

# Assessment of the Contractility of Bovine Lateral Saphenous and Digital Veins in Response to Ergot Alkaloids

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## INTRODUCTION

- Unregulated vasoconstriction is a hallmark of ergot alkaloid exposure.
- Prior research has utilized the cranial branch of the lateral saphenous vein as a model vein for peripheral vasculature exposure to ergot alkaloids (Klotz et al. 2006).
- The digital vein is more distal and closer to the hoof where extreme damage due to ergot alkaloid-induced vasoconstriction occurs.
- The objective of this experiment was to compare the vasoactivity of ergot alkaloids in both the lateral saphenous and digital veins.

## MATERIALS and METHODS

- Blood vessels were obtained from Holstein steers at slaughter (n = 12; 551 ± 29 kg), cleaned, cut into 2-mm cross-sections, and mounted in a multi-myograph (Fig. 1).
- Blood vessels were submersed in continuously gassed (95% O<sub>2</sub>/5% CO<sub>2</sub>) Krebs-Henseleit buffer. Following a 1.5-hr tension equilibration, blood vessels were exposed to a reference dose of 1x10<sup>-4</sup> M norepinephrine.

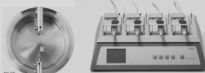


Fig. 1. Example of a multi-myograph and vessel mounted in a myograph chamber

## MATERIALS and METHODS

- Digital (Fig. 2, red oval) and lateral saphenous veins (Fig. 2, green oval) from each steer were exposed to increasing concentrations of:
  - α-ergocryptine (ERP)
  - ergotamine (ERT)
  - ergocristine (ERS)
  - ergocornine (ERO)
  - ergonovine (ERN)
  - tall fescue seed extract (EXT; dilutions based on measured ergovaline concentration)
  - lysergic acid (LSA)
  - lysergol (LYS)

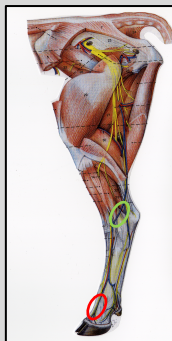
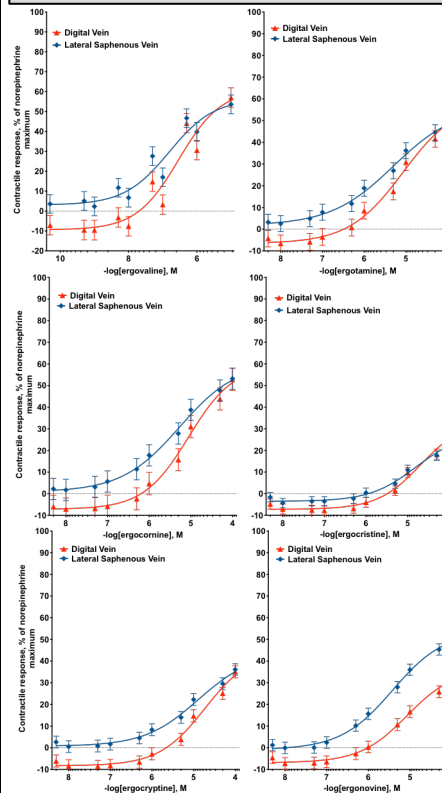


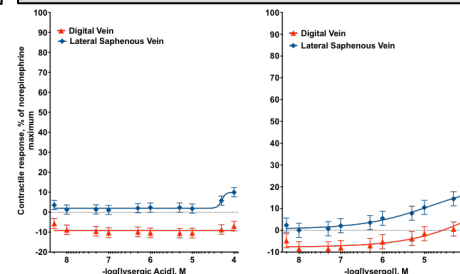
Fig. 2. Illustration of the left bovine pelvic limb (Taken from Budras et al., 2003).

- Standards were diluted to final concentrations for use in the tissue bath of 5x10<sup>-10</sup> to 1x10<sup>-4</sup> M.
- All resultant contractile response data were normalized as a percentage of the 1x10<sup>-4</sup> M norepinephrine response.
- Data were analyzed as randomized design for effects of vein and alkaloid concentration.

## RESULTS



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## CONCLUSIONS

- The maximal contractile response induced by EXT, ERT, ERO, ERS, and ERP did not differ by vein type and EXT was the most vasoactive alkaloid.
- The response to ERN was greater for the saphenous than the digital vein (P=0.03) and LYS and LSA did not differ (P>0.05).
- These data confirm that the cranial branch of lateral saphenous vein is a representative model of peripheral vasculature for the bovine hindlimb.

## REFERENCES

- Budras, K., R.E. Habel, A. Wunsche, and S. Buda. 2003. *Bovine Anatomy An Illustrated Text*. page 17. Schlutersche, Hannover, Germany
- Klotz, J. L., L. P. Bush, D. L. Smith, W. D. Shafer, L. L. Smith, A. C. Vevoda, A. M. Craig, B. C. Arrington and J. R. Strickland 2006. Assessment of vasoconstrictive potential of D-lysergic acid using an isolated bovine lateral saphenous vein bioassay. *J. Anim. Sci.* 84(11): 3167-3175.