

**LAB 6: RODENTIA I**

Sources: Martin et al. Ch. 23 (pp. 138-161); this handout

In General:

Nearly half (ca. 1,800 spp.) of the living species of mammal are rodents. Most are primarily herbivorous, however some (e.g. *Onychomys*) are fairly insectivorous/carnivorous. They range in size from a few grams (*Baiomys*) to over 50 kg (*Hydrochoerus*).

Taxonomic Notes:

Traditionally the order has been divided into three or four suborders based on major differences in the masseter muscle and zygomatic arch (Sciuromorpha, Hystricomorpha, Myomorpha and Caviomorpha). However, not all species fit neatly into these morphological categories and it is virtually certain that some or all are paraphyletic groups. The current taxonomy recognizes only two suborders (Sciurognathi and Hystricognathi). However, there remains a great deal of contention about rodent systematics at all hierarchical levels

Diagnosis:

Single pair of semicircular, ever-growing incisors which have enamel only on the anterior surface; canines absent, large diastema present, mandibular symphysis flexible; orbit broadly united with temporal fossa; premaxilla has processes reaching to frontals.

Range:

Worldwide except Antarctica, New Zealand and some oceanic islands; some species of Muridae (Old World rats and mice) have been transported wherever humans have traveled.

**SUBORDER: HISTRICOGNATHI**

Taxonomic note: historically divided into Old World Hystricomorpha and New World Caviomorpha.

Diagnosis: histricognathus mandible—angular process arises lateral to the incisive alveolus; pterygoid fossa which opens into orbit or braincase; hystricomorphous masseter condition — enlarged infrorbital canal through which passes the anterior deep portion of the masseter muscle

Distribution: Africa, southern Europe, South and Central America, West Indies, NA

**Family Erethizontidae** (New World porcupines)

Diagnosis: feet modified for arboreal life; some hair modified into sharp, short spines having minute, imbricate, proximally-directed barbs; bullae prominent; paroccipital process not elongate; teeth brachydont with re-entrant folds; dental formula 1/1, 0/0, 1/1, 3/3 = 20; one genus (*Coendu*) with prehensile tail

Habits: herbivorous; arboreal; not colonial; primarily nocturnal; *Erethizon* bears one young in spring after gestation of seven months

Range: North, Central and South America

Specimen: *Erethizon dorsatum* (skin + skull) (a Connecticut species, NW part of state only)

Know: **Erethizontidae, *Erethizon***

**Family Caviidae** (cavies, Patagonian hares)

Diagnosis: infraorbital canal greatly enlarged; mandible with angular process drawn backward and not distorted outward, with prominent groove below tooth-row on lateral side; cheekteeth ever-growing and simple, consisting of two prisms having sharp folds and angular projections; dental formula 1/1, 0/0, 1/1, 3/3 = 20; tooth-rows strongly convergent anteriorly; digits on hind feet reduced to four; tail vestigial

Habits: herbivorous, make runways in thick grass or dig burrows; run swiftly, walk quadrupedally; crepuscular or nocturnal; bear 1-5 young after gestation of 2 months, twice yearly in wild; social

Range: SA

Specimen: *Cavia* (skin)

Know: **Caviidae**

**Family Hydrochoeridae** (capybara)

Diagnosis: zygomatic structure as in Caviidae; cheekteeth ever-growing, complex and adapted for grinding, M3 longer than other three molariform teeth together; largest living rodent, dental formula 1/1, 0/0, 1/1, 3/3 = 20; tooth rows strongly convergent anteriorly; digits on hind feet reduced to three; four digits on forefeet; digits semi-webbed; tail vestigial; paroccipital process more elongate than any other rodent; muzzle heavy and truncate; ears short and rounded; eyes small and placed dorsally, relatively far back on head

Habits: herbivorous; do not excavate dens; remain in family groups of as many as 10 to 20; bear 3-8 young once a year; inhabit swamps, streams, herbaceous vegetation of plains, or in forest

