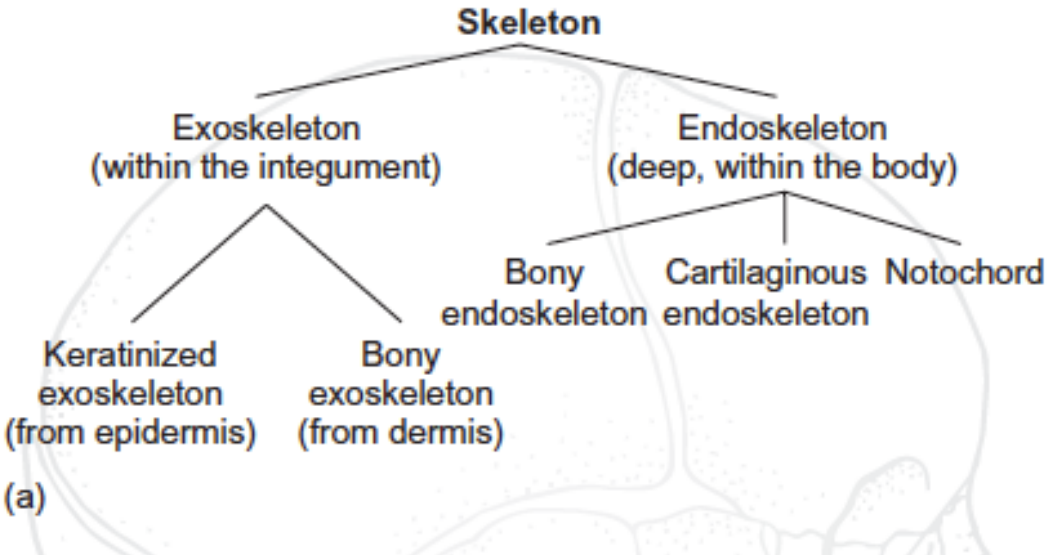
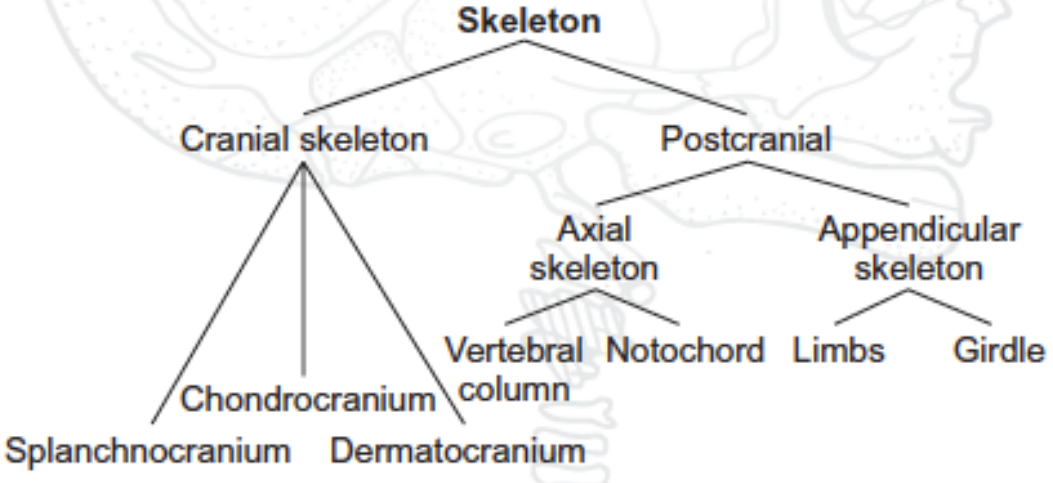
Características dos Mamíferos - Crânio e dentição


Skeleton
Exoskeleton
(within the integument)
Endoskeleton
(deep, within the body)
Bony
endoskeleton
Cartilaginous
endoskeleton
Notochord
Keratinized
exoskeleton
(from epidermis)
Bony
exoskeleton
(from dermis)

(a)


Skeleton
Cranial skeleton
Postcranial
Axial
skeleton
Appendicular
skeleton
Vertebral
column
Notochord
Limbs
Girdle
Chondrocranium
Splanchnocranium
Dermatocranium

(b)

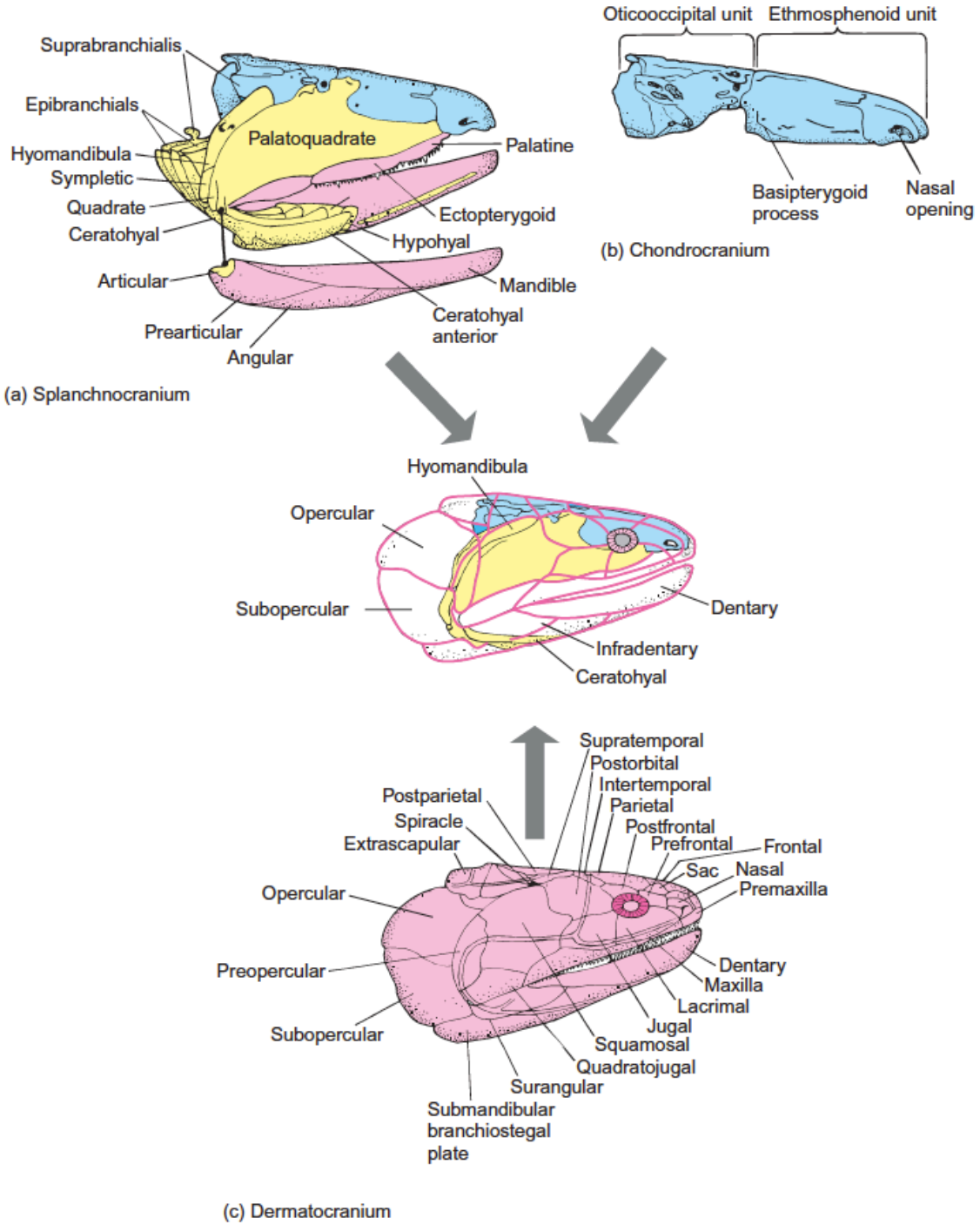
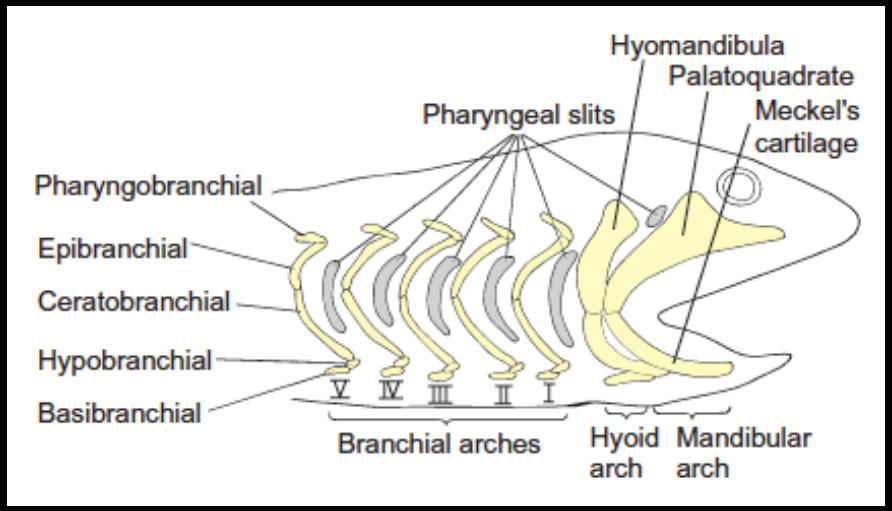

Suprabranchialis
Epibranchials
Hyomandibula
Sympletic
Quadrate
Ceratohyal
Palatoquadrate
Palatine
Ectopterygoid
Hypohyal
Articular
Mandible
Ceratohyal anterior
Prearticular
Angular
(a) Splanchnocranium
Oticooccipital unit
Ethmosphenoid unit
Basipterygoid process
Nasal opening
(b) Chondrocranium
Hyomandibula
Opercular
Subopercular
Dentary
Infradentary
Ceratohyal
Supratemporal
Postorbital
Intertemporal
Parietal
Postfrontal
Postparietal
Spiracle
Extrascapular
Prefrontal
Frontal
Sac
Nasal
Premaxilla
Opercular
Preopercular
Dentary
Maxilla
Lacrimal
Jugal
Subopercular
Squamosal
Quadratojugal
Surangular
Submandibular branchiostegal plate
(c) Dermatocranium

TABLE 7.1 Endochondral Contributions to the Chondrocranium

Endochondral Structure	Fishes (Teleost)	Amphibians	Reptiles/Birds	Mammals
Occipital bones	Supraoccipital Exoccipital Basioccipital	Supraoccipital Exoccipital Basioccipital	Supraoccipital Exoccipital Basioccipital	Supraoccipital Exoccipital Basioccipital } Occipital bone
Mesethmoid bone	Mesethmoid[a] (internasal)	Absent	Absent	Mesethmoid (absent in primitive mammals, ungulates) } Ethmoid
Ethmoid region	Ossified	Unossified	Unossified	Turbinals (ethmo-, naso-, maxillo-) } Ethmoid
Sphenoid bones				
Sphenethmoid	*Sphenethmoid*	*Sphenethmoid*	*Sphenethmoid*	*Presphenoid* } *Sphenoid*[c]
Orbitosphenoid	*Orbitosphenoid*	*Orbitosphenoid*	*Orbitosphenoid*	*Orbitosphenoid* } *Sphenoid*[c]
Basisphenoid	*[Basisphenoid]*[b]	*Basisphenoid*	*Basisphenoid*	*Basisphenoid* } *Sphenoid*[c]
Pleurosphenoid	*Pleurosphenoid*	*?*	*Pleurosphenoid (crocodilians, amphisbaenians)*	*Absent*
Laterosphenoid			Laterosphenoid (snakes)	Absent
Otic capsule	Prootic	Prootic	Prootic	Petrosal with
Periotic	*Epiotic* *Sphenotic*	*Opisthotic*	*Opisthotic* *Epiotic (absent in birds)*	*mastoid process*


Hyomandibula
Palatoquadrate
Pharyngeal slits
Meckel's cartilage
Pharyngobranchial
Epibranchial
Ceratobranchial
Hypobranchial
Basibranchial
V
IV
III
II
I
Branchial arches
Hyoid arch
Mandibular arch

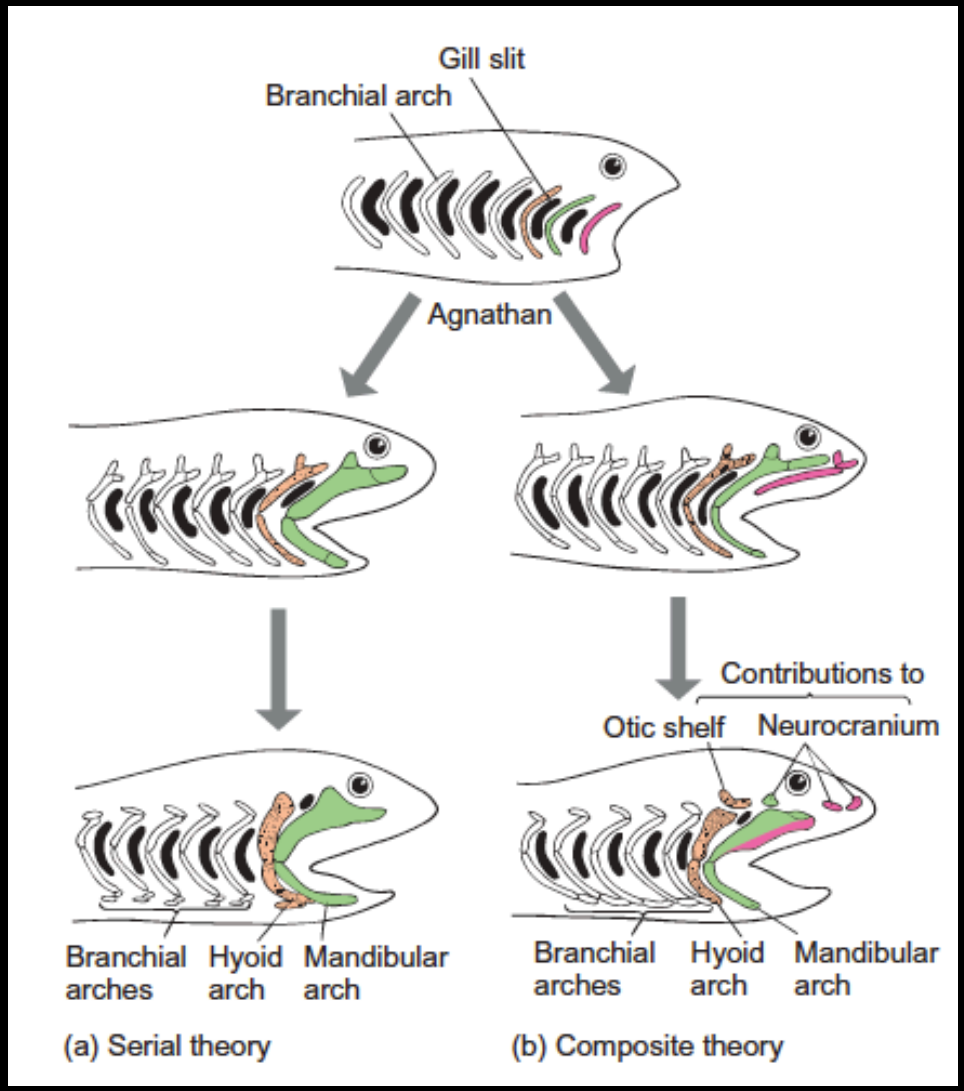

Gill slit
Branchial arch
Agnathan
Contributions to
Otic shelf
Neurocranium
Branchial arches
Hyoid arch
Mandibular arch
Branchial arches
Hyoid arch
Mandibular arch
(a) Serial theory
(b) Composite theory

