

since the remaining calves and the sire had been slaughtered before our examination began.

Of the 8 calves examined four showed 1/29 translocation in the heterozygous state, one animal showed this translocation in the homozygous state and the remaining three calves were free of this aberration. None of the dams showed translocation. It is of interest to note that some quantitative cytogenetic data (counts of cells with breaks or gaps) obtained for the calves corresponded to those obtained for their dams.

The cytogenetic findings are interpreted as indicating random association of two inherited ealth disorders.

R-Banding studies in *Bos taurus* and *Ovis aries*

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The chromosomes of *Bos taurus* and *Ovis aries* have been studied using the R-banding technique (DUTRILLAUX and LÉJEUNE, 1971). The banding pattern obtained allows an accurate identification of chromosome pairs, including those of *Ovis aries* involved in the centromeric fusion.

But the most striking observation concerns the centromeres. All centromeres appear darkly stained, just as if C-banding had been used. As a control, human chromosomes were stained in identical conditions, in the same containers than the *Bovoidae* chromosomes: the usual R-banding pattern of Man was observed. This shows first that the centromeric staining of *Bos taurus* and *Ovis aries* is not an artefact, second that very likely it is not constitutive heterochromatin that has been detected.

Should R and C-banding be linked with the nature of the chromosomal DNA (eu — or heterochromatin, repetitive short or long DNA sequences, etc.), the present observation is suggestive of the presence of more than one kind of DNA at the centromeric region of the *Bovoidae*.

Fertility of sires born as dizygotic twins and sex ratio in their progeny groups

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Often reduced fertility and deviating sex ratios in progeny groups have been reported for bulls born as dizygotic twins. Experience from the last 20 years' of A.I. work within the *Swedish Red and White* cattle breed is reported. A total of 33 bulls born as dizygotic twins and divided into three groups according to sampling method, were investigated with respect to semen quality and quantity, conception rate at first service, non-return (NR) rates of 28 and 56 days, and sex ratio of progeny groups. The information available neither point to deviating semen characteristics and reduced fertility of the bulls nor to deviating sex ratios of the progeny groups. Therefore the diagnosis « born as a twin » has hitherto been omitted from consideration in breeding work of cattle in Sweden.

Disparition des cellules germinales et déroulement anormal de la méiose chez les fœtus de veau freemartins

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L'effet freemartin se manifeste au niveau des glandes génitales vers 49-52 j par un arrêt de leur croissance et par un ralentissement très marqué de l'augmentation du nombre des cellules germinales par rapport aux témoins. Le nombre des cellules germinales décroît à partir de 70 j et devient très faible à 150 j.

Le déficit en cellules germinales est loin de suffire à expliquer, à lui seul, l'arrêt de croissance des gonades. Le déficit en tissu somatique est plus important. La différence de volume entre les gonades des freemartins et des fœtus témoins est due pour 95 p. cent à une déficience en tissu somatique chez les fœtus de 49 à 59 j et pour 70 p. cent environ chez les fœtus de 60 à 110 j. Cependant, chez les freemartins de 49 à 59 j, le nombre des cellules germinales par unité de volume gonadique est identique à celui des témoins. Il y a donc proportionnalité entre la réduction du nombre des cellules germinales et la réduction du volume de tissu somatique; ceci ne s'observe plus après 59 j.

La méiose apparaît chez tous les freemartins de plus de 77 j, mais à chaque stade, elle ne concerne qu'un petit nombre des cellules germinales présentes. De plus, elle ne semble pas évoluer au delà du stade pachytène. Après le stade où sont apparues les premières figures de méiose, le nombre des cellules germinales contenues dans les gonades diminue beaucoup, il en subsiste encore quelques-unes après 150 j, mais aucune n'est en méiose.

Cytogenetic and Reproductive studies of Bulls Born Co-Twin to Freemartins

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Thirteen A.I. Center bulls, born twin to freemartins, were karyotyped. Records of reproductive performance were available on 13 and necropsy specimens on 8. Fifty or more metaphases from cultured lymphocytes were scored to establish the XX/XV ratios. The percentage of XX cells, which ranged from 6 p. cent to 93 p. cent, were used to identify the bulls.

Five bulls (13XX, 36XX, 43XX, 60XX, and 71XX) either failed to produce semen or the semen produced was below standards for sperm motility, concentration and morphology, and as young bulls they were culled. The highest percentage of abnormal sperm were observed in 15 successive, unsatisfactory ejaculates of 60 XX.

The remaining eight bulls were used for artificial breeding. Four (6XX, 30XX, 63XX, 84XX) are now in-waiting for A.I. proofs. With the exception of 63XX, which produced a high percentage of sperm with acrosomal defects, their sperm production and fertility as young bulls were satisfactory. Thirty-three p. cent of the frozen semen of the young bull 29XX was discarded, but freezability of his sperm appeared satisfactory as a 6-year-old when he was culled for A.I. production. Fertility of 33XX was below breed average. Two Holsteins, 85XX and 93XX, were used as A.I. proven sires. Their sperm production as young bulls was below the average of their randomly chosen stablemates. There was a highly significant decline ($P < 0.01$) in 85XX's sperm production as a 6-year-old, and he was culled as an 8-year-old despite his good fertility record. Fertility of 93XX was slightly below breed average but semen samples were satisfactory until severe spondylosis at age 10 complicated his semen collection.

The sex ratios of offspring of 29XX, 33XX and 85XX were obtained. A skewed male:female sex ratio of 29:71 in offspring of 33XX was significant ($P < 0.05$). There was no evidence of germ cell chimerism based on blood typing of three offspring of 33XX and 23 offspring of 85XX.

Necropsy specimens from 13XX, 29XX, 36XX, 43XX, 60XX, 71XX, 85XX and 93XX revealed various levels of testicular degeneration.

These results indicate that XX/XV chimeric bulls are high risk sires for breeding purposes, probably as a result of hormonal deficiencies or invasion of the gonads with XX primordial germ cells.

Le chimérisme XX/XY ne joue pas de rôle dans la phase initiale du freemartinisme chez les bovins

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Le développement des anomalies sexuelles chez les fœtus freemartins passe par deux phases successives distinctes: — entre 50 et 70 j, une phase initiale exclusivement d'inhibition (arrêt du développement de la gonade et régression des canaux de Müller comme chez les mâles) — après