TABLE I.
Amount of Weight Lost by Mice on the Various Diets.

Groups	A	B	C	D	E	F
	Avg wt in g					
At start of experiment	24.4	24.6	24.0	23.9	23.0	25.4
At time inoculated with virus	21.7	22.1	21.7	21.4	24.2	25.2
At time of death	15.9	—	16.6	—	16.8	—
Surviving mice	20.3	22.6	19.1	21.0	25.1	26.7

essential that the virus dilution be kept at this 50% point in order to assure a number of survivors. Groups B and D remained under similar condition but received no virus. The 4 groups did not differ in food intake and weight. Rockland Mouse Diet which is adequate and has a protein level of 24% was fed the mice in Groups E and F. Inoculation of the mice in Group E was done at the same time and in the same manner as in Groups A and C. The controls, the mice in Group F, received no virus.

The results of the experiment are given in Chart 1. Groups B. D, and F are omitted as none of the mice died during the experiments. The weights of all the groups are shown in Table I. It is seen that all the animals in Groups A, B, C, and D lost similar amounts.

The mice on the low protein diet plus methionine are the most susceptible to swine influenza, those on the low protein diet alone the least susceptible. The increased susceptibility of the mice receiving methionine over the other 2 groups is significant statistically. The differences between the mice on the Rockland Mouse Diet and on the low protein diet has been significant in some experiments but not in others.

Six experiments similar to the above and others along the same lines have given similar results. Cystine used under similar conditions increased slightly the susceptibility of the mouse to swine influenza. The effect of other amino acids is now being studied.

We have no explanation as to why methionine decreased the susceptibility of the rabbit to vaccinia and increased the susceptibility of the mouse to swine influenza. The experiments which we have in progress may elucidate this problem. Three possibilities appear now: (1) Methionine in some way lowers the resistance of the host to infection, possibly by increasing the permeability of the cell to the virus. (2) Methionine may interfere with the formation of antibodies. (3) Multiplication of the virus may be aided by methionine.

Conclusions. Mice on a low protein diet, if given methionine, have a greatly increased susceptibility to the swine influenza virus.

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Effect of Adrenalectomy Upon Level of Blood Amino Acids in the Eviscerated Rat.

DWIGHT J. INGLE, MILDRED C. PRESTRUD, AND JAMES E. NEZAMIS.
From the Research Laboratories, The Upjohn Company, Kalamazoo, Mich.

Following evisceration the concentration of amino acids in the blood increases gradually throughout the period of survival but this rise can be completely suppressed by the administration of optimal amounts of insulin with glucose.[1] In the present study it was shown that adrenalectomy suppressed the level of blood amino acids below that of non-adrenalectomized eviscerated rats at each

[1] Ingle, D. J., Prestrud, M. C., and Nezamis, J. E., *Am. J. Physiol.*, 1947, **150**, 682.

level of insulin dose and glucose load.

Methods. Male rats of the Sprague-Dawley strain were eviscerated at 250 g weight. Adrenalectomy was performed in the same operation. Immediately following operation all of the animals were given continuous intravenous infusions of 0.9% sodium chloride solution with and without added glucose and crystalline zinc insulin (Lilly). The volume was 20 cc per 24 hours per rat. The details of the methods have been described.[1]

Experiments and Results. Equal numbers of eviscerated rats and adrenalectomized-eviscerated rats were studied simultaneously. Samples of blood were taken from the abdominal aorta at the end of 24 hours. Sixteen pairs of rats were given 4 units of insulin and 40 mg of glucose per 100 g of rat per hour (40/100/h); 10 pairs were given 1 unit of insulin and 40/100/h; 16 pairs were given 0.5 units of insulin and 24/100/h; and 7 pairs were given no insulin and 8/100/h of glucose. At each level of insulin dosage and glucose load the average value for amino acids was lower in the adrenalectomized-eviscerated rats than in the eviscerated rats. Likewise, in each of the 49 pairs of rats the value for blood amino acids was lower in the adrenalectomized rat than in the non-adrenalectomized rat. The data are summarized in Fig. 1.

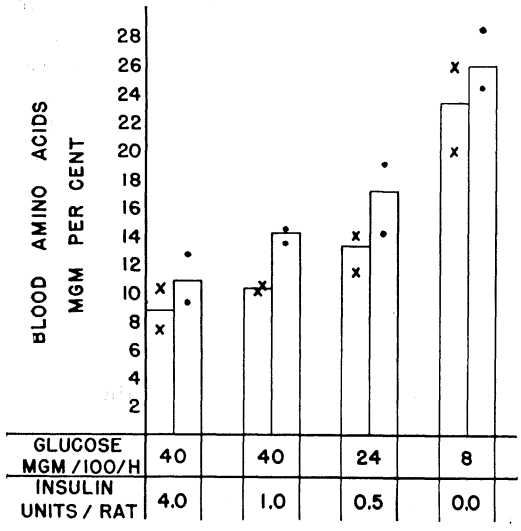

FIG. 1.

Level of blood amino acids at the end of 24 hours of continuous intravenous infusion. Averages and Range.

• Eviscerated rats.

x Adrenalectomized-eviscerated rats.

Discussion. These results are consistent with an earlier study showing that insulin prevents the rise in blood amino acids which follows evisceration in the rat. The effect of adrenalectomy upon the level of blood amino acids in the eviscerated rat is apparently independent of insulin dosage and glucose load. Friedberg and Greenberg[2] have shown that the level of plasma amino acids is depressed by adrenalectomy in the non-eviscerated rat. Roberts[3] reported that adrenalectomy in the eviscerated rat did not influence the rate of rise of blood amino acids but the periods of observation were shorter than in the present study and other conditions were different.

How do these data relate to the subnormal ability of the untreated adrenalectomized animal to mobilize its cellular proteins during stress? The level of blood amino acids in the eviscerated animal represents a balance between the breakdown and resynthesis of tissue proteins the rates of which were not appraised in this study. What would be the effect of cortical hormone overdosage upon the level of blood amino acids in eviscerated animals? Cortical hormone overdosage is antagonistic to the hypoglycemic effect of insulin in the normal force-fed rat[4] and the eviscerated rat.[5] Would it antagonize the effect of insulin in suppressing the rise in blood amino acids which follows evisceration? Further studies are planned.

Summary. Adrenalectomy in the eviscerated rat lowered the level of amino acids in whole blood at each level of insulin dosage and glucose load when determined 24 hours after operation.

2 Friedberg, F., and Greenberg, D. M., *J. Biol. Chem.*, 1947, **168**, 405.

3 Roberts, S., *Endocrinology*, 1946, **39**, 80.

4 Ingle, D. J., Sheppard, R., Evans, J. S., and Kuizenga, M. H., *Endocrinology*, 1945, **37**, 341.

5 Ingle, D. J., Prestrud, M. C., Nezamis, J. E., and Kuizenga, M. H., *Am. J. Physiol.*, 1947, **150**, 423.