TABLE 7.2 Derivatives of Branchial Arches in Sharks, Teleosts, and Tetrapods

Arch	Sharks	Teleosts	Amphibians	Reptiles/Birds	Mammals
I	Meckel's cartilage	Articular[a]	Articular	Articular	Malleus[b]
	Palatoquadrate	Quadrate Epipterygoid	Quadrate Epipterygoid	Quadrate Epipterygoid	Incus[b] Alisphenoid
II	Hyomandibula	Hyomandibula Symplectic Interhyal	Stapes Extracolumella	Stapes Extracolumella	Stapes[b]
	Ceratohyal	Ceratohyal Hypohyal	Ceratohyal Hypohyal	Ceratohyal	Anterior horn hyoid
	Basihyal	Basihyal		Body of hyoid	Body of hyoid
III	Pharyngobranchial Epibranchial Ceratobranchial Hypobranchial	Pharyngobranchial Epibranchial Ceratobranchial Hypobranchial	Body of hyoid	Second horn of hyoid	Second horn of hyoid
IV	Branchial arch		Last horn and body of hyoid Laryngeal cartilages (?)	Last horn and body of hyoid Laryngeal cartilages (?)	Thyroid cartilages (?)
V	Branchial arch	Branchial arch	Laryngeal cartilages (?)	Laryngeal cartilages (?)	Laryngeal cartilages
VI	Branchial arch	Branchial arch	Not present	Not present	Not present
VII	Branchial arch	Branchial arch			

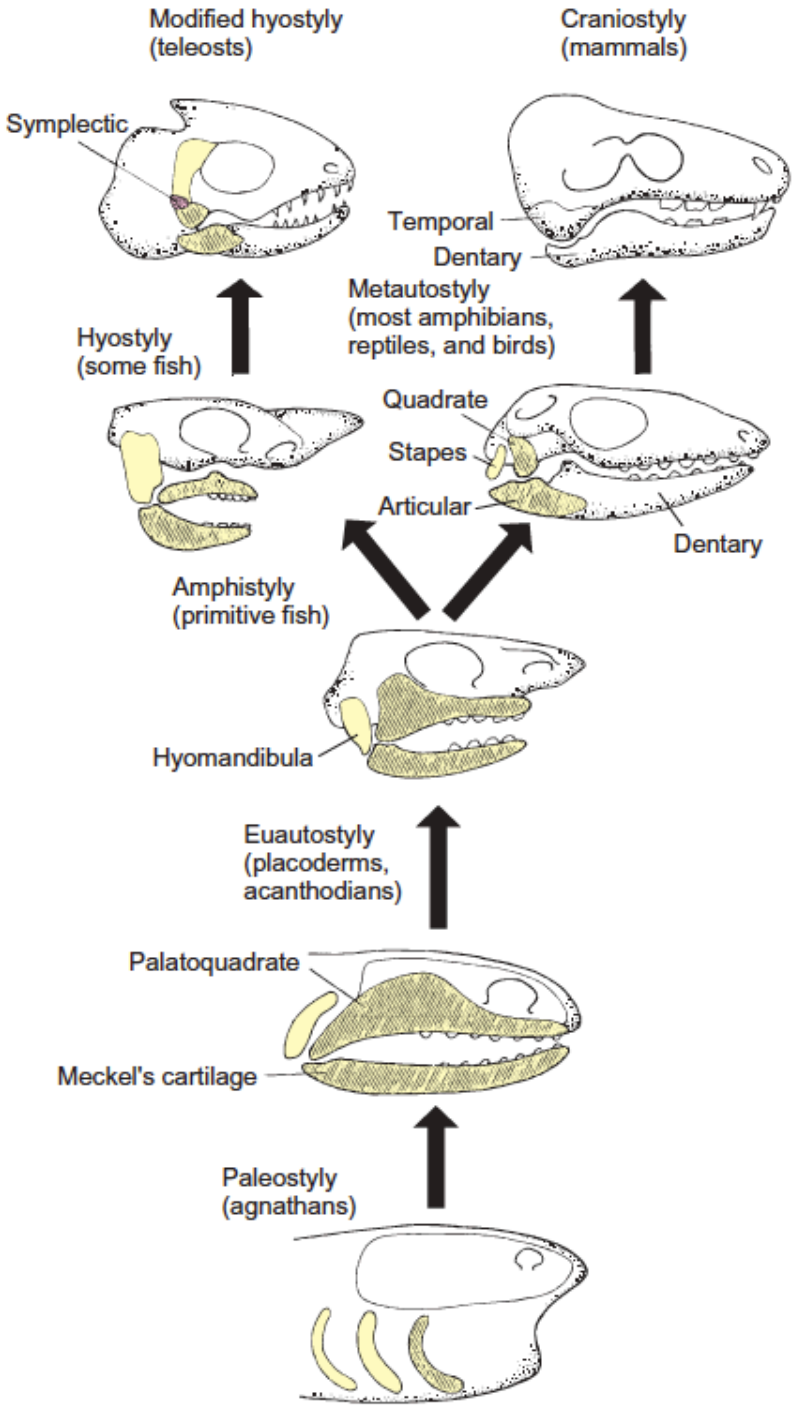
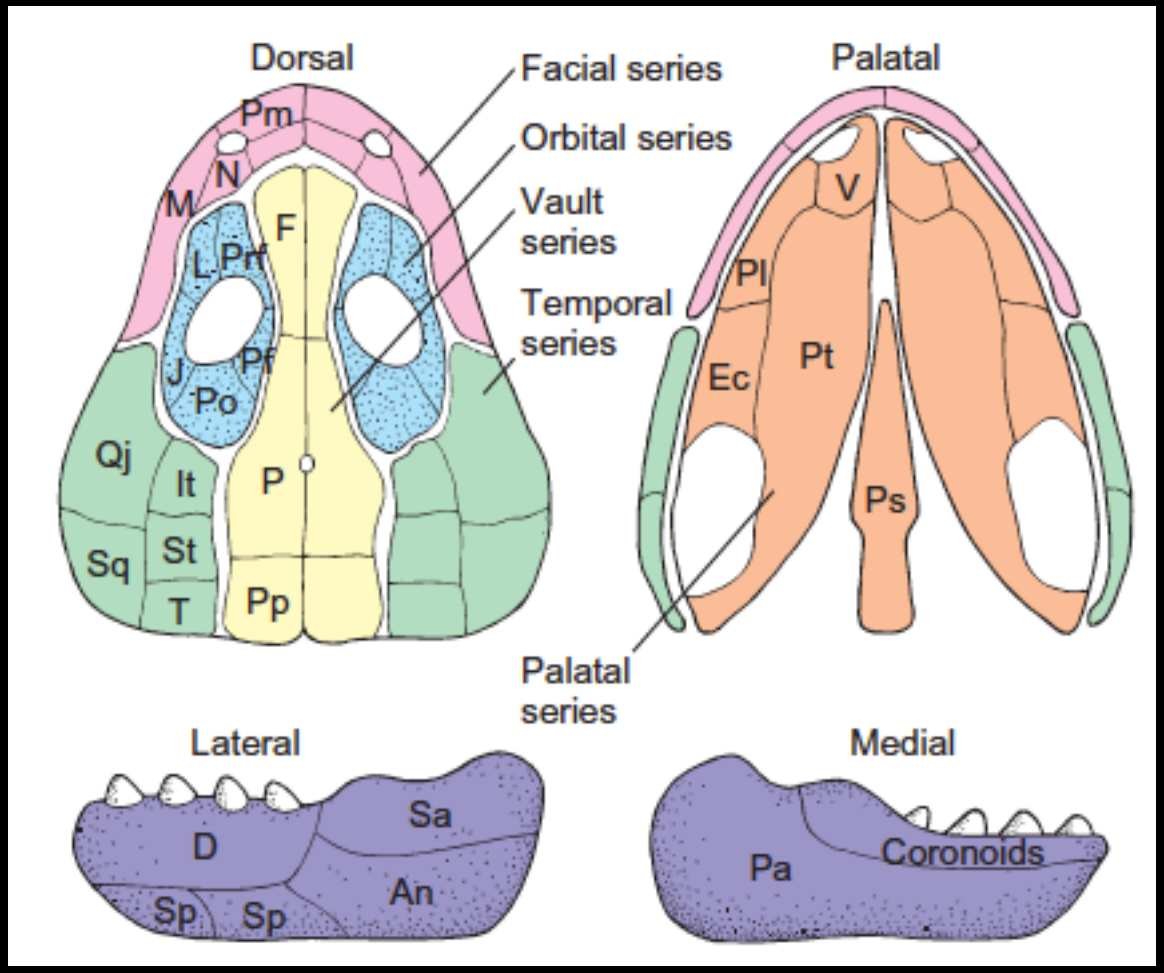
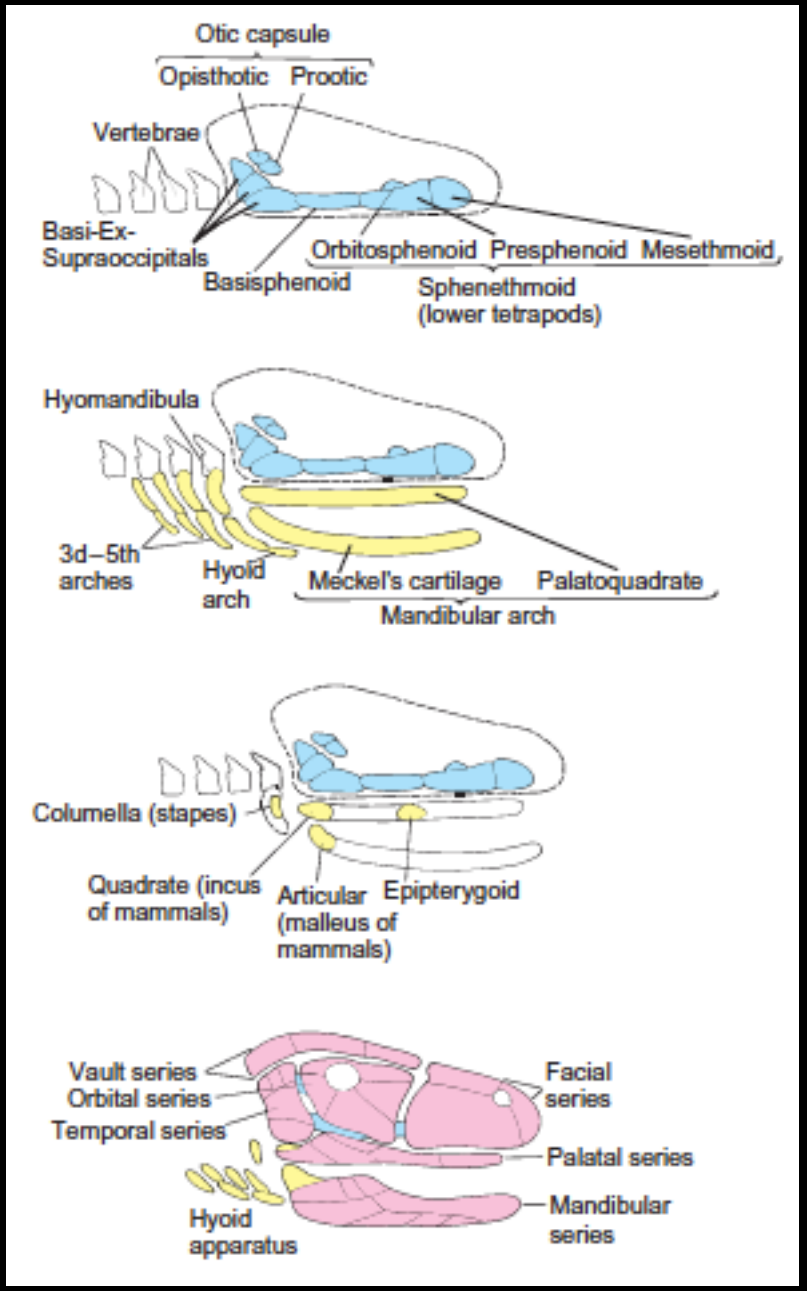
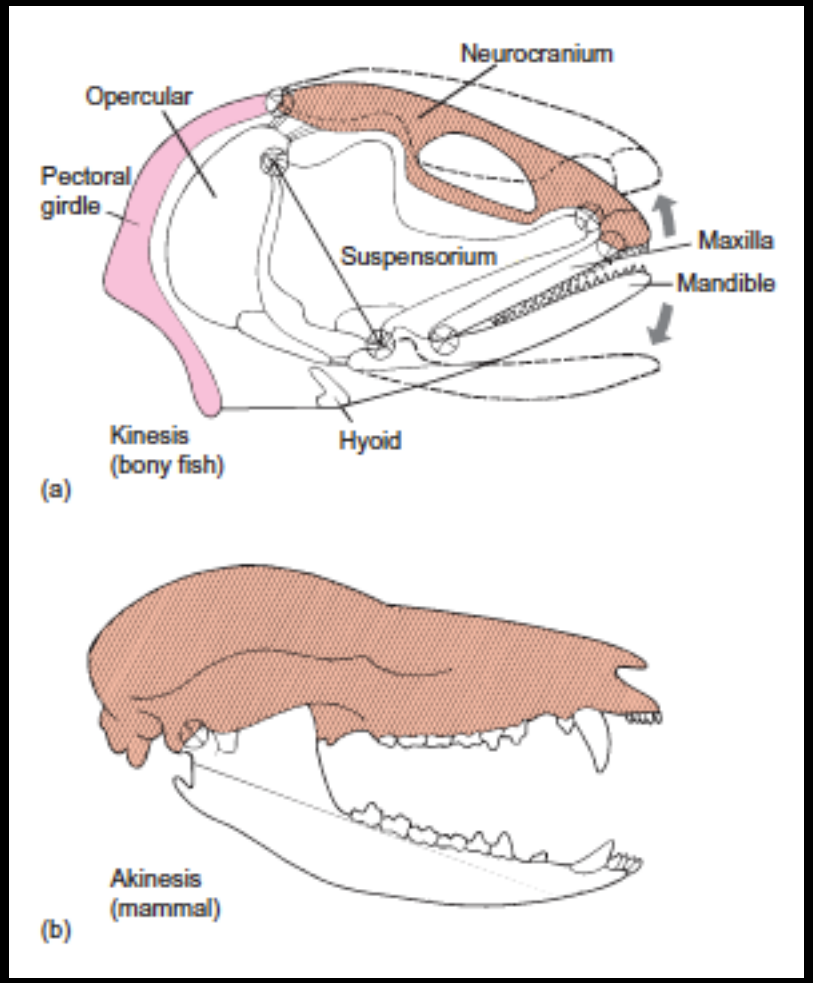

Modified hyostyly
(teleosts)
Craniostyly
(mammals)
Symplectic
Temporal
Dentary
Metautostyly
(most amphibians,
reptiles, and birds)
Hyostyly
(some fish)
Quadrate
Stapes
Articular
Dentary
Amphistyly
(primitive fish)
Hyomandibula
Euautostyly
(placoderms,
acanthodians)
Palatoquadrate
Meckel's cartilage
Paleostyly
(agnathans)

