lines drawn at the value 13 in figure 2 were arbitrarily established to act as a guideline for comparative purposes.

After 12 weeks of training, both the SPT and END groups demonstrated a 'retardation effect' in motor neuron size when compared to 12-week control distribution (figures 1 and 2). Furthermore, the degree of 'retardation' is apparently dependent on the intensity of exercise used. This is shown in figures 1 and 2 with the SPT group demonstrating a greater number of smaller soma and nuclei than the END group. These findings are in contrast to earlier studies reporting no changes in motor neuron morphology between control and experimental groups following chronic activity[4,10,11]. It is the opinion of the authors that these observed differences are primarily due to 2 reasons: a) the training intensities used in earlier studies were not great enough to produce changes, and b) the statistical treatment of the data may have masked any changes – any statistical analyses comparing the means of the groups in this study would have revealed no significant differences between the 3 groups. In fact, however, there are significant distribution differences as evidenced by the figures 1 and 2.

A probable maturation effect can be observed between the control zero-week animals and the control 12-week animals (table 2). That is, the control 12-week distribution shows a greater number of larger motor neurons. In conclusion, it is evident that specific differences have been observed for the treatments used. It appears that motor neurons in a state of 'normality' reflect patterns of change which are specific to various chronic exercise regimens.

Suppression of delayed type hypersensitivity of mice by lead

S. Müller, K.-E. Gillert, Ch. Krause[1], U. Gross[2], J. L'Age-Stehr[3] and T. Diamantstein[3,4]

Robert-Koch-Institut, Nordufer 20, D–1000 Berlin (West) 65, 27 September 1976

Summary. Application of lead suppressed the delayed type hypersensitivity (DTH) of mice induced by sheep red blood cells (SRBC). Inhibition of elicitation of DTH in primary as well as in secondary response was correlated with the concentration of lead in the blood of the mice.

It has been shown that several environmental contaminants[5] including subclinical doses of lead[6] reduce the resistance of mice to bacterial infection. As reported recently, chronic exposure of mice to lead suppresses the humoral antibody response to sheep red blood cells (SRBC) as measured by the number of anti-SRBC producing spleen cells[5]. The authors concluded that the impaired resistance to the bacterial infection was probably due to a suppressed humoral antibody formation. But otherwise not only the humoral but also the cell mediated immunity (CMI), as well as nonspecific defense mechanisms due to phagocytic cells, are involved in these processes.

We investigated the effect of chronic lead exposure on the T-lymphocyte mediated and monocyte dependent delayed type hypersensitivity (DTH) against SRBC in mice. 10 mice in each group were injected i.p. once daily for 30 days with various amounts of lead acetate dissolved in saline. On the 30th day the mice were sensitized with 10^5 SRBC i.v. To assess the DTH mice were challenged 4 days after sensitization by injection of 10^8 SRBC in 40 µl of saline into the right hind footpad. As controls non-sensitized mice were injected into the footpad with the same dose of antigen. For this, lead-treated as well as non-treated animals were used. The footpad swelling was measured with a dial gauge caliper before antigen challenge, 24 h, and 48 h after challenge according to Miller et al.[7]. The mice were killed and the lead content of the blood was determined by atomic absorption spectrophotometry.

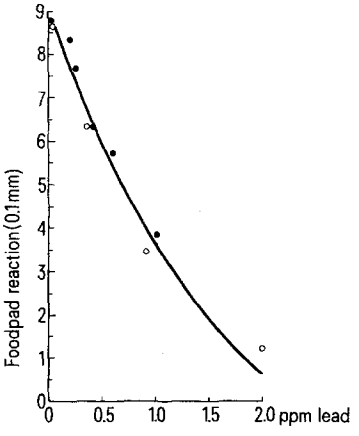

Fig. 1. Dose-dependent inhibition of DTH in mice exposed to lead. Levels of DTH elicited by inoculation of 10^8 SRBC into the right hind footpad of balb/c mice (6–8 weeks old) sensitized 4 days previously with 10^5 SRBC i.v. DTH was measured 24 h after antigen challenge. Various amounts of lead acetate were injected i.p. in a volume of 0.5 ml saline daily for 30 days. In the first experiment the mice received 0.25 mg, 0.10 mg and 0.025 mg lead acetate daily (○). In the second experiment the mice received 0.20 mg, 0.10 mg, 0.075 mg, 0.05 mg and 0.025 mg lead acetate daily (●). The lead content in the blood of mice was determined by means of an atomic absorption spectrophotometer immediately after DTH-measurement. Abscissa: ppm lead detected in whole blood. Ordinata: units of footpad reaction (1 unit = 0.1 mm). Each point represents the mean value detected in each group of 10 mice. In the group of highest lead concentration, 4 mice died in consequence of lead intoxication.

1 Institut für Wasser-, Boden- und Lufthygiene, Corrensplatz 1, D–1000 Berlin (West) 33.

2 Institut für Pathologie, Klinikum Steglitz, Freie Universität Berlin, Hindenburgdamm 30, D–1000 Berlin (West) 45.

3 Immunologische Forschungseinheit, Klinikum Steglitz, Freie Universität Berlin, Hindenburgdamm 30, D–1000 Berlin (West) 45.

