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Lysosomal acid phosphatase activity in the peripheral blood mononuclear cells of mice induced by Ranopterin-Neopterin

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The in vivo influence of the ranopterin-neopterin on the lysosomal acid phosphatase activity of the mouse peripheral blood mononuclear cells — lymphocytes and monocytes, has been studied. It was established that i. p. inoculation of 25 μg/per animal induced cell proliferation of some macrophageal and T-lymphocyte subpopulations simultaneously increasing their lysosomal acid phosphatase activity.

Key words: acid phosphatase, T-lymphocytes, macrophages, neopterin, T cell proliferation, immunostimulation.

Recent in vivo investigations [1-4] have revealed relationships between pteridine metabolism and activation state of the cellular immune system — including T-lymphocytes and macrophages. Moreover our data [4, 5] provide information about the in vitro and in vivo stimulating influence of ranopterin - neopterin on the MG-CSA (macrophageal-granulocyte colony-stimulating activity) and bone marrow lymphopoiesis, as well as on the spleen lymphoproliferative and lymphocyte mytogenic responses in mice [6].

The aim of the present study is to investigate the in vivo influence of the same ranopterin-neopterin on the lysosomal acid phosphatase activity in the peripheral blood mononuclear cells — lymphocytes and monocytes in mice.

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Material and Methods

The ranopterin-neopterin was isolated after homogenization of frog skins of the Rana ridibunda species followed by acid extraction and lyophylization of the homogenates.

Neopterin in a dose 25 μg per animal was ingected i. p. in 8 male BALB/c mice, 6-8 weeks old. Five animals were used as controls. Peripheral blood smears were

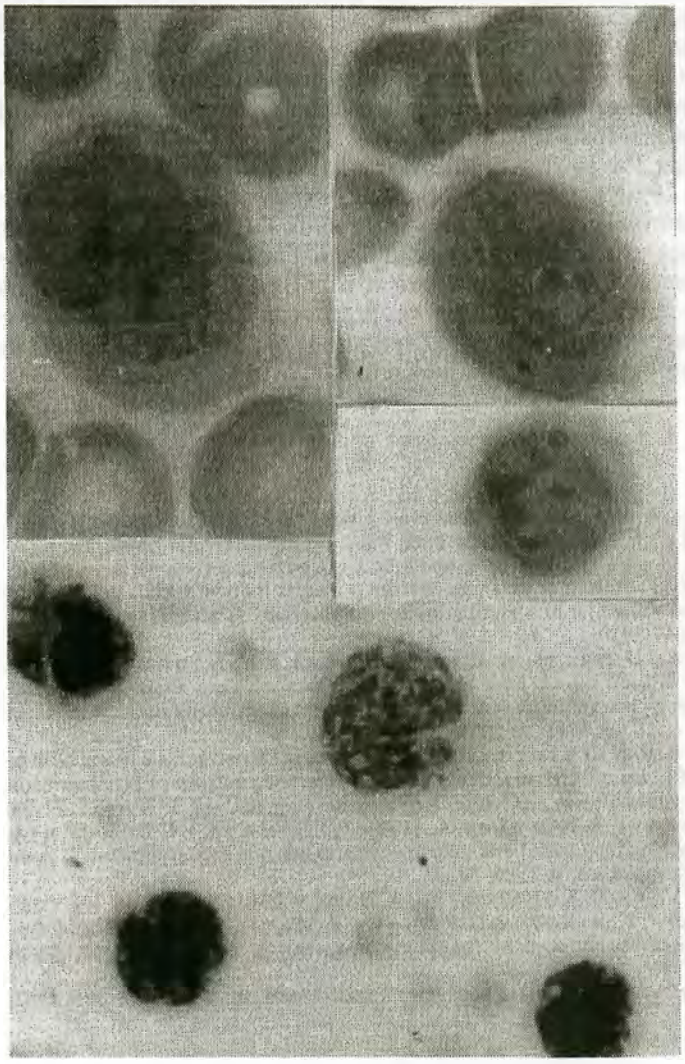

Fig. 1. Activated monocytes and lymphocytes after in vivo treatment by ranopterin - neopterin; peripheral blood smears stained by Giemza-Pappenheim Opton microscope (×400)

Fig. 2. Acid phosphatase activity in the same cellular types from the peripheral blood of neopterin-treated animals. Opton microscope (×400)

made from each animal at 24 h and stained according to Pappenheim and for acid phosphatase — according to Goldberg and Barka [7]. Enzyme activity was examined light microscopically — as diffuse or granular rose - red staining in the cytoplasm of peripheral blood monocytes and lymphocytes.

Results and Discussion

An expressed lymphocytosis was established in the treatment which correlate with our previous results [6] during more continuing period (24 h — days 3, 5 and 10) of observation. Simultaneously in the blood smears one can see a high number of lymphoblasts/immunoblasts (Fig. 1). The treatment of experimental animals with the ranopterin-neopterin induced a significant stimulation effect on the lymphocyte and monocyte acid phosphatase activity (Fig. 2).

It was established that the in vivo application of the ranopterin-neopterin in mice (i. p. inoculation of 25 μg per animal) induced not only proliferation of some macrophageal and lymphocyte subpopulations — especially T-lymphocytes [1-6] but also increased their lysosomal acid phosphatase activity. This fact as well as established by us increased lysosomal basic protein contents in the same cell populations [6] after their stimulation in vivo by ranopterin-neopterin can explicate the high tumour resistance of neopterin treated animals (Zvetkova et al., unpublished data) in cases of virus induced myeloid tumours and leukaemia.

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