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Distribution of endocannabinoid system receptors in the equine hoof: dysregulation as a potential therapeutic target for laminitis

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Abstract

A growing body of evidence indicates that the endocannabinoid system (ECS) is essential for controlling the homeostasis of the skin and that the ECS is modified in the presence of skin disease. It is plausible to expect that the lamellar junction of the hoof expresses cannabinoid receptors and that their expression could be affected by lamellar disease. The goal of this study was to characterise the cannabinoid receptor type 1 (CB1R) and type 2 (CB2R) and the G protein-coupled receptor 55 (GPR55) within the dermo-epidermal junction of the hooves of healthy and laminitic horses. The expression of the CB1R, CB2R, and GPR55 within the dermo-epidermal lamellar junction of six healthy and 12 laminitic hooves was studied using polymerase chain reaction (PCR) and immunofluorescence. Both the mRNA and protein expression of the CB1R,

CB2R, and GPR55 were found in the dermo-epidermal lamellar junction of horse hooves. The immunolabelling was expressed by the epithelial cells of the primary and secondary laminae of healthy hooves (CB2R > GPR55 > CB1R). The presence of CB1R, CB2R, and GPR55 immunoreactivity in the healthy laminar epithelial cells, coupled with increased protein expression in pathological epithelial cells, provided strong motivation for future investigation. These findings suggest that cannabinoid compounds which interact with these receptors may influence lamellar healing and mitigate inflammation in hoof diseases, particularly laminitis.

Keywords: Cannabis sp.; Cannabinoid receptors; Epidermal lamellae; Horse; Lamellae.

Conflict of interest statement

Declarations. Conflict of interest: The authors have no relevant financial or non-financial interests to disclose. Ethics approval and consent to participate: According to Directive 2010/63/EU of the European Parliament and of the Council of 22 September 2010 regarding the protection of animals used for scientific purposes, Italian legislation (D. Lgs. n. 26/2014) did not require any approval by competent authorities or ethics committees as this study did not influence any therapeutic decisions. Consent for publication: All the authors have approved the publication of this manuscript.

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