

creased from 480 mg. % to 260 mg. %. The CO₂ increased from 48.1 vol. % to 78.2 vol. %. The specific gravity increased from 1.027 to 1.030; the hemoglobin decreased from 14 gm. to 11 gm., and the red blood cells decreased by 1,300,000.

Heuer and Andrus⁷ prolonged the lives of dogs receiving intravenous injections of aqueous extracts of closed intestinal loops by administering cortical extract combined with transfusion. Scudder, Zwemer and Truszkowski⁸ fortified our comparison between the clinical and biological picture of acute intestinal obstruction and adrenal insufficiency by demonstrating high blood potassium values in cats with high intestinal obstruction. This assumes special importance in view of Zwemer's and Truszkowski's⁹ findings that symptoms of adrenal insufficiency may be explained in terms of a disturbance of cortico-adrenal-potassium interrelation.

We appreciate that our experiments are too few in number to permit the drawing of definite conclusions, but one would seem justified in emphasizing: 1. The many features in common in acute intestinal obstruction and adrenal insufficiency. 2. The apparent benefit from the combined administration of physiological salt solution and adrenal cortex extracts in combating the toxemia of high intestinal obstruction.

9303

Diffusion of Ions Through Collodion Membranes Treated with Urethanes.

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Anselmino¹ has shown that collodion membranes, made so as to permit a slow passage of thiocyanate ion, have a lowered permeability to this ion when the dialysis system is treated with urethane, and that after the "narcotized" membrane is washed for about an hour with water, the normal thiocyanate permeability is restored. This observation has been frequently used in connection with the thesis that narcotics produce their effects through changes in per-

⁷ Heuer, G. J., and Andrus, W. D., *Ann. Surg.*, 1934, **100**, 734.

⁸ Scudder, J., Zwemer, R. L., and Truszkowski, R., *Surgery*, St. Louis, 1937, **1**, 74.

⁹ Truszkowski, R., and Zwemer, R. L., *Biochem. J.*, 1936, **30**, 1345.

¹ Anselmino, K. S., *Pfluger's Arch.*, 1928, **220**, 524.

meability. When the experiments were extended to the study of the Cl ion, however, similar but less convincing results were obtained; we have, therefore, felt that a more complete investigation of the problem was necessary.

Collodion membranes were made as described by Anselmino, and 5 cc. of M/2 KSCN placed on one side, and distilled water on the other. Determinations of the amount of thiocyanate passing were made at 3, 6, . . . 15 minute intervals by the addition of ferric chloride and comparison with standards. The experiment was then repeated with M ethyl carbamate on both sides of the membrane, and the retardation of diffusion described by Anselmino was confirmed, even when the ionic strengths on both sides of the membrane were equalized by the addition of KCl. Propyl, butyl, iso-amyl, and phenyl carbamate produce a similar effect, the concentration required decreasing with the length of the carbon chain.

On extending the investigation to the rates of diffusion of other ions, however, we found the rates to be quite unaffected by the presence of any of the carbamates, for chloride ion (silver precipitation determination), sulphate ion (Ba determination), nitrate ion (phenylsulphonic acid determination), iodide ion (S_2O_3 determination), permanganate ion, ferrocyanide and ferricyanide ions ($FeCl_3$ determination), ferrous and ferric ions, and finally potassium ion (cobaltinitrite determination) all pass through the collodion membranes as rapidly in the presence of the carbamates as in their absence. It therefore seems that the effect of the narcotics is a specific one for thiocyanate ion, and does not have the general significance which has been attributed to it.

Collodion membranes containing lecithin were then prepared, and when these were used in the same type of experiment we found the addition of the carbamates to cause an *acceleration* of the diffusion of thiocyanate ion, instead of an inhibition. This effect depends on the quantity of lecithin present in the membrane (Table I).

The narcotics, however, produced no effect whatever on the diffusion of sulphate, permanganate, or ferricyanide ion through these

TABLE I.

p. c. lecithin per gm. dry membrane	Ethyl carbamate	mg. SCN' penetrating in 15 min.
.01	Absent	8.
	0.5 M	12.
.05	Absent	6.
	0.5 M	12.
.10	Absent	9.
	0.5 M	25.

lipoid-containing membranes, and again we seem to be dealing with some effect specific for the thiocyanate ion.

In the case of collodion membranes containing varying amounts of lecithin, from 0.01 to 0.1 p.c. of lecithin per gm. of dry membrane, together with varying amounts of cholesterol, from 0.01 to 0.1 p.c. per gm. of dry membrane, the carbamates again produce an acceleration of the diffusion rate of thiocyanate, but the effect becomes less as the amount of cholesterol is increased. The passage of the other ions studied was not affected by the addition of the narcotics.

9304 P

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Adrenalectomized-Depancreatized Dogs.

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We have previously reported¹ that removal of the adrenal glands from the cat ameliorates the effects of pancreatic diabetes to an extent comparable to that obtained by hypophysectomy and, furthermore, that the removal of the adrenal cortex is responsible for this effect of adrenalectomy. Houssay and Biasotti² have recently reported a similar effect of adrenalectomy upon pancreatic diabetes in the toad. Since the dog has been extensively used in the study of experimental diabetes and since several workers have reported that adrenalectomy does not modify an experimental diabetes^{3, 4, 5} in this species, it was of some interest to prepare long surviving animals in which all adrenal and pancreatic tissue had been removed. This was accomplished by first removing one adrenal and at a later date, the pancreas. The animals were then maintained by use of protamine insulin until in good health, when the second adrenal was removed and the insulin discontinued. During the remainder of their lives, they received a diet of meat and raw pancreas and, in addition, from 4 to 8 gm. of NaCl daily. They also received 5-10 cc. of cortical extract (Upjohn) daily. Analyses of the blood at

¹ Long, C. N. H., and Lukens, F. D. W., *J. Exp. Med.*, 1936, **63**, 465.

² Houssay, B. A., and Biasotti, A., *Rev. Soc. Argent. Biol.*, 1936, **12**, 104.

³ Stewart, G. N., and Rogoff, J. M., *Am. J. Physiol.*, 1923, **65**, 319.

⁴ Tureatti, E. S., *Rev. Soc. Argent. Biol.*, 1929, **5**, 173.

⁵ Leloir, L. F., *Rev. Soc. Argent. Biol.*, 1934, **10**, 216.