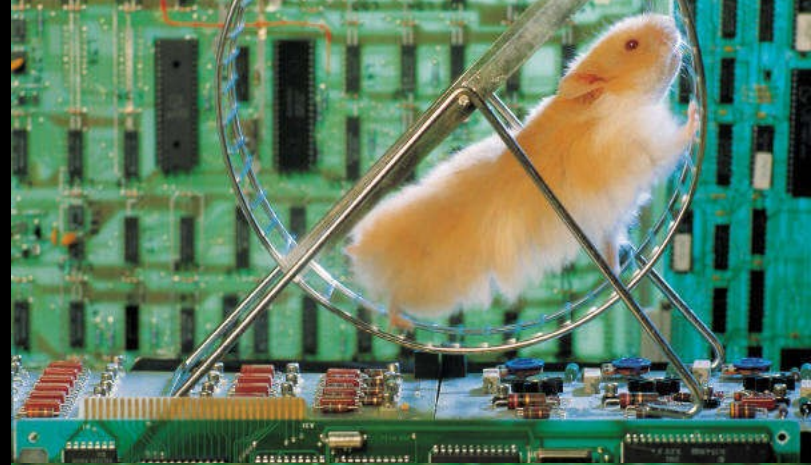


Nutrition of Lagomorphs and Rodent Species



Rabbits



- ◉ Belong to the order “Lagomorph”
- ◉ Non-ruminant herbivores; high forage diet
- ◉ Have specialized digestive tract similar to horse
- ◉ Have a “circadian rhythm” in digestion

Rabbit Digestive System

- Sharp incisors allow for cutting any forage or woody plant
- Large upper and lower biting incisors and large **diastema** to accommodate long forages
- Incisors need constant work to maintain ideal size



Source: BBC News

Rabbit Digestive System

- ◉ GI tract is very similar to horse up until the large intestine
- ◉ Large cecum contains bacteria to break down plant cell walls
- ◉ Nervous system keeps microbial activity normal during the day and rabbit makes normal fecal pellets

Rabbit Digestive System

- ◉ Circadian Rhythm changes GI motility and **cecotropes** are formed
 - Fecal pellets with high concentration of protein, low fiber
 - Rabbits eat cecotropes directly from the anus and digest them in small intestine, allowing rabbit to “capture” amino acids
 - Allows rabbit to survive during seasons when only low-protein fibrous plants are available

Cecotropes are more commonly known as Night Feces

All Poop is not Created Equal

- ◉ Rabbits make both hard and soft feces
 - Soft Feces (cecotropes): contain higher levels of water, electrolytes and nitrogen. Covered by a soft mucous envelop
 - Hard Feces: contain higher levels of fiber
- ◉ Rabbits never eat hard feces or soft feces that have dropped to bottom of cage

Coprophagy = consumption of feces

Cecotrophy = consumption of cecotropes

Problems in Rabbit Digestion

◎ Gastric Stasis:

- > Condition where gastric motility is slowed because of too much grain and too little fiber in diet
- > Huge quantities of hair build up in GI tract causing **Trichobezoars**, which get stuck in the tract. Can cause death

What is the more commonly known term for Trichobezoars?

Hairballs!



What to Feed Rabbits

- ◉ Alfalfa-based pellet with hay supplement given daily
- ◉ Include fresh greens or veggies daily
 - Carrots, ripe bananas, rice cakes, dandelion leaves, dark leafy veggies, feed many colors
 - Beware fruit pits and seeds

Remove any uneaten parts – spoiled food causes GI upset

What to Feed Rabbits

- ◉ Rabbits are nocturnal: feed hay in morning and pellets with grains in afternoon or evening.
- ◉ Water ad libitum
- ◉ Commercial feeds should be purchased and consumed within 90 days of production
- ◉ Pellets high in calcium or Vit D can cause kidney or bladder stones

Commercial mixes w/ seeds, dried fruit or colored cereals are junk food. Too high in sugars and CHO, can cause overgrowth of bad bacteria!

