ferment, urease. Toward the alkaline side of the isoelectric range the tendency to convert urea into $(NH_4)_2CO_3$ predominates; toward the acid side the tendency to synthesize urea is more pronounced.

In conclusion the writer wishes to express his gratitude to Dr. M. Garcia Banus for his advice and supervision of the work.

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Exogenous Arginine as the Precursor of Creatine in the Dog.

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Of the substances normally present in the diet, structural relationships point to arginine as the most logical precursor of creatine and creatinine. In view of the recent work of Benedict and Osterberg,[1] who fed creatine over long periods of time, and the confirmation of their work in man by Rose, Helming and Ellis,[2] it seemed possible that earlier attempts to demonstrate that creatine may originate from exogenous arginine failed because the amino acid was administered over too short a period to observe any significant change in the excretion of creatine or creatinine. Therefore it was decided to study the effect of arginine on the creatine-creatinine elimination, when the arginine was fed daily to a dog over a period of several weeks. After the completion of the experiment, Hyde and Rose[3] published the results of a similar study of prolonged administration of arginine to a normal man and woman. Although their results showed no evidence of the conversion of exogenous arginine to creatine or creatinine, they have suggested that other species, particularly the pig,[4] may differ in their response to arginine feeding. Our results presented in Table I, with another species, the dog, confirm those of Hyde and Rose, in that oral administration of arginine for a period of 35 days failed to influence the excretion of urinary creatine or creatinine, although exogenous creatine (Periods XIII and XIV) in small amounts resulted in prompt increases in both these catabolites, thus confirming the earlier work of Benedict and Osterberg.

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1 Benedict, S. R., and Osterberg, E., *J. Biol. Chem.*, 1923, lvi, 229.

2 Rose, W. C., Ellis, R. H., and Helming, O. C., *J. Biol. Chem.*, 1928, lxxvii, 171.

3 Hyde, E. C., and Rose, W. C., *J. Biol. Chem.*, 1929, lxxxiv, 535.

4 Gross, E. G., and Steenbock, H., *J. Biol. Chem.*, 1921, xlvii, 33.

Our experiment was carried out with a trained metabolism dog, female, of about 14 kg. weight. Urine was collected by catheterization daily and analyzed for creatine and creatinine by the standard micromethods of Folin. The initial basal diet consisted of cracker meal, 50 gm., casein, 20 gm., evaporated milk, 200 cc., sucrose, 25 gm., bone ash, 10 gm. and vegex (as a source of vitamin B), 5 gm. Unfortunately, after the first two periods, the animal began to refuse this diet, so that it was necessary to add 25 gm. of fresh beef heart. The meat was thoroughly ground and mixed, the daily rations weighed out in separate portions and kept frozen in a freezing chamber. The basal diet on analysis was shown to contain 6.36 gm. of nitrogen and was estimated to furnish 650 calories or about 46 calories per kilo of body weight.

TABLE I.

*Creatine-Creatinine Excretion in the Dog After the Feeding of Arginine and Creatine.**

Period	Body weight	Dietary N	Urine			
			Total N	Creatinine	Creatine as Creatinine	
	kg.	gm.	gm.	mg.	mg.	
I	14.2	5.61	3.57	386	23	
II	14.1	5.61	3.31	379	26	Fore periods
III†	14.0	6.36	4.55	387	29	Basal diet.
IV	14.1	6.36	5.35	400	13	
V	14.1	6.53	5.59	415	18	1 gm. arginine hydrochloride daily.
VI	14.1	6.53	5.63	421	13	1 gm. arginine hydrochloride daily.
VII	14.2	6.76	5.70	421	14	1.5 gm. arginine hydrochloride daily.
VIII	14.3	6.76	5.51	419	20	1.5 gm. arginine hydrochloride daily.
IX	14.1	6.89	6.06	424	13	2 gm. arginine hydrochloride daily.
X	14.0	6.36	5.41	434	6	After periods.
XI	14.0	6.36	5.45	427	14	
XII	14.0	6.36	5.35	426	9	Basal diet.
XIII	14.0	6.57	5.31	453	49	0.75 gm. creatine hydrate daily.
XIV	14.0	6.64	4.76	477	218	1 gm. creatine hydrate daily.
XV	13.9	6.36	5.20	459	41	After periods.
XVI	13.9	6.36	4.92	438	20	Basal diet.

* The figures represent daily averages for the periods. All periods except II and IV (6 days each) were of 7 days' duration.

† Beginning with Period III, 25 gm. of beef heart daily were added to the basal diet.

A slight increase in the total creatinine was observed in Periods III to V, the periods immediately following the addition of the beef heart to the basal diet. We believe this is to be ascribed to the response of the metabolism to the small amount of creatine (estimated at 60 mg.) present in the beef heart.

Since administration of arginine did not alter the urinary creatine or creatinine and since the administration of creatine was followed by an increased urinary elimination of both creatine and creatinine (maximum values, 494 and 380 mg. of creatine and creatinine respectively on the 6th day of Period XIV), no evidence was obtained that under our experimental conditions, exogenous arginine had any relationship to the urinary creatine or creatinine in the dog.

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The Growth-Promoting Power of Egg for Planarian Worms.

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It has been previously demonstrated by us[1] that an exclusive diet of egg albumin is not capable of promoting growth in *Planaria maculata.* Although the food is well taken, the worms show progressive decrease in size throughout the experimental period. Upon an exclusive diet of egg yolk the worms may maintain or increase their size for a period of 2 or 3 weeks, but after that time their length becomes progressively less.

We have confirmed these results repeatedly with the species of planarian worm *(Planaria agilis?)* which we are at present using, and have found in addition that a combination of egg yolk with egg albumin produces a diet decidedly superior to either substance used alone.

Each group in an experimental series consisted of 30 worms of equivalent size which were fed *ad lib.* twice a week on the experimental diets. The total length of the worms was found at the beginning of the experiment and at its conclusion and the proportional increase in length was determined. In one experiment of 2 weeks duration kept at room temperature, the group of 30 worms fed upon egg yolk made a gain in total length of 3.9%, while those fed upon a combination of equal parts of egg yolk and albumin gained 20.2%

[1] Wulzen, R., *Univ. of Calif. Publications in Physiology,* 1923, v, 175.