Short Communications

Urinary Excretion of a Pterin after Administration of Pteroylglutamic Acid

T. FLOYSTRUP, M. A. SCHOU and
H. M. KALCKAR

*Institute of Cytophysiology, University of
Copenhagen, Copenhagen, Denmark*

Koschara's¹ observation that xanthopterin is excreted in human urine has gained in importance after the identification of folic acid with pteroylglutamic acid. We have been able to obtain a significant increase in the excretion of xanthopterin in human urine after oral or intramuscular administration of pteroylglutamic acid. (Fig. 1.)

Fig. 1. Administration of pteroylglutamic acid.

- A. 15 mg per day orally.
- B. 50 mg per day orally.
- C. 15 mg per day intramuscularly.
- D. 45 mg per day intramuscularly.

Xanthopterin does not occur in a free state in the urine, as revealed by the fact that the fluorescence of untreated urine does not decrease after addition of xanthopterin oxidase, which would convert any free xanthopterin to the non-fluorescent leucopterin. The fluorescence of urine is therefore due to other substances, *e. g.* riboflavin. Xanthopterin can be obtained from the urine by adsorption on coal or superfiltrol and subsequent elution with dilute alkali³. In the neutralized eluate it may be determined quantitatively by the enzymatic method previously described².

Obviously the compound present in untreated urine is not xanthopterin and we have called it 'pro-xanthopterin'. It is not fluorescent and is stable in the dark between pH 1 and 13. When irradiated with ultraviolet light at pH 7–8 it is converted to xanthopterin and the same transformation takes place by heating to 100° C for about ten minutes. The R_F value of 'pro-xanthopterin' as determined in a paper chromatogram is about half that of xanthopterin in a butanol-acetic acid-water mixture.

At pH values lower than 8–9 xanthopterin is partly and reversibly converted to a non-fluorescent compound, which is not oxidized by xanthopterin oxidase³. This compound differs from 'pro-xanthopterin' in the following respects: 1) At pH 10 it is rapidly reconverted to xanthopterin, 2) its stability is unaffected by ultraviolet irradiation and 3) it is on heating transformed to xanthopterin at a much faster rate than is 'pro-xanthopterin'.