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## Freemartinism in calves

Freemartinism is a detailed form of intersexuality that occurs *in-utero* due to connecting blood supply between the placenta of a male and female calf. A freemartin is a non-breeding (sterile) female. It is estimated that 90-95% of heifer calves that are born co-twin to a bull calf will be a freemartin.

Due to the connecting blood supply *in-utero*, there is an exchange of cells and hormones between the fetuses, producing calves that are blood-cell chimeras. The presence of XY cells in the female foetus results in the failure to develop normal reproductive organs. Freemartins often have ovaries but lack a uterus, a cervix and only have a short vagina. There is often clitoral enlargement, and the vulva often has coarse hair present (as the photo to the right demonstrates).



Diagnosis can be easily made once the freemartin is large enough to have their reproductive system examined per rectum (usually around joining age). Diagnosis of a freemartin at a younger age can be more difficult. A crude test that can be carried out on farm involves inserting a thermometer in the vagina and it will often be half the depth of a normal heifer calf of the same age. A definitive diagnosis involves taking a blood sample and sending it to a laboratory for chromosomal analysis.



It should be noted that a bull's born co-twin to a freemartin are generally anatomically normal, but a small proportion may have reduced fertility. The photo to the left demonstrates a severe form where the male co-twin failed to descend testicles into the scrotum. It is unknown if this bull calf has testicles present within the abdomen (bilateral cryptorchid).

## References

Parkinson, T. J., Vermunt, J. J., & Malmo, J. (2019). Diseases of cattle in Australasia: a comprehensive textbook. New Zealand Veterinary Association Foundation for Continuing Education. Massey University Press, Auckland, 0745, New Zealand, pp: 626-627.