

treatment of herpes. Experiments utilizing corneal epithelium are in progress.

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HÆMATOLOGY

Dizygotic Twins with XX/XY Chimerism

CHIMERAS, dizygotic twins who have two populations of blood cells, arise when hematopoietic cells are exchanged or shared at some time in early embryonic life. The first case of chimerism in man was reported by Dunsford *et al.*¹.

The twins here reported are clinically normal male and female infants. They had a single dichorionic placenta with no obvious anastomosis of the surface blood vessels. Chimerism was discovered by blood grouping of the red cells of the twins by the Rh Laboratory of Winnipeg. Two red-cell populations were found in the same proportion in each twin, approximately 85 per cent being group O and the rest group A. The inherited ABO types were established by testing the saliva: the boy was group A and the girl group O. Details of the blood group investigations have been reported elsewhere².

Peripheral blood samples were obtained for chromosomal investigations. Karyotype analyses of 100 cells of each twin revealed normal chromosome complements except for the presence of numerous cells in the male twin with a female karyotype and some cells in the female twin with a male karyotype in the following proportions: 70 XX : 30 XY cells in the male and 78 XX : 22 XY cells in the female twin. The parents and sib have normal karyotypes. These proportions are similar to, and probably not significantly different from, those found for the red-cell populations.

The phenomenon of chimerism is best known in cattle, and was first described by Owen³. The sterility of the female chimera is believed to be caused by androgens circulating in the common placental vascular system. Cattle chimeric twins have been observed to have the same proportions of each of the two types of blood irrespective of their genotype. This suggests that each twin has drawn its primordial blood cells from a common pool rather than having received the foreign cells by partial exchange⁴.

Among marmosets chimeras are even more common than among cattle since 87.5 per cent of births are reported to be twins, the majority of which are suspected to be dizygotic⁵. Extensive placental anastomoses between dizygotic twins are present but freemartins are unknown. The actual proportions of the two types of red blood cells in marmosets are not known. However, Benirschke *et al.*⁶ have demonstrated by bone marrow culture that in one female and two males the cells were chimeric with respect to the sex chromosomes. In each case the major population of cells was its own.

There have been occasional reports of vascular anastomoses in human dichorionic placentæ⁷. However, in a series of 409 fused dichorionic placentæ (238 isosexual and 171 heterosexual twins) examined by injection of the blood vessels, we have found no instance of a vascular communication. This suggests that such intercommunication is a rare event. On the other hand, it is possible that a vascular communication could have existed some time in early embryonic life and disappeared during later development.

With respect to the blood group types, the previously reported human chimeras are similar to marmosets in that the major proportion of cells corresponds to the genotype

of the individual. Chromosomal analyses in the only case studied gave frequencies of XX and XY cells consistent with the blood group proportions^{8,9}. These twins are unmarried. Two other female chimeras have produced children^{1,10}. The present pair of twins differs from the other human chimeras and from marmosets but resembles cattle in the proportion of blood types.

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Alkaline Phosphatase Activity of the Leucocytes in Animals

THE study of alkaline phosphatase activity in neutrophilic leucocytes has become a useful tool in clinical laboratory work. Although the practical usefulness of the test has been demonstrated, the significance of differences in activity in different conditions is still obscure.

A convenient histochemical method has been described by Kaplow¹. Since many factors influence the outcome of the test, it is important to have a positive control when examining the blood of unknowns. It has been found that pregnant women have increased alkaline phosphatase activity of the leucocytes² and therefore they can always be used as positive controls. However, pregnant women are not always available or the maternity wards may not be convenient to the laboratory.

The work recorded here had the following objectives: (a) to find laboratory animals with constant and physiological high alkaline phosphatase activity of the leucocytes, which can be used as positive control any time in the laboratory; (b) to contribute to the understanding of this enzyme metabolism in leucocytes.

Using the method of Kaplow¹, I examined 157 laboratory animals of different species, hamsters, rats, mice, guinea-pigs, rabbits and monkeys. In rabbits, guinea-pigs and monkeys, the blood can easily be obtained from the ear, while in hamsters, mice and rats it is easier to get it from the tail. The scoring was carried out in duplicate in the first 37 animals, but after it had been found that the duplicate findings were rather close to each other, this practice was discontinued.

The hamsters, rats, mice, guinea-pigs and rabbits were adult and healthy, and reared in the laboratory. Some were young unmated adults, others had one or more litters. None was pregnant. The results are shown in Table 1. In 53 normal healthy men and women we