by modification of renal function.

Summary. 1. Studies were undertaken in a patient with hypertensive vascular disease, Addison's disease, diabetes mellitus and rheumatoid arthritis. 2. The arthritis responded to smaller doses of cortisone than those generally effective. 3. Whereas large doses of sodium chloride failed to modify the blood pressure, the arterial tension rose and fell in conjunction with salt intake providing the patient was maintained on constant amounts of desoxycorticosterone acetate. 4. It is suggested that the action of sodium chloride on blood pressure is mediated through an adrenal mechanism.

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Use of Monosodium Glutamate for Improving the Palatability of Amino Acid Rations.* (18114)

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It has been observed repeatedly in this laboratory that mice and rats require several days to become accustomed to rations containing free amino acids as the source of nitrogen when fed *ad libitum*. During this adjustment period the animals consume less food and hence grow at a slower rate as compared with those which receive rations containing casein. In some instances a loss in weight occurs during the first 3 to 7 days. Maddy and Elvehjem(1) found that in spite of this lag in growth during the first week, mice that received a ration containing 16 amino acids exhibited growth rates during the second and third weeks that closely approximated those of animals which received a 19% casein ration. Ramasarma *et al.*(2) obtained similar results when rats were fed a ration containing 18 amino acids. Food consumption was variable and lower, and growth rates remained below those of the casein controls until the third week at which time considerable improvement was noted. The latter workers resorted to the force-feeding and paired-feeding techniques to insure equal nitrogen intakes. Over a period of 2 years we have obtained growth data on 200 mice representing 22 groups that have received *ad libitum* the amino acid ration of Maddy and Elvehjem. The final average weights of these groups ranged between 77 and 98% of those of the casein controls with most of the values being between 85 and 90%. The initial lag period was less pronounced in some groups than others, but it occurred without exception. These concordant findings indicate that a ration of amino acids is not as palatable to the mouse as is a casein ration. It appeared that growth during the first few days of the experimental period was critical in that animals which received the amino acid rations could not overcome completely the initial setback, and final weights rarely completely reached those of animals fed casein.

Since the techniques of force-feeding and paired-feeding are tedious when applied to large groups of animals or are objectionable for other reasons, attempts were made to improve the palatability of the amino acid ration. This report is concerned with the use of monosodium glutamate for this purpose.

Experimental. All mice used in these studies were males of the Webster Swiss strain and

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1. Maddy, K. H., Elvehjem, C. A., *J. Biol. Chem.*, 1949, v177, 577.

2. Ramasarma, G. B., Henderson, L. M., and Elvehjem, C. A., *J. Nutrition*, 1949, v38, 177.

were from our stock colony. When 3-4 weeks old, the animals were divided into groups as equally as possible on the basis of weight so that the average weights of the groups within a series differed from each other by not more than 0.3 g. The mice were housed in individual screen-bottom cages and were fed ration and water *ad libitum*. Weighings were made twice weekly during the 21-day experimental period. The amino acid ration fed (hereafter referred to as AAM-2) was the one reported by Maddy and Elvehjem (*loc. cit.*) to be the best for the growth of young mice. This ration contained sucrose, corn oil, salts, vitamins and 16 purified amino acids including 5.03% of L-glutamic acid. In the casein control ration the amino acids were replaced by 19% casein. The nitrogen content of each ration was 2.5%. Monosodium glutamate (MSG), when used, was added at the expense of sucrose, and the amount of L-glutamic acid or casein was altered to maintain the nitrogen content at 2.5%. The average weight gain of the mice receiving the casein ration was assigned a value of 100% in each series, and the final growth of each group receiving an amino acid ration was calculated as a percentage of the growth of the casein group. These data are summarized in Table I.

TABLE I. Growth Data on Mice Receiving AAM-2 and AAM-2 + MSG.

Series No.	Diet	No. of mice	Avg wt gain (21 days) g	% growth on casein
1	19% casein	10	8.8	100
	AAM-2	10	8.6	98
	AAM-2 + 0.5% MSG	9	9.6	109
2	19% casein	10	8.8	100
	AAM-2	10	7.6	86
	AAM-2 + 0.5% MSG	10	9.0	102
	AAM-2 + 1.0% MSG	10	9.1	103
3	19% casein	11	16.0	100
	AAM-2	11	14.6	91
	19% casein + 1% MSG	11	16.5	103
	AAM-2 + 0.5% MSG	10	14.4	90
	AAM-2 + 1.0% MSG	10	14.1	88
	AAM-2 + 2.0% MSG	11	14.5	91
4	19% casein	22	10.0	100
	AAM-2	22	8.5	85
	AAM-2 + 1.0% MSG	24	9.3	93

