TABLE I.
Experimental Values for the Phenylalanine Content of Egg Albumin.

Quantity of egg albumin analyzed, mg	G of phenylalanine from 100 g of egg albumin, g	G of phenylalanine residue per 100 g of unhydrolyzed egg albumin, g
87.3	5.20	4.63
87.3	5.33	4.75
87.3	5.33	4.75
84.3	5.29	4.71
72.5	5.53	4.93
72.0	5.35	4.77
64.6	5.31	4.73
54.0	5.33	4.75
52.7	5.16	4.60
48.4	5.31	4.73
36.0	5.33	4.75
	Avg 5.32	4.73

albumin contains 13 phenylalanine residues. On the other hand, adoption of the theory of Bergmann[13] would make it appear probable that one molecule of protein contains 12 phenylalanine residues; and the calculated molecular weight of egg albumin would be 37,300.

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Osmotic Relationships Between Blood Plasma and Intestinal Fluid During Absorption.

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It has been noted by Katzenellenbogen,[1] Goldschmidt, and Dayton[2] and others[3, 4, 5] that univalent ion salts may be absorbed from the intestine against concentration gradients. This paper is concerned with a study of the changes in vapor pressure or osmotic activity accompanying such absorption from the intestine of the dog.

Methods. Vapor pressure determinations were made with the

13 Bergmann, M., *Chem. Rev.*, 1938, **22**, 423.

1 Katzenellenbogen, M., *Pflüger's Arch.*, 1906, **114**, 522.

2 Goldschmidt, S., and Dayton, A. B., *Am. J. Physiol.*, 1919, **48**, 459.

3 Burns, H. S., and Visscher, M. B., *Ibid.*, 1934, **110**, 490.

4 Ingraham, R. C., and Visscher, M. B., *Ibid.*, 1936, **114**, 676.

5 Ingraham, R. C., and Visscher, M. B., *Ibid.*, 1936, **114**, 681.

thermo-electric method as modified by Baldes.[6] This method involves a comparison of the rates of evaporation from or condensation on drops of the sample and of a reference solution when placed on opposite junctions of a thermocouple enclosed in a moist chamber. The deflection of the galvanometer to which the thermocouple is connected is a measure of the difference in temperature of the 2 drops, which in turn is a measure of the difference in vapor pressure of the 2 solutions. The results are expressed in terms of the concentration of the reference solution and since the vapor pressure of a solution varies inversely as the concentration, the term "osmotic activity" will be used in order to avoid confusion. Thus a solution with an osmotic activity of 150 mM NaCl is one in which the vapor pressure is equivalent to that of a solution containing 150 mM NaCl per kg

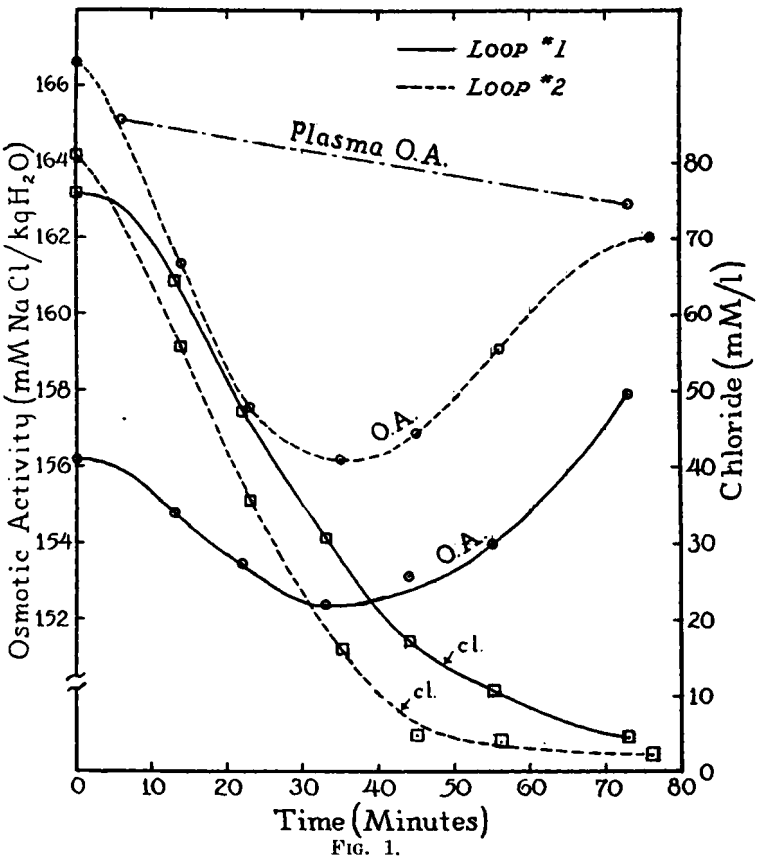

FIG. 1.

