Fig. 5

plying at a centre from which three double-walled cristae of a disrupted mitochondrion radiate into the cytoplasm. In this cell (and in Fig. 3) there are three mitochondrial foci in which the walls of the mitochondria have become sinuous and are enveloping the viral particles. In Fig. 4 viral particles are found within disintegrated mitochondria. Fig. 5 shows a cell in which the protoplast has been transformed into virus particles and membranes.

We thank Mrs. Masako Osumi and Mr. Wilbert Bowers for the electron micrographs.

This work was supported in part by a training grant, 5T1 GM 593-03, from the U.S. National Institutes of Health.

CARL C. LINDEGREN
YONG NYU BANG

Biological Research Laboratory,
Southern Illinois University,
Carbondale.

GENETICS

Occurrence of Transferrin D₁ in Korea

So far, sixteen electrophoretically distinguishable transferrin variants have been distinguished by means of starch-gel electrophoresis^{1,2}. Observations on the frequency and distribution of the variants have been recently summarized by Giblett³. In all populations examined transferrin C is by far the most frequently encountered. Those variants which occur in a measurable gene frequency are usually restricted to certain populations. Transferrin D₁ is widely distributed and has been reported most frequently in American and African Negroes. It has also been reported as occurring in New Guinea, Fiji, New Hebrides, Malaya, Thailand, Philippines, Formosa, Ceylon, India, Central and South America and Sweden.

Recently, however, using a modification of the vertical gel-electrophoresis technique, it has been possible to discriminate a transferrin variant with a mobility very similar to D₁. This variant was originally found in Chinese populations and has been designated D_{Chi} (ref. 4). Kirk, Parker and Bearn⁵ re-investigated the transferrin D₁ variants previously reported from different populations to determine whether those transferrin previously classified as D₁ might represent D_{Chi} variants. The D_{Chi} variant was found exclusively in Ceylon, Thailand, north-east India, Malaya, Turk Islands, Formosa, and Japan. Since no transferrin D₁ variants were observed in these areas, it seemed likely that if a transferrin variant occurred in appreciable frequency in Korean populations, it would be of the D_{Chi} type.

Analysis of 120 samples of serum from individuals from Korea disclosed one in heterozygous D variant which proved to be D₁. The occurrence of the D₁ variant in a very low frequency could be ascribed to mutation

Fig. 1. Comparison of Korean transferrin variant and standard CD₁ and CD_{Chi} by autoradiography after starch-gel electrophoresis. Transferrin C is the faster migrating and transferrin D the slower migrating of the two components. A = CD₁, B = CD_{Chi}, C = Korean samples (CD₁)

pressure alone. It will be of interest to examine a larger sample to obtain an accurate estimate of the gene frequency of D₁ in the Korean population and to determine whether the D_{Chi} variant is also present.

This work was supported in part by the U.S. National Foundation.

BONG-SOP SHIM*

Rockefeller Institute,
New York.

* Present address: Department of Biochemistry, Catholic Medical College, Seoul, Korea.

¹ Parker, W. C., and Bearn, A. G., *Science*, **137**, 854 (1962).

² Glen-Bott, A. M., Harris, H., Robson, E. B., Bearn, A. G., and Parker, W. C., *Acta Genet.* (in the press).

³ Giblett, E. R., in *Progress in Medical Genetics*, 1962, edit. by Steinberg, A. G., and Bearn, A. G., 34 (Grune and Stratton, New York, 1962).

⁴ Parker, W. C., and Bearn, A. G., *Ann. Hum. Genet.*, **25**, 227 (1961).

⁵ Kirk, R. L., Parker, W. C., and Bearn, A. G., *Acta Genet.* (in the press).

Does a Connexion exist between Blood Group Modifications observed in Leukæmia and Certain Chromosomal Alterations?

A LARGE number of blood group modifications have been observed during the evolution of leukæmias. They belong most often to the ABO system, and can be divided in two classes: (1) In the first group one can classify the cases where a transformation from groups A or B into A weak is observed, or a transformation into group O by a progressive substitution of the substance H, for the substances A or B. (2) In the second group one can classify the cases where the diminution of the antigen A or B is not accompanied by a corresponding increase in substance H, and the cases where, the patient being group O, one assists progressively in the disappearance from his red-cells of the substance H (ref. 1).

As these modifications occur most often in the course of acute myelogenous leukæmias, and as there are strong reasons for believing that the alterations of the chromosomes observed in the leukæmias of this type also affect the erythroblasts, the blood group modifications are perhaps a result of a genetic alteration of the latter.

It is known that the antigens of the ABO system blood group develop from a fundamental substance formed in the erythroblasts^{3,4} (Morgan and Watkins, Salmon). This is transformed into substance H by the action of a pair of genes Xx and then the substance H is transformed into substance A by the gene A or into substance B by the gene B. It follows, therefore, that one can consider very schematically that the sum of the antigens A, B and H is constant in the red cell, all development of the antigen A, causing a reduction in the quantity of the antigen H, and all diminution of the formation of the antigen A ending in an accumulation of the substance H.

The transformations from group A into A 'weak' might therefore result from a chromosomal alteration located in the locus containing the genes of the ABO system; one