

TABLE II.
Nicotinamide Content of Human Blood.

Sample	Dilution of filtrate	Method of sterilization	Value found, γ /cc whole blood	Hematocrit
A	.03	Filtered	.60	42.0
	.02		.54	
A	.03	Autoclaved	.80	42.0
	.02		.70	
B	.03	Filtered	.58	46.5
	.02		.55	
B	.03	Autoclaved	.88	46.5
	.02		.92	
C	.03	Filtered	.64	53.0
	.02		.72	
C	.03	Autoclaved	.91	53.0
	.02		.97	
D	.03	Filtered	.45	41.0
	.02		.52	
D	.03	Autoclaved	.83	41.0
	.02		.85	
E	.03	Filtered	.58	46.0
	.03		Autoclaved	

equivalent amount of either pyridine-containing coenzyme. Hydrolysis increases the activity of the latter, indicating that the function of nicotinamide is not based entirely on synthesis to either of the known coenzymes. A method has been developed for determining nicotinamide and related substances in blood. The values obtained are higher if autoclaved blood is used.

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Rapidity of Passage of Chloride Ion from Blood into Gastric Juice of Stimulated Stomach.*

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In order to study the passage of chloride from the blood into the acid gastric juice of the stimulated stomach, chloride ions were "tagged" by rendering them radioactive. Thus radioactivity detected in the juice would signify that such ions if previously injected into the blood had been brought through the gastric mucosa.

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Radio-chloride has a half life of approximately 35 minutes and lithium a half life of $1/25$ second. Thus lithium chloride was employed as a target for bombardment by the beam in the cyclotron of the Departments of Chemistry and Physics. Because of the brief radioactivity of the lithium the salt afforded a soluble chloride in which only the latter ion was radioactive. The lithium chloride was dissolved in sterile water and a drop or two of $1/10$ N NaOH added to insure slight alkalinity. The solution was boiled gently for sterilization and then injected intravenously at the desired moment. The injections were made within 45 minutes after the material was received from the cyclotron and the observations completed within 3 hours. Radioactivity was determined by holding approximately 1 to 3 cc of the fluid to be tested in cellophane sacs 1 to 1.5 cm from the aluminum foil-covered aperture of a quartz-fiber Lauritsen electro-scope. Proper control observations were of course made upon the "background" of the room in which the readings were made and upon blood, urine and gastric juice samples before injection of the radio-chloride.

Experiment I. Female dog An. Wt. 10 kg with large cannulated gastric pouch. After several feedings of cooked lean meat vigorous pouch secretion developed and was collected every 10 minutes in Soxhlet flasks suspended below the cannula. These samples varied from 1 to 1.75 cc per 10-minute period with free acid varying between 100 and 150 clinical units and combined acid 20 to 30 clinical units. At the termination of one period 500 mg of radioactive lithium chloride dissolved in 10 cc of water were injected intravenously in a hind extremity. The volume of juice secreted during the next 10-minute period equalled 3 cc and when tested was found to be strongly radioactive. Similar samples collected at 10-minute intervals for the next 130 minutes each showed radioactivity.

Experiment II. Male Dog Gyp. Wt. 10 kg with large cannulated gastric pouch. Procedure as in Experiment I. In this case 3 cc were secreted during the 120 seconds following the termination of the injection of lithium chloride. This sample was tested separately and found to be strongly radioactive. Tests were also made on blood and urine samples, the results are indicated in the accompanying graph.

Experiment III. Patient, Mrs. H., age 58, Wt. 50 kg, thin and emaciated, 8 days postoperative cholecystectomy for cholecystitis and cholelithiasis. A Levine tube was passed into the stomach after 18 hours' starvation and gastric lavage performed with water, all of the latter being withdrawn. One milligram of histamine was injected subcutaneously and 10 minutes later gastric aspirations were begun,