Changes in osmotic activity and in chloride concentrations of solutions of NaCl + Na_2SO_4 (in equi-osmotic proportions) when placed in isolated ileal loops.

[6] Baldes, E. J., *J. Sc. Instruments*, 1934, **11**, 223.

water. All determinations of osmotic activity were made in a chamber containing 5% CO_2 in oxygen. Chloride was determined according to the method of Van Slyke.[7]

The animals were anesthetized and the intestinal loops prepared as described previously.[4] Blood samples were drawn in an oiled syringe from the femoral artery, transferred out of contact of air to a test tube containing oil and the required amount of dry heparin (Connaught), the tube stoppered and the plasma separated immediately by centrifugation. Samples of intestinal fluid were drawn with needle and syringes at intervals of from 10 to 30 minutes.

Results. Five different types of experiments were conducted, using solutions of NaCl, NaCl + Na_2SO_4 in equi-osmotic proportions, Na_2SO_4, Na_2SO_4 + .001 M $HgCl_2$, and samples of the dog's own blood serum. In all experiments in which chloride impoverishment occurred, the osmotic activity of the intestinal fluid was decreased during absorption unless it was originally appreciably below that of the blood plasma.

The results of an experiment in which solutions containing NaCl and Na_2SO_4 were placed in isolated ileal loops are given in Fig. 1. It should be noted that during the period of maximum rate of chloride impoverishment, the osmotic activity of the intestinal fluid decreased even though it was originally below that of the blood plasma. At the end of 35 minutes, the osmotic activity of the solution in one loop of the intestine is below that of the blood plasma by an amount corresponding to a difference in osmotic pressure of 355 mm Hg.* In the second loop the difference corresponds to 230 mm Hg.

The osmotic activity of the intestinal fluid was also decreased below that of the plasma when the dogs' own serum or solutions of NaCl were placed in the loops although as a rule the changes were not as great as with solutions of NaCl + Na_2SO_4. With solutions of Na_2SO_4, the osmotic activity of the intestinal fluid approached that of the plasma at approximately the same rate whether the solutions were originally hypotonic or hypertonic. With solutions of Na_2SO_4 containing 0.001 M $HgCl_2$ as a poison, the osmotic activity of the intestinal fluid rose above that of the blood plasma due, apparently, to the diffusion of NaCl from the blood into the intestinal loop.

Summary. During the process of absorption of various solutions

[7] Van Slyke, D. D., *J. Biol. Chem.*, 1923, **58**, 523.

* Calculated according to the relation used by Culbert, McCune, and Weech.[8]

[8] Culbert, R. W., McCune, D. J., and Weech, A. A., *Ibid.*, 1937, **119**, 589.

from isolated loops of dog's ileum the osmotic activity of the loop fluid normally decreases. The total osmotic pressure may fall to a half atmosphere below that of the blood plasma, even when the major solute constituents of the fluid show changes in concentration opposite to those expected on the basis of simple diffusion. These observations appear to leave no doubt as to the occurrence of active osmotic work in intestinal absorption, but they do not permit conclusions concerning the mechanism by which it is performed.

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Some Effects of Menopause Urine Extract on Sexual Organs of Immature Female Cats.

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It has been shown that menopause urine extract is capable of inducing estrus in the mature anestrus cat.[1] Mature and immature cats (ages not stated) have shown a similar reaction when FSH was administered.[2] Bourg[3] reported that in 2 immature cats of 45 days of age and in 2 cats of 15 days of age the ovaries were capable of responding to pregnancy urine extract. Our work was undertaken to study the effect of menopause urine extract on the immature female cat of known age with reference to the general effect on the ovary and uterus.

Menopause urine (pooled samples) was acidified with glacial acetic acid and precipitated with 95% alcohol. The precipitate was washed with ether and stored as a powder. This single batch of material was used for all experiments. The powder was dissolved in distilled water, as needed, and injected subcutaneously. Mature cats re-

1 Collings, W. D., Ph.D. Thesis Princeton Univ. Library, 1938; PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 679.

2 Foster, M. A., and Hisaw, F. L., *Anat. Rec.*, 1935, **62**, 75.

3 Bourg, R., *Compt. Rend. Soc. Biol.*, 1932, **111**, 148.