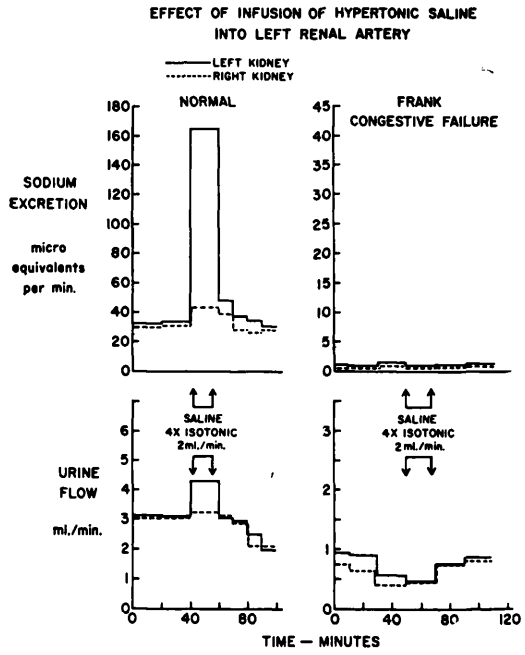

FIG. 2. Effect of infusion of hypertonic saline into left renal artery of normal dog, and dog with congestive heart failure.

and 83 to 94 after, catheterization. Repeated clearance measurements over a period of 5 months have shown no significant changes. The animals were sacrificed at varying intervals after catheterization; neither the control nor catheterized kidneys showed any histological abnormalities. The bladder mucosa was hyperemic and hypertrophied.

With the successful development of the technic for chronic catheterization of the renal artery preliminary studies have been performed on renal tubular reabsorption of sodium in normal dogs and in dogs with chronic congestive heart failure. For example, as indicated in Fig. 2, the infusion of hypertonic saline (580 meq/L) into one renal artery of a normal dog at the rate of 2 ml/min produces a 5 to 10 fold increase in sodium excretion on the injected side with a smaller increment in water excretion. Little or no change is observed in the control kidney. A similar infusion into the renal artery of a dog in congestive failure, with marked sodium retention but a normal basal glomerular filtration rate, does not produce any increase in sodium or water excretion—further evidence for increased tubular reabsorption of sodium and water in congestive heart failure.

Summary. A method has been developed for chronic catheterization of one renal artery, with collection of urine from each kidney separately. The presence of the catheter has not altered renal function over a period of months. Preliminary studies with infusion of hypertonic saline into the renal artery of the dog in congestive heart failure indicate a marked increase in tubular reabsorption of sodium.

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Adenosine and Ash as Unidentified Chick Growth Factors in Fish Meal.* (22745)

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Growth stimulation of many microorganisms by adenine and other purines has long been recognized(1). It has also frequently been postulated that in animal nutrition it may be possible that the rate of purine synthesis is inadequate for optimal growth, and at various times adenine and its derivatives have been stated to possess vitamin-like properties. For example, vit. B_4 has been postulated to be adenine and vit. L_2 has been stated to be adenylthio-methyl pentose. Huff and Bosshardt(2) have reported that the growth retardation brought about by the inclusion of succinylsulfathiazole in the diet of mice is

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largely prevented by the addition of adenine and by other purines and purine ribosides. Very recently(3) it has been reported that adenosine stimulates the growth of chicks fed a purified diet. A number of reports indicate that the ash of various natural products will, under certain conditions, stimulate the growth of chicks on purified diets(4-6) and corn-soya type rations(7). In contrast, negative results from alfalfa ash(8) and the ash of distillers' dried solubles(9) have been reported with purified diets where the salt mixture used in the present work was employed.

Fractionation work on the unidentified growth factor(s) in fish meal has been under our investigation for some time. We are presenting evidence at this time that the organic factor in fish meal is not adenosine and that supplemental adenosine does not improve our basal diet which gives excellent growth in contrast to the growth reported in the study referred to above. The fish meal† employed has consistently given a marked growth response when added to a purified basal diet containing an isolated soya protein.

