Activity of antioxidant enzymes and concentrations of thiobarbituric acid reactive substances (TBARS) in melanotic and amelanotic Bomirski melanoma tissues in the golden hamster (*Mesocricetus auratus*, Waterhouse)

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Received May 16, 2002

The activity of superoxide dismutase (SOD) and glutathione peroxidase (GSHPx), as well as the concentration of thiobarbituric acid reactive substances (TBARS) in tissues of transplantable melanoma in the golden hamster were measured and compared. Ten inbred male hamsters were used for the experiment. They were divided into two groups and were given Bomirski melanoma cells subcutaneously. The first group was given melanotic (Ma) melanoma cells. The second group was given amelanotic (Ab) melanoma cells. Thirty days after the transplantation the hamsters were dissected and the tumor tissues were taken and homogenized.

A statistically significantly higher activity of the measured antioxidant enzymes was found in homogenates of Ma tumor than in homogenates of the Ab tumor. Activity of SOD is 8% higher in melanotic melanoma, 24% higher in CAT, and 45% higher in GSHPx. Statistically significant differences between TBARS concentrations were not confirmed.

The higher activity of antioxidant enzymes in the melanotic tumor is a result of increased generation of oxygen-derived free radicals. It is presumed that it is strictly connected with intensified production of quinone and semiquinone radicals in the process of melanogenesis.

Key words: Bomirski melanoma, superoxide dismutase, catalase, glutathione peroxidase, lipid peroxidation, hamster.

In neoplasmatic cells, like in normal cells of healthy tissues, oxygen-derived free radicals (ODFR) are generated [13]. ODFR are atoms or molecules, able to exist independently, which have at least one unpaired electron. They can accept or give away electrons, which in organisms play the role of oxidants or reductors [2, 13]. In neoplasmatic cells, as well as in normal cells, there are antioxidant mechanisms, which protect the cells against the toxic influence of ODFR. Antioxidant enzymes and nonenzymatic scavengers contribute to the elimination of those reactive oxygen species [13, 32]. The main antioxidant enzymes are superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GSHPx). One of the effects of generating reactive oxygen species is lipid peroxidation, i.e. the oxidation of polyunsaturated fatty acids, which build, among other things, cell membranes [9, 13]. The final products of that process are lipid hydroperoxides, pentane, ethane and aldehydes, especially malondialdehyde (MDA).

Bomirski melanotic melanoma (Ma) differs from amelanotic (Ab) melanoma in melanin concentration [30], rate of tumor growth [10, 16] and metastatic potential [20, 31]. Differences between those two types of melanoma also relate to the cytotoxic activity of NK (Natural Killer) cells during the process of tumor growth [20], activity of transglutaminase [16] and activity of lysosomal enzymes [11].

Determining differences between the reduction of 2.2-diphenyl-1-picrylhydrazyl (DPPH) by Ma and Ab melanoma homogenates [14] allows us to measure and to compare the activity of the three main antioxidant enzymes in the melanomas tissues. The aim of this work was to determine the activity of SOD, CAT and GSHPx and concentration of thiobarbituric acid reactive substances (TBARS), as ex-