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SECTION MEETINGS

BALTIMORE	
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Effect of Cortisone on Tissue Mast Cells in the Hamster Cheek Pouch.* (20609)

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Tissue mast cells are now of interest because of the belief that they may be unicellular endocrines which release heparin(1,2), histamine(3), and hyaluronic acid(4). The dramatic results of the use of cortisone in the treatment of rheumatoid arthritis(5) have stimulated inquiry into its action on various tissue elements including mast cells. Investigators have stated that cortisone acts as an inhibitory factor on these cells as on other cellular components of mesenchymal tissues (6). Mast cell tumors in dogs have been successfully treated with large doses of cortisone(7), and the neoplastic mast cells showed cytoplasmic vacuolization, conglomeration, altered staining reaction of metachromatic granules, disappearance of granules, fraying and disruption of the cellular membrane, granule scattering and finally cellular destruction and disappearance. However, Kelsall and Crabb reported that cortisone in the hamster did not affect the number of mast cells in the sublingual glands(8) or in the thymi(9).

The present report is concerned with the effects of cortisone upon the mast cells of the cheek pouch of the hamster.

Method. Cortisone acetate (Merck) was injected subcutaneously into 12 adult hamsters (*Mesocricetus auratus*) in doses of 5 mg per day for periods varying from 12 to 23 days. The cheek pouches were excised under nembutal anesthesia (6-10 mg/100 g), and whole mount preparations stained with methylene blue were made by the method of Zahl and Nowak(10). The preparations were examined under the microscope at magnifications of 150x and 645x. Mast cell counts were taken at 150x in 5 different unit areas (0.3 sq mm) of each preparation, with the aid of a Whipple disc. As a control, the

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TABLE I. Mast Cell Counts in the Hamster Cheek Pouch and Clotting Times during Cortisone Treatment.

	Days treated	Mast cell count/5 unit areas (1.5 mm²)	No. of mast cells/mm²	Clotting time, sec.
Normals (avg of 4)		807	538	107
Cortisone-treated	12	302	201	
	14	139	93	
	14	567	378	
	14	404	269	
	14	272	181	60
	14	312	208	45
	14	197	131	60
	14	490	327	45
	14	443	295	60
	21	165	110	120
	21	110	73	30 min.
	23	116	77	
Avg of 12	12-23	293	195	

numbers of mast cells were counted in the cheek pouches of 4 untreated hamsters. Clotting time determinations were made on 7 hamsters by means of the Lee-White technique.

Results. A definite decrease occurred in tissue mast cells in the cortisone-treated hamsters as compared with the controls (Table I). The count in 12 hamsters during treatment averaged 293 per 5 discrete unit areas totalling 1.5 sq mm of the cheek pouch (195/sq mm), as compared with 807 (538/sq mm) in 4 normal hamsters. In the controls the mast cells were numerous, large, and both perivascular and extravascular in distribution. The presence of extruded granules indicated possible secretion. Cytological observations indicated the probable formation of mast cells from fibroblasts. In the treated hamsters, mast cells were fewer (especially remote from blood vessels), smaller, often spindle-shaped, and frequently adjacent to extracellular granules and amorphous stainable material. Somewhat similar changes have been described in the cheek pouch following x-irradiation (11,12).

The clotting times after 14 days of treatment with cortisone were less than the control value (Table I), consistent with the hypercoagulability reported from many clinical studies with cortisone. After 21 days of treatment, the clotting time increased, especially in one hamster (over 30 minutes). This might indicate a delay between the time of disruption of mast cells and the appearance of a significant increase in circulating anticoagulants.

Summary. Cortisone acetate injected subcutaneously into hamsters produced a decrease in the number of tissue mast cells in the cheek pouch. The size decreased and the cells were disrupted, with discharge of granules and stainable material. The treated hamsters consistently had fewer extravascular cells. The clotting times in the treated hamsters were at first somewhat less than in the controls, but in those surviving 21 days of treatment, an increase in clotting time occurred.

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