Results. In Series 1 it is seen that although growth on the AAM-2 ration was 98% of that obtained with 19% casein, the addition of 0.5% of MSG resulted in still better growth of 109%. Moreover, the growth curves of this series showed that the group receiving MSG grew at a considerably better rate during the early days of the growth period. In Series 2 the AAM-2 group grew only 86% as much as the casein group. The growth of the groups receiving 0.5% and 1% MSG was 102% and 103% respectively. Growth curves revealed that the 0.5% MSG group surpassed the casein group in rate of growth during the first 3 days, and the 1% MSG group grew at almost the same rate as the casein group during this time. The unsupplemented AAM-2 group lagged in growth over the same period. A further supplement of 2% MSG was tested in Series 3 in addition to the 0.5% and 1% levels. Again in this series the growth of the AAM-2 group was quite good, 91%, and the addition of MSG produced no significant differences in final growth. However, the group that received the 1% MSG exhibited a better growth rate during the first 10 days than did the AAM-2 group. When 1% MSG was added isonitrogenously to the casein ration, somewhat better growth occurred (103%), and food consumption during the first 10 days was 7% above that of the unsupplemented group.

In Series 4 larger groups of animals were used to determine more accurately the effect of the MSG supplementation. It was found that the growth of the group receiving 1% MSG was 93% as compared with only 85% for the unsupplemented group. Furthermore, the growth rate of the MSG group actually surpassed that of the casein group during the first 3 days. Growth curves for this series are given in Fig. 1.

That the effect of MSG in increasing growth of mice on this amino acid ration is due to increased food consumption is evident from the data in Table II. Figures are presented for only the first 10 days since it has been found that after this time the differences in

food consumption between the various groups are relatively constant. The utility of MSG in increasing food consumption was most evident during the first 7 days. After this time the food consumption of the unsupplemented group increased to a level comparable with the MSG groups. Although completely equivalent food consumption on the casein and amino acid rations has not been obtained by the use of MSG, it appears likely that the maximum effect obtainable with this substance and this particular amino acid ration has been reached since 2% MSG did not give significantly better results than 1%.

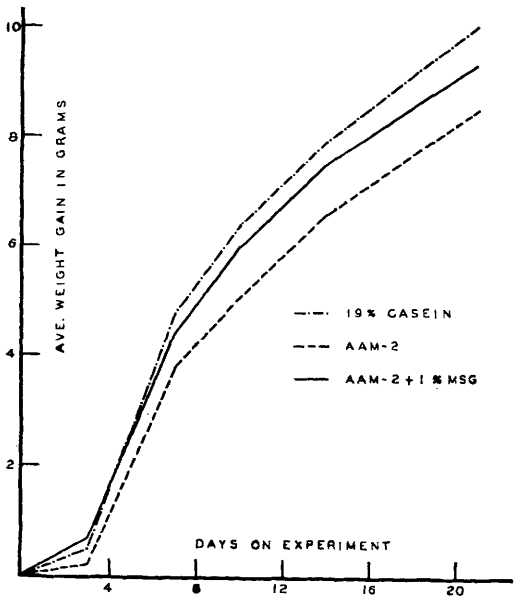

FIG. 1

Growth of mice fed rations containing casein, amino acids or amino acids plus MSG.

TABLE II. Food Consumption Data.

Day	Avg food consumption per mouse per day, g			
	19% casein	AAM-2	AAM-2 + 1% MSG	AAM-2 + 2% MSG
1	2.9	2.1	2.0	2.3
2	4.1	2.9	3.5	2.9
3	4.1	2.9	3.5	2.9
Days 1-3 avg	3.7	2.6	3.0	2.7
4	4.2	3.6	4.1	3.9
5	4.6	3.3	3.1	3.2
6	4.8	3.7	4.6	4.7
7	4.8	4.3	4.6	5.0
Days 4-7 avg	4.6	3.7	4.1	4.2
8	4.5	4.3	3.7	4.7
9	3.9	3.6	3.5	3.3
10	5.4	4.4	5.0	4.6
Days 8-10 avg	4.6	4.1	4.1	4.2
Avg/day 10 days	4.3	3.5	3.8	3.8

Summary. A synthetic ration in which all of the nitrogen is furnished as free amino acids is not as palatable to the mouse as one containing casein. The inferior palatability results in less food consumption during the first 3 to 7 days and consequently poorer growth. When the initial lag period is diminished or eliminated by the addition of 1% of monosodium glutamate to the ration, the final weights of the mice are more consistent and approach more closely those of the animals fed a ration containing casein.

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Purification of the Egg-White Inhibitor of Influenza Virus Hemagglutination by Filtration.* (18115)

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Egg-white (EW) is one of the richest and most readily available sources of a material capable of inhibiting hemagglutination by heated influenza viruses(1). This material has considerable interest as a substrate for the enzyme-like action of influenza viruses

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