DAILY CHANGES IN URINARY TESTOSTERONE LEVELS OF THE HUMAN MALE

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The observation of an 8- to 10-day cyclic excretion of urinary oestrone in the normal human male (Exley & Corker, 1966) and the suggestion that this could be the result of a cyclic secretion of oestrone by the testes, stimulated a search for evidence of such a cycle in the urinary excretion of testosterone. Testosterone is excreted in the urine mainly as testosterone glucosiduronate and although the amount excreted of this urinary metabolite is not an accurate parameter of testosterone production it is considered to provide a reasonable indication of this production in the human male (Horton, Shinsako & Forsham, 1965). A longitudinal study of the daily excretion of urinary testosterone was therefore undertaken.

Two normal male subjects with sedentary occupations who abstained from unusual exertion during the period of urine collection were investigated. Subject A was 28 yr. old, 5 ft. 11 in. tall, weighed 161 lb. and was married. Subject B was 19 yr. old, 5 ft. 11 in. tall, weighed 168 lb. and was unmarried. Twenty-four hr. samples of urine were collected for 42 consecutive days from each subject. Creatinine was determined by the method of Delory (1949) in order to obtain a correction factor for inaccurate urine collections. The amount of urinary testosterone excreted was determined with an average accuracy of ±3·6% between duplicate determinations by the method of Corker & Exley (in preparation) which is a modification of the method of Ismail & Harkness (1966a) and more accurate. A radioactive label was used to determine recovery together with an internal standard for flame ionization gas-liquid chromatography of acetylated testosterone.

The creatinine-corrected urinary testosterone results of the two subjects are shown in Fig. 1. Each result is shown as a percentage of the mean value of each subject, and errors are indicated when they exceed ±1%. The mean urinary testosterone excretion of subject A was 109 µg./24 hr. and 88 µg./24 hr. for subject B. The coefficient of variation about the mean was ±30·2% for subject A and ±20·3% for subject B. The fluctuations in the levels were large, and urinary testosterone levels would therefore have to be determined for several days in order to detect abnormalities of testosterone excretion.

No evidence of an 8- to 10-day cycle was found in subject A and very little for subject B, but close examination of the excretion values in B suggests peaks of excretion around days 5, 14, 20, 31 and 40, making the average interval between peaks approximately 9 days. The only other longitudinal studies of urinary testosterone excretion so far reported are those of Ismail & Harkness (1966b) who used a less
accurate method for determining testosterone and made two short serial studies of 14 days only and one of 26 days. They reported intervals of 6 and 12 days between peaks of excretion. Thus there is some evidence of cyclic activity but no

definite 8- to 10-day cycles can be observed in the amounts of urinary testosterone excreted. This could mean that there may be a cyclic production of testosterone, but due to the complex metabolism of this hormone or other factors this cannot be ascertained by the serial determination of urinary testosterone. No further subjects were studied and plasma testosterone levels are at present being investigated.

REFERENCES