This work will be published elsewhere in greater detail.

O. D. KOWLESSAR
K. I. ALTMAN
L. H. HEMPELMANN

Divisions of Experimental Radiology
and Radiation Biology,
University of Rochester
School of Medicine and Dentistry,
Rochester, New York.
July 8.

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A Disturbance of Tryptophan Metabolism in Congenital Hypoplastic Anæmia

THE clinical entity originally designated as congenital hypoplastic anæmia¹ and more recently termed erythrocytogenesis imperfecta² is a rare type of anæmia characterized by an erythroid hypoplasia of the bone marrow, by normocytic and normochromic circulating red cells, and by the lack of response to any of the known erythropoietic agents. In the course of some metabolic studies conducted on one such patient whose anæmia was diagnosed shortly after birth and who had been studied for four years by one of the authors (G. M.), a strongly bluish-fluorescent substance was noted in the urine. (This patient has been studied through the kindness of Dr. C. P. Katsampes.) This fluorescent material was identified as anthranilic acid by chromatographic methods³, isolation from the patient's urine, and by spectroscopic techniques. The R_F of this fluorescent material was 0.90 in butanol:acetic acid:water, 1:1:5, in agreement with the R_F of a known sample of anthranilic acid. The melting point of the material isolated (144–146°) and the absorption spectrum are identical with comparable data reported in the literature for anthranilic acid.

Oral administration of 1.6 gm. of L-tryptophan led to increased urinary excretion of anthranilic acid as well as to the excretion of other intermediary metabolites of tryptophan.

On the basis of the available knowledge concerning tryptophan metabolism it was reasoned that anthranilic acid was most likely to accumulate in excessive amounts under conditions of riboflavin deficiency. This point of view has recently been confirmed by the work of Charconnet-Harding *et al.*⁴ and Mason⁵. In order to test the validity of this postulate, the patient in question was treated with massive doses of riboflavin per os (200 mgm. per day for 17 days and then 100 mgm. per day for 13 days). Although no change in the hæmatological status was observed even after one month under this therapeutic regimen, there appeared to be a decrease in the amount of anthranilic acid excreted.

Specimens from eight additional cases have been made available to us and in all instances anthranilic acid could be found in the urine. (Specimens of urine from cases studied elsewhere were furnished through the kindness of Drs. I. A. B. Cathie, L. K. Diamond, E. Freshman and C. H. Smith.) In one case (specimen and information on the case furnished by Dr. L. K.

Diamond) experiencing hæmatological improvement nine weeks after splenectomy, anthranilic acid was still detectable in the urine. Urinary specimens collected at random on the pædiatric ward revealed no case in which anthranilic acid was detectable in the urine.

The findings reported here are suggestive of an inborn error in tryptophan metabolism. The relationship of this metabolic disturbance to the co-existing anæmia has, as yet, not been elucidated. Studies aimed at exploring this point are now in progress. The genetic disturbance, if such exists, may be pleiotropic in nature. None of the members of the immediate family of the patient studied was found to excrete the metabolite in question. Details of this work will be published elsewhere.

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K. I. ALTMAN
GERALD MILLER

Divisions of Experimental Radiology
and Radiation Biology,
University of Rochester
School of Medicine and Dentistry,
Rochester, New York.
July 8.

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Quantitative Aspects of the Indirect Action of X-Radiation at Various Concentrations on *E. coli*

THE lethal effects of irradiations with X-rays on *E. coli* have been studied. Our observations were made on bacteria dried, or suspended either in 2 per cent broth or saline solution, at bacterial densities of 10^{-1} to 10^{-10} gm./ml. Some experiments were also made by adding 10^{-3} M cysteine to the solutions. An X-ray tube was used operating at 110 kV., and 4 m.amp., at a dose-rate of 36 r./min., without any additional filter.

The overall configuration of the curves paralleled that observed by other authors on tobacco mosaic virus¹, rabbit papilloma virus² and S-13 *coli* phage³. Our results can be partly explained on the basis of widely accepted theories. On the dry bacteria and strongly concentrated suspensions, the effect is only direct; as the concentration is diminished (in the absence of broth), both direct and indirect effects occur. If the suspending medium contains cysteine, the indirect action is reduced; it disappears if the medium contains broth.

There is no clear explanation of the observation that the dose giving 36.8 per cent survival (D_{37}) is independent of the bacterial concentration, at extremely diluted cell suspensions. The hypothesis (Lea⁴, p. 317), that the 'death' of a bacterium is due to a direct effect only, cannot be accepted under the conditions of our experiments. The marked difference between the D_{37} for irradiated dry bacteria and for those in water, as well as the chemical protection, necessarily require an explanation of the absence of