TABLE I. Serum Potassium Levels in Young Infants. Data from the literature.

Authors	No. of cases	Age	Serum potassium, meq./l Mean	Range
Edelstein and Yllpö(1)	11	Placental blood	11.04	7.09-22.92
Bakwin and Rivkin(2)	20	" "	9.63	5.75-13.00
Kotikoff(3)	14	<1 mo.	7.03	5.30- 8.39
McCance and Young(4)	12	7 to 14 days	7.65	4.25-10.08

TABLE II. Plasma Potassium Levels in Newborns and Infants.

	Plasma potassium, meq/liter — Individual levels									Mean
Placental plasma	4.5	4.6	4.6	5.0	5.1	5.1	5.2	5.3	5.4	4.98
1 to 3 days old	2.7	4.8	5.1	5.1	5.3	5.8				4.89
6 to 9 days old	3.8	4.6	4.7	4.8	4.9	5.1	5.2	5.7	5.8	

plasma was separated from the erythrocytes within 20 minutes of withdrawal from the body. Specimens with more than a faint trace of hemolysis were discarded. All potassium measurements were made on an internal standard flame photometer with an error of less than 1%.

Results. The plasma potassium levels observed in 9 placental samples and in 15 infants ranging in age from 1 to 9 days are recorded in Table II. Although the mean plasma potassium levels are only slightly above the mean normal for adults, all but 2 of the 15 infants have values greater than the adult mean.

Comment. When strict attention is paid to details in obtaining plasma samples, the plasma potassium level in blood obtained from the placenta and from infants under 10 days of age is only slightly greater than the mean normal adult value. Earlier reports of potassium levels in placental serum and in infants' serum well above the normal adult average and ranging up to 23 meq./liter appear to be erroneous.

Summary. Plasma potassium levels of placental and early infantile blood samples are only slightly greater than the mean normal level for adults.

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Bile Acids in Blood and Lymph in Experimental Obstructive Jaundice.* (18622)

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While engaged in studies endeavoring to discover more of the nature of the metabolism of the bile acids in obstructive jaundice, several phenomena were observed which seem sufficiently important to report at this time. In these experiments we have employed the method of Irvin, Johnston, and Kopala(1) for determining the concentration of cholic acid in blood and lymph. This method has shown itself to be reliable, and obviates many of the difficulties encountered in the earlier methods of bile acid analysis.

I. Four dogs were employed. Under intravenous nembutal anesthesia, the common bile duct was double ligated and severed between the ligatures. The cystic duct was ligated

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1. Irvin, J. L., Johnston, C. G., and Kopala, J., *J. Biol. Chem.*, 1944, v153, 439.

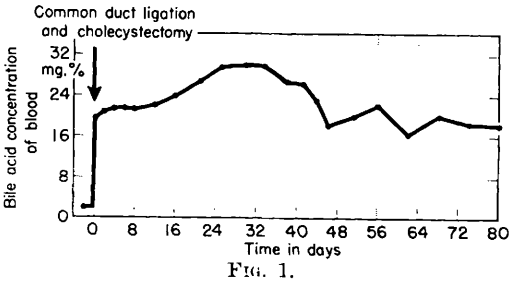

FIG. 1.

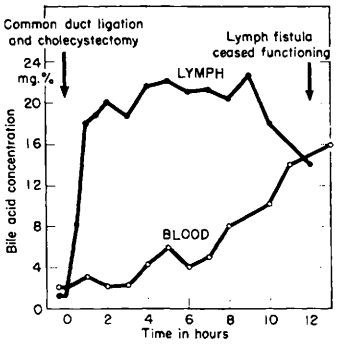

FIG. 2.

and the gall bladder was removed. One blood sample was drawn preoperatively. Postoperative samples were taken at hourly intervals for the first several hours, then at increasingly longer intervals (1 to 5 days) until the animal died. The survival periods ranged from 70 to 105 days. All dogs rapidly developed intense jaundice. They maintained their weight well for the first 30 to 60 days, after which they began to lose weight, refused to eat, and later died, apparently from inanition. They remained active and alert until the terminal period.

The bile acid concentrations in the blood of these dogs all followed a similar curve (Fig. 1). The normal concentration ranges from 1 to 3 mg %. (This is also the normal level found in humans by the use of this method.) Following complete obstruction of the biliary tree with exclusion of the gall bladder, the bile acid concentration of the blood rises suddenly from normal levels to values of 17 to 20 mg % within the first 3 to 4 hours. There is a more gradual rise over the next 20 to 30 days until a peak level of approximately 30 mg % is attained, then a very gradual decline until death supervenes. The lowest value observed was 11 mg % in the terminal phase of one animal. The other three died while the bile acids were still 18 mg % or higher.

