

## HÆMATOLOGY

### A Human Blood Group Antigen, $Ny^a$ (Nyberg), segregating with the $Ns$ Gene Complex of the MNSs System

A SAMPLE of human serum was found to contain an antibody to a hitherto unrecognized red blood cell antigen: the corresponding antigen was first found in the cells of Mr. Nyberg and for that reason the antigen is being called  $Ny^a$ , the corresponding gene  $Ny^a$ , and the antibody anti- $Ny^a$ . Anti- $Ny^a$  distinguishes two phenotypes,  $Ny(a+)$  and  $Ny(a-)$ .

One further example of  $Ny(a+)$  cells was found and after that a survey of Oslo blood donors was begun in which nine  $Ny(a+)$  persons were found in testing about 4,000, a frequency of about 0.2 per cent.

The inheritance of the antigen  $Ny^a$  has so far been examined in eight families and the results strongly indicate that the antigen is, as expected, a Mendelian dominant character. Of the sibs of the propositi 8 were  $Ny(a+)$  and 9  $Ny(a-)$ , which is close to the expected 50 : 50; the propositi themselves are excluded from this count. The families include 10 matings of the type  $Ny(a+) \times Ny(a-)$  and 7 which for probability reasons may be assumed to be of this type (for one parent is  $Ny(a+)$  and the other was not available for testing): 14 of the issue of these matings were  $Ny(a+)$  and 19 were  $Ny(a-)$ , which does not differ significantly from the expected 50 : 50 (when the propositus appeared as a child he was not included in this count).

All 11  $Ny(a+)$  propositi have the antigens  $N$  and  $s$ , and the probability in Caucasians<sup>1</sup> of this being due to chance is 0.01. Moreover, in the families 31  $Ny(a+)$  members were found and all had the gene complex  $Ns$ . Furthermore, in these families the gene  $Ny^a$  can be seen to be closely or absolutely linked to  $Ns$  in coupling. From 12 matings of the informative double back-cross type there were 28 non-recombinant children to 1 recombinant. The apparent recombinant is probably to be explained by illegitimacy, an opinion supported by the fact that his older sister was excluded from the count because the Rh groups had shown her to be illegitimate.

As the new antigen clearly belongs to the MNSs system only the groups within this system will be mentioned in this preliminary communication. Mr. Nyberg is  $NS Ns$  and he lacks all the following rare antigens known to belong to the MNSs complex:  $Hu$ ,  $He$ ,  $Ms$ ,  $Mi^a$ ,  $Vw$ ,  $Vr$ ,  $Sta$ ,  $Ria$ ,  $Mu$ ,  $Mt^a$  and  $Cl^a$ .

Three further examples of anti- $Ny^a$  were found in testing the serum of about 2,500 Oslo blood donors. As in the original case there was no evidence that the antibody was immune in origin. The antibody agglutinated  $Ny(a+)$  cells suspended in saline rather more strongly at 4° C and at room temperature than at 37° C; it does not react by the antiglobulin method nor with cells treated with papain.

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<sup>1</sup> Cleghorn, T. E., *Nature*, 187, 701 (1960).

### Effects of $\alpha$ -Methyl-norvaline on Synthesis of Hæmoglobin in the Area Vasculosa of the Chick Embryo

IN the course of investigations on the effects of amino-acid analogues on explanted two-day chick embryos,  $\alpha$ -methyl-norvaline, which has a structure closely similar to both valine and leucine (Fig. 1), has been found to cause a reduction of the quantity of hæmoglobin formed in the area vasculosa. At the concentrations used in these experiments, there was no effect on other embryonic tissues, but in higher concentrations the analogue caused arrest of the heart-beat and subsequent death and disintegration of the embryonic axis.

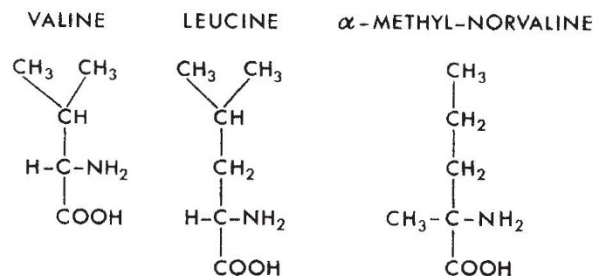


Fig. 1. Structure of valine, leucine and  $\alpha$ -methyl-norvaline

The experimental procedure was as follows: chick embryos of 48-h incubation were explanted, endoderm surface downwards, in watch-glasses each containing 1 ml. of Spratt's agar/saline/glucose medium<sup>1</sup> to which 2.5 mg/ml. of  $\alpha$ -methyl-norvaline had been added. The embryos had been trimmed close to the sinus terminalis, and the vitelline membrane and any adherent yolk removed. Their precise developmental stage had been checked by somite counts, and embryos of exactly equivalent stages were explanted as controls on medium lacking the analogue. In later experiments, when it had become clear that the only effect of the analogue was on the area vasculosa, this area alone was explanted after excision of the embryo and central part of the area pellucida (Fig. 2). Such explants remained healthy and formed networks of capillary vessels, besides tending to spread centripetally so that the hole left by excision of the embryo was healed (Fig. 2). They were cultured for 20 h at 38° C, by which time hæmoglobin was abundantly present in all regions of the area vasculosa in controls. The analogue-treated embryos contained noticeably less.

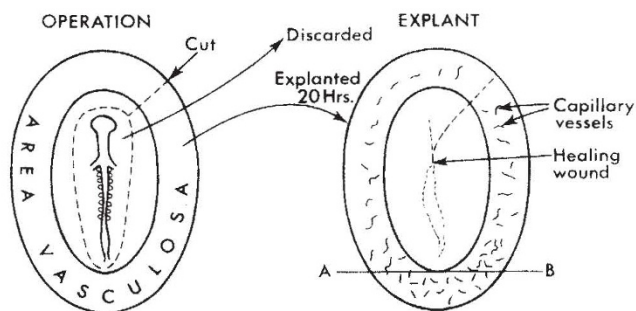


Fig. 2. Method of explantation

The red blood cells were isolated from groups of 20-25 explants, following D'Amelio and Salvo's method<sup>2</sup>, except that the cells were not clumped by incubation, but were finally collected by centrifugation in a melting-point tube from which the bottom layer, containing pure red cells uncontaminated by yolk, could be broken off. The red cells were transferred to a second melting-point tube and hæmolyzed in this overnight, with an equal volume of distilled water (total volume about 10  $\mu$ l.). After the cell debris had been removed by centrifugation, the hæmo-