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It is of interest to compare our data on lead absorption with those found in men; blood levels of lead up to 0.2 ppm are considered normal, clinical signs of toxicity appear upward of 0.35 ppm[8]. In the blood of control mice 0.05 ppm lead was detected. The blood levels in the lead-treated mice rose according to the dose of administered lead up to 2 ppm. Symptoms of toxicity could be seen in the mice only at the latter high blood level of lead. The doses given were the same as those reported by Hemphill et al.[6].

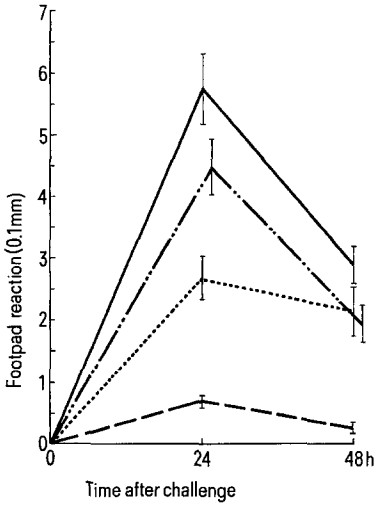

Fig. 2. Inhibition of the secondary DTH-response by lead. 10 mice were injected with 10^5 SRBC i.v. and challenged 4 days later with 10^8 SRBC into the right hind footpad. After 4 days DTH was elicited by inoculation of 10^8 SRBC into the left hind footpad. The inflammatory response was followed for 2 days. ———, saline; — — —, 0.25 mg lead acetate; ..... 0.10 mg lead acetate; –..–..–, 0.025 mg lead acetate. Each point represents the mean value detected in each group of mice. Vertical bars represent the SE of the mean.

The lymph nodes and thymi of the lead-exposed animals showed, as compared to the controls, no significant morphological changes. However, in some cases the marginal zone of the white spleen pulp of lead-treated animals seemed to be smaller and contained a lower number of cells than that of controls. The results of 2 independent experiments summarized in figure 1 clearly demonstrate a dose-dependent suppression of DTH-response by lead acetate.

To assess the effect of lead on the secondary DTH-response, groups of mice receiving various doses of lead for 30 days were sensitized with 10^5 SRBC i.v.; challenged 4 days later with 10^8 SRBC into the right hind footpad and rechallenged with the same antigen dose into the left hind footpad after another 4 days (figure 2). Similar to the primary response lead-treated animals showed also a suppressed secondary DTH-response.

The question arises whether lead exposure may affect the afferent or efferent arc of DTH. In other words, does the exposure of the animals to lead affect the generation of sensitized lymphocytes responsible for DTH, or does lead affect the expression of already established DTH? The result of a preliminary experiment (data not given here) seems to argue against the first possibility. Spleen cells of sensitized normal mice, as well as spleen cells derived from donors exposed previously to lead, both elicited DTH when transferred into normal recipients. If this is true, the most probable targets for lead effects seem to be monocytes known to be involved in the expression of cell-mediated immunity[9] and macrophages participating in induction (or modulation) of humoral immune responses[10].

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Degradation of [^{3}H]thymidine by a pentosyltransferase (EC 2.4.2.4) in the plasma of man and different animals[1]

J. L. Pauly, M. G. Schuller, A. A. Zelcer and M. J. Germain

Department of Medicine B, Roswell Park Memorial Institute, New York State Department of Health, 666 Elm Street, Buffalo (New York 14263, USA), 15 November 1976

Summary. [^{3}H]Thymidine is degraded by an enzyme (thymidine phosphorylase; EC 2.4.2.4) which we have identified in the plasma of man and some animals. The presence of this enzyme in plasma or sera used to supplement culture media may, under certain experimental conditions, limit the validity of measuring the uptake of radiolabeled thymidine as a means of defining DNA synthesis.

Thymidine phosphorylase (EC 2.4.2.4; thymidine-orthophosphate deoxyribosyltransferase) catalyses the reversible reaction of thymidine (TdR) + orthophosphate ⇌ thymine (Th) + 2-deoxy-α-D-ribose-1-phosphate[2,3]. This enzyme is present in many normal and neoplastic cells of man and different animals[2–13] as well as in various pathogenic and nonpathogenic prokaryotic cells[2,3,14]. We report here the identification of TdR phosphorylase in the plasma of man and some animals, and discuss those limitation which this enzyme may have on assays in which [^{3}H]TdR uptake is used as a means of defining DNA synthesis.

Material and methods. Plasma assayed was from fresh blood which had been collected aseptically into siliconized tubes containing EDTA anticoagulant (1.5 mg/ml). After depositing the cells by centrifugation (500×g, 12 min), the plasma was collected carefully and, in some instances, passed through a micropore (0.22 μm) filter; particular care was used in handling the blood so as to avoid contamination or cell damage. TdR phosphorylase was evaluated using our microassay[10]; this is a modification of techniques which have been described previously[2,5–7,11] and was constructed to simulate conditions prevalent in microcultures. In this assay, 20 μl of plasma was added