

Veterinary Bioscience: Digestive System



LECTURE 13 RUMINANT PHYSIOLOGY

LECTURER

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Christina is a Lecturer in Veterinary Biosciences in the Melbourne Veterinary School at The University of Melbourne. Christina completed a PhD exploring how innate immune factors influence the way horses respond to breeding and the ability of healthy horses to clear all traces of inflammation from their uterus efficiently. Prior to coming to the University of Melbourne, Christina has completed a veterinary degree at the University of Veterinary Medicine in Hannover, Germany. Her research interests are in reproductive physiology, immunology and microbiology and their impact on fertility in horses, cattle and dogs.

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INTENDED LEARNING OUTCOMES

At the end of this lecture, you should be able to:

- Discuss the main functions of the forestomachs in ruminants and how they relate to their anatomical design.
- Explain the main patterns of motility of the reticulo-rumen in order to interpret their respective functions and control mechanisms.
- Explain the anatomy of the gastric groove in order to relate it to function in juvenile animals.
- Compare the ruminant salivary gland physiology to that of monogastric animals in order to evaluate the main differences and their relevance for rumen function and water balance.

KEY WORDS

Rumen fermentation and absorption, rumen motility patterns, rumen motility control, smooth muscle, rumination, eructation, gastric groove, vagus nerve, salivary glands, water balance.

LECTURE OVERVIEW

The digestive system of ruminants is much more complicated than that of monogastric animals. For effective fermentation of ingesta by the microbiota residing in the reticulo-rumen, this environment needs to be carefully controlled regarding acid-base homeostasis and motility patterns.

Some of the main functions of the ruminant forestomachs are:

- To serve as a fermentation chamber for microbes.
- To mix and separate ingesta appropriately.
- To allow built-up gas to escape.
- To buffer the rumen content to maintain an optimal pH for the microbes while conserving water and electrolytes.

FURTHER READING

Reece. *Dukes' Physiology of Domestic Animals*. 13th edition (2015). Wiley Blackwell Publishing.

Cunningham and Klein. *Textbook of Veterinary Physiology*. (2007) 4th edition. Saunders.

The ruminant animal digestive physiology and nutrition. Church DC Ed. (1988). Eaglewood Cliffs, Prentice Hall.