EFFECTS OF HYDROCORTISONE ON ABSORPTIVE FUNCTIONS OF THE SMALL INTESTINE IN SUCKLING RATS

Naoko TOGO

Department of Physiology
Faculty of Veterinary Medicine
Hokkaido University, Sapporo 060, Japan

1. The effects of hydrocortisone injected at 13 days of age were examined on body weight, activity of disaccharidases, and absorption of immunoglobulin-G and glucose from the small intestine in suckling rats.

2. The increase in body weight during growth was inhibited by administration of hydrocortisone. The inhibitory effect on body weight increase depended on the dose of hydrocortisone. Injection of a high dose (50 or 200 μg/g bwt.) resulted in marked and prolonged depression of body weight. In contrast, the rate of body-weight increase (per day) returned to the control level within 3 days after injection of the low dose (10 μg/g bwt. or less) of hydrocortisone.

3. The activity of maltase in 16-day-old pups was significantly increased (approximately 7–fold) by injection of the low dose (10 μg/g bwt.) as well as by the high dose (50 μg/g bwt.) of hydrocortisone. Lactase activity, however, showed a decreasing tendency; it decreased significantly only when the high dose of hydrocortisone was used.

4. The absorption of bovine IgG, administered orally at 16 days of age, was almost completely inhibited in the pups treated with the high dose of hydrocortisone. It was depressed by 95% in the pups treated with the low dose of hydrocortisone.

5. The glucose concentration in plasma rose to the maximal level 30 min after the oral administration of glucose, followed by secondary gradual decay. The maximal glucose level in the hydrocortisone-(10 μg/g bwt.) treated pups was significantly lower than that in the control group, but the secondary decay phase was almost identical between these two groups.

6. The present study showed that a low dose (10 μg/g bwt.) of hydrocortisone, that has only a small influence on body weight, was effective in inducing an increase in maltase activity and a decrease in macromolecular absorption in the small intestine. These effects were previously reported in pups only when higher doses (more than 50 μg/g bwt.) of hydrocortisone were administered.