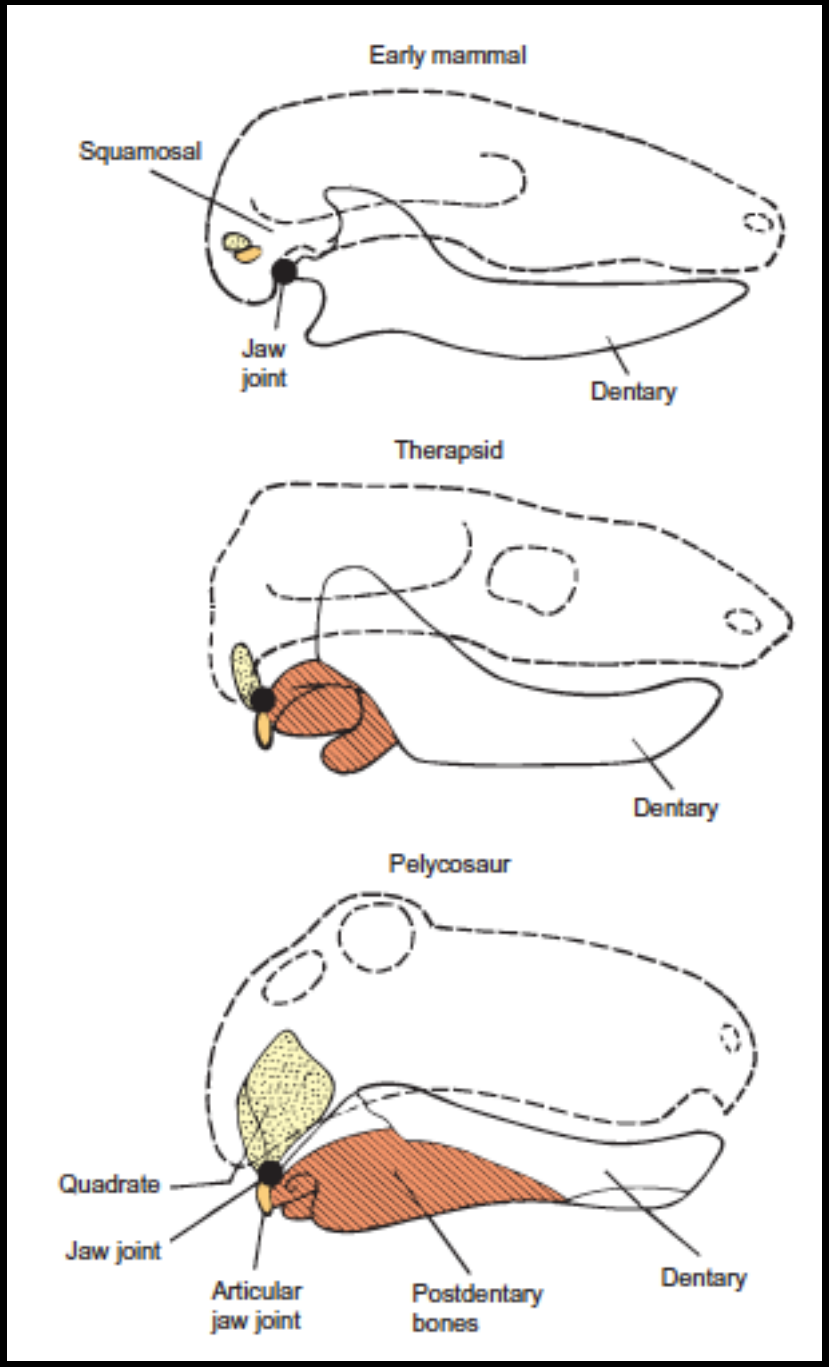
TABLE 7.3 Major Dermal Bones of the Skull

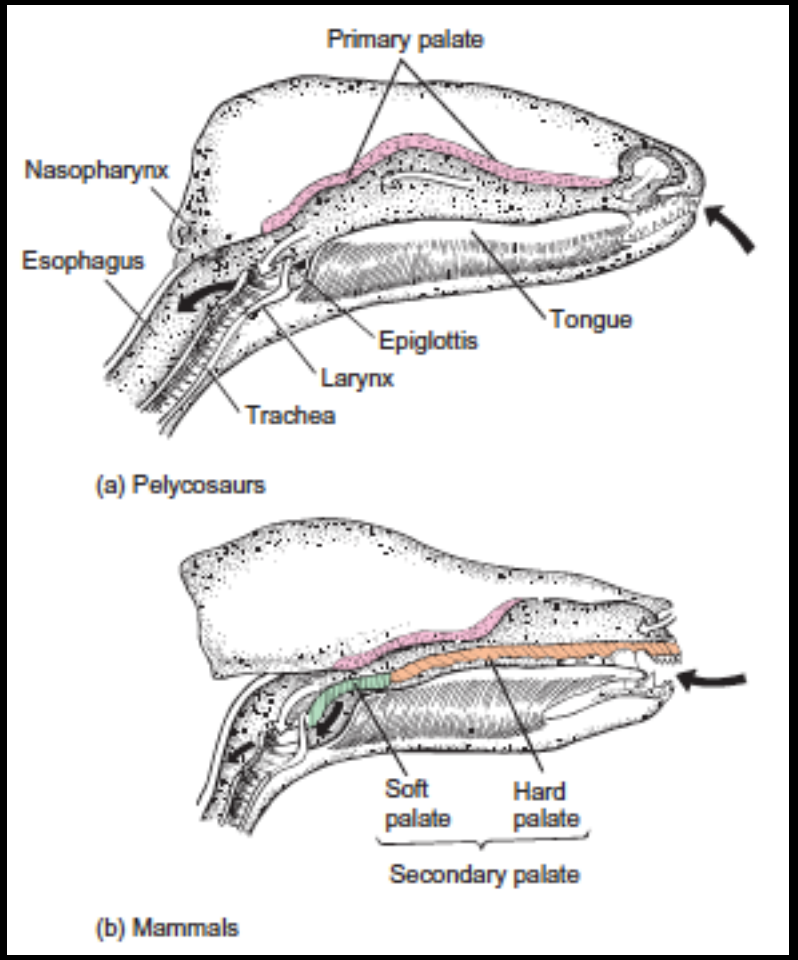
BRAINCASE					MANDIBLE
Facial Series	**Orbital Series**	**Temporal Series**	**Vault Series**	**Palatal Series**	**Mandibular Series**
Premaxilla	Lacrimal	Intertemporal	Frontal	Vomer	Lateral bones:
Maxilla	Prefrontal	Supratemporal	Parietal	Palatine	Dentary (teeth)
Nasals *(septomaxilla)*	Postfrontal Postorbital	Tabular	Postparietal	Ectopterygoid	Splenials (2)
	Jugal	Squamosal Quadratojugal		Pterygoid Parasphenoid *(unpaired)*	Angular Surangular
					Medial bones: *Prearticular* *Coronoids*

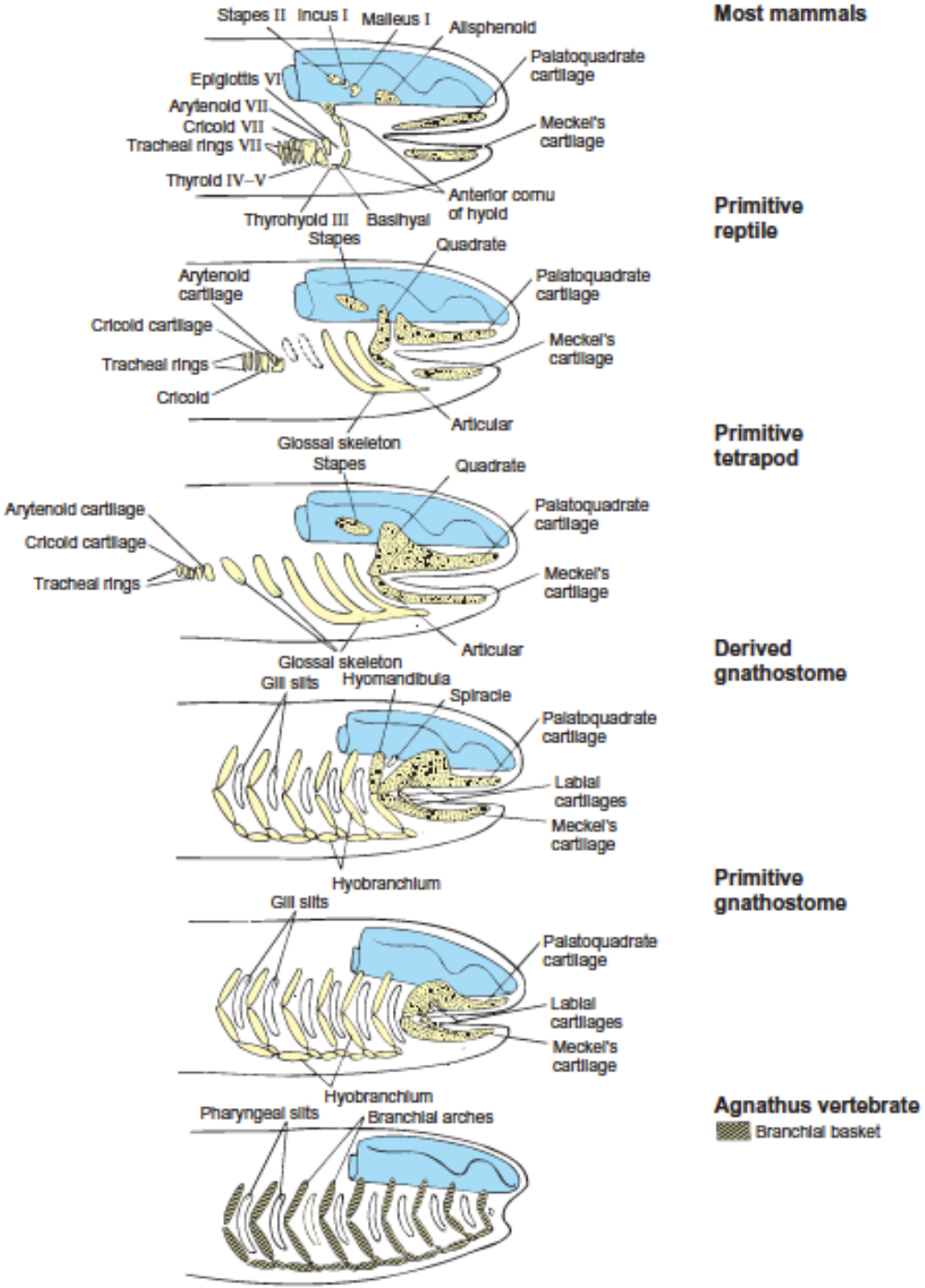

Dorsal
Facial series
Orbital series
Vault series
Temporal series
Palatal series
Palatal
Pm
N
M
F
L
Prf
J
Pf
Po
Qj
It
P
Sq
St
T
Pp
V
Pl
Ec
Pt
Ps
Lateral
Sa
D
An
Sp
Sp
Medial
Pa
Coronoids

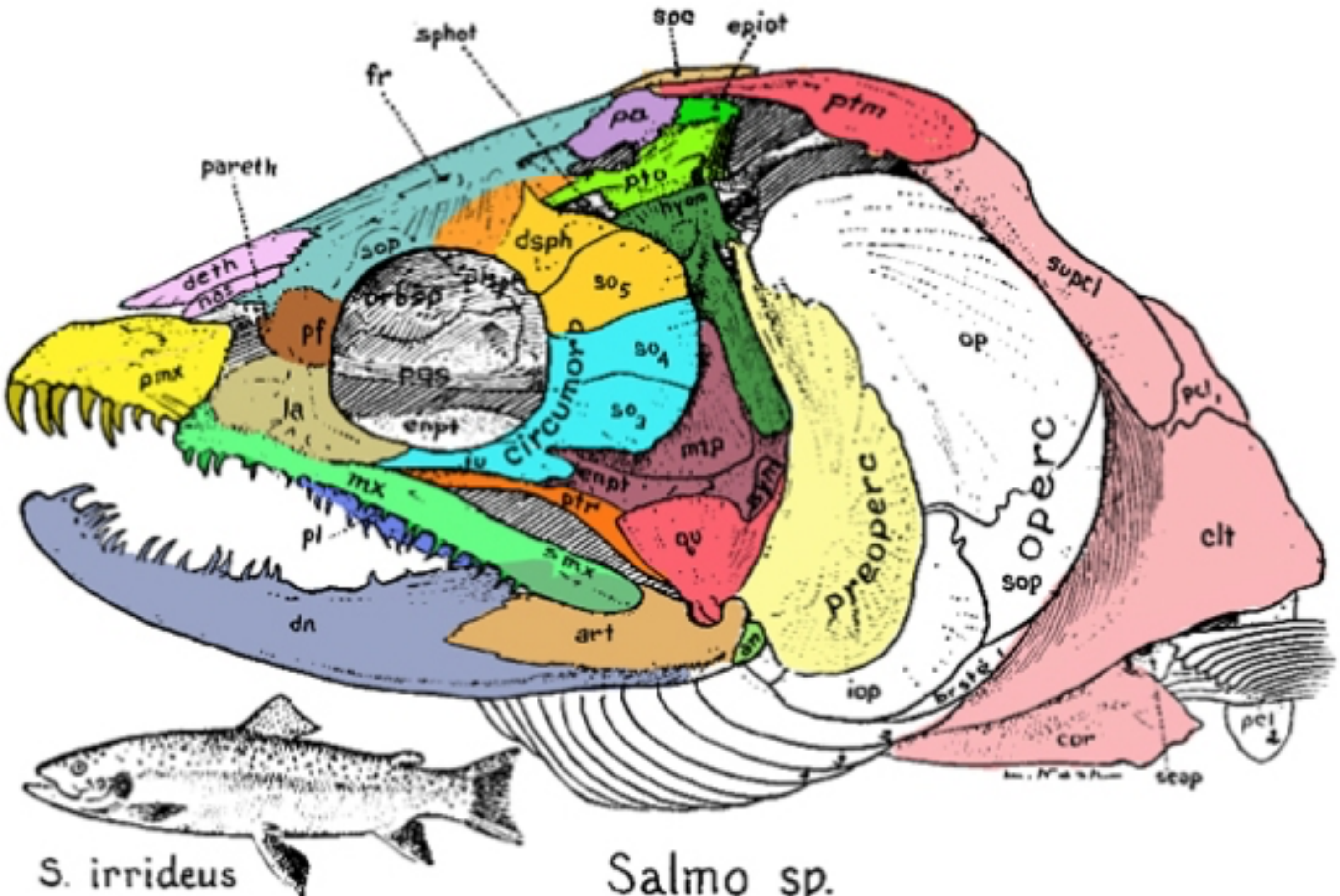

Otic capsule
Opisthotic
Prootic
Vertebrae
Basi-Ex-
Supraoccipitals
Basisphenoid
Orbitosphenoid
Presphenoid
Mesethmoid
Sphenethmoid
(lower tetrapods)
Hyomandibula
3d–5th
arches
Hyoid
arch
Meckel's cartilage
Palatoquadrate
Mandibular arch
Columella (stapes)
Quadrate (incus
of mammals)
Articular
(malleus of
mammals)
Epipterygoid
Vault series
Orbital series
Temporal series
Facial
series
Palatal series
Mandibular
series
Hyoid
apparatus


Neurocranium
Opercular
Pectoral
girdle
Suspensorium
Maxilla
Mandible
Kinesis
(bony fish)
Hyoid
(a)
Akinesis
(mammal)
(b)


Early mammal
Squamosal
Jaw joint
Dentary
Therapsid
Dentary
Pelycosaur
Quadrate
Jaw joint
Articular jaw joint
Postdentary bones
Dentary

