Rodents

- Class Rodentia
- 5 (depends) Suborders
- 33 (maybe more) Families
- About 481 genera, 2277+ species

Over 40% of all mammal species in the next 2 labs
Sciuromorpha: squirrels, dormice, mountain beaver, and relatives

Castorimorpha: beavers, gophers, kangaroo rats, pocket mice, and relatives

Myomorpha: mice, rats, gerbils, jerboas, and relatives

Anomaluromorpha: scaly-tailed squirrels and springhares

Hystricomorpha: hystricognath rodents...lots of South American and African species, mostly
Why rodents are evil...

Because rodents are such a diverse and speciose group, their higher-level taxonomy keeps being revised. Hard to keep up!

In recent decades, there have been 2, 3, 4 or 5 Suborders, depending on the revision, and Families keep getting pooled and split. We’ll just focus on some of the important Families and leave their relationships to future generations.
Why rodents are fun...

They are a diverse and speciose group, occur in just about every kind of habitat and climate, and show the broadest ecological diversity of any group of mammals.

There are terrestrial, arboreal, scansorial, subterranean, and semiaquatic rodents. There are solitary, pair-forming, and social rodents. There are plantigrade, cursorial, fossorial, bipedal, swimming and gliding rodents.

You could spend your whole life studying this group! (Some do.)
General characteristics of rodents

- Specialized ever-growing, self-sharpening incisors (2 upper, 2 lower) separated from cheek teeth by diastema; no canines
- Cheek teeth may be ever-growing or rooted, but show a variety of cusp patterns, often with complex loops and folds of enamel and dentine reflecting the diet; cusp patterns also often useful taxonomically
- Mostly small, average range of body size is 20-100 g, but some can get pretty large (capybara is largest extant species, may reach 50 kg)
- Mostly herbivorous (including some specialized as folivores and granivores) or omnivorous
- Females with duplex uterus, baculum present in males
- Worldwide distribution, wide range of habitats and ecologies

And now, on to a few Families...
**Aplodontidae** (mountain beaver, 1 genus, 1 species)

- Pacific Northwest, from British Columbia to northern California, in humod forest with dense understory, especially near water

- Jaw structure and masseters like earliest rodents, other characters make them the most primitive living rodent

- Stocky (1-1.5 kg), no external tail, nocturnal, herbivorous, burrow extensively

- Flattened, triangular skull with long necks extending from bullae
**Sciuridae** (squirrels, chipmunks, marmots, etc.; 51+ genera, 278 species)

- Large and diverse group, worldwide distribution except Australia, Madagascar, southern S. America, Antarctica, and a few deserts
- At least 5 subfamilies, but can generally be thought of as tree squirrels (climbers), ground squirrels (diggers), and gliding squirrels
- Mostly diurnal herbivores, but will eat a variety of foods, including vegetation, seeds and nuts, fruit, many species eat insects for part of the year, many take bird eggs and nestlings, fungi; flying squirrels are nocturnal

*Sciurus aberti*

*Ratufa indica*
Some ground squirrels

*Ictidomys tridecemlineatus*

*Tamias amoenus*

*Spermophilus lateralis*

*Marmota flaviventris*

*Cynomys ludovicianus*

*Ammospermophilus harrisi*
Some tree squirrels

*Sciurus vulgaris*

*Tamiasciurus hudsonicus*

*Ratufa bicolor*

*Callosciurus prevosti*
Some gliding squirrels

Glaucomys volans

Petaurista petaurista
We’re tired of just giving alarm calls...
Time for some action!
Jedi squirrels

New carnivorous quad squirrel?
Castoridae (beaver; 1 genus, 2 species)

Castor canadensis
Geomyidae (pocket gophers; 6 genera, 40 species)

- External, fur-lined cheek pouches
- Subterranean, herbivorous, generally solitary
- SW Canada through western and central US to Colombia, S. Am.

Geomys bursarius
**Heteromyidae** (kangaroo rats, pocket mice, kangaroo mice; 6 genera, 60 species)

*Chaetodipus*

- SW Canada, western US, Central America to NW S. Am.
- Some are specialized desert granivores with external, fur-lined cheek pouches; *Dipodomys* and *Microdipodops* are bipedal

*Microdipodops*
• But a couple of genera are tropical quadrupeds

ID clue: hole through rostrum
Dipodidae (jerboas, jumping mice, birch mice; 16 genera, 51 species)

- Jerboas also are highly adapted for deserts, but occur in N. Africa through central Asia
- They are bipedal, and some look much like kangaroo rats without the cheek pouches

- But others don’t... having long ears, and being even more specialized for bipedalism than k-rats (3 central metatarsals often fused into a cannon bone with other toes reduced or lost)
- As a group, they are more diverse than k-rats in terms of diets as well
• Birch mice and jumping mice were once their own family, Zapodidae, but are now included in the Dipodidae

• *Zapus* and *Napeozapus* in North America, *Sicista* in Europe and central Asia, *Eozapus* in China

• Saltators (good jumpers), but not bipedal

• Wooded areas, moist grassy fields, alpine meadows

• Hibernators
Cricetidae (New World rats and mice, voles, hamsters, and relatives; 130 genera, 681 species)

Voles, lemmings, muskrats, hamsters, crested rats, New World mice of various sorts, woodrats, golden mouse, climbing rats, mole voles... what the hey! You are pretty familiar with these, just look over the common North American genera we have out in lab.

*Lemmus lemmus* ... one of my favorites
*Microtus ochrogaster*

*Myodes [Clethrionomys] glareolus*

*Synaptomys cooperi*

*Dicrostonyx groenlandicus*
Muridae (Old World rats and mice, gerbils, and lots of relatives; 150 genera, 730 species)

Rattus

Apodemus flavicollis... Apodemus is the Eurasian counterpart of Peromyscus

Invasives

Mus

Oh, but there are so many more neater ones.
Spalacidae: Spalax

Gliridae: Glis glis

Micromys

Lemniscomys

Meriones
**Pedetidae** (springhare; 1 genus, 2 species)

- Eastern and southern Africa, in sandy semi-arid habitats
- Bipedal hoppers, nocturnal, herbivorous, good burrowers, “spring” out of burrows when wary
- Sciurognathous jaw, but hystricomorphous masseters (large infraorbital foramen)
Anomaluridae (scaly-tailed squirrels; 3 genera, 7 species)

Anomalurus

- Like large flying squirrels, but more gliding areas (e.g., ankle to tail) and cartilage extending from elbows instead of wrists
- 2 rows of scales on underside of tail
- Tropical forests in west and central Africa
- Nocturnal, herbivorous, may occur in colonies

Not related to Sciurids, similarities are convergent with gliding squirrels