Rodent Nutrition

Digestive Comparisons of 4 Common Rodent Species

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KEYWORDS

• Chinchilla • Guinea pig • Hamster • Gerbil • Coprophagy
• Colon separation mechanism (CSM) • Captive diet • Dental issues

KEY POINTS

- Rodents in the suborders Caviomorpha and Myomorpha have dietary differences and different dental formulas.
- Although rodents share a digestive adaptation with lagomorphs, called coprophagy, they use a different mechanism to accomplish it.
- Hamsters differ from other rodents in that they use foregut fermentation, similar to ruminants.
- Hamsters have a digestive adaptation to metabolize oxalates and absorb calcium from them.
- The captive diet of caviomorphs (chinchilla and guinea pigs) is based on grass hay.
- Dental disease is promoted in caviomorphs when the diet lacks adequate fiber and abrasive matter.
- Captive diet of myomorphs (hamsters and gerbils) is based on rodent pellet and seed mix.

INTRODUCTION

The common pocket pets, chinchilla (*Chinchilla lanigera*), guinea pig (*Cavia porcellus*), golden hamster (*Mesocricetus auratus*), and Mongolian gerbil (*Meriones unguiculatus*) represent 2 subgroups of Rodentia: the infraorder Caviomorpha (chinchilla and guinea pig) and suborder Myomorpha (hamster and gerbil). Wild relatives of chinchilla and guinea pig are New World porcupines, nutria, capybara, and degu. Relatives of hamsters and gerbils are rats, mice, voles, and lemmings.

Natural Diet

Caviomorphs

Caviomorphs are rodents that originated in South America (and 1 in North America). Their natural diet is herbivorous and comprises some combination of wild fruit, leaves,

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and grasses, depending on species. Myomorphs may have herbivorous, granivorous, or omnivorous feeding strategies and consume a diet of seeds, fruit, vegetation, and insects.

Chinchillas are native to the Andes Mountains in South America. There are 2 recognized species: *C lanigera* (long-tailed chinchilla), the progenitor of pet chinchillas, and *Chinchilla chinchilla* (formerly *Chinchilla brevicaudata*), commonly known as the short-tailed chinchilla. Both species are critically endangered in the wild.[1,2] The weight range of wild long-tailed chinchilla is 369 to 493 g for males and 379 to 450 g for females.[3] Domestic male chinchillas weigh up to 600 g and females 800 g.[4]

Consistent with the caviomorph feeding strategy, chinchillas are herbivores, and are considered to be folivorous, opportunistic feeders. Their diet is seasonally varied, consisting of roots, leaves, fruit, berries, bark, alfalfa, grasses, shrubs, and cacti. They prefer dried leaves rather than fresh; succulents and seeds comprise only a small part of the diet.[5] The diet is naturally high in fiber (>66% of the diet), coming from bark, woody stems, and bromeliads. To mimic the wild feeding strategy as closely as possible, the captive diet should contain grass hay as a main dietary component.

Guinea pigs have been domesticated in South America for thousands of years. Little information is available on the specific diet of their wild counterparts; however, they are considered strict herbivores. Habitat studies place them in open grasslands, consisting of short grasses.[6] A captive diet containing grass hay for adults and mixed grass hay/alfalfa for growing pigs and lactating females is appropriate. Adult weight is 700 to 1200 g.[7]

Both the chinchilla and guinea pig have a dental formula of 2 (I 1/1, C 0/0, PM 1/1, M 3/3) = 20. Because they evolved on a diet of fibrous vegetation that constantly wears down teeth, they have open-rooted hypsodont cheek teeth (high crowned with enamel extending past the gum line) that grow continuously throughout their lives.[8–10] Captive animals fed a diet lacking in adequate fiber/abrasive material are prone to malocclusions and other dental issues.[11]

Myomorphs

Hamsters and gerbils are myomorphs and belong to the family Cricetidae. The natural diet of both the Syrian golden hamster and Mongolian gerbil consists of seeds, fruits, grasses, leaves, and insects.[12,13] Adult hamster body weight is 85 to 130 g for males and 95 to 150 g for females. Gerbils weigh 70 to 135 g, with males being slightly heavier than females.[14]

Gerbils naturally inhabit arid and semiarid regions. Because of this, it was once thought they did not require fresh drinking water. Although they consume a predominantly dry diet, they also eat succulents with high moisture content. In captive studies, gerbils maintained on only a dry diet had higher mortalities than animals that were provided with fresh water.[15] It was determined that gerbils consume water from fresh sources and succulent plant matter at an amount comparable with 8% to 13% of their body weight per day (4–10 mL/100 g body weight).[16]

Hamster and gerbil dental formula is 2 (I 1/1, C 0/0, PM 0/0, M 3/3) = 16. Unlike the chinchilla and guinea pig, hamsters and gerbils have brachyodont (low-crowned) dentition with anatomic roots that stop growing after they are fully erupted.[11] This type of dentition is appropriate for a diet consisting mostly of seeds, grains, leaves, and other matter that does not continuously wear on the teeth. In captivity, hamsters and gerbils are less prone to develop dental disease of their molars than their caviomorph relatives.