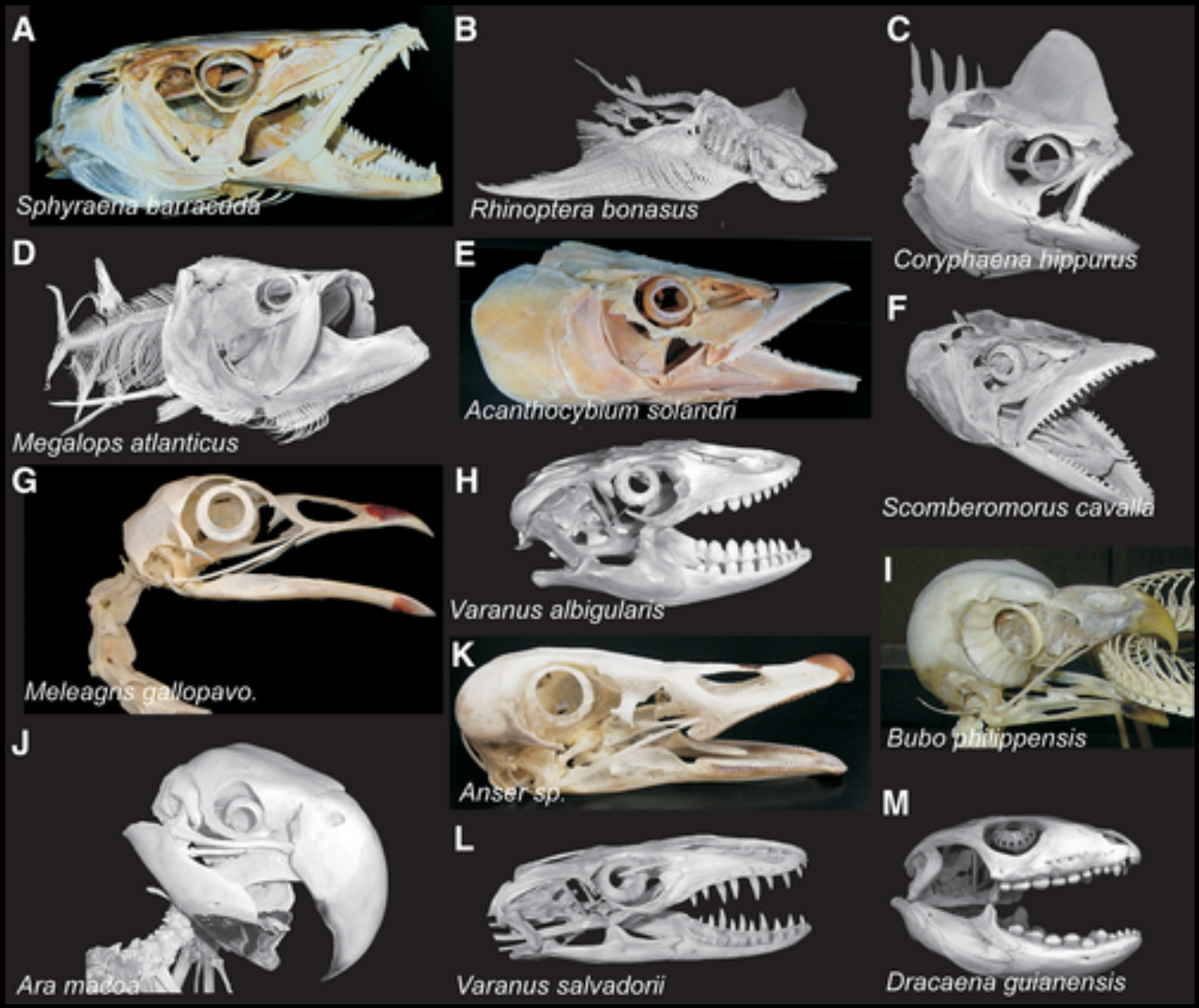

Primary palate
Nasopharynx
Esophagus
Epiglottis
Tongue
Larynx
Trachea
(a) Pelycosaurs
Soft palate
Hard palate
Secondary palate
(b) Mammals


Most mammals
Stapes II
Incus I
Malleus I
Alisphenoid
Palatoquadrate cartilage
Epiglottis VI
Arytenoid VII
Cricoid VII
Tracheal rings VII
Meckel's cartilage
Thyroid IV–V
Anterior cornu of hyoid
Thyrohyoid III
Basihyal
Primitive reptile
Stapes
Quadrate
Arytenoid cartilage
Palatoquadrate cartilage
Cricoid cartilage
Meckel's cartilage
Tracheal rings
Cricoid
Articular
Glossal skeleton
Primitive tetrapod
Stapes
Quadrate
Arytenoid cartilage
Palatoquadrate cartilage
Cricoid cartilage
Tracheal rings
Meckel's cartilage
Articular
Glossal skeleton
Derived gnathostome
Gill slits
Hyomandibula
Spiracle
Palatoquadrate cartilage
Labial cartilages
Meckel's cartilage
Hyobranchium
Primitive gnathostome
Gill slits
Palatoquadrate cartilage
Labial cartilages
Meckel's cartilage
Hyobranchium
Agnathus vertebrate
Pharyngeal slits
Branchial arches
Branchial basket

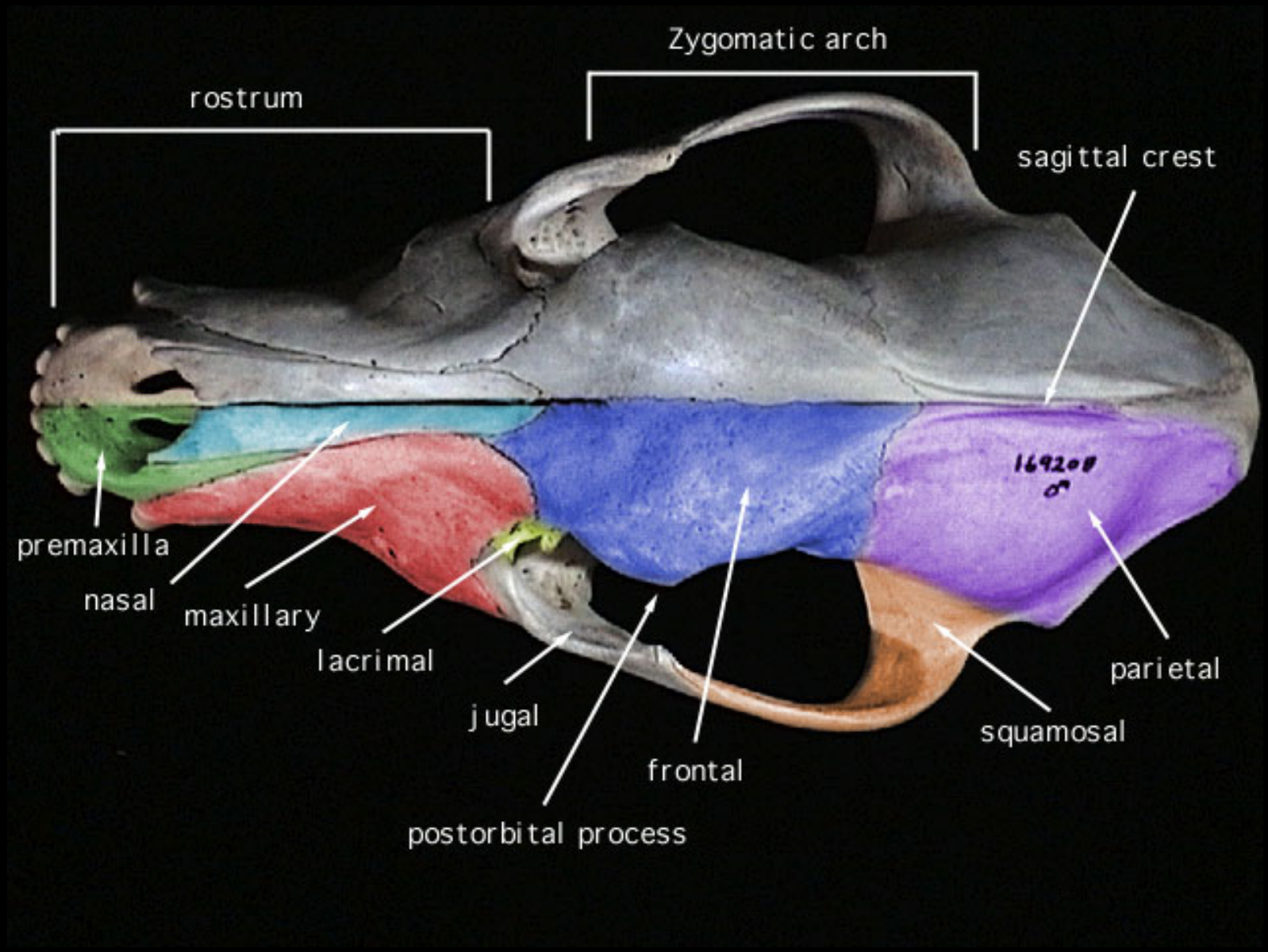


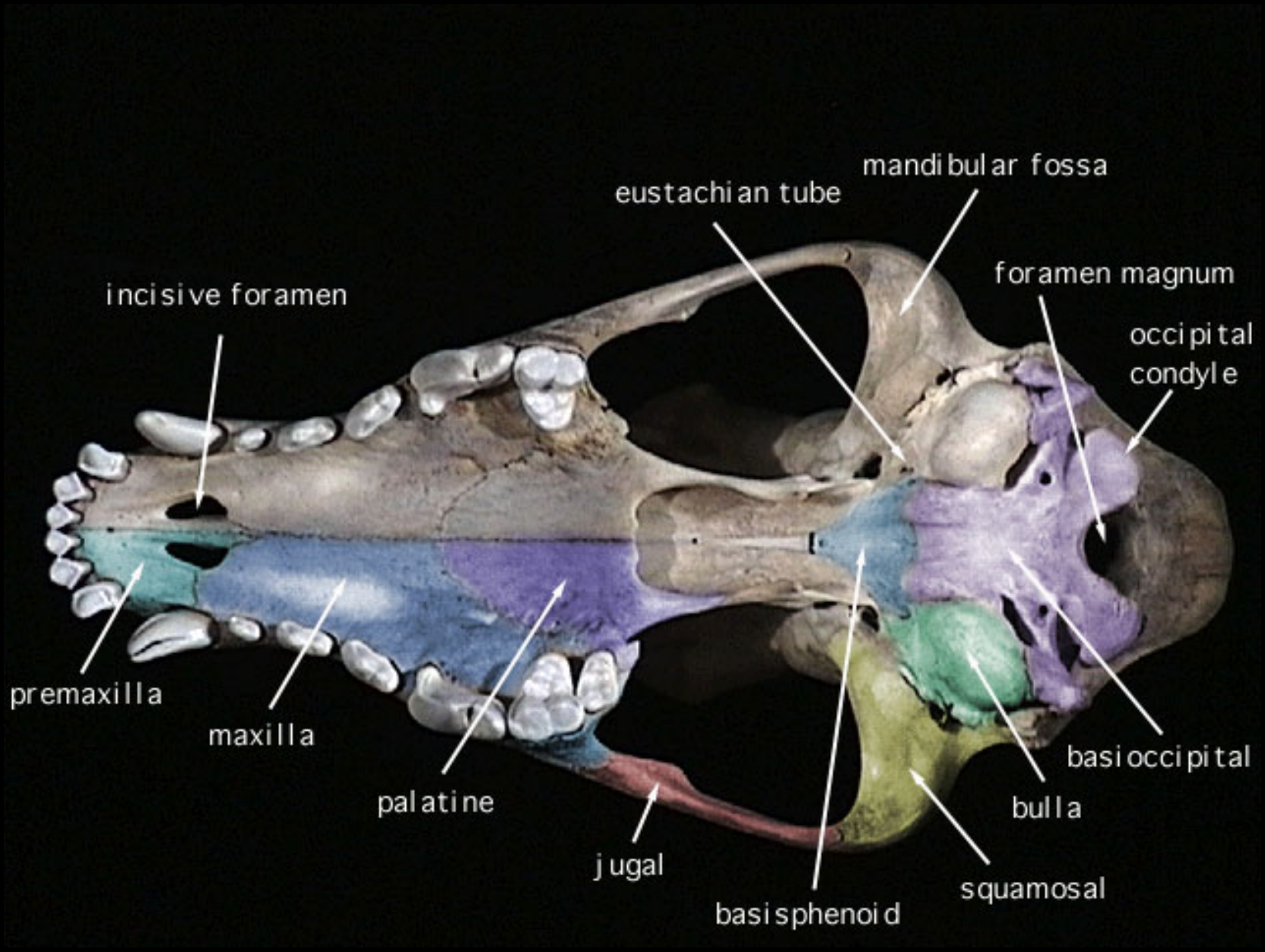
sphot
spc
epiot
fr
pa
ptm
pareth
pto
hyom
sop
dsph
deth
nas
orbsp
so5
pf
pmx
pas
so4
op
la
enpt
circumorb
so3
mtp
operc
supcl
pcl1
mx
ptr
qu
sym
preoperc
pl
smx
clt
sop
dn
art
an
iop
cor
pcl2
scap
S. irrideus

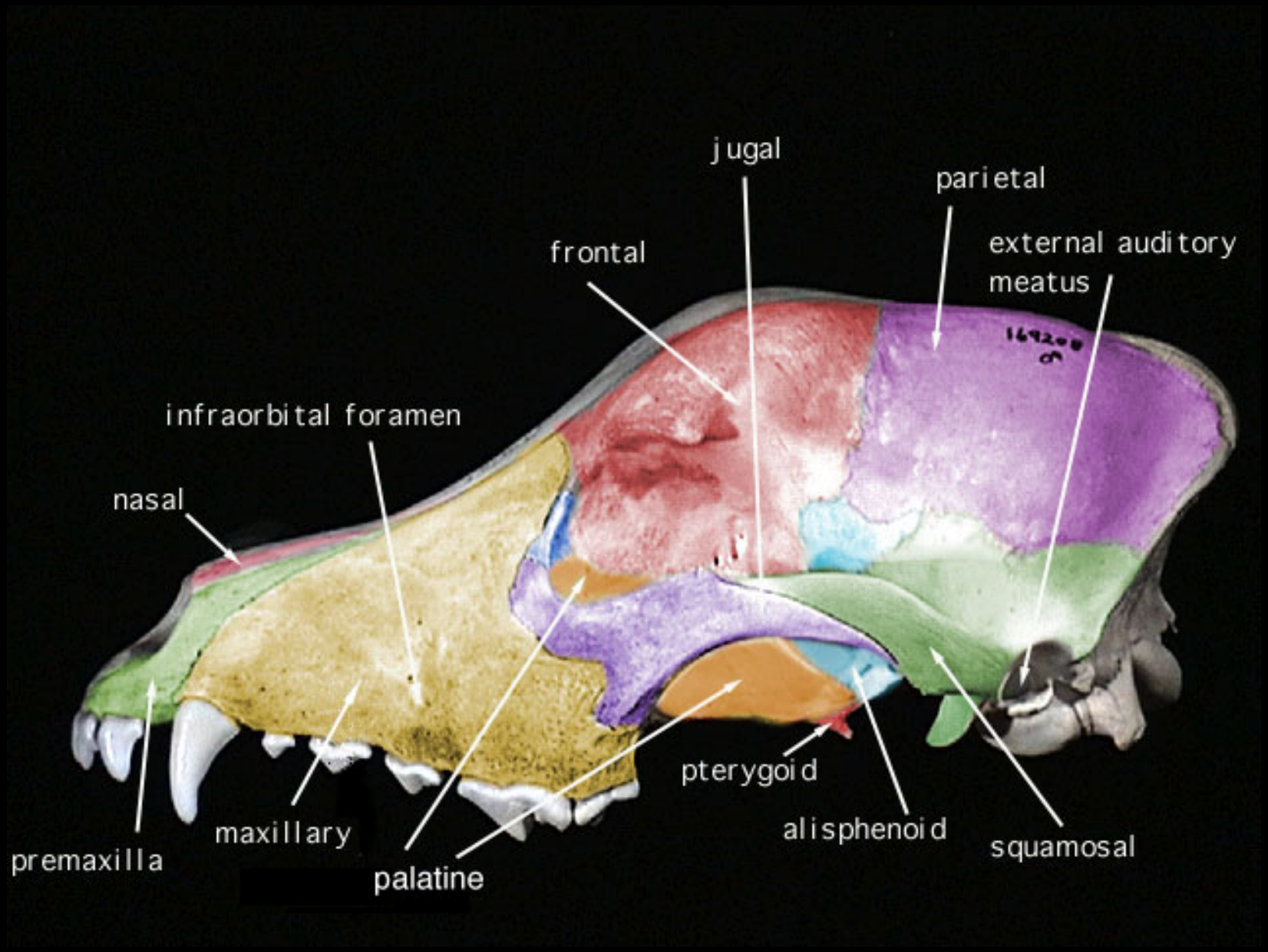
Salmo sp.

