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ZOOL567

Literature Review 3: Topic Summary

### **Topic Summary: Cribbing in Horses**

Cribbing is a stereotypical behaviour with no known function that is believed to occur in 5-10% of domesticated horses (Haupt, 2012). During cribbing, horses put their incisor teeth onto a fixed surface, pull their head backwards while contracting their neck muscles, breathe in and then make a grunting sound (Wickens & Heleski, 2010; Albright *et al.*, 2017; Whisher *et al.*, 2011). Cribbing is studied using surveys or asking the owners directly, as done in Hemmann *et al.* (2014), Waters *et al.* (2002), Nagy *et al.* (2008), experimentally manipulating different variables to observe how they affect cribbing, done in Albright *et al.* (2017), Whisher *et al.* (2011), and Haupt (2012), sampling blood like Lebelt *et al.* (1998), or a combination of all, like Gillham *et al.* (1994).

Lebelt *et al.* (1998) tested cribbing horses' physiological traits through blood samples and measuring devices, where they found that nociception, which is the processing of stimuli, and heart rate were significantly lower when horses were cribbing compared to their basal levels. They also found that basal  $\beta$ -endorphins in cribbing horses were three times higher than the control horses.  $\beta$ -endorphins are believed to stimulate opioid pathways, either by increasing opioid release (Lebelt *et al.*, 1998), or increasing the density or sensitivity of opioid receptors (Gillham *et al.*, 1994), leading the horses to crib. However, contradicting Lebelt and colleagues, Gillham *et al.* (1994) found that basal  $\beta$ -endorphins in cribbing horses were significantly lower than control horses, suggesting further studies are needed to make conclusions on the effects of  $\beta$ -endorphins on cribbing horses.

Cribbing horses have a very high motivation to crib and will exert a lot of energy to locate a surface to do so (Haupt, 2012). Many factors have been studied and suggested to cause this motivation, including diet, heritability, weaning, and management. To investigate the effects of diet, Albright *et al.* (2017), Whisher *et al.* (2011), and Gillham *et al.* (1994) observed how horses responded when given different diets. They all found that, when fed grains or high sugar feed, cribbing was seen to significantly increase, possibly because these feeds are believed to increase opioid release in horses, resulting in the increased frequency of cribbing (Whisher *et al.*, 2011). Genetically, Hemmann *et al.* (2014) were able to determine the heritability of cribbing in a population of Finnhorses through analyzing their recorded data, suggesting that cribbing could be a predisposed behaviour. Then, to study the factors that influence the development of cribbing in young horses, Waters *et al.* (2002) followed and recorded the onsets of stereotypical behaviours throughout a horse's weaning process, in which they found abruptly weaned horses to be more likely to develop cribbing compared to naturally weaned horses.

Some causes that haven't been exclusively studied yet or have been found to not affect cribbing include management, stereotypical neighbours, and boredom. Cribbing is only seen in domesticated horses (Wickens & Heleski, 2010), suggesting that management is a factor in developing cribbing, but this has not been exclusively studied as it is quite improbable to place a sample of horses into an environment that could be manipulated to observe the effects of housing. Additionally, many owners believe that cribbing could be

learned, so Nagy *et al.* (2008) investigated the effects of neighbouring a cribbing horse. They found that cribbing cannot be learned since non-cribbing horses did not start cribbing after observing a cribbing horse. Finally, boredom was also believed to be a cause, so Whisher *et al.* (2011) provided cribbing horses with different feeding toys and short periods of exercise but found that cribbing did not decrease, suggesting that boredom isn't a cause.

Owners have attempted to use preventions such as collars, muzzles, making the cribbing surface bitter, or even removing the surface, but none of these were able to stop horses from cribbing long-term, sometimes even increasing the cribbing frequency in horses as they had a higher motivation to crib (Hothersall and Casey, 2012). Further studies must be done for enrichments that could have long-term effects on preventing cribbing, such as higher social contact (Hothersall and Casey, 2012), more foraging (Whisher *et al.*, 2011), components in feed like high fibre (Gillham *et al.*, 1994; Albright *et al.*, 2017), or pharmacological treatments (Haupt, 2012).

[Word Count: 698]

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