

THE EFFECT OF ACTH ON THE DEVELOPMENT OF THE ARTHÜS PHENOMENON AND ON THE MORPHOLOGICAL COMPOSITION OF THE INFLAMMATORY EXUDATE

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It is generally held [1-12] that ACTH and cortisone effectively suppress or inhibit allergic manifestations, primarily during the period of sensitization. If sensitization has already arisen, these hormones have no action on reactions of inflammation or hemorrhagic necrosis. Nevertheless it is not clear why ACTH and the glucocorticoids should be inactive against allergic inflammation, yet active against ordinary nonallergic inflammation.

We carried out experiments to test the action of these hormones on various aspects of allergic and ordinary inflammation.

The Arthüs phenomenon was reproduced in 42 rabbits in the classical manner. ACTH was given (10-20 units) to 33 of the rabbits before the reacting injection of horse serum, and after the 2nd and 3rd sensitizing injections. In most experiments the Arthüs phenomenon did not develop or was much weaker than in the control animals (Table 1).

TABLE 1. Arthüs Phenomenon in Control Rabbits and in Rabbits Receiving 10-20 Units ACTH before Each Injection of Serum Starting with the 4th

Injection	No. of experimental animals			No. of control animals		
	Arthüs phenomenon did not develop	infiltration	necrosis	Arthüs phenomenon did not develop	infiltration	necrosis
4th	—	—	—	—	1	1
5th	—	—	—	—	2	—
6th	—	—	1	—	2	2
7th	12	1	2	—	2	—
8th	4	1	—	—	—	—
9th	—	—	—	—	1	—
10th	8	—	—	—	—	—

TABLE 2. Leukocyte Formula of Peritoneal Exudate 20 h after Intraperitoneal Injection of Broth (mean figures)

Index	Experiment	Control	P
Neutrophils	37.9 ± 3.6	64.0 ± 5.1	< 0.001
Lymphocytes	53.9 ± 4.8	30.0 ± 5.3	< 0.001
Monocytes	8.1 ± 2.0	5.4 ± 1.3	> 0.1

In another series of experiments we studied the cell composition of the exudate in rats with experimental aseptic peritonitis caused by injection of sterile broth into the peritoneal cavity. In animals receiving ACTH (2.5 units) before the injection of broth, the exudate was thicker in consistency and its cell composition was different from that in the control animals. The percentage of neutrophils was considerably smaller (Table 2). A lymphocytic phase developed sooner than in the control animals.

The results indicate that ACTH affects both the manifestation of allergic inflammation and the exudative reaction in ordinary inflammation.

SUMMARY

Arthüs phenomenon was induced in 42 rabbits by the classical method. ACTH (10-20 units) was injected into 33 of them before the injection of the booster dose of horse serum, as well as beginning from the 3rd-4th administration of sensitizing doses. In the majority of experiments Arthüs phenomenon did not develop at all, or was much weaker than in control animals.

The second group of experiments dealt with the cellular composition of the exudate in rats in experimental aseptic peritonitis caused by injecting sterile broth into the peritoneal cavity. Experimental results demonstrated that in animals which received ACTH (2.5 units) prior to broth injection the exudate was of thicker consistency and its cellular composition differed from control. Neutrophil percentage was much lower and lymphocytic phase occurred much earlier.

The data obtained indicates the effect of ACTH both on the manifestation of allergic inflammation and on the exudative reaction during usual inflammation.

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