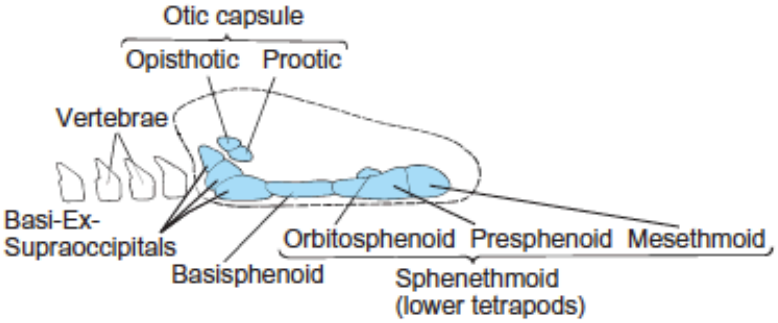

A
Sphyraena barracuda
B
Rhinoptera bonasus
C
Coryphaena hippurus
D
Megalops atlanticus
E
Acanthocybium solandri
F
Scomberomorus cavalla
G
Meleagris gallopavo.
H
Varanus albigularis
I
Bubo philippensis
J
Ara macao
K
Anser sp.
L
Varanus salvadorii
M
Dracaena guianensis

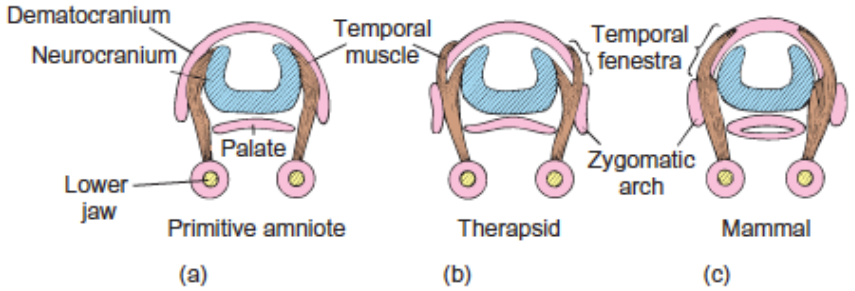

1 cm

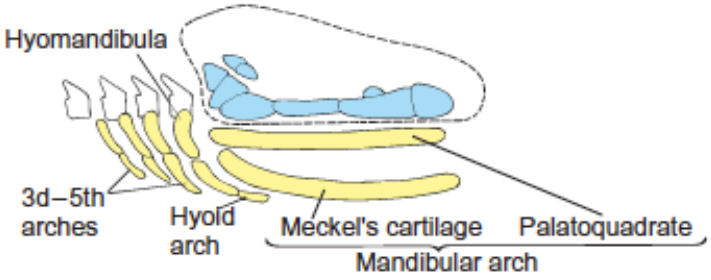

Zygomatic arch
rostrum
sagittal crest
premaxilla
nasal
maxillary
lacrimal
jugal
frontal
postorbital process
squamosal
parietal

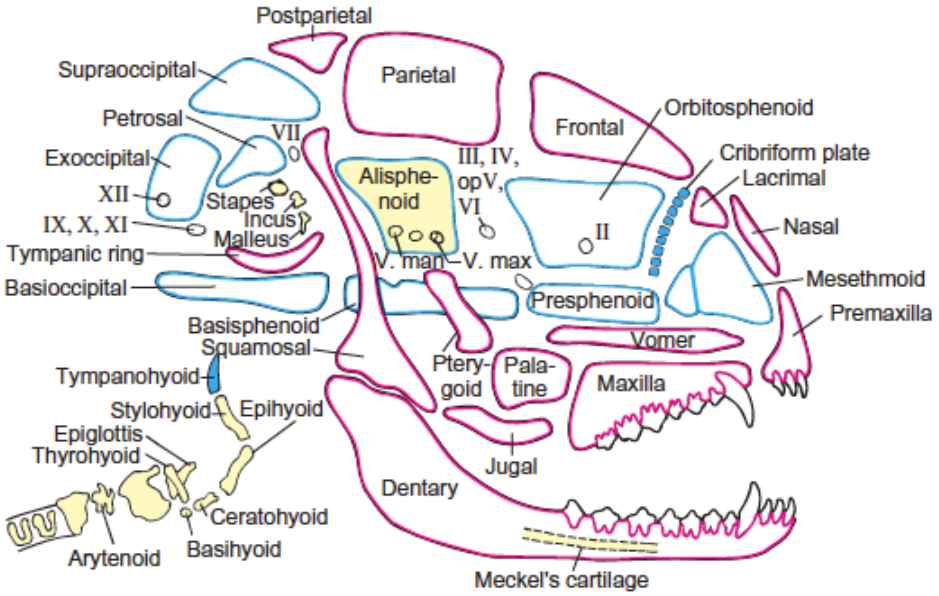

mandibular fossa
eustachian tube
foramen magnum
incisive foramen
occipital condyle
premaxilla
maxilla
palatine
jugal
basisphenoid
squamosal
bulla
basioccipital

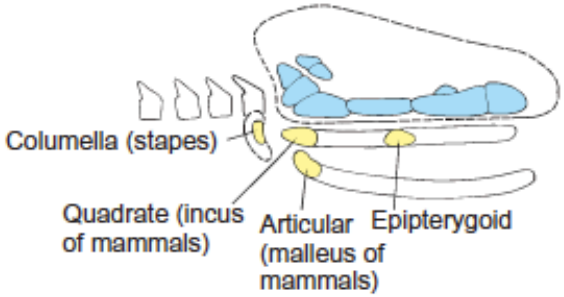

jugal
parietal
frontal
external auditory meatus
infraorbital foramen
nasal
pterygoid
maxillary
alisphenoid
squamosal
premaxilla
palatine

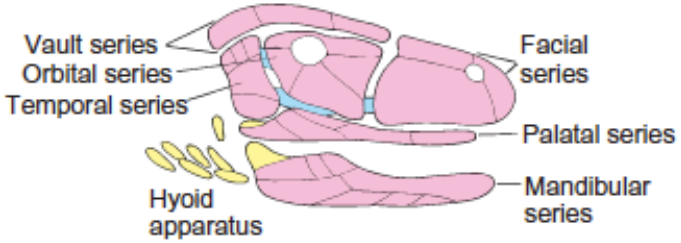

Otic capsule
Opisthotic
Prootic
Vertebrae
Basi-Ex-
Supraoccipitals
Basisphenoid
Orbitosphenoid
Presphenoid
Mesethmoid
Sphenethmoid
(lower tetrapods)

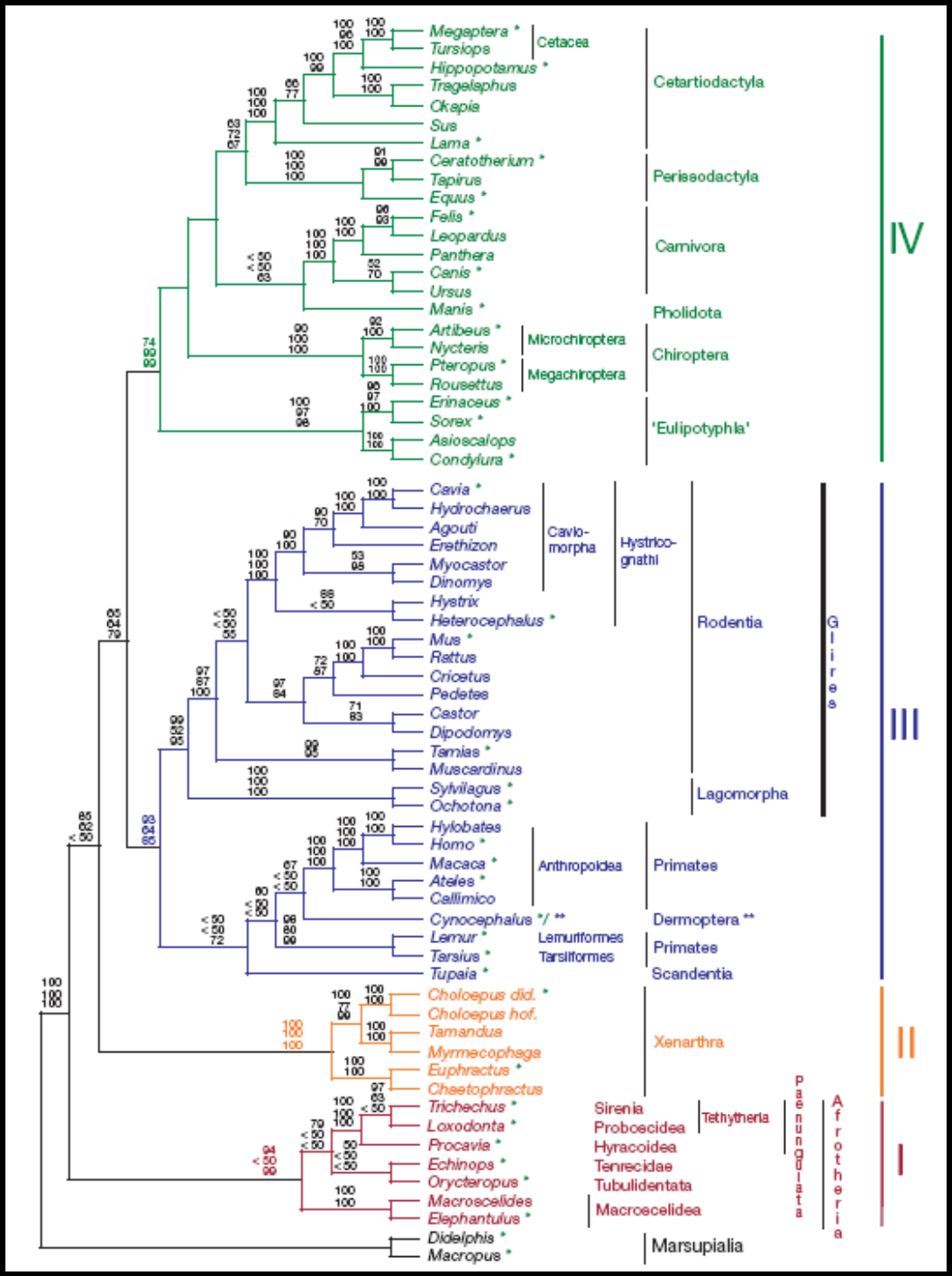

Dematocranium
Neurocranium
Palate
Lower
jaw
Primitive amniote
(a)
Temporal
muscle
Therapsid
(b)
Temporal
fenestra
Zygomatic
arch
Mammal
(c)

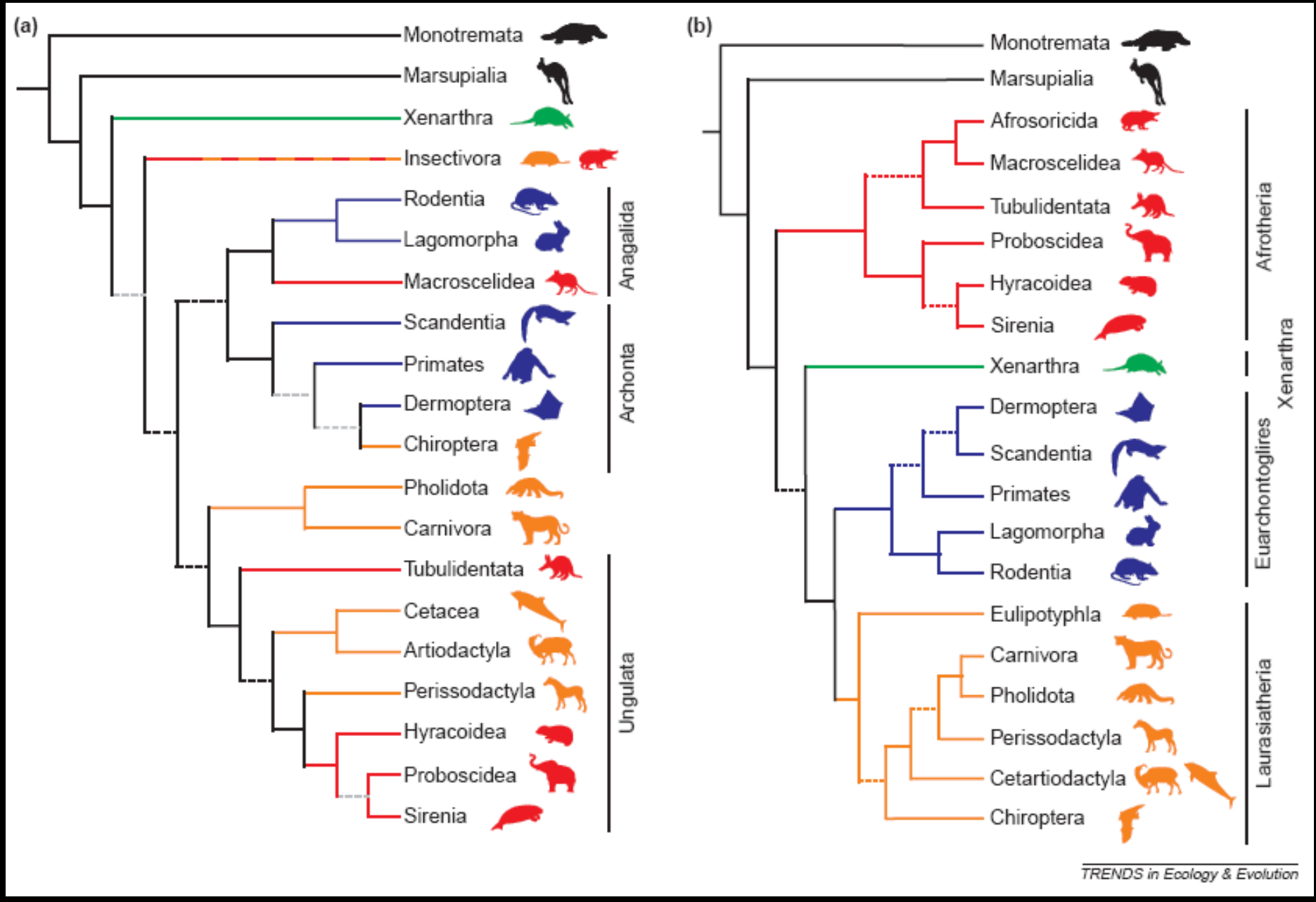

Hyomandibula
3d–5th
arches
Hyoid
arch
Meckel's cartilage
Palatoquadrate
Mandibular arch


