creasingly large number of people will reach adult life without exposure to a tubercle bacillus infection; some sort of vaccination may have to replace the "normal childhood infection."

In a thoughtful epilogue, one is again reminded of the well-known fact that "wars, internal and external, financial depressions and labor troubles are all breeders of infectious disease. Who knows, a serious world-wide epidemic might perhaps do more to initiate a sense of genuine international cooperation." Artificial dissemination of disease as a war measure is likely to be unsuccessful, but such a weapon could be created. To combat it, Burnet believes "would require a wholly new social technique, which would bring to light as leaders men of entirely different instinctive qualities from those who now stand in authority."

This book in its handy and convenient form and with its vast store of material carefully and attractively presented is highly recommended to everybody, but in particular to all students in medicine and biology.

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SPECIAL ARTICLES

THE EFFECT OF 17-HYDROXYCORTICOSTERONE AND RELATED ADRENAL CORTICAL STEROIDS ON SODIUM AND CHLORIDE EXCRETION[1]

RECENT studies[2] suggested that adrenal cortical steroids with a hydroxyl group on C_{17} induced an increased excretion of sodium and chloride in contrast to the well-known sodium and chloride "retaining-effect" of other adrenal steroids such as corticosterone and desoxycorticosterone.[3] For this reason a comparison has been made of the effect of a number of adrenal cortical steroids on the renal excretion of sodium and chloride in an effort to determine, if possible, the relationship of chemical structure to physiological activity. The experimental methods which have been used are similar to those which have been reported previously.[3]

The subcutaneous injection of 5 and 8 mg respectively of 17-hydroxycorticosterone was followed by a significant increase in the renal excretion of sodium and chloride in a normal dog (Table 1). 1 mg of this substance was ineffective in this respect. The injection of 25 mg of 11-dehydro-17-hydroxycorticosterone was followed by a striking increase in sodium and chloride excretion in both a normal dog and an adrenalectomized dog maintained on a low sodium chloride intake. In the normal dog, sodium excretion increased from a level of 10 m.eq. per day prior to treatment to 25 m.eq. on the day of therapy. In the adrenalectomized dog sodium excretion increased from a level of 10 m.eq. per day prior to treatment to 48 m.eq. on the day of therapy. In both instances chloride excretion paralleled the changes in sodium excretion. In normal rats the injection of 6 mg of 11-dehydro-17-hydroxycorticosterone increased the 24-hour excretion of sodium chloride by approximately 75 per cent. during the day of therapy. Potassium, nitrogen and inorganic phosphorus excretion were increased appreciably during treatment with either 17-hydroxycorticosterone or 11-dehydro-17-hydroxycorticosterone in normal and adrenalectomized dogs and rats. The relation of these changes to changes in carbohydrate metabolism have been considered.[1]

In contrast to the effect of these two compounds, treatment with desoxycorticosterone or corticosterone was followed by a significant retention of sodium and chloride (Table 1). Allopregnane-3,11,17,20,21-pentol and allopregnane-3,17,20-triol were found to be inactive. When 11-desoxy-17-hydroxycorticosterone is available for experimental use it will be possible to determine the physiological effect of the hydroxyl group on C_{17} in the absence of an oxygen atom on C_{11}. The relation of chemical structure to physiological activity is illustrated in Fig. 1.

TABLE 1

THE EFFECT OF ADRENAL CORTICAL STEROIDS ON THE RENAL EXCRETION OF SODIUM AND CHLORIDE IN NORMAL DOGS

24-hour period	Urine volume cc	Sodium m.eq.	Chloride m.eq.	Substance	Quantity mg
Control	480	56	53		
Treated	640	71	67	17-Hydroxycorticosterone	5
Control	500	50	50		
Treated	600	69	62	17-Hydroxycorticosterone	8
Control	450	54	55		
Treated	520	46	49	Corticosterone	4
Control	470	56	56		
Treated	420	29	38	Desoxycorticosterone	1
Control	530	57	59		
Treated	480	56	57	Allopregnane-3,17,20-triol	5
Control	650	57	61		
Treated	640	58	61	Allopregnane-3,11,17,20,21-pentol	5

[1] This study was aided by a grant from the Committee on Research in Endocrinology, National Research Council.