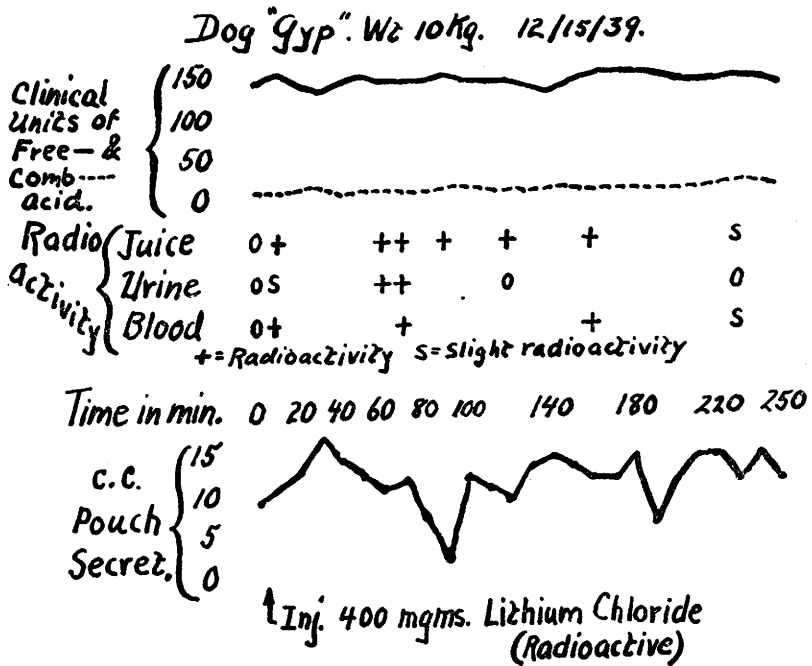


FIG. 1.

Graph of Exp. II described in text showing appearance time of radioactive chlorine in pouch gastric juice subsequent to its injection into an extremity vein. Persistence of the "tagged" ions in the blood and their presence in the urine are also indicated.

and continued at similar intervals for 90 minutes. Following the third aspiration which yielded a juice containing 25 clinical units of free acid and combined acid of 12 clinical units, 400 mg of radioactive lithium chloride dissolved in 10 cc of water were injected intravenously in the arm. During the 120 seconds following the termination of this injection 1½ cc of gastric juice were aspirated which showed radioactivity. Six subsequent samples aspirated at 10-minute intervals all showed radioactivity. Five cc of blood withdrawn from the antecubital vein 1 minute and 70 minutes respectively following injection showed radioactivity. Prior to the experiment the patient voided. At the termination of the experiment the patient voided 36 cc. Three cc of this urine showed radioactivity but approximately one-half as intense as the last sample of 3 cc of gastric juice tested.

Experiment IV. Patient, St., white male, 23, one week after bilateral herniorrhaphy. Procedure as in Exp. III. 3 cc of gastric juice aspirated 60 to 90 seconds following the termination of the injection of radio chloride showed radio-activity. The free acid in this sample equaled 110 clinical units, the combined acid, 17 clinical units.

As a control for the method, radioactive phosphorus in the form of sodium phosphate was injected intravenously into three pouched dogs. The blood was observed to be radioactive for over 45 minutes but the gastric pouch juices secreted during this period exhibited no radioactivity, according to the criteria adopted in these experiments.

Summary. The foregoing observations show that "tagged" chloride ions when injected into the general circulation are identified in the acid gastric juice of the stimulated stomach in dog and in man as quickly as 60 to 120 seconds after injection. Presumably at least some of these ions in the juice were derived from the HCl present. Tagged chloride ions continued to circulate in the blood for more than one hour after intravenous injection and were transported into the gastric juice continuously during this period. Such ions did appear in the urine but were detected at irregular intervals and in relatively low concentration.

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Availability of Staphylococcal Antitoxin After Intramuscular Injection into Normal Monkeys and Men.*

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The increasing use of staphylococcal antitoxin^{1, 2} makes it advisable to study its rate of absorption and concentration in the blood after injection of therapeutic doses. In accordance with previous work on diphtheric antitoxin³ and antipneumococcal serums,⁴ daily estimations were made of the titers of 6 "normal" human subjects, who were not suffering from staphylococcal infections and of 9 normal monkeys (*M. mulatta*) after intramuscular injections of Squibb's concentrated antitoxin. Some of each group were injected into the gluteal muscle with 1000 units per kg, while others received 2 such doses, 24 hours apart (Table I). *Alpha* antistaphylococcal serum

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³ Glenny, A. T., and Hopkins, B. E., *J. Hygiene*, 1924, **22**, 12-36; 208-222.

⁴ Finland, M., and Brown, J. W., *J. Immunol.*, 1938, **35**, 245.