the casing and the blood residue remains in the casing. After the visible liquid has evaporated, the casing is suspended in air and dried 24 hours or in an oven at 100° and dried for one hour and then analyzed by the McClendon-Bratton method.[1]

It was shown that although KI is washed out of the blood by this means that thyroglobulin-iodine added to the blood is entirely retained. Therefore the method is provisionally considered a method of determining "hormone iodine."

	Hormone Iodine
5 cc beef blood	0.55 γ
5 cc beef blood + 0.5 γ thyroglobulin-iodine	1.04 γ
5 cc beef blood + 1 γ iodine as KI	0.56 γ

The values of 125 determinations on human blood obtained by this method are near 0.3 γ in 5 cc whereas the normal of total blood iodine is near 0.5 γ in 5 cc. Taking 2.5 g iodide by mouth did not greatly raise the "hormone iodine."

10157 P

Effect of Solutions of Salts Normally Present in the Body on Imbibition of Water by Brain Tissue *in Vitro*.*

A. E. TAFT. (Introduced by S. Mudd.)

From the Psychiatric Laboratory, Philadelphia General Hospital.

Earlier experiments[1] on the effects of solutions of various salts on brain cells have led indirectly to this study of imbibition of water in salt solutions by whole brains of white rats.

The rat's brain was chosen in order to find the reaction of the whole organ, so that the relation of surface to mass should be relatively constant. As might have been anticipated, Parry[2] found this relation to be a factor in variations in the degree of swelling of muscle tissue.

If the swelling is not allowed to go on until a constant is reached,

1 McClendon, J. F., and Bratton, A. C., *J. Biol. Chem.*, 1938, **123**, 699.

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1 Ludlum, S. DeW., Taft, A. E., and Nugent, R. L., *Arch. Neur. and Psy.*, 1930, **23**, 1121.

2 Parry, A. A., *J. Cell. and Comp. Physiol.*, 1936, **8**, 277.

comparisons are open to error, and since brain tissue is so rapidly hydrated when left in water or in salt solutions of any degree of hypotonicity, it seemed that small total brains might yield more satisfactory results than larger brains or blocks of tissue. In the case of the latter, the difference in the swelling capacities of gray and white matter is a point of special significance in making comparisons.

The brains were removed from young animals up to 10 days of age after decapitation; in older ones, after ether. The removal was done rapidly, they were weighed immediately and placed at once in the various solutions. The results are based on more than 300 weighings.

The fluid series was made up of distilled water alone, Ringer-Tyrode solution, sodium, potassium, magnesium and calcium chlorides in distilled water at a concentration iso-osmotic with Ringer's solution. This was made according to Höber[3]: NaCl 0.8%; $NaHCO_2$ 0.1; KCl 0.02; $CaCl_2$ 0.02; $MgCl_2$ 0.01; NaH_2PO_4 0.005.

After standing 24 hours in the several solutions in the refrigerator, the specimens were weighed again, with particular care in draining and deducting the weight of excess water which collected in the weighing pan during the process of weighing.

There was more or less difference in the individual results, but for the sake of brevity the average of the swelling quotients, expressed in terms of gain in weight, are presented:

H_2O	Ringer	NaCl	KCl	$MgCl_2$	$CaCl_2$
2.56	1.37	1.36	1.48	1.39	1.25

These weights have the same general relations as those in the individual series. The standard error (variation) is ± 0.03, except for KCl, ± 0.05.

A second set of similar experiments was made in which the brains were allowed to stand in the same series of salt solutions for 90 minutes, at room temperature, when they were changed to distilled water for 24 hours in the refrigerator with these results:

H_2O	Ringer	NaCl	KCl	$MgCl_2$	$CaCl_2$
2.56	2.44	2.26	2.16	1.90	1.71

The standard error (variation) in this series is ± 0.1; this value applies to H_2O throughout.

In the first series, in which only salt solutions were used, the difference between the value for water alone and those for the salt

[3] Höber, R., *Physikalische Chemie der Zelle und der Gewebe*, 6th Ed., 1926, p. 666.

solutions is clear, with the figure for Ca notably smaller than the others.

In the second series, in which the salt solutions were followed by distilled water, the difference between the figures for water alone, and after the salt solutions is relatively little, except in the instances of Mg and Ca.

Since the same anion is present in both series, in each case of the individual salts, the bi-valent cations are apparently the chief factors of influence.

Where the same points are concerned, these results correspond in general to those of Haldi[4] and his associates in relation to swelling of brain tissue. They indicate an effect of Ca on brain tissue similar to that reported by Höber[5] on the plasma membrane and other parts of various cells, and to the findings of Langmuir and Blodgett[6] on the effect of salt solutions on mono-layers, and those of Herbst,[7] who observed that the individual cells of developing echinoderm eggs fall apart in Ca-free water, but are united again on the addition of Ca.

The findings have a bearing on the importance of these salts in maintaining normal water relations in the body tissues, notably in the brain.

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Vitamin C Nutrition in Artificial Fever.

JANE ZOOK AND GEORGE R. SHARPLESS. (Introduced by F. W. Hartman.)

From the Department of Laboratories, Henry Ford Hospital, Detroit, Michigan.

A number of studies have shown that Vitamin C requirement is increased in pneumonia, tuberculosis, and other diseases. It has been suggested that the decreased Vitamin C excretion in pneumonia may signify a greater requirement because of an increased metabolic rate.[1] Heise and Martin[2] have shown an increased rate of utiliza-

4 Haldi, J. A., and Rauth, J. W., *Am. J. Physiol.*, 1925-26, **75**, 294; *ibid.*, 1927, **80**, 631.

5 Höber, R., *loc. cit.*, p. 695.

6 Langmuir, I., and Blodgett, K. B., *Koll. Z.*, 1936, **73**, 257.

7 Herbst, C., in Höber, p. 695.

1 Bullowa, J. G. M., Rothstein, I. A., Ratish, H. D., and Harde, E., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 1.

2 Heise, F. H., and Martin, G. J., *Am. J. Dig. Dis. and Nutrit.*, 1937, **4**, 368.