II. Again 4 dogs were used. They were all operated upon in the fasting state. The thoracic duct was catheterized by a plastic tube where it entered the left subclavian vein. Specimens of lymph and blood were taken for baseline values. The common bile duct was then ligated and severed and the gall bladder removed as in the previous experiment. Blood and lymph samples were taken at half hour or hour intervals and analyzed for bile acids.

The results are shown in Fig. 2. The initial bile acid concentration of the lymph in these animals was the same as in normal blood (1 to 3 mg %). Following obstruction of the biliary tree and exclusion of the gall bladder the concentration became very high within one hour. The increase in the blood was much slower. It was impossible to carry this experiment farther than 8 to 12 hours because the dogs poured out such large quantities of lymph and became so dehydrated that lymph ceased to flow. The administration of intravenous saline in 2 of the dogs prolonged the flow from the functioning fistula for only a few hours.

Discussion. Other investigators(2,3) have observed rises in bile acid concentration after common duct obstruction, though not as rapidly or as large as in our experiments. In at least one of these experiments(3) the discrepancy can be partly explained by the fact that the gall bladder was left intact. Its concentrating action could account for the fact that very little of the bile acid found its way into the general circulation.

Summary. 1. Studies of the bile acid in the blood of patients with obstructive jaundice indicate that if the blood bile acid increases after obstruction it rapidly returns to normal (4). We are unable to explain this dis-

2. Jungner, G., Rydin, A., and Josephson, B., *Acta. Med. Scand.*, 1938, v97, 254.

3. Chabrol, E., Charonnat, R., and Blanchard, J., *Compt. Rend. Soc. de Biol.*, 1941, v135, 359.

4. Unpublished data.

crepancy between the findings in patients with obstructive jaundice and in our experimental animals. 2. The rapid increase in thoracic duct lymph following common duct obstruction confirms the work of Mayo and Greene (5) indicating that the preferential route through which bile acid reaches the blood stream is through the lymphatics.

5. Mayo, C., II, and Greene, C. H., *Am. J. Physiol.*, 1929, v89, 280.

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Alkyl Nitrites XVI. Comparative Depressor Responses of Octyl Nitrite and Glyceryl Trinitrate. (18623)

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Studies from this laboratory on the pharmacology of high molecular weight alkyl nitrites (1) led to the use of octyl nitrite (2-ethyl-n-hexyl-1-nitrite) (2) in the treatment of angiospastic disease. Octyl nitrite exerts a vapor pressure of 3.3 mm at 25°. This permits the compound to be used clinically in an inhaler and administered by inhalation for the purpose of producing prompt coronary dilatation. Comparisons of the relative efficacy of octyl nitrite and glyceryl trinitrate as therapeutic agents have been made by Freedberg *et al.*(3) and Russek and Anderson(4). The latter investigators found that the inhalation from the octyl nitrite inhaler elicited a therapeutic response comparable to the sublingual administration of 1/200 to 1/300 grain glyceryl trinitrate tablet.

We have been concerned for more than a decade in the mechanism of action of the organic nitrates and nitrites(5,6). Our studies have shown that their actions on a cellular level involve different enzymic components in arterial tissue. The purpose of this study is to assess the relative potency as depressor agents of octyl nitrite and glyceryl trinitrate, and to explore their absorption.

Methods employed. Mongrel dogs weighing from 6 to 13 kg were used in these experiments. The animals were anesthetized with ether. Blood pressure was recorded from the carotid artery with a mercury manometer. Electrocardiograms were made with a "Cardiette." Intravenous injections were made into the saphenous vein; all injections were diluted to 5 cc with normal salt solution. Inhalations of octyl nitrite were achieved by removal of the tracheal ether bottle and replacing it with a 100 cc container into which 0.2 cc of octyl nitrite had been placed.

Results. In 10 dogs, octyl nitrite was administered sublingually in doses of 0.2 cc. There were 12 doses given. Not any of these elicited a depressor response, indicating that octyl nitrite is not absorbed from the buccal mucosa of the dog. Dissolving octyl nitrite in alcohol did not promote its absorption through the buccal membranes. Similarly, amyl nitrite was not absorbed sublingually. In the same dogs, glyceryl trinitrate was administered in the form of the official 1% spirit in doses of 0.2 cc. There were 11 doses given. In all of the 9 animals a depressor response was produced. There were wide variations in depressor response evoked by

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2. Krantz, J. C., Jr., Carr, C. J., and Forman, S. E., *J. Pharm. and Exp. Therap.*, 1938, v64, 302.

3. Freedberg, A. S., Spiegl, E. D., and Riseman, J. E. F., *Am. Heart J.*, 1941, v22, 519.

4. Russek, H. I., and Anderson, W. H., personal communication.

5. Krantz, J. C., Jr., Carr, C. J., Forman, S. E. and Cone N., *J. Pharm. and Exp. Therap.*, 1940, v70, 323.

6. Krantz, J. C., Jr., Carr, C. J., Bryant, H., *J. Pharm. and Exp. Therap.*, 1951 in press.