Postparietal
Supraoccipital
Parietal
Petrosal
VII
Exoccipital
XII
Stapes
Incus
Malleus
IX, X, XI
Tympanic ring
Basioccipital
Alisphe-
noid
III, IV,
opV,
VI
V. man
V. max
Frontal
Orbitosphenoid
II
Cribriform plate
Lacrimal
Nasal
Mesethmoid
Premaxilla
Presphenoid
Vomer
Basisphenoid
Squamosal
Ptery-
goid
Pala-
tine
Maxilla
Tympanohyoid
Stylohyoid
Epihyoid
Epiglottis
Thyrohyoid
Jugal
Dentary
Ceratohyoid
Basihyoid
Arytenoid
Meckel's cartilage


Columella (stapes)
Quadrate (incus
of mammals)
Articular
(malleus of
mammals)
Epipterygoid


Vault series
Orbital series
Temporal series
Facial
series
Palatal series
Mandibular
series
Hyoid
apparatus


Megaptera *
Tursiops
Hippopotamus *
Tragelaphus
Okapia
Sus
Lama *
Ceratotherium *
Tapirus
Equus *
Felis *
Leopardus
Panthera
Canis *
Ursus
Manis *
Artibeus *
Nycteris
Pteropus *
Rousettus
Erinaceus *
Sorex *
Asioscalops
Condylura *
Cavia *
Hydrochaerus
Agouti
Erethizon
Myocastor
Dinomys
Hystrix
Heterocephalus *
Mus *
Rattus
Cricetus
Pedetes
Castor
Dipodomys
Tamias *
Muscardinus
Sylvilagus *
Ochotona *
Hylobates
Homo *
Macaca *
Ateles *
Callimico
Cynocephalus */ **
Lemur *
Tarsius *
Tupaia *
Choloepus did. *
Choloepus hof.
Tamandua
Myrmecophaga
Euphractus *
Chaetophractus
Trichechus *
Loxodonta *
Procavia *
Echinops *
Orycteropus *
Macroscelides
Elephantulus *
Didelphis *
Macropus *
Cetacea
Cetartiodactyla
Perissodactyla
Carnivora
Pholidota
Microchiroptera
Megachiroptera
Chiroptera
'Eulipotyphla'
IV
Caviomorpha
Hystricognathi
Rodentia
Lagomorpha
Glires
III
Anthropoidea
Primates
Dermoptera **
Lemuriformes
Tarsiiformes
Primates
Scandentia
II
Xenarthra
Sirenia
Proboscidea
Hyracoidea
Tenrecidae
Tubulidentata
Tethytheria
Paenungulata
Macroscelidea
Afrotheria
I
Marsupialia


(a)
Monotremata
Marsupialia
Xenarthra
Insectivora
Rodentia
Lagomorpha
Macroscelidea
Anagalida
Scandentia
Primates
Dermoptera
Chiroptera
Archonta
Pholidota
Carnivora
Tubulidentata
Cetacea
Artiodactyla
Perissodactyla
Hyracoidea
Proboscidea
Sirenia
Ungulata
(b)
Monotremata
Marsupialia
Afrosoricida
Macroscelidea
Tubulidentata
Proboscidea
Hyracoidea
Sirenia
Afrotheria
Xenarthra
Xenarthra
Dermoptera
Scandentia
Primates
Lagomorpha
Rodentia
Euarchontoglires
Eulipotyphla
Carnivora
Pholidota
Perissodactyla
Cetartiodactyla
Chiroptera
Laurasiatheria
TRENDS in Ecology & Evolution

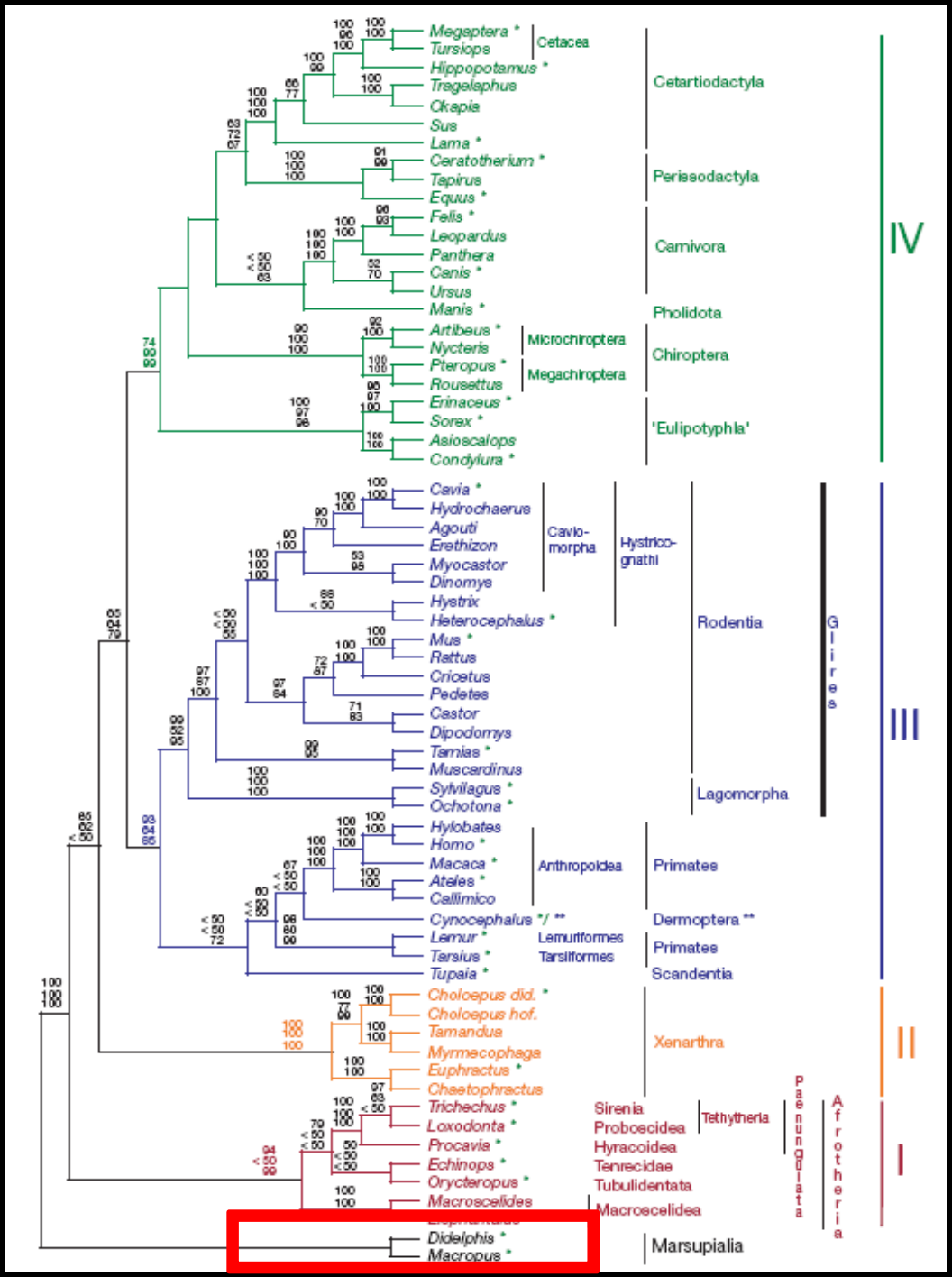

126965
♂
126973
♀

Não THERIA

-Molar primitivo, perdido na fase adulta
-ovíparo
-sem pavilhão
-músculo detrahens
-mamilos não estão presentes
-articulação mesotarsal astrágalo ao lado do calcâneo
sem projeção
-elementos ventrais da cintura escapular
bem desenvolvidos: coracóide
anterior, interclavícula
-espinha reduzida, s/ acrômio

THERIA

-molar tribosfênico
-vivíparo
-cóclea com 2 ½ voltas
-pavilhão auditivo externo
-abertura da boca, músculo digástrico
-mamilos
-articulação crurotarsal
-astrágalo sobre o calcâneo
-calcâneo estendido posteriormente
formando um projeção calcanear
-redução dos elementos ventrais da cintura escapular
-espinha escapular, acrômio bem desenvolvido
-clavícula articulada com acrômio
-fossa supraespinosa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Hippopotamus *
Tragelaphus
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Sorex *
Asioscalops
Condylura *
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Dinomys
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Callimico
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Lemur *
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Hyracoidea
Tenrecidae
Tubulidentata
Tethytheria
Paenungulata
Afrotheria
Macroscelidea
Marsupialia
IV
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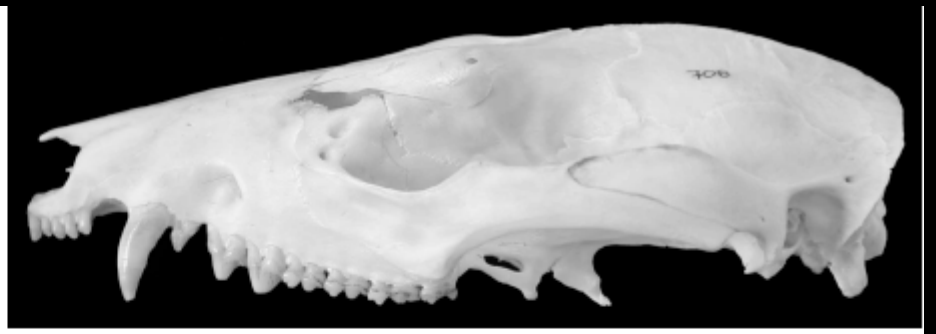
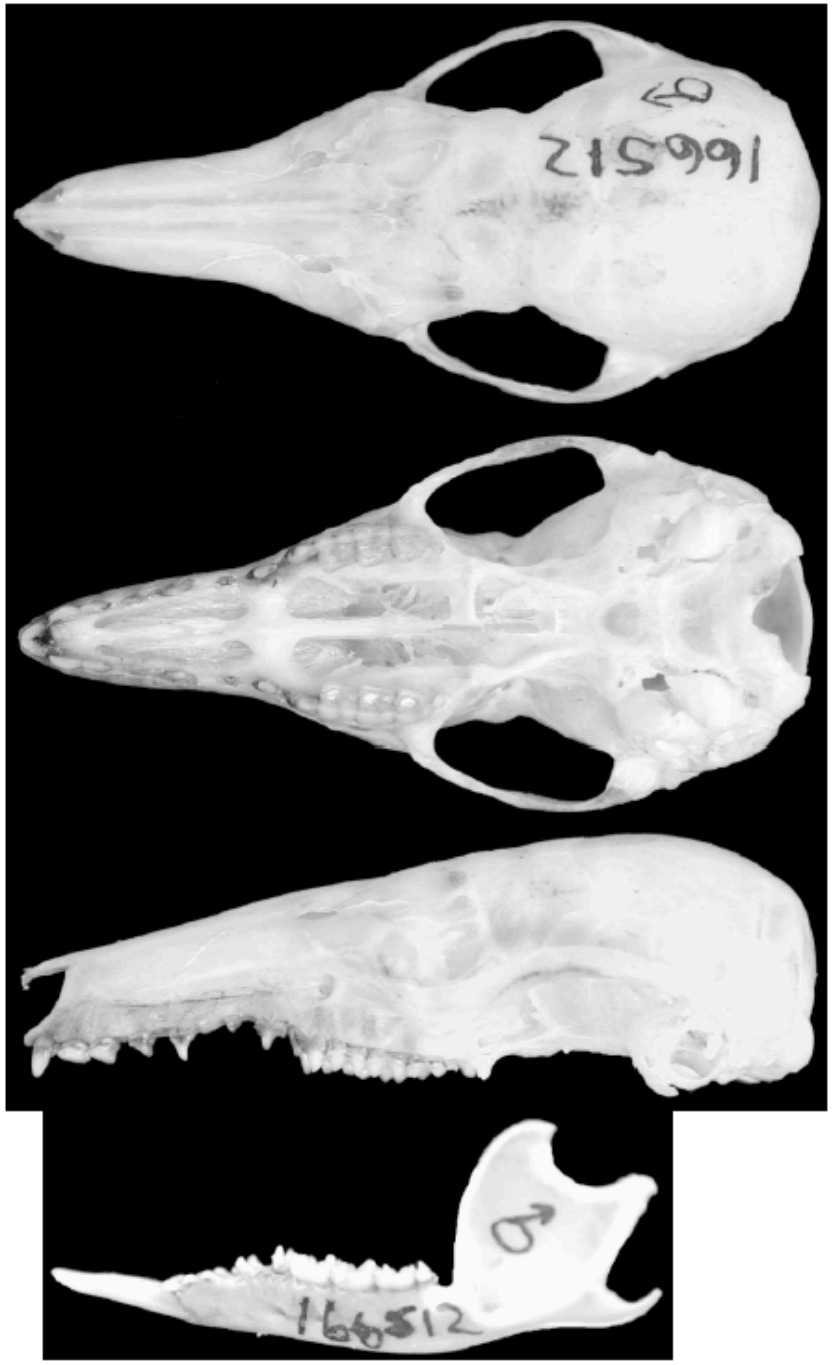
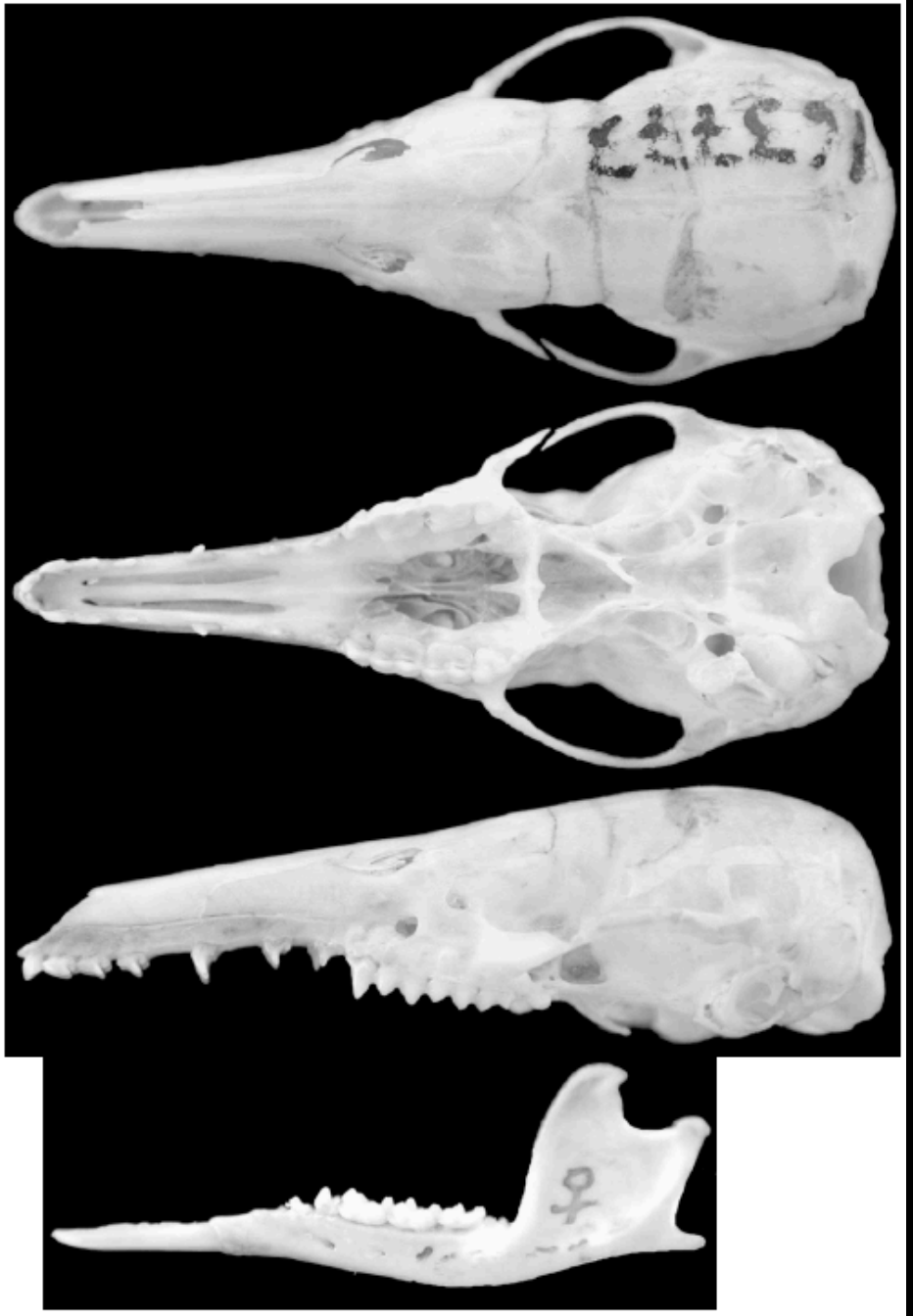


