

Order RODENTIA

1. The largest and most successful mammalian order
2. 29 extant families, >426 genera, and >2015 recognized species (43% of mammals)
3. Broad variety of foods and habitats
4. Cosmopolitan except for Antarctica, New Zealand, a few Oceanic islands

1

Why so successful?

1. High fecundity
2. High population densities
3. Rapid population turnover
4. Small size
5. Efficient jaws and dentition
6. Repeated adaptive radiations

2

Rodents and Humans

1. Economic benefits
 - A. Scientific
 - B. Fur
2. Costs
 - A. Pests
 - B. Disease vectors

3

Order RODENTIA

1. Latin "rodere" = "to gnaw"
2. single pair of curved, evergrowing incisors with enamel restricted to the anterior face, self-sharpening
3. long diastema



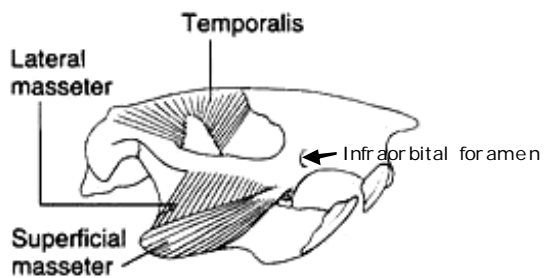
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Skull Types

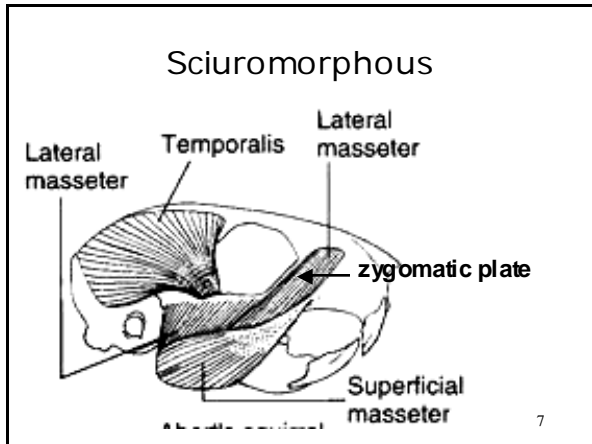
1. Modifications to the insertion of the masseter muscle
2. The masseter pulls the jaw forward.

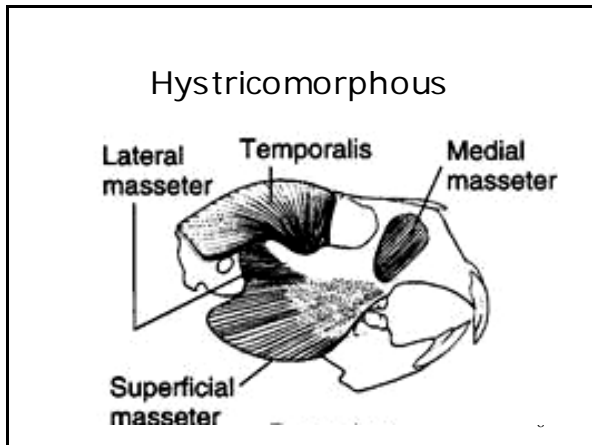
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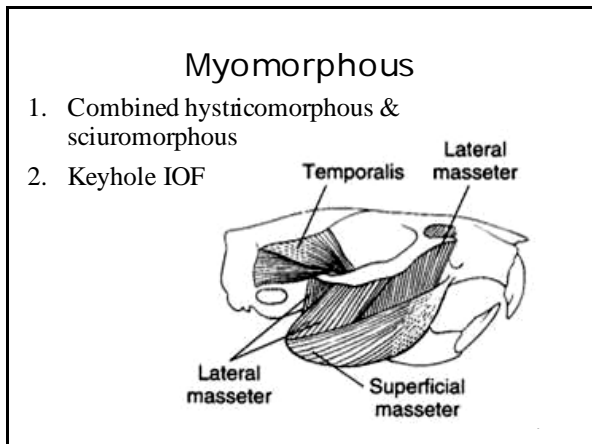
Protrogomorphous

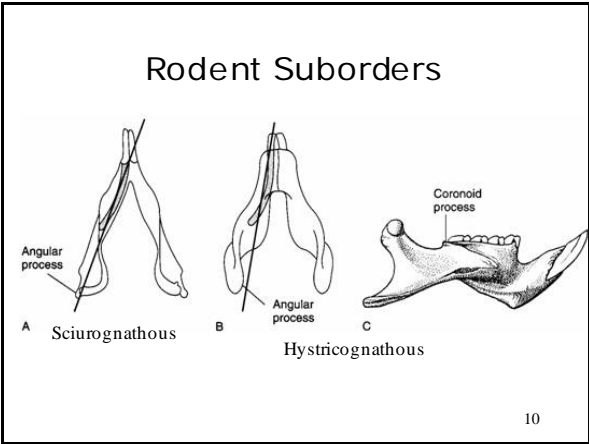


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Family APLODONTIDAE

1. *Aplodontia rufa*
2. Endemic to western North America .
3. Protrogomorphous
- 4.
- 5.
- 6.

11

Family SCIURIDAE

1. Tree, ground, and "flying" squirrels (fig. 18.8, 18.9)
2. cosmopolitan except Australian, Madagascar
3. 50 genera; 273 species
4. Sciuromorphic
5. Diurnal herbivores

12

Bernoulli and Prairie Dogs

1. openings at different altitudes.
2. air that travels faster has lower pressure.
- 3.

