

SHORT COMMUNICATION:

An intersex pig with XX/XY karyotype

Irineu Machado Benevides Filho, Erica Pauls, Lucia Moreno de Souza Benevides and Beatriz Goldschmidt

ABSTRACT

Cytogenetic studies were made of pigs in the state of Rio de Janeiro. An intersex pig from the Large White breed with an atypical penis was found among the animals analyzed. On examination it showed a 38,XX/38,XY karyotype (1:2) with testis, epididymis, uterus and vagina. The data suggest a sex chromosome mosaicism.

INTRODUCTION

According to Laus (1982) the majority of intersex pigs have predominantly female external genitalia with an enlarged clitoris. The internal genital tract shows a great variety of masculine and feminine characteristics, frequently with a bicornuate uterus common to the species. Various gonadal combinations are also described, with unilateral or bilateral ovotestis being the most common. Studies show that the majority of intersex pigs have a chromosome sexual complement of the type 38,XX (see review in Laus, 1982).

MATERIAL AND METHODS

An intersex Large White pig, whose penis was atypical in appearance and localization, was examined cytogenetically (Figure 1). A lymphocyte culture was made according to the Moorhead *et al.* (1960) method.

The slides were stained with 1:30 Giemsa for four minutes and analyzed with a light microscope under oil immersion. Diagrams were made and photographs taken of 30 metaphases to analyze chromosome number and morphology.

Routine methods used by the Pathological Anatomy Laboratory at the UFF Veterinary School were employed in the preparation of the reproductive tract histopathology.

RESULTS AND DISCUSSION

The cytogenetic analysis showed a 38,XX/38,XY (1:2) karyotype. The genital histopathological examinations confirmed the presence of testis, epididymis, deferens ducts, uterus and vagina.

Intersexuality in pigs has been studied by several authors. McFee *et al.* (1966), Vogt (1968) and Bruere *et al.* (1968) found chromosome mosaicism while studying 38,XX/38,XY animals. Somlev *et al.* (1970) classified animals with the same chromosome constitution, masculine gonads and ambiguous genitalia as pseudohermaphrodite and chimerical chromosome carriers.

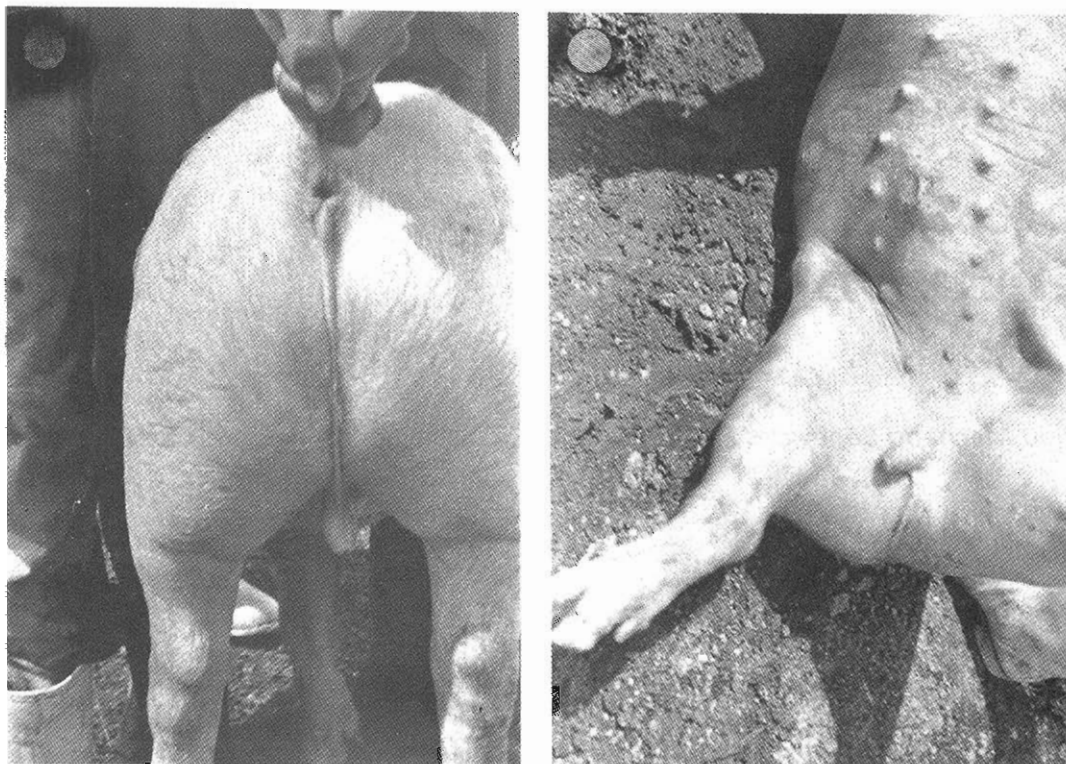


Figure 1 - Large White pig showing a pendulus penis, without a scrotum, located in the middle of the pubic region.

Chromosome mosaicism can be explained by a mitotic nondisjunction of the sex chromosomes in the cell division of an XY normal zygote, giving rise to the lines XX,XY and YY. The line YY, lethal, is eliminated and the embryo becomes XX/XY.

On the other hand, the fecundation of an oocyte fertilized by two spermatozoids, one bearing an X and the other a Y chromosome that had failed to expel the second polar body, or choriovascular anastomosis between male and female twins in uterus, would both originate the chromosome constitution 38,XX/38,XY, though in this case described as chimeric.

The freemartin has occasionally been described in pig breeds as animals with a 38,XX/38,XY chromosome composition in various tissues and with external female genitalia, an enlarged clitoris and ovotestis.

In this study, contrary to others described in the literature, the animal had external male genitalia and testes. This suggests a non mitotic disjunction of the sex chromosomes in an XY embryo rather than choriovascular anastomosis.

RESUMO

Em um estudo citogenético realizado em suínos, no Estado do Rio de Janeiro, foi encontrado um animal da raça Large

White com pênis atípico. Ao exame apresentou testículos, epidídimos, útero, vagina e cariótipo 38,XX/XY, na proporção 1:2. Os resultados sugerem um mosaicismos dos cromossomos sexuais.

REFERENCES

- Bruere, A.N. Fielden, E.D. and Hutchings, H. (1968). XX/XY mosaicism in lymphocyte cultures from a pig with freemartin characteristics. *New Zealand Vet. J.* 16: 31-38.
- Laus, J.E. (1982). Aspectos citogenéticos e morfológicos da intersexualidade em suínos (*Sus scrofa doméstica*). Master's Thesis, Faculdade de Medicina, USP, Ribeirão Preto, SP.
- McFee, A.F., Knight, M. and Banner, M.W. (1966). An intersex pig with XX/XY leucocyte mosaicism. *Can. J. Genet. Cytol.* 8: 502-505.
- Moorhead, P.S., Norwell, P.C., Mellman, W.J., Battips, D.M. and Hungerford, D.A. (1960). Chromosome preparations of leucocytes cultured from human peripheral blood. *Exp. Cell. Res.* 20: 613.
- Somlev, B., Melander, E.H., Melander, Y. and Holm, L. (1970). XX/XY chimerism in leucocytes of two intersexual pigs. *Hereditas* 64: 203-210.
- Vogt, D.W. (1968). Sex chromosome mosaicism in a swine intersex. *J. Hered.* 59: 166-197.

(Received December 3, 1993)