

produce a variety of steroid hormones, chemically related to vitamin D and cholesterol. The major steroid of the adrenal cortex is compound F (17-hydroxycorticosterone). Cortisone (17-hydroxy-11-dehydrocorticosterone) is chemically similar to compound F, but is present in only small quantities in the adrenal cortex. The administration of ACTH and cortisone or similar steroids causes an alteration in the circulating level of adrenal steroids. The clinical effects produced depend on the degree to which this basal steroid level is altered, i. e., increased or decreased. It is for the latter reason that there is great variability in clinical response with identical doses of ACTH or the adrenal steroids. Just as there are considerable variations in steroid levels, so are there great variations in adrenal gland sensitivity to ACTH. With either ACTH or cortisone there is no specific dose that is consistently, uniformly effective in all patients. The dose must be individualized.

TABLE 1.—*Physiological Changes Associated with Reduced Adrenal Cortical Function*

1. Sodium and chloride loss (urine, sweat, saliva)
2. Potassium retention
3. Glycogen depletion (liver and muscle)
4. Impaired fat mobilization and utilization
5. Decreased gluconeogenesis from protein
6. Increased antidiuretic activity
8. Altered muscular function (heart and skeletal)
9. Lymphoid hyperplasia
10. Abnormal pigmentation

TABLE 2.—*Physiological Changes Related to Excessive Corticoid Levels*

1. Hypochlôremic alkalosis with hypopotassemia
2. Hyperglycemia, glycogenosis and glycosuria
3. Negative nitrogen balance
4. Hematological changes (erythropoiesis, eosinopenia, lymphopenia)
5. Lymphoid involution
6. Depression of thyroid function
7. Increased pepsin and uropepsin production
8. Hyaluronidase inhibition
9. Increased pigmentation
10. Psychological changes

A variety of physiological alterations associated with reduced adrenal cortical function are listed in table 1. They consist of electrolyte effects, carbohydrate, fat and protein effects, neuromuscular changes, hematological and cellular effects. While these disturbances are characteristic of severe adrenal cortical insufficiency, there is no evidence to date that similar, though less marked, changes are not present in many disease processes. Indeed, with the measurements of adrenal cortical activity which are available to us today, no alteration is found in this activity even in those diseases which respond dramatically to ACTH or cortisone treatment.

A number of physiological changes also result when there is increased adrenal cortical activity (table 2). They comprise the principal effects of corticoids and form the basis for the discussion which follows. With few exceptions, these are generally the opposite of those present in adrenal hormone insufficiency.

The manner in which ACTH and cortisone modify specific disease processes is still unknown, but it appears that the effect is a nonspecific one in which cellular reaction and consequent cellular destruction are prevented. It is unlikely, however,