TNF if they are left for some time before the addition of TNF. The results show the slow return in resistance to TNF of U937 sublines primarily resistant to this cytokine. We did observe a faster increase in resistance in the TNF-sensitive U937M cells. This U937 subline became almost resistant to TNF 4 hours after heat shock, although the sensitivity to TNF returned to normal after 12 hours. These results were confirmed by DNA degradation assay and cell cycle analysis. We also estimated the levels of Hsp 27, Hsp 70 and Hsp 90 after heat shock in all the sublines. It turned out that the level of all Hsps increased, which may suggest that they could be engaged in cell protection against TNF. We also suppose that the elevated constitutive level of Hsp 70 in TNF-sensitive U937M cells may contribute to a rapid increase in resistance to TNF shortly after heat shock. In the future, we are going to specifically inhibit and overexpress particular heat shock proteins that would help to confirm and strengthen our data suggesting the role of Hsp in the regulation of apoptosis by TNF in U937 cells.