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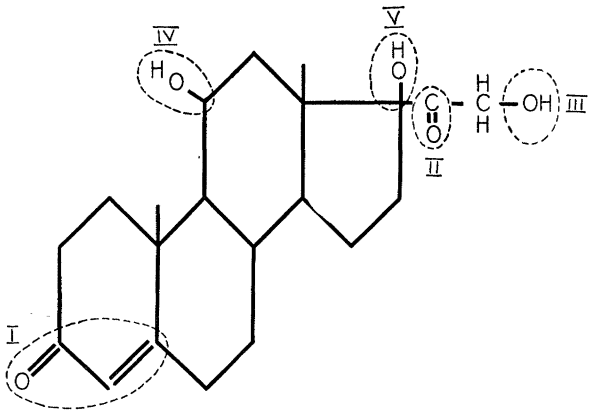

FIG. 1. I. Is essential for all known physiological activity. II. Is essential for all known physiological activity. III. Enhances sodium retention; necessary for carbohydrate activity. IV. (Either a hydroxyl or a carbonyl group.) In the presence of III, decreases sodium retention and increases carbohydrate activity. V. In the presence of III, and ? IV, increases carbohydrate activity and induces sodium excretion.

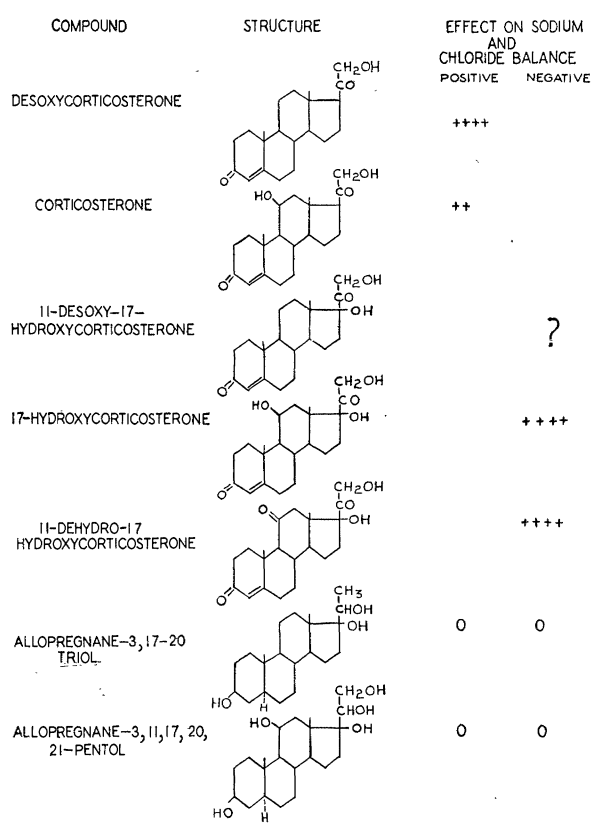

FIG. 2

These studies help to clarify a number of controversial experimental data in regard to the effect of various cortical extracts and their derivatives on electrolyte metabolism. It is also apparent from this study why desoxycorticosterone acetate therapy, (sodium-retaining factor) in Addison's disease produces edema so readily in contrast to treatment with adequate doses of potent adrenal cortical extract which contains a mixture of "sodium-retaining" and "sodium-excreting" factors.

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THE ENZYMATIC LINK BETWEEN DIHYDRO-DIPHOSPHOPYRIDINE NUCLEOTIDE AND CYTOCHROME C

ALTHOUGH it has been generally held that reactions involving diphosphopyridine nucleotide (DPN) are linked to oxygen through cytochrome C, no isolated enzyme system has as yet been shown to catalyze the reduction of cytochrome C by reduced DPN (DPN · H_2). Corran, Green and Straub[1] have suggested that heart flavoprotein performs this function, but no evidence has been presented on which such a suggestion can be based. Lockhart and Potter[2] demonstrated the existence in crude heart muscle extract of such an enzyme system, but the active agent was apparently not capable of being extracted in a soluble form and therefore could not be subjected to fractionation and purification. In this note we are reporting the extraction from baker's yeast of a soluble enzyme which is very active in catalyzing the reduction of cytochrome C by DPN · H_2.

A spectrophotometric test similar to that used by Haas, Horecker and Hogness[3] in the isolation of cytochrome reductase was used. The DPN was reduced by a system consisting of hexose disphosphate, arsenate and an acetone dried enzyme powder containing zymohexase, isomerase and phosphoglyceraldehyde oxidase prepared according to the method of Warburg and Christian.[4] The DPN is incubated with this mixture for one-half hour at 25° and then heated for five minutes to 85° to destroy all the enzymes present. The DPN · H_2 is unaffected by this heating process and is stable for several days. Upon mixing an excess of DPN · H_2 and cytochrome C in an absorption cell,

[4] John D. Archbold Fellow-in-Medicine.

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