

# Hoof histopathological changes in cattle subjected to the euglycemic hyperinsulinemic clamp

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## Introduction

Although hyperinsulinemia has been shown to play a central role in horse laminitis, the link between insulin and hoof diseases has not been established in cattle. The objective was to investigate the effects of prolonged hyperinsulinemia on the integrity of the hoof lamellar tissue in cattle.

## Materials and Methods

Five healthy adult males (two castrated) weighting  $475 \pm 95$ kg (mean  $\pm$  SD) were subjected to the euglycemic hyperinsulinemic clamp technique (EHC) for 72 hours. Dorsal lamellar biopsies from the hind hooves were taken before (baseline), at the end (T72h) and 11 days after (T11d) the EHC period. Lamellar samples were histologically processed, stained with periodic acid Schiff (PAS) and Masson's trichrome techniques, and morphometrically analyzed. Data were analyzed by one way ANOVA considering  $P < 0.05$ .

## Results

After 72 h of hyperinsulinemia, there was disintegration of the keratinized axis (KA) of the epidermal

lamellae (EL), with formation of an intermediate layer apparently composed of nucleated cells in keratinization between the stratum lamellatum and the stratum medium in all animals. After 11 days, there was progression of the changes seen at the end of EHC with the elongation of the EL, which presented increased length compared with baseline and T72h time points ( $P < 0.001$ ). Although there were no changes in the basement membrane, evidences of hoof integrity loss were seen by the disintegration of the KA in the stratum lamellatum and by the presence of abnormal nucleated and anucleated cells in the stratum medium at this interface with the abaxial extremities of the dermal lamellae.

## Significance

In conclusion, the euglycemic hyperinsulinemic clamp model produced histopathological changes in the bovine hind hoof that progressed after 11 days. Such changes seem to be linked to an abnormal keratinization processes and cause hoof integrity loss. Our results indicate that hyperinsulinemia can predispose cattle to laminitis and other hoof problems.

# The effects of flunixin meglumine treatment and hoof trimming on lying behavior and locomotion in dairy cows

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## Introduction

Lameness is a common disorder in US dairy herds and a welfare concern. Compared to non-lame cows, lame cows spend more time lying down. Although regular

hoof trimming is often a component of lameness prevention efforts, increased lying time has been observed following hoof trimming, suggesting that it may cause discomfort in dairy cows. Preliminary work suggested that treatment with a non-steroidal anti-inflammatory