An abnormal hemoglobin in red cells of diabetics

In a survey carried out on 1200 patients from Tehran University Hospitals, in addition to three rare hemoglobins which are under investigation both in our department here and at the University of Cambridge, two patients also showed an abnormal fast moving hemoglobin fraction: both were suffering from diabetes mellitus.

Studies were started to investigate the occurrence of this abnormal fraction in other diabetics, and in 47 cases examined in the last three months, including 11 children with severe diabetes mellitus, the additional fraction was detected. Routine hematological examination according to standard methods gave normal results in the majority of cases.

Electrophoresis of hemoglobin was carried out on cellulose acetate according to Graham and Gruenbaum; the abnormal fraction does not separate well by this method, but there is a broadening of the Hb A band. In starch gel electrophoresis with tris-EDTA-borate buffer pH 8.1 (ref. 1) the additional fraction moves a little faster than Hb A and slower than Hb J (Iran) (Fig. 1).

Agar gel electrophoresis in citrate buffer pH 6.2 by the method of Robinson et al. is the method of choice for the separation and demonstration of this fraction which moves in front of Hb A to the cathode in the same position as Hb F (Fig. 2).

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Fig. 1. Starch gel electrophoresis in tris-EDTA-borate buffer, pH 8.1. a-Dianizidine stain, ref. 7. a: normal; b: Hb A + Hb x; c: Hb A + Hb J (Iran).

Fig. 2. Agar gel electrophoresis, pH 6.2. a: Hb A+x; b: normal; c: Hb A+Hb F.

Fig. 3. Agar gel electrophoresis, pH 6.2. a and d: normal; b: hemolysate (enriched) of abnormal fraction; c and e: diabetic hemoglobins.

Starch grain electrophoresis is performed with barbital buffer pH 8.6—0.05 in maize starch and the faster proton of the Hb A band which contains the abnormal fraction is removed, eluted from the starch, concentrated in vacuum and re-run on paper to enrich the abnormal fraction. The electrophoretic pattern of this enriched preparation can be seen in Fig. 3b.

For further investigation the hemolysate was reacted with p-chloromercuribenzoate (PCMB) by the original method of Bucci and Fronticelli as modified by Rosemeyer and Huehns, and the peptide chains were separated by starch gel electrophoresis.

Fig. 4 shows that in diabetic hemolysate, in addition to normal \( \alpha A^{MB} \) and \( \beta A^{MB} \) there exists an additional fast moving \( \alpha \) chain. The separation of peptide chains in urea gel according to Chernoff et al. fails to separate the additional peptides.

No previous report has appeared in the literature on this subject and further work is needed to clarify the nature of the abnormality.

Fig. 4. Starch gel electrophoresis of PCMB-treated hemoglobins. a: normal; b: diabetic. Note the existence of an additional band faster than \( \alpha A \) (↑).
Some urinary indole metabolites of vitiliginous patients

The depletion of the skin melanin is the primary criterion of vitiligo. In consideration of the facts that some natural melanins are indole melanins, that melatonin\(^1\) (5-hydroxy-N-acetyl tryptamine) acts as a lightening agent in vitiligo and that 5-hydroxytryptamine (5HT)\(^4\) is a pigment-enhancing factor, it is conceivable that vitiligo may have some connection with abnormal indole metabolites. Urinary indole metabolites provide a valuable documentation on the metabolism in diseases involving abnormal indole compounds. It was, therefore, of interest to examine the urinary indoles in vitiliginous subjects in connection with our studies on psoralene drugs\(^*\). In the present communication we report some of our results.

MATERIALS AND METHODS

Twenty-four hour urine from thirty vitiliginous patients and twenty non-vitiliginous control subjects (males and females; age group 15–72 years) were collected. They had no evidence of senile cataract, van der Hoeve’s syndrome or hepatic disorder and they did not receive any hormonal therapy. The urinary samples of young women


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