TABLE I.
Mitotic Activity in the Hypophysis of Rats.

Group	No. of animals	Age mean	Sex	Inj. of androgen and/or estrogen μg	Mitoses per mm² Mean ± S.E.
1	5	117	♀		1.20 ± 0.25
2	4	102	♀	3x500A	1.17 ± 1.07
3	6	101	♀	3x500A + 2x25E 3x1000A + 2x25E	17.0 ± 2.76
4	10	97	♀	2x25E	20.0 ± 1.94
5	10	91	♀	4x17E	21.3 ± 1.55
6	6	94	♂	4x500A + 4x17E	18.7 ± 4.20
7	6	93	♂	4x17E	20.8 ± 2.00
8	9	92	♂		.52 ± .13

females does not change the mitotic activity in the hypophysis (Group 2). The glands of only 4 animals were examined but since in all of these the activity is uniformly low, it seemed unnecessary to extend the series.

In the males and females which received both androgen and estrogen (Groups 3 and 6) the average mitotic activity does not differ significantly from either the male or female groups which received estrogen alone. In comparing Group 3 with 4 statistically, $P = .35$, and 6 with 7, $P = .65$. The animals in Group 3 that had injections of 500 μg of androgen show a somewhat lower activity than those which had 1000 μg, but the difference is not believed to be important.

Summary. The estrogenic hormone, alpha-estradiol benzoate, stimulates mitotic division in the cells of the anterior hypophysis of both male and female rats and, provided the animals are about the same age, an equal amount injected results in approximately the same mitotic activity. When the androgen, testosterone propionate, is injected with the estrogen in either male or female rats, the mitotic activity is not significantly different from that resulting from injections of estrogen alone.

16290 P

Increased Susceptibility of Mice to Swine Influenza as a Result of Methionine Injections.*

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In recent years numerous experiments have been reported on the effects of various dietary constituents on the susceptibility of animals to viral infections. I reported in 1942 that methionine decreased the susceptibility of the rabbit to vaccinia.[1] It seemed advisable however to repeat these experiments in the mouse using swine influenza as the virus. When mice on an adequate diet are injected with methionine there is a slight increase rather than decrease in susceptibility to swine influenza. But, if methionine were given to mice on a low protein diet, a marked increase in susceptibility occurs. This paper is to report such experiments.

Since poor or malnutrition from many causes will result in an increase in the animal's resistance to viral infections[2] it was thought

* Aided in part by grants-in-aid from The John and Mary R. Markle Foundation and the United States Public Health Service.

1 Sprunt, D. H., PROC. SOC. EXP. BIOL. AND MED., 1942, **51**, 226.

2 Sprunt, D. H., *J. Exp. Med.*, 1942, **75**, 297; Foster, C., Jones, J. H., Henle, W., and Dorfman, F., *J. Exp. Med.*, 1944, **80**, 257.

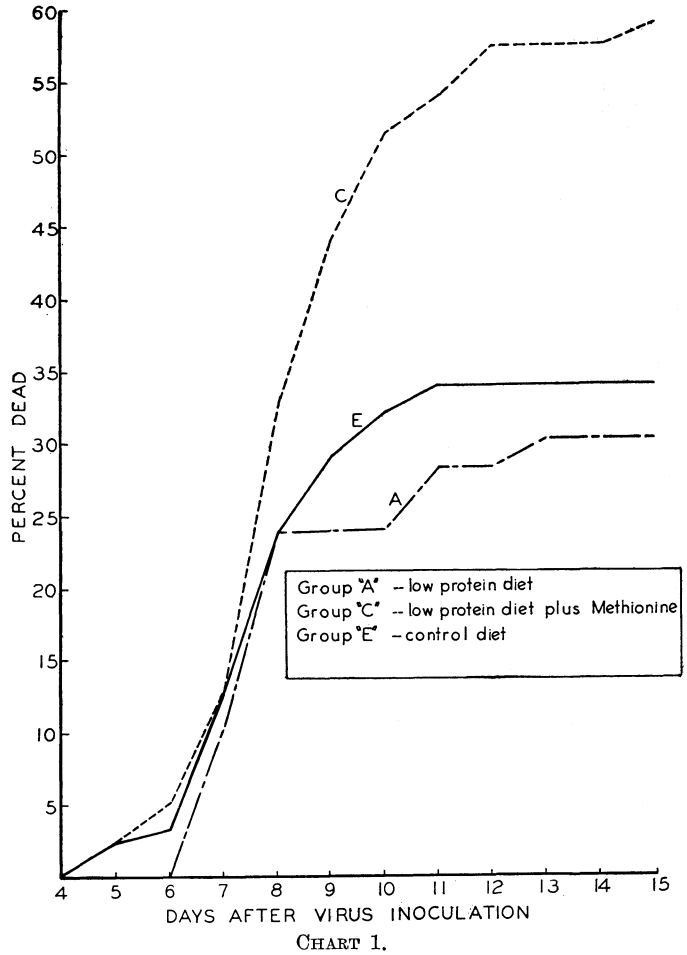

CHART 1.
The percentage of mice on different diets dying after injection with swine influenza.

essential that the substance to be studied should be added to a diet which by itself caused some malnutrition and increased resistance. A low protein diet was found to meet these requirements. Although malnutrition generally increases the animal's resistance to infection it does, if too extreme, result in the death of the animals from starvation. For this reason mice under similar conditions to those injected were kept as controls, in order to see if any of the deaths were due to malnutrition.

In the following experiments 360 male adult mice weighing approximately 25 g each were divided into 6 groups. The mice in Groups A, B, C, and D were fed the low protein diet, but in addition Groups C and D were given daily intraperitoneal injections of 15 mg of an aqueous solution of methionine. After 2 weeks the mice in Groups A and C were inoculated intranasally, under ether anesthesia, with swine influenza virus.† The virus was diluted before inoculation to the 50% point, although similar results could be obtained with other strains of both human and swine influenza virus. This virus was used in most of the experiments, since the 50% point was more constant in various groups of mice. In these experiments it is

† The virus was kindly supplied to us by Dr. Joseph Beard of Duke University. It was an egg-adapted strain of swine influenza which came originally from Dr. R. E. Shope and has been designated as Strain 15.

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.

16291 P

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

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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.