

Gastrointestinal Anatomy and Physiology of Select Exotic Companion Mammals

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KEYWORDS

- Rabbits • Guinea pigs • Chinchillas • Small herbivores • Fiber • Hindgut
- Gastrointestinal • Cecotroph • Colonic separation mechanism

KEY POINTS

- The anatomy and gastrointestinal physiology of rabbits, guinea pigs, and chinchillas are different from those of other exotic companion mammals.
- Rabbits, guinea pigs, and chinchillas are all concentrate selectors, hindgut fermenters, and coprophagic.
- They are designed to intake large quantities of high-fibrous, low-energy-density foods.
- They use unique colonic separation mechanisms and have open-rooted, constantly growing dentition.
- Gastrointestinal disease, often secondary to diet or environmental factors, is common in these species.

INTRODUCTION

The anatomy and gastrointestinal physiology of rabbits, guinea pigs, and chinchillas are different from those of other exotic companion mammals. These species are strict herbivores, classified as hindgut (cecum and colon) fermenters and concentrate selectors, and are designed to ingest large amounts of high-fibrous food. As prey species, maintaining a small body size is advantageous. Their unique gastrointestinal system, with its rapid transit time and ability to differentiate particulates of fiber, allows them to remain small and active, while surviving on high-fiber, low-energy-density plant materials. Although all 3 species have similar gastrointestinal function and nutritional needs, each has some unique species traits. Gastrointestinal disease in these species is a very common presenting issue in clinical practice. It is often associated with dysbiosis and can present as both primary and secondary disease.

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RABBIT

Domestic rabbits (*Oryctolagus cuniculus*) are herbivores and concentrate selectors, and are classified as hindgut (cecum and colon) fermenters. They are mostly crepuscular and nocturnal feeders. They are anatomically and physiologically adapted to handle significant amounts of low-energy-density fibrous food and to effectively use the nutrients found in a high-fiber diet (Fig. 1). However, because of their small body size they are unable to store large amounts of food material and therefore use

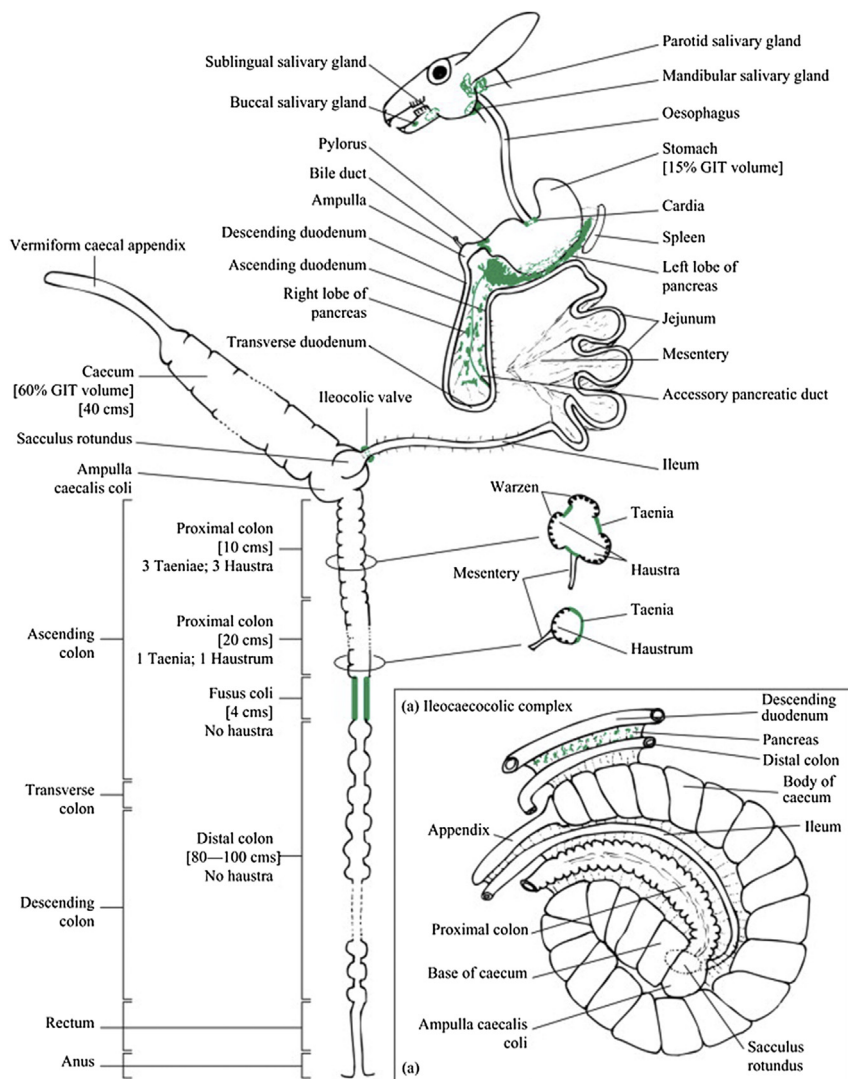


Fig. 1. Schematic diagram of the anatomy of the alimentary tract of the rabbit. cms, Centimeters; GIT, Gastrointestinal Tract; HCO₃, Bicarbonate; H⁺CL, Hydrochloric Acid; VFA, Volatile Fatty Acids. (From Harcourt-Brown F. Biologic characteristics of the domestic rabbit (*Oryctolagus cuniculi*). In: Harcourt-Brown F, editor. Textbook of Rabbit Medicine. Burlington (VT): Butterworth-Heinemann; 2002. p. 1–18; with permission.)

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