13

Family CASTORIDAE

1. Beavers.
2. Holarctic: 2 species.
3. Sciuriformous, sciurognathus.
- 4.
- 5.
- 6.

14

Castoridae

Semiaquatic Adaptations

1. .
- 2.
3. .

Behavior

1. .
- 2.
- 3.

4. Castor Gland

15

Environmental Modification

1. Dams across streams.
- 2.
- 3.
4. burrow into the banks of large rivers

16

Beaver ponds

- 1.
- 2.
- 3.
- 4.
5. Keystone Species
 - A.
 - B.
 - C.
 - D.

17

Conservation

- 1.
 - 2.
 - 3.
 - 4.
- Negative Impacts
Tierra del Fuego

Castoroides ohioensis

18

Family GEOMYIDAE

1. pocket gophers
2. Nearctic, Neotropical (northern Columbia)
3. 5 genera, 35 species
4. Sciuromorphous
5. external, furred cheek pouches
6. fossorial

19

Family HETEROMYIDAE

1. Pocket mice, Kangaroo rats
2. Nearctic and northern Neotropical (Columbia, Venezuela)
3. Sciuromorphous
4. external, furred cheek pouches
5. pinna evident
6. granivores
- 7.

20

Xeric adaptations

1. Metabolic water
A. .
2. Long loops of Henle
3. Dry feces
4. Countercurrent heat exchanger in nasal passages of Kangaroo rats (*Dipodomys*)

21

Superfamily MUROIDEA

1. rats and mice (Figures 18.20-18-23)
2. Cosmopolitan
3. 66% of all rodents; 28% of all mammal species
4. 281 genera, 1325 species
5. Myomorphous
6. 6 families, including

22

Family Muridae

1. Old World rats and mice
2. 117+ genera, 529+ species
3. Palearctic, Oriental, Ethiopian, Australian, Oceanic
4. terrestrial, fossorial, largely aquatic and arboreal members.

23

Impact

1. NEGATIVE
 - A. commensals
 - B. Food destruction and disease
 - a.
 - C. extinction of native fauna on islands
2. POSITIVE
 - A.
 - B.

24

Family Cricetidae

1. 112 Genera and 600 species of
 - A. Hamsters (Cricetinae)
 - B. New World rats and mice (Sigmodontinae)
 - C. Voles and lemmings (Arvicolinae)

25

Family Cricetidae

1. New World rats and mice.
2. Second largest taxonomic group of the Muroidea.
3. 73+ genera, 422+ species.
4. Ecologically replaces Murinae in New World.
5. 85% of species are South American.

26

Sigmodontinae

1. Peromyscines
 - A. simple phallus.
2. Sigmodontines
 - A. complex phallus.



27

Subfamily Arvicolinae

1. voles, lemmings, and muskrats
2. Holarctic grazers
3. r & K selection in rodents

28

Population cycles in voles and lemmings

1.
 - A.
 - B.
2. 2 - 5 year cycles
- 3.
4. Multi-annual cycles in *Lemmus*
5. Why cycling lemmings crash – John Whitfield

29

Hystricognathi

1. Hystricognathous
2. K-selected
 - A.
3. New World
4. Old World

30

1. Family HYDROCHOERIDAE

A. *Hydrochoerus*

2. Caviidae - guinea pigs/cavies

A. grasslands and savannas of South America

B. Patagonian hare:

a.

C.

31

Myocastoridae

1.

2. *Nutria*

3.

4.

32

Agoutidae

1. Pacas

2.

3. skulls are broad and massive with resonating chambers

33

Convergence in Porcupines

1. Hystricidae
 - A. Old World Porcupines
 - B. Ethiopian, Palearctic, Oriental
 - C. Quills are not barbed
2. Erethizontidae
 - A. American porcupines [Fig. 18-29]
 - B. Nearctic, Neotropical
 - C. Barbed quills
 - D. Mainly arboreal

34

Bathyergidae

1. African mole-rats
2. Ethiopian (sub-Saharan)
3. 5 genera, 9 species
4. Fossorial
5. *Heterocephalus* (the naked mole rat)

35

Heterocephalus and *Cryptomys*

1. colonial, up to 40 individuals
2. dig extensive burrows
3. both are eusocial

36

Order LAGOMORPHA

1. 13 genera, 80 species
2. Family Ochotonidae
3. Family Leporidae

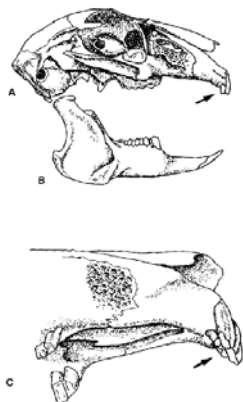
37

Lagomorphs

1. distribution is nearly worldwide.
- 2.
3. Introduced in Australia in 1859
 - A. a pest species there
 - B. Myxomatosis control

38

Skull and dentition



Family Ochotonidae - pikas

1. 2 genera, 26 species
2. 0.1 - 0.15 kg
3. Short rounded ears, short limbs and tail
4. Not cursorial
5. Behavior

40

Family Leporidae

1. Hares and rabbits
2. 11 genera, 54 species
3. Diverse habitats
4. Very successful

41

Ecology & behaviour

1.
 - A. Hares:
 - B.

Reproduction

- 1.
- 2.
- 3.
- 4.
- 5.

42

Feeding in rabbits and pikas

1. Herbivores
 - A.
2. Large cecum
3. Coprophagy
- 4.

43

Australia's plague of rabbits

44

Oscillations in the populations of snowshoe hare and lynx in Canada

45