Range: Tropical America from Panama to Uruguay

Specimen: *Hydrochoerus*

Know: **Hydrochoeridae**

### **Family Dasyproctidae** (agoutis)

Diagnosis: moderate size; cursorial, limbs (esp. hind) lengthened; lateral toes reduced in size; pollex vestigial; claws thick, hoof-like; dental formula 1/1, 0/0, 1/1, 3/3 = 20; cheek teeth hypsodont, semi-rooted, tending to isolate narrow transversely-oriented islands; infraorbital foramen very large; tail short or absent

Habits: dig burrows; herbivorous; digitigrade, walk, trot, or gallop; agile, sure-footed and fast; nocturnal; generally solitary; bear 1-4 young after 104 day gestation

Range: southern Mexico to southern Brazil and on the Lesser Antilles

Specimens: *Dasyprocta* (skin + skull)  
*Myoprocta* (skull)

Know: **Dasyproctidae**

### **Family Agoutidae** (pacas)

Taxonomic note: The common name ‘agouti’ applies to members of the family Dasyproctidae (above), whereas the Agoutidae, including the genus *Agouti*, are the ‘pacas’ — extremely confusing, of course. A partial reason for this ambiguity is that the Agoutidae was formerly included as a subfamily (Agoutinae or Cuniculinae) within the family Dasyproctidae.

Diagnosis: resemble Dasyproctidae in general body form and dentition; principle differences are: spotted pelage; larger number of digits on the feet; part of the zygomatic arch of the skull is greatly inflated, containing a sinus apparently used as a resonating chamber—a condition not found in any other mammal; in the adult the surface of this chamber becomes very rugous (rough)

Habits: nocturnal, spend days in burrows that they excavate; enter water freely and swim well; herbivorous, including tough material, but captives will eat meat; often considered agricultural pests

Range: east-central Mexico to Paraguay (*A. paca*); Andes of northwestern Venezuela, Colombia, Ecuador (*A. taczanowskii*)

Species: *Agouti paca*, *A. taczanowskii*

Specimens: *Agouti* sp. (probably *A. paca*) (skin)

Know: **Agoutidae**

### **Family Chinchillidae** (chinchillas and viscahcas)

Diagnosis: infraorbital foramen very large; cheekteeth ever-growing and having tightly pressed transverse laminae without cement; angular process elongate and only slightly deflected laterally; palate and maxillary tooth-row constricted anteriorly; dental formula 1/1, 0/0, 1/1, 3/3 = 20; hind limbs and feet long, bearing three toes; forelimbs short, manus small

Habits: herbivorous; seek shelter in burrows or rock piles; leap or run quadrupedally; diurnal or nocturnal; colonial; bear well-developed young

Range: western SA

Specimens: *Chinchilla* (skin + skull)

Know: **Chinchillidae**

### **Family Myocastoridae** (nutria or coypu)

Diagnosis: robust; pes much larger than manus and having four toes webbed, the fifth free; pollex vestigial; paroccipital process elongate; cheekteeth decrease in size and converge anteriorly, are semi-rooted, hypsodont; fur soft and thick; tail moderately long, scaly, round in cross-section, and poorly haired

Habits: eat aquatic vegetation; voracious; burrow in banks; can submerge for up to half hour; swim well; bear 2-8 young; polyestrous

Range: native to southern SA but have been widely introduced into southern NA and southern Eurasia where they have become pests

Specimens: *Myocastor* (skin + skull)

Know: **Myocastoridae**

### **Family Ctenomyidae** (tuco tucos)

Diagnosis: hard palate ends between tooth-rows; anterior end of ventral zygomatic root anterior to first cheektooth and anterior to dorsal zygomatic root; incisive foramen never enlarged; infraorbital foramen enlarged with vertical dimension greater than horizontal dimension; rostrum broad; postorbital process of jugal and frontal usually present; parietals well-ridged; lamboidal crest prominent; bullae enlarged; paroccipital process enlarged; dental formula 1/1, 0/0, 1/1, 3/3 = 20; last upper molar vestigial

Habits: herbivorous; store food; fossorial; hearing and vision well-developed; 2-5 young per litter; ecological equivalent to pocket gophers

Range: southern SA

Specimens: *Ctenomys* (skin + skull)

Know: **Ctenomyidae**

### **SUBORDER: SCIUROGNATHI**

Taxonomic note: historically divided into Sciuromorpha and Myomorpha, the former regarded as primitive and the latter derived from it; probably not valid

Diagnosis: sciurognathus condition of mandible—origin of angular process arises medial to the line of the incisive alveolar sheath.

