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ABO Antigens in the Human Cornea

It has been found that mammalian cornea is capable of eliciting an immunity reaction and of succumbing to it¹. The following is a report of findings that human corneas possess *A* and *B* blood-group specific substances. Homogenized corneal tissue, obtained under sterile precautions by trephining the central portion of the cornea from cadavers, not later than 12 hr. after death, was used for adsorption of high-titred normal human sera. To 0.5 ml. of *A*, *B* and *O* sera, diluted 1 : 2 with normal saline, 0.5 ml. of corneal homogenate was added. The adsorption was carried out at 6° C. for 8 hr., the serum-cornea mixture being shaken every 15-30 min. The anti-*A* and anti-*B* titre of the serum was examined against erythrocytes by the double serial dilution method, both before and after adsorption.

It has been found that corneal material from a donor of blood group *A* significantly reduced the anti-*A* titre of *O* antiserum, while the anti-*B* titre remained unchanged. Similarly, corneal homogenate from a donor of blood group *B* reduced only the anti-*B* titre of the *O* serum. Corneas from *AB* donors reduced both the anti-*A* and anti-*B* titre of the serum, while material from donors of blood group *O* was ineffective in reducing either the anti-*A* or anti-*B* titre.

Eluates were prepared after the adsorption by shaking the washed adsorbates in a 56° C. water-bath². The eluates agglutinated red blood cells of the corresponding group.

Twenty samples of corneas belonging to donors of blood groups *A-5*, *B-5*, *AB-3* and *O-7* were examined by adsorption and elution experiments. In all cases identity of antigenic substances of the corneal material and erythrocytes has been proved.

Distinct differences in intensity of agglutination were always observed in the last two to three tubes of the titration.

Table 1. TYPICAL RESULTS OF ADSORPTION AND ELUTION EXPERIMENTS

Titre of serum <i>O</i> before adsorption	Corneal material from donor of blood group	Titre of serum <i>O</i> after one adsorption with corneal homogenate	Titre of eluate against red blood cells
Anti- <i>A</i> 1 : 64 Anti- <i>B</i> 1 : 128	<i>A</i>	1 : 8 1 : 128	1 : 4 1 : 1
Anti- <i>A</i> 1 : 64 Anti- <i>B</i> 1 : 128	<i>B</i>	1 : 64 1 : 64	0 1 : 4
Anti- <i>A</i> 1 : 32 Anti- <i>B</i> 1 : 64	<i>AB</i>	1 : 8 1 : 32	1 : 2 1 : 8
Anti- <i>A</i> 1 : 64 Anti- <i>B</i> 1 : 128	<i>O</i>	1 : 64 1 : 128	0 0

In one case three consecutive adsorptions with corneal material of the same group were performed. The titre of the antiserum was thus reduced from 1 : 128 to 1 : 1.

The question whether failures of corneal transplantation could be explained on the basis of group incompatibility between donor and recipient is under investigation.

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Chromatographic Behaviour of Hæmoglobin E

RECENTLY, the chromatographic separation of four different human carboxyhæmoglobins (normal adult (*A*), sickle cell (*B*), *C* and foetal (*F*)) on the ion exchange resin 'Amberlite IRC 50' (*XE 64*) has been reported by us¹. It was shown that these hæmoglobins move down the column at different rates in the sequence *F* > *A* > *B* > *C*. Now we are able to describe the behaviour of a third abnormal human hæmoglobin (*E*), using the same chromatographic method.

The blood samples were obtained from three members of a family of Indonesian origin, which has been described briefly². These three patients were suffering from the heterozygous hæmoglobin *E* disease. Using the elution technique³ we did not obtain a complete separation of the hæmoglobin *A* and *E* present. With the cuvette method, however, the two hæmoglobins were separated quite well (Fig. 1, I). Even a mixture of five different human hæmoglobins can be separated completely into the original components. The rate of displacement of the hæmoglobin *E* is intermediate between those of the normal adult and sickle cell hæmoglobin (*A* > *E* > *B*, Fig. 1, III).

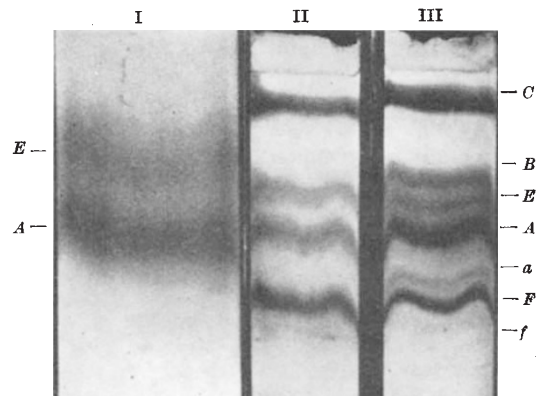


Fig. 1. Chromatographic separation of hæmoglobin-*E* and other human hæmoglobins. I, Hæmoglobin of a patient with heterozygous hæmoglobin-*E* disease; II, artificial mixture of four hæmoglobins (*C*, *B*, *A* and *F*); III, artificial mixture of five hæmoglobins (*C*, *B*, *E*, *A* and *F*)