What to Feed Rabbits

- ◉ Hay is most important factor in diet
prime source of fiber

- Fresh Timothy, Oat and Grass Hays

**BEWARE
MOLDY
HAY!**

- ◉ Buy pellets from feed store or online. Avoid grocery & pet store chains – feed may be many months old

- ◉ Exercise for 3-5 hours daily outside of cage

Rodents

- ✓ Guinea Pigs
- ✓ Gerbils
- ✓ Hamsters
- ✓ Rats and Mice
- ✓ Chinchillas
- ✓ Ferrets



Guinea Pigs

- Large rodent, indigenous to Peru
- Notoriously fastidious eaters
- Herbivores with cecotrophic behavior
- “Cavies”



What to Feed Guinea Pigs

- ◉ Fresh guinea pig pellets (18-20% crude protein and 10-16% fiber)
- ◉ Unlimited supply of quality grass hay
- ◉ Fresh, clean water ad libitum

What Water
Soluble
Vitamin is
Considered
Essential in
the
Guinea Pig?
Vitamin C

Guinea Pigs and Grass Hay

- ◉ Very important – feed ad libitum
- ◉ Timothy hay best – less calcium and protein than alfalfa, which interfere with pellets
- ◉ Long fibers stimulate muscle contraction in intestines to maintain motility
- ◉ Chewing hay helps grind down molars which are constantly growing

Guinea Pigs and Pellets

- ◉ Must use Guinea pig pellets
- ◉ Don't use "fiesta" mixes with seeds, nuts and dried fruit – pigs don't like high CHO or fatty foods
- ◉ Adults prone to obesity, so limit pellet intake



Guinea Pigs and Vitamin C

- ◉ Vit C **MUST** be included in diet or scurvy develops
 - Optimal amount is 1 to 2 mg per 100 grams of body weight
- ◉ Commercial guinea pig pellets contain extra Vit C, but only good for ~90 days
- ◉ Can add Vit C to water, but it's light sensitive and loses 50% of potency in 24 hours. Cover the bottle with sock or foil

Guinea Pigs and Vitamin C

- ◉ Can supplement diet with veggies and fruits high in Vit. C
- ◉ Guava, orange and lemon peel; parsley, brussel sprouts, broccoli, collard, mustard greens and kale
- ◉ Chewable Vit C tablets

Gerbils

- Omnivore, desert dwelling rodent
- High metabolic requirements
- Eat ~10% of body weight every 24 hrs
- Diet mostly of grains, other CHO



What to Feed Gerbils

- ◉ Pellets made from ground seeds and grass and vitamin fortified
- ◉ Remove sunflower seeds from mixes; fattening
- ◉ At least one piece of fresh veggie per day
- ◉ Can give a cricket or two a few times per

Use an elevated feeding bin to prevent fecal contamination

Gerbils and Water

- ◉ Desert animals, therefore very efficient kidneys. Rely primarily on plants fluids in the wild
- ◉ Give plenty of fresh water
- ◉ Make sure container is clean



Source: Desertcreatures.com

Gerbils and Treats



- ◉ Sunflower seeds and pieces of fruit in small amounts
- ◉ Front teeth are constantly growing – give chew sticks or pieces of fruit tree branches or bark to wear teeth down
- ◉ Avoid cherry, cedar and oleander – TOXIC!

Plain dog bones make good nutritious treat!



Hamsters

Hamsters

- ◉ Desert-dwellers
- ◉ Eat 10% of body weight every 24 hours
- ◉ Diet mostly of grains and other CHO and fresh water
- ◉ Restrict amount of sweet or oily food



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Hamster Feeding Behavior

- ◉ Can carry up to $\frac{1}{2}$ body weight in cheek pouches
- ◉ In the wild, may hide up to 60lbs of grain for winter
- ◉ Sometimes they urine-mark. Food can become moldy if they urine mark their stash
- ◉ Sometimes engage in coprophagia for more complete digestion

What to Feed Hamsters

- ◉ Require grains and lots of fresh fruits & greens (broccoli, peas in the pod, melons, etc.)
- ◉ Avoid iceberg lettuce and apples (too high in water and fiber)
- ◉ Try to avoid overfeeding: let hamster fill pouches

Rule of Thumb: feed only enough for the day and a little for the next morning; remove leftover fruit and veggies!

