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Chromosome Chimerism and Skin Grafts in Bovine Twins and a Shift in the Sex Ratio of Their Progeny

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Chromosome analysis was made on peripheral blood and bone marrow cells of bovine twins, triplets and quadruplets of different sex. Both sexes showed 60,XY/60,XX chimerism. The percentage of cells with XX and XY chromosomes varied from animal to animal, ranging from 10% to 76%. The differences between the peripheral blood and bone marrow were relatively small. Some males had a majority of cells with female heterochromosomes.

This chimerism presumably also affects other tissues, because the progeny of a bull with a 60,XX/60,XY pattern and 68% of cells with XX heterochromosomes showed a marked shift in the sex ratio, namely, 68 ♂: 100 ♀. This evidence suggests that the chimerism affects spermatogonia, which, nevertheless, are able to produce fertile spermatozoa.

Immunological studies of the quadruplets showed identity of red blood cell antigens in the A, B, C, FV, L, SU, Z and \dot{R}/\dot{S} systems. Cross transplantation of skin grafts among the quadruplets produced not even traces of antibodies to these red blood cell antigens, and no cytotoxic antibodies to peripheral blood lymphocytes in these animals.

Transplantation of skin grafts from triplets to quadruplets induced production of haemolysins and cytotoxicity to lymphoid cells within 14 days and rejection of the grafts within 17 days; i.e., a reaction commonly found in animals with different isoantigens.

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