Methods. Male chicks from a mating of New Hampshire males x Columbian females were used throughout. The parent stock had received a diet containing liberal amounts of fish meal, whey, and alfalfa meal. The chicks were housed in electrically heated batteries with raised wire floors. They were offered food and water *ad libitum* from one day of age. In each experiment three or four replicates of 10 chicks were used for each treatment. The experimental ration is given in Table I. The fish meal ash was prepared by ashing in a muffle furnace at a dull red heat and the ash was fed at a level equivalent to the ash in 10% fish meal. This amounted to 2% ash added to the ration. All supplements were added at the expense of cerelose. The general experimental design of the 3 experiments reported here can be seen from Table II. In Exp. 2 the Glista salt mixture was increased from the usual 5.34% to 7.34% in group 4, and in group 5 it was decreased to 3.34% so that the 2% fish meal ash replaced 2% of the usual mineral mixture. In Exp. 3 adenosine was fed both as the only supplement to the diet (group 4) and also on top of added fish meal (group 5) and on top of added fish meal ash (group 6).

Results. From the results presented in

TABLE I. Composition of Basal Diet.

	%
Cerelose	57.11
Drackett protein C-1	35.30
Salt mixture*	5.34
Corn oil (refined)	1.00
DL-methionine	.75
Glycine	.30
Choline Cl	.20
Vitamins†	+
Total	100

* See reference 8.

† Vitamins (mg/kg diet):

Thiamine HCl	100	Inositol	100
Niacin	100	P-aminobenzoic acid	2
Riboflavin	16		
Ca-pantothenate	20	Ascorbic acid	250
B_{12}	.02	Menadione	5
Pyridoxine HCl	6	α-toc. acetate	20
Biotin	.6	Vit. A acetate	10,000 I.U.
Folic acid	4		
		D_3	600 I.C.U.

† A defatted fish meal prepared by VioBin Corp, Monticello, Ill., and generously supplied by Mr. Ezra Levin.

TABLE II. Growth Response of Chicks to Various Supplements.

Group ration	Avg wt (g) 28 days	% increase over basal
Exp. 1		
1. Basal	280*	—
2. " + 10% fish meal	355	26.8
3. " + 2% fish meal ash ≅ 10% fish meal	307	9.6
Exp. 2		
1. Basal	381†	—
2. " + 10% fish meal	438	15.0
3. " + 2% " " ash	389	2.1
4. " + 2% Glista salts	390	2.4
5. " − 2% Glista salts + 2% fish meal ash	395	3.7
Exp. 3		
1. Basal	365*	—
2. " + 10% fish meal	425	16.4
3. " + 2% fish meal ash ≅ 10% fish meal	379	3.8
4. " + adenosine 150 mg/kg	346	−5.2
5. " " + fish meal (2 + 4)	414	13.4
6. " " + ash (3 + 4)	358	−1.9

* Avg of triplicate groups of 10 chicks each.
† " " quadruplicate " " " " " .

Table II it appears evident that adenosine gave no growth response when added to the soy protein type synthetic ration used in this study, or when added to this diet on top of fish meal or fish meal ash supplements. The picture with regard to ash is not quite so clear but certainly, considering all experiments, little response was obtained compared to the response obtained by the addition of 10% of this particular sample of fish meal. Other experiments not reported here have given the same order of response with respect to the intact fish meal.

Summary. It was found that adenosine at 150 mg kg of ration failed to stimulate chick growth when supplementing a 30% protein, soy protein type purified diet. Supplementation of such rations with 2% fish meal ash gave only small and variable responses, while supplementation with 10% fish meal uniformly gave marked growth response.

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Effect of Replacement Therapy on Dental Caries Experience of Radiothyroidectomized Rats.* (22746)

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Previous work from this laboratory(1-3) has indicated that the thyroid gland in rats is associated with the dental caries experience. By feeding desiccated thyroid it has been possible to repeatedly demonstrate a significant reduction in dental caries while the administration of I^{131} or thiouracil results in a significant increase in dental caries. From these data it appears quite convincing that the thyroid gland is intimately associated with the dental caries experience in rats. It has become a difficult problem to determine accurately the mechanism by which these effects take place. Various facts are known, however, which suggest that the salivary glands are important intermediates in this mechanism. For example, when salivariadenectomized rats are used, there is no appreciable anticariogenic effect observed by feeding desiccated thyroid. Also, it has been possible to demonstrate a direct relationship between thyroid function, the histological structure of the submaxillary gland and the incidence of dental caries. A further correlation has been shown not only between the microscopic structure of the submaxillary glands, their proteolytic enzyme content and dental caries incidence in hypophysectomized rats but also of proteolytic activity and arginase activity in the submaxillary glands with thyroid function(4-6).

To extend these studies on the relationship of the rat thyroid gland and dental caries, it was considered important to determine if it were possible to return the increased incidence of dental caries occurring in radiothyroid-

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