Didelphis (common opossum)

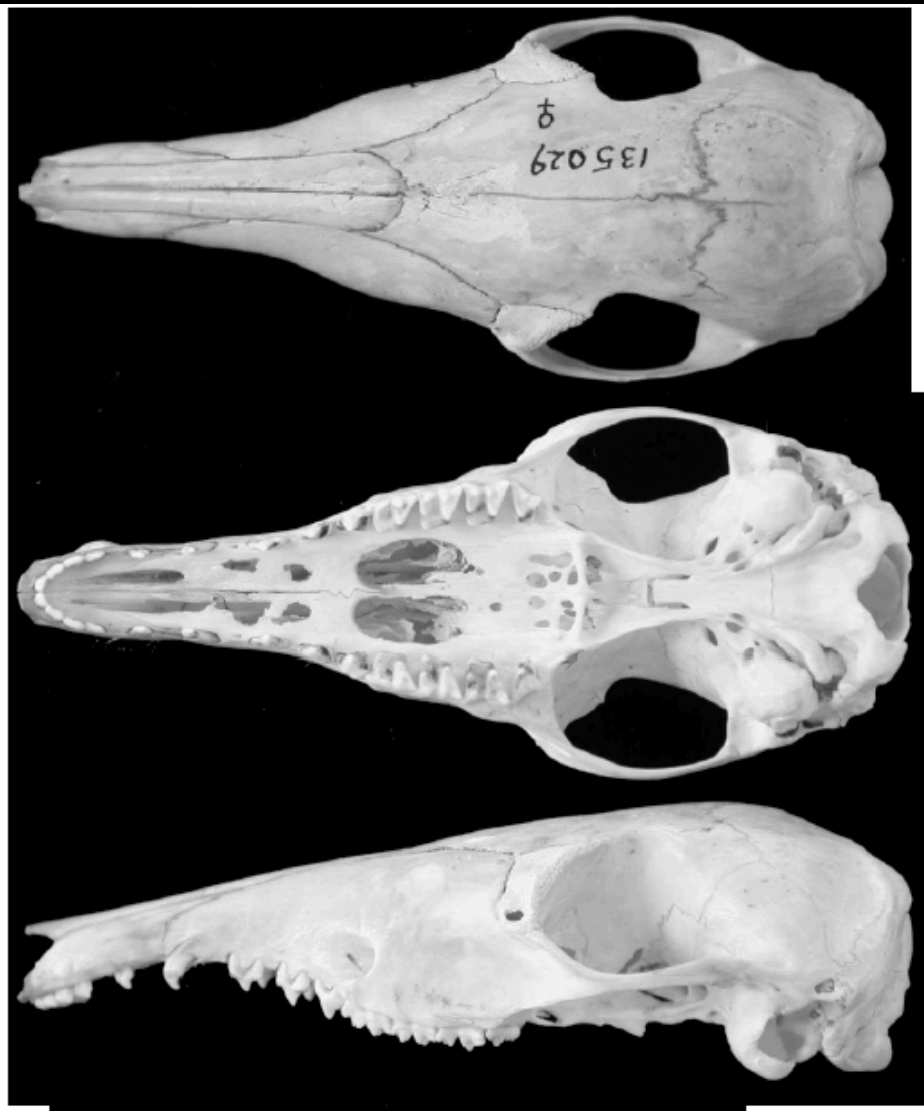


Peruvian rat opossum, *Lestoros inca*



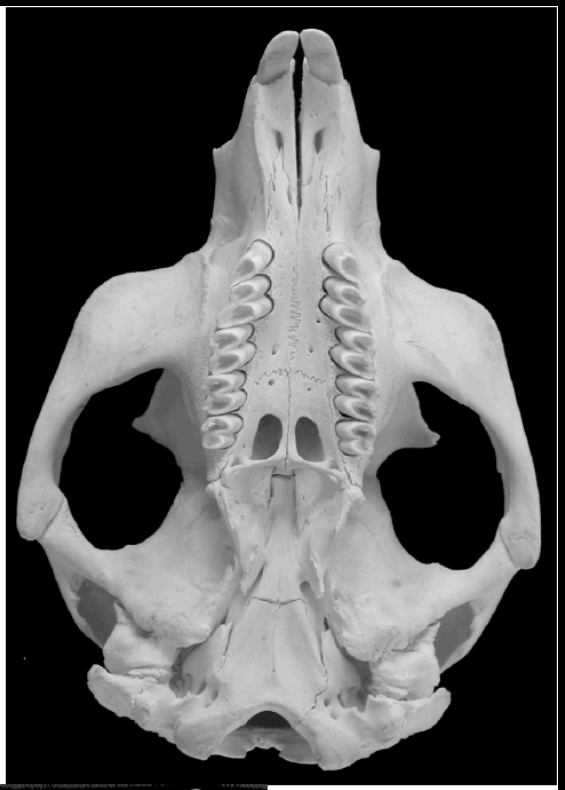
Chilean rat opossum, *Rhyncholestes raphanurus*

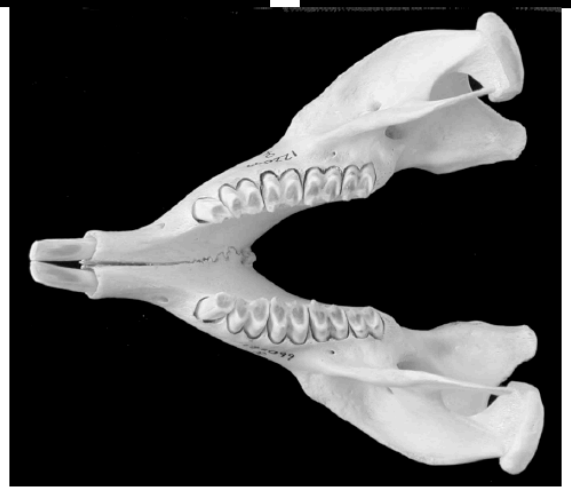
above: bandicoot, *Isoodon obesulus*



right: bandicoot, *Perameles gunni*

marsupial “cat” (quoll), *Dasyurus maculatus*





hairy-nosed wombat, *Lasiorhinus latifrons*

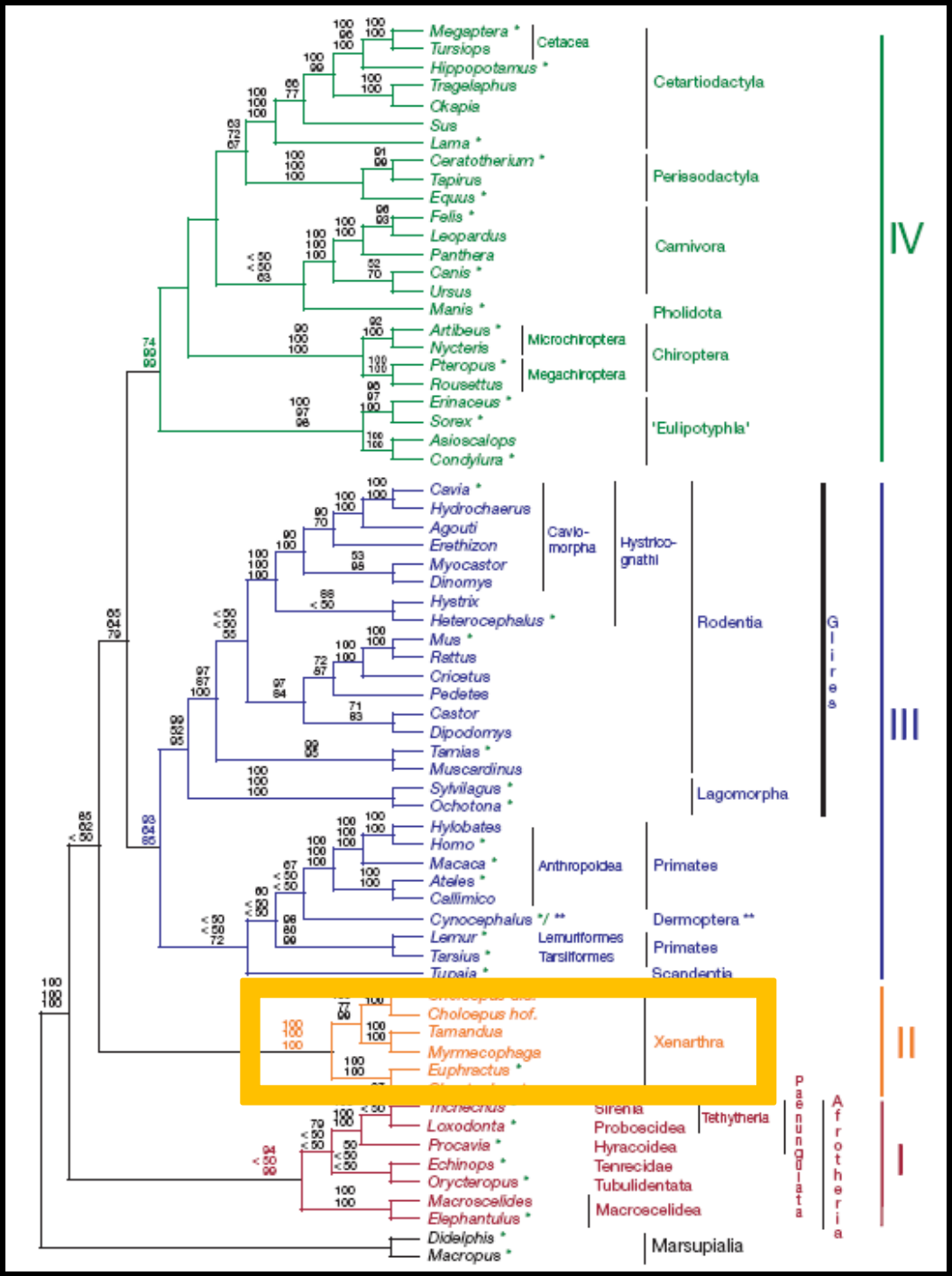
bettong, *Bettongia cuniculus*

Marsupiais

- torção no dentário
- Margens do nasal em forma de diamante
- sem bula (se pres., não homóloga)
- barra pós-orbital sempre ausente
- troca apenas o último premolar
- 3P/4M
- com ossos epi-púbicos

