

# CHANGES IN THE STATE OF THE HYPOTHALAMO-HYPOPHYSEO-ADRENAL SYSTEM IN EXPERIMENTAL DIPHThERIA

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UDC 616.931-092.9-07:[616.831.41 + 616.432 + 616.45]-07

Changes in adsorption of neutral red by tissues of the hypothalamus, pituitary, adrenals, and myocardium in rats following administration of diphtheria toxin are described.

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The object of this investigation was to determine whether the disorders of cardiac activity in experimental diphtheria are connected with changes in the hypothalamo-hypophyseo-adrenal system. The method of vital staining of the tissues suggested by Nasonov and his pupils [3] was used for this purpose.

The experimental method has been described previously [5].

## EXPERIMENTAL METHOD

After intravenous injection of a toxic dose (death within 24 h) of diphtheria toxin into cats, a sharp increase in the adsorption of neutral red was observed in the hypothalamus ( $22.2 \pm 0.9 \mu\text{g}/\text{mg}$  compared with  $11.6 \pm 1.1 \mu\text{g}/\text{mg}$  dry weight of tissue;  $P < 0.05$ ) and the myocardium ( $18.2 \pm 1.2 \mu\text{g}/\text{mg}$  compared with  $10.7 \pm 0.55 \mu\text{g}/\text{mg}$ ;  $P < 0.05$ ). A less marked increase in absorption of the dye was observed in the adrenals ( $49.1 \pm 4.25$  compared with  $33 \pm 2.2$ ;  $P < 0.05$ ). Adsorption of the dye by the pituitary was unchanged at this stage of diphtheria poisoning (Fig. 1).

After subcutaneous injection of a larger dose of toxin the animals survived for a certain time and were sacrificed at various intervals after injection. If sacrificed after 4-6 days, a more marked increase in fixation of the dye by the adrenals was observed ( $57.5 \pm 3.2 \mu\text{g}/\text{mg}$  compared with  $33.0 \pm 2.2 \mu\text{g}/\text{mg}$ ;  $P < 0.05$ ). Adsorption by the hypothalamus and myocardium remained increased. On subsequent days of poisoning (8th, 10th, 20th), adsorption by the adrenals, hypothalamus, and myocardium remained at a high level, while adsorption by the pituitary fell sharply ( $15.8 \pm 1.4 \mu\text{g}/\text{mg}$  compared with  $37.7 \pm 2.8 \mu\text{g}/\text{mg}$ ;  $P < 0.05$ ).

The increase in adsorption by the hypothalamus, myocardium, and adrenals in the acute stage of poisoning could be due to increased excitation of the tissues, activation of their metabolism, and the development of anoxia, leading to increased fixation of the dye [1]. One cause of the decrease in adsorption by the pituitary could be increased hyperpolarization connected with activation of the cholinergic innervation [2].

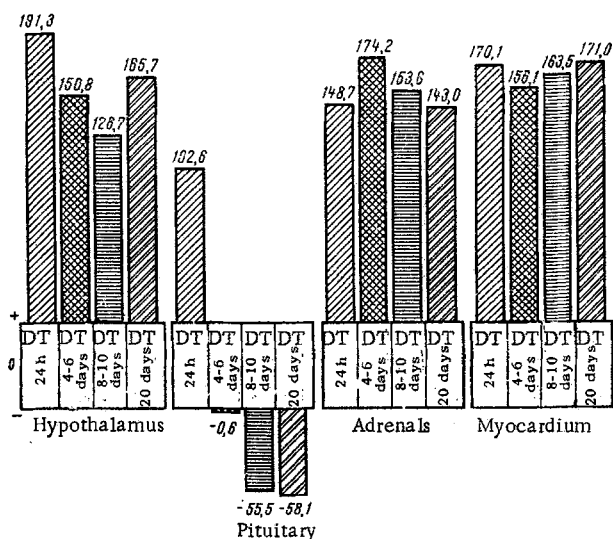


Fig. 1. Changes in adsorptive activity of tissues in experimental diphtheria (control 100%). DT) diphtheria toxin.

Department of Pathological Physiology, Astrakhan Medical Institute. (Presented by Academician V. V. Parin.) Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 68, No. 8, pp. 38-39, August, 1969. Original article submitted January 14, 1968.

The results described above agree with earlier findings [4] and demonstrate changes in the functional state of the hypothalamo-hypophyseo-adrenal system in experimental diphtheria.

#### LITERATURE CITED

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