Range: virtually worldwide

#### **Family Aplodontidae** (mountain beaver)

Diagnosis: cheek teeth ever-growing; upper P3 minute; dental formula 1/1, 0/0, 2/1, 3/3 = 22; infraorbital foramen small and not transmitting any muscle; zygomatic plate narrow; neck of bulla long and directed horizontally outward; parietal ridges well marked; palate broad, extending behind tooth-rows; five digits on each foot.

Habits: dig burrows with many openings; feed on succulent stems; short estrous; bear 2-6 young after gestation period of 28-30 days.

Range: mountains of northwestern NA

Specimens: *Aplodontia*

Know: Aplodontidae (skin) (skull?)

#### **Family Sciuridae** (squirrels, chipmunks, marmots)

Diagnosis: cheekteeth rooted, high or low-crowned, usually characterized by prominent cusps and ridges; post-orbital processes usually well-developed; angular process slightly inflected; palate broad, generally terminating behind tooth-rows or at level of last molar; five digits on hind feet, four on forefeet; tail always fully haired, often bushy; infraorbital foramen small; zygomatic plate broadened, tilted upward; incisive foramina usually short and considerably anterior to tooth-rows.

Habits: diurnal, nocturnal, or crepuscular; arboreal or terrestrial; herbivorous, but occasionally eat insects; some estivate or hibernate; 1-15 young born after gestation of 22-45 days.

Range: cosmopolitan except Australian region, Madagascar and southern half of SA



## A Classification of the Order Rodentia

(taxa represented in the lab and which you must identify are bolded)

### Suborder Hystricognathi

Bathyergidae  
Hystricidae  
Petromuridae  
Thryonomyidae  
**Erethizontidae**  
**Chinchillidae**  
Dinomyidae  
**Caviidae**  
    Caviinae  
    Dolichotinae  
**Hydrochaeridae**  
**Dasyproctidae**  
**Agoutidae**  
**Ctenomyidae**  
Octodontidae  
Abrocomidae

Echimyidae  
    Chaetomyinae  
    Dactylomyinae  
    Echimyinae  
    Eumysopinae  
    Heteropsomyinae  
Capromyidae  
    Capromyinae  
    Hexolobodontinae  
    Isolobodontinae  
    Plagiodontinae  
Heptaxodontidae  
    Clidomyinae  
    Heptaxodontinae  
**Myocastoridae**

### Suborder Sciurognathi

**Aplodontidae**  
**Sciuridae**  
    Sciurinae  
    Petauristinae  
**Castoridae**  
**Geomyidae**  
**Heteromyidae**  
    Dipidomyinae  
    Heteromyinae  
    Perognathinae  
**Dipodidae**  
    Allactaginae  
    Cardocraniinae  
    Dipodinae  
    Euchoreutinae  
    Paradipodinae  
    Sicistinae  
    Zapodinae  
Anomaluridae  
    Anomalurinae  
    Zenkerellinae  
Ctenodactylidae  
Pedetidae

**Muridae**  
**Arvicolinae**  
    Calomyscinae  
**Cricetinae**  
    Cricetomyinae  
    Dendromurinae  
**Gerbillinae**  
    Lophiomyinae  
**Murinae**  
    Myospalacinae  
    Mystromyinae  
    Nesomyinae  
    Otomyinae  
    Petromyscinae  
    Platacanthomyinae  
    Rhizomyinae  
**Sigmodontinae**  
**Spalacinae**  
**Myoxidae** (formerly Gliridae)  
    Graphiurinae  
    Leithiinae (formerly Seleviniinae)  
    Myoxinae