Hamsters, Treats and Water

- ◉ Sunflower seeds in small amounts

- ◉ Pet store snacks are good

- ◉ Fresh water in sipper bottles

- ◉ Change water daily and run thru dishwasher weekly to kill bacteria



Rats and Mice



Source: Wikipedia

Rat & Mouse Feeding Behavior

- ◉ Eat ~10% of body weight daily
- ◉ Indiscriminate eaters so must give them a complete diet!
- ◉ Careful what you feed, as they will eat anything – even things not good for them (ex. May choke on peanut butter)

What to Feed Rats & Mice

- ◉ Basic diet of kibble or lab blocks, & add small amounts of leafy green veggies
- ◉ Commercial rat or mouse chow is available
- ◉ Can feed cooked meat as a small treat (leave it on the bone – rats/mice use bone to wear down teeth)

**Buy only enough pellets to feed for 3 months at a time...
nutritive value decreases in 3-5 months**

Rats, Mice Water and Treats

- ◉ Fresh water daily and clean bottle
- ◉ Sunflower seeds & small pieces of fruit and veggies are good snacks
- ◉ Chew sticks for continually growing incisors. Avoid cherry, cedar and oleander

Chinchillas

- ◉ Herbivores
- ◉ Require high fiber, vitamin-rich diet
- ◉ Most crucial part of diet is unlimited access to grass hay (Timothy, Brome, Oat and Wheat Hay).
- ◉ Also need commercial chinchilla pellets



What to Feed Chinchillas

- ◉ <8 months: plain alfalfa pellets available always
- ◉ Older chinchillas: feed 1-2 tblsns fresh commercial pellets per day; grass hay available always
- ◉ Use fresh pellets (not older than 3 months)
- ◉ Avoid pellet mixes with nuts and grains – can cause obesity

What to Feed Chinchillas

- ◉ Dried fruit (apricots, pineapple, papaya) basil, broccoli leaves, carrots and carrot tops, green peppers, kale, raspberry leaves, squash, dandelion leaves – all in small amounts
- ◉ Small amount of raisins help with constipation

Chinchilla Feeding Behavior

- ◉ Chewing and gnawing are daily habits. Nocturnal, chew furniture, cords and plants
- ◉ Branches of maple, birch or bark from apple, peach and pear trees help
- ◉ Avoid cherry, oleander, cedar, plum or redwood – all are toxic
- ◉ Require a dust bath to keep fur clean

Ferrets

- ◉ Strict carnivores
- ◉ Short digestive tract; food passes in 3-4 hours
- ◉ High protein requirements: meat protein only – plant proteins not utilized by ferrets
- ◉ Poor digesters of fiber
- ◉ Dry diets are for teeth & are more energy efficient



Source: National Geographic News

Ferrets and Protein

- ◉ Diet must have 32-38% protein and minimum of 20% fat
- ◉ First ingredient on label should be meat
- ◉ Avoid soy or plant proteins
- ◉ Avoid fish and fish oil – make ferrets smelly



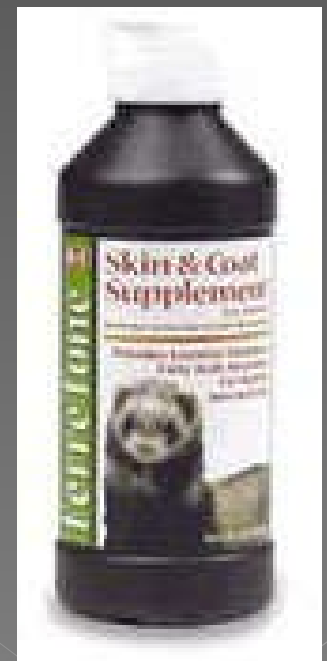
Ferret Feeding Behavior

- ◉ Feed ad libitum – ferrets don't gorge
- ◉ High GI transit rate means ferret needs to eat frequently and obesity is rarely a problem
- ◉ High levels of corn fillers in food can cause bladder stones



Ferrets and Snacks

- ◉ Ferretone, a fatty acid supplement that makes coat shiny. Few drops per day.
- ◉ Small helpings of mashed or liquefied fruits, but avoid starchy foods like cereal
- ◉ Limit sweets – can lead to diabetes
- ◉ Can give a little cooked chicken and cooked egg in small amounts



Lifestage Feeding and Special Needs

- ◉ Shedding causes hairballs in spring and fall, so give Laxatone or Ferretlax
- ◉ After 4 years ferrets slow down & need less fat and protein. Feed Senior Ferret food (50% less fat and protein)