Placentários

- sem torção no dentário
- próx. frontal, nasal com margens paralelas retangulares
- bula auditiva
- barra pós-orbital pres. ou não
- difiodontia total
- fórmula dental: 4P/3M
- sem ossos epi-púbicos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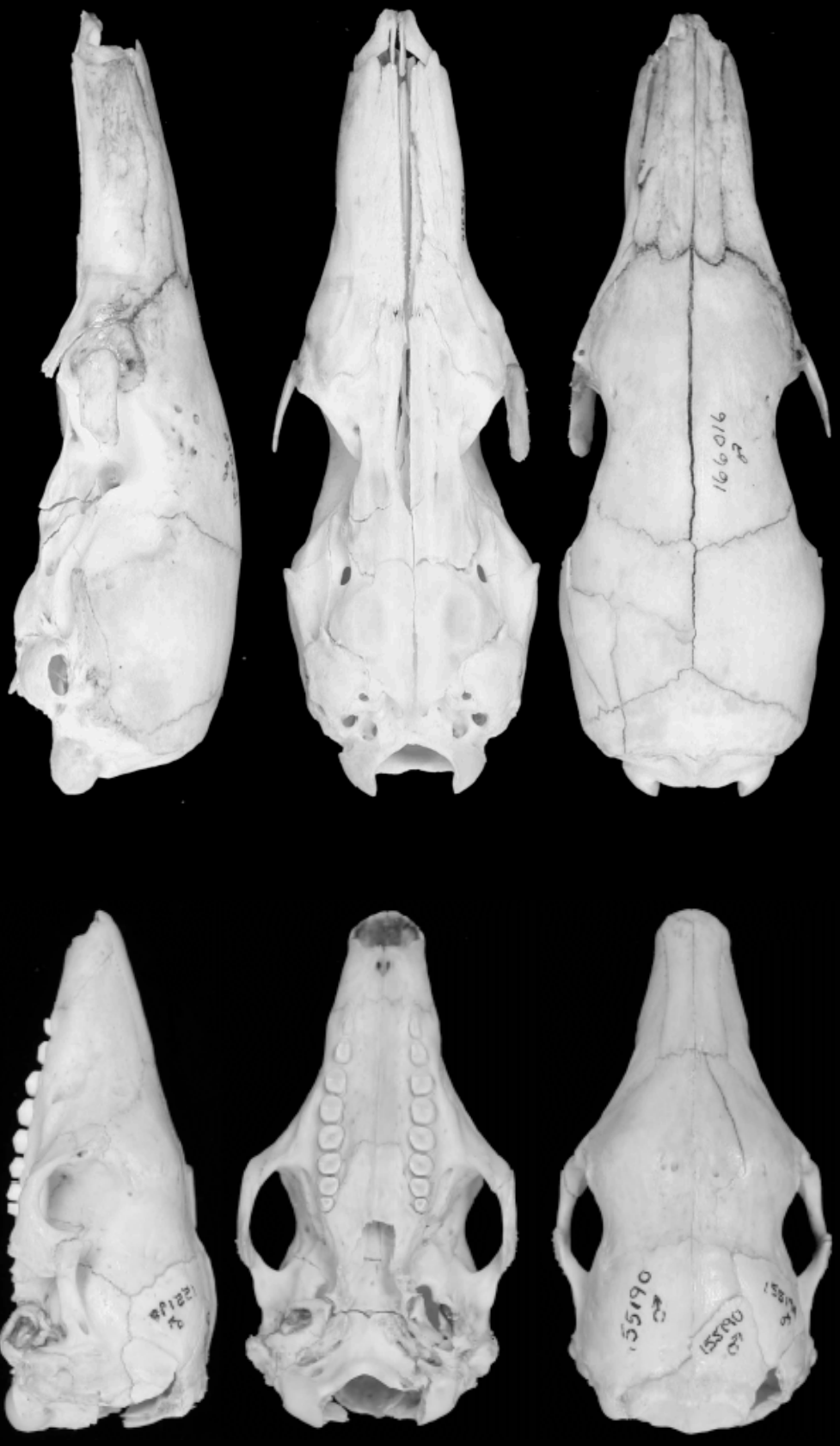
Marsupialia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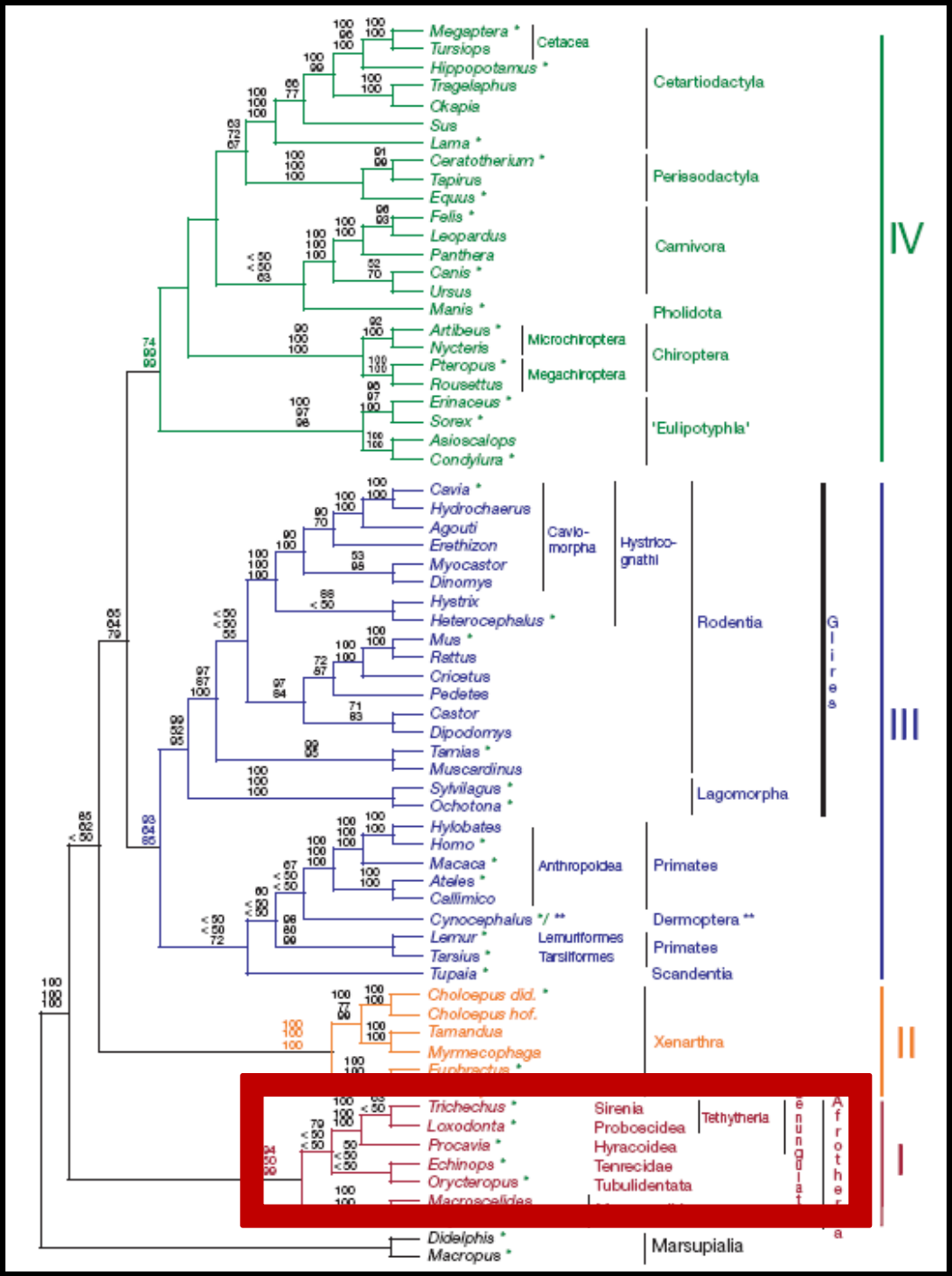
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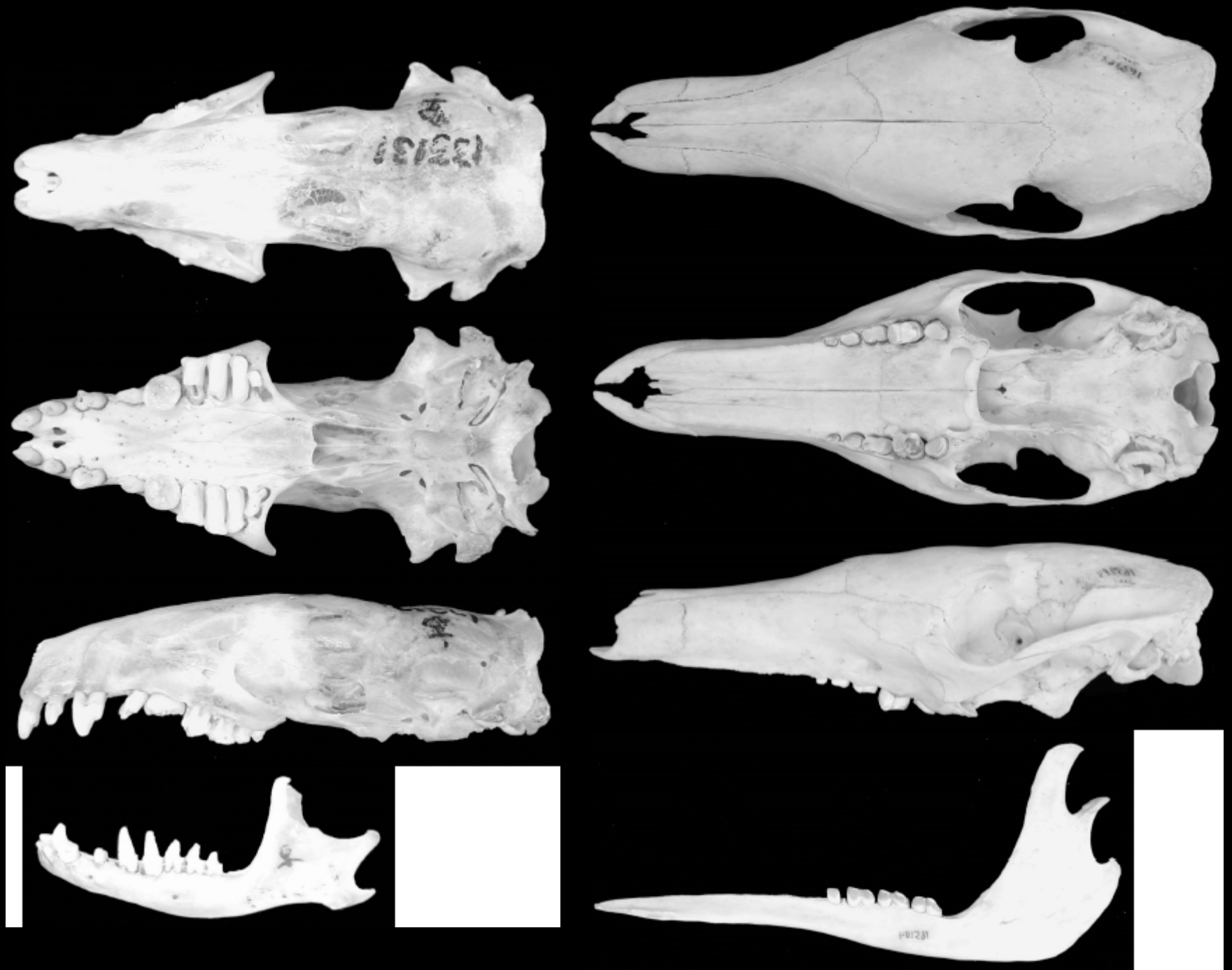
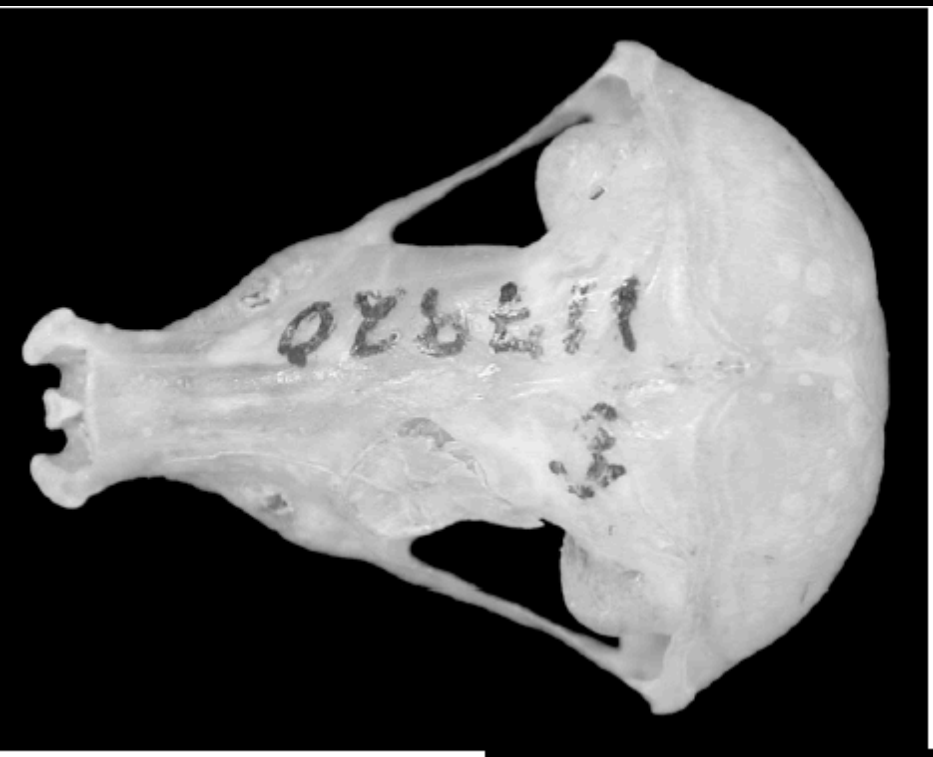
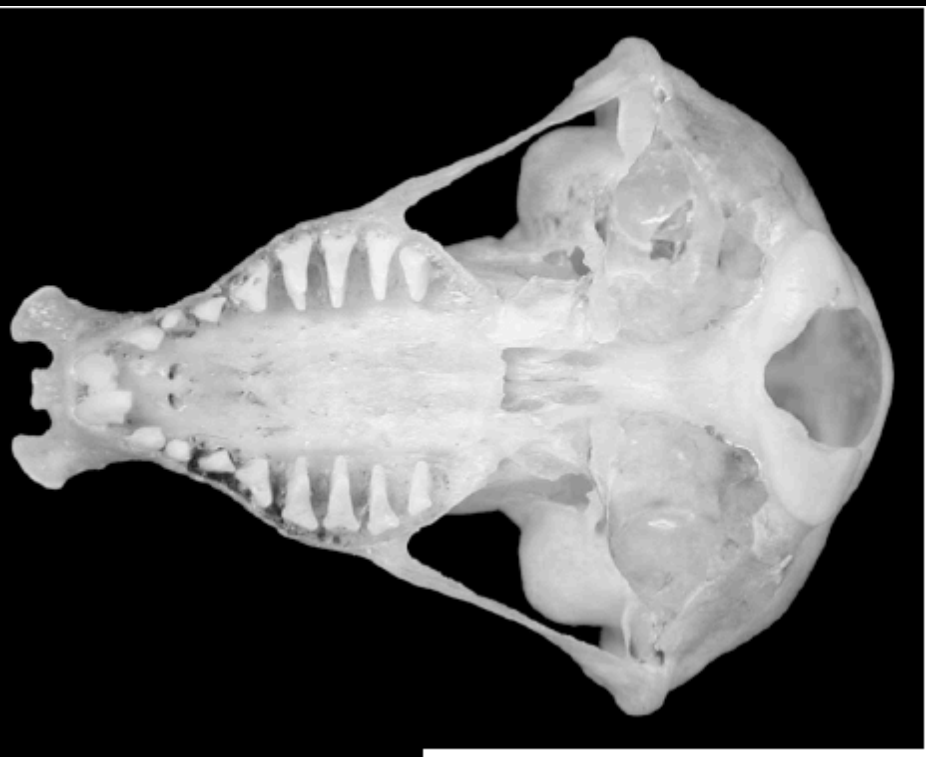




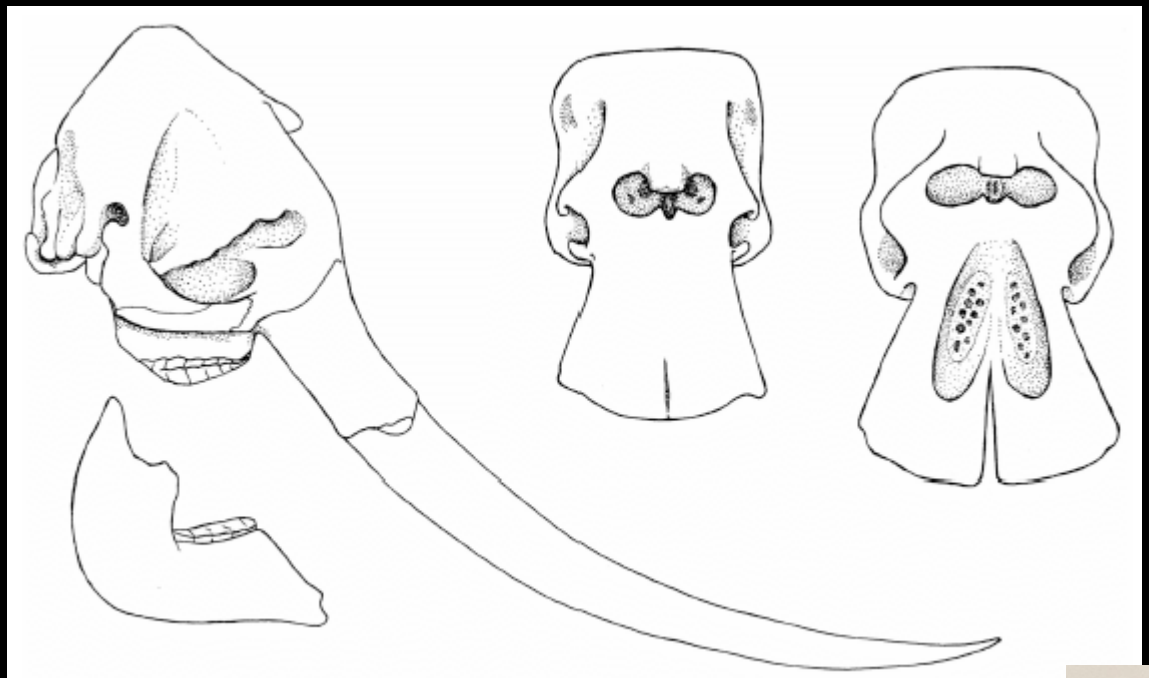


Cape golden mole, *Chrysochloris asiatica*

