Veterinary Bioscience: Digestive System

LECTURE 12
GASTROINTESTINAL MOTILITY

LECTURER

PROFESSOR ELIZABETH TUDOR

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INTENDED LEARNING OUTCOMES

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

- Explain the features of gastrointestinal smooth muscle that provide for its autonomous activity and describe the hierarchy of neural and hormonal pathways that control secretory and motor activity in the gastrointestinal tract.
- Describe the contractile patterns characteristic of gastric motility and explain their purpose, and explain how the structural and functional properties of gastric smooth muscle permit changes in volume with minimal changes in intra-luminal pressure.
- Explain the mechanisms responsible for gastric emptying, the complex mechanisms that control this process and describe the characteristic motility forms of the small intestine.
- Explain how different classes of drugs, including pro kinetics, laxatives and antispasmodics, can be used to either increase or decrease gut motility.

KEY WORDS

Chemoreceptor, mechanoreceptor, intrinsic nerves, myenteric plexus, submucosal plexus, extrinsic nerves, autonomic nervous system, vagus nerve, sympathetic nervous system, parasympathetic nervous system, enterochromaffin cell, enterogastrone, cardiac sphincter, gastric cardia, gastric fundus, pylorus, pyloric antrum, pyloric sphincter, gastric filling, receptive relaxation, gastric emptying, chyme, gastrin, secretin, cholecystokinin (CCK), gastric inhibitory peptide (GIP), hydrochloric acid, entero-gastric reflex, prokinetics, anti spasmodics, metaclopramide, cisapride.

LECTURE OVERVIEW

The digestive system performs four basic functions- motility, secretion, digestion and absorption of ingested food. Of these secretion and motility exhibit the highest degree of control.

Motility of the gut is provided for by layers of smooth muscle- circular and longitudinal, along the length of the gut. The sequenced contraction and relaxation of these muscle layers allow for mixing of ingested food with secretions, mechanical breakdown of food particles, propulsion of food along the gut tube and periodic release of chyme through sphincters from one region of the gut to the next. This lecture will describe the range of motility forms characteristic of gut smooth muscle and introduce you to the control mechanisms that modulate motility, particularly in the stomach.

FURTHER READING

Sherwood, L. *Human Physiology from Cells to Systems* 8th Edition 2013 Ch 16

Cunningham's *Textbook of Veterinary Physiology* 6th Ed Elsevier 2020 Ch 27 & 28

Sjaastad OV, Sand O & Hove K *Physiology of Domestic Animals* Scandinavian Veterinary Press 2010 Ch 15

Berne RM, Levy MN, Koeppen BM & Stanton BA *Physiology*. (ebook) 6th Edn 2010 Section Six