later development. Subsequently, these knob-like projections appear to have grown slightly to form bulges on the dorsal and ventral margins of their respective rays. The knobs of the ends of the third and fifth pairs of rays develop into primitive copulatory hooks which soon become fully developed. The knob-like projections of the fourth pair of rays appear to have undergone an early development to form accessory copulatory hooks, or counterhooks, to supplement those of the third and fifth pairs of rays. These accessory hooks which began their development just previously, soon appear as fully formed accessory copulatory hooks. Symmetrical teeth-like projections are noted on the third, fourth, and fifth pairs of rays. Thus, the experimentally induced changes in the normal female anal fin simulate the structural configuration of the normal male anal fin, referred to as the gonopod.

Conclusions. The transformation of the normal female anal fin into a male-like gonopod is induced by prolonged administration of testosterone propionate. Such treatments influence this secondary sex characteristic in all cases, from female to male, over an interval of approximately 5 months. These experimentally induced transformations of the normal female anal fin into that of a male-like gonopod were observed in all of 91 specimens so treated.

11968 P

Secretion of Orally Administered Radio-Iron in the Milk of Cows.

L. A. ERF.* (Introduced by J. H. Lawrence.)

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The purpose of this experiment was to determine the percentage of ingested iron taken up by the whole blood and that secreted into the whole milk of cows.

Methods. Radio-iron ($_{26}Fe^{59}$) produced in the Berkeley cyclotron was converted into an iron chloride solution,[1] each cc of which contained 4 mg of $FeCl_3$ and emitted, on the day of administration, 1820 counts/sec. of gamma radiation. (Only gamma radiation was measured.)

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1 Austoni, M. E., Rabinovitch, A., and Greenberg, D. M., *J. Biol. Chem.*, 1940, **134**, 17.

Two cows were used, one a grade Holstein, No. 238, weighing 800 lb and in the 8th month of the 2nd lactation period, the other a grade Jersey, No. 684, weighing 650 lb and in the 6th month of the 1st lactation period. The former had 12 g of hemoglobin per 100 cc of blood before and after the experiment, the latter 13.1 g. Both cows had received, for months, the same diet. No. 684 received twice daily for 12 days immediately preceding the experiment, 8 g of ferrous sulphate.

Experiment. The cows were milked dry just before the oral administration (by drenching) to each of 115 cc of the labeled iron chloride solution. Six hours later both were milked and bled. They were milked twice daily thereafter and the total milkings saved separately for 3 days. One hundred cc of whole blood were removed from each on the 6th, 30th, 48th and 78th hours. The 8 samples of whole milk and the 8 of whole blood were ashed at 850°C and together with aliquot samples of the solution administered were assayed by means of a modified Geiger-Muller counter.

Results. Table I indicates the results.

TABLE I.

Cow	Hrs after oral admin. of $_{26}Fe^{59}$	Cc of specimens obtained	Gamma radiation emitted by ashed specimens (counts/sec)	Recovery of $_{26}Fe^{59}$ admin. in % per L whole blood or whole milk	Avg % admin. radio-iron per L of milk secreted during 78 hr
No. 238					
A. Blood	6	100	20	.095	
	30	,,	23	.110	
	48	,,	28	.133	
	78	,,	17	.081	
B. Milk	1- 6	1220	1680	.65	
	6-30	3570	851	.11	
	30-48	4560	466	.05	
	48-78	4000	420	.05	
		13350			.121
No. 684					
A. Blood	6	100	16	.076	
	30	,,	30	.143	
	48	,,	28	.128	
	78	,,	32	.152	
B. Milk	1- 6	2300	990	.22	
	6-30	4930	2502	.24	
	30-48	5900	442	.03	
	48-78	5680	1170	.10	
		18810			.128

Whole Blood. The levels of radio-iron in the blood of each were quite similar despite the fact that the iron reservoirs of No. 684 supposedly were adequately saturated. The levels were similar to those found in dogs[2] but lower than those of rats.[1]

Whole Milk. The configuration of the curve illustrating the amount of radio-iron secreted in milk of No. 238 is similar to those which show the amount of radio-strontium secreted in milk.[3] The curve of No. 684 is flatter. No. 238 produced 13,350 cc of milk and secreted an average of .121% of radio-iron per liter of milk, or a total of 1.5% of the amount administered, during the 78-hour period; while No. 684 produced 18,810 cc. and secreted .128% per liter, or a total of 2.5% of labeled iron.

Discussion. Blood. The previous administration of non-radioactive iron apparently did not lower the amount of radioactive iron absorbed, probably because the iron reservoirs of both cows were saturated. However, there were differences in breed, period of lactation and probably in rates of bodily metabolism and rates of utilization of iron.[4] The ratios of radio-iron in the plasma and red cells should have been made for undoubtedly such results would have explained the more rapid rate of secretion of radio-iron in the milk during the first few hours after the administration of $_{26}Fe^{59}$. It has been demonstrated that absorbed radio-iron is present first in the plasma and later fixed in the hemoglobin of the red cells[2, 5] and that the kidney cells excrete radio-iron only when the plasma levels are high.[6]

Milk. Similarly it can be assumed that radio-iron is secreted by the lactating cells only when the level of plasma radio-iron, which is available to the cells, is high. The rate of the secretion of radio-iron in the milk was slower and more prolonged in No. 684 than in No. 238. This would make one suspect that the non-radioactive iron previously administered had saturated the body cells and fluids and overtaxed the excretory mechanism, thereby permitting the labeled iron a prolonged exposure to the lactating cells of this cow. The greater total quantity of radio-iron secreted by this cow was probably due to the supposition just mentioned and to the fact that

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she produced more milk and was in an earlier state of lactation.

If the average cow producing 4 liters of milk a day can secrete in the milk 0.5% of a 10 g oral dose of iron per 24 hours, 12.5 mg of iron would be present in each liter—an amount more than adequate for a growing child who consumed a liter of milk a day.

Conclusions. In the 2 cows studied, 1.5% and 2.5% of the radio-iron administered orally was secreted respectively in the milk during a 78-hour period.

I am deeply indebted to Dr. M. D. Kamen for preparing the radioactive iron solution used and for counting the samples; to Dr. O. W. Schalm, Department of Veterinary Science, for the use of the cows and for the procurement of the blood and milk used; and to Dr. L. H. Duschak, Department of Mining Engineering, for use of high temperature ovens.

11969 P

NaCl and Peritoneal Absorption and Renal Excretion of Glucose in Normal and Diabetic Rats.*

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Sodium chloride appears to influence the glucose tolerance of the diabetic rat[1] and to exert a favorable effect upon certain human diabetics.[2] Its mode of action is interesting from both the practical and the more theoretical aspects of carbohydrate metabolism. It may aid the body in storing[3] and in utilizing more glucose or it may lower the absorption and retention[4] of sugar.

The present study has been made to determine the effect of sodium

* The data in this paper were taken from a dissertation presented by George Sayers in partial fulfillment of the requirements for the degree of Master of Science in Wayne University, 1941.

Aided by a grant from the Committee on Therapeutic Research, Council on Pharmacy and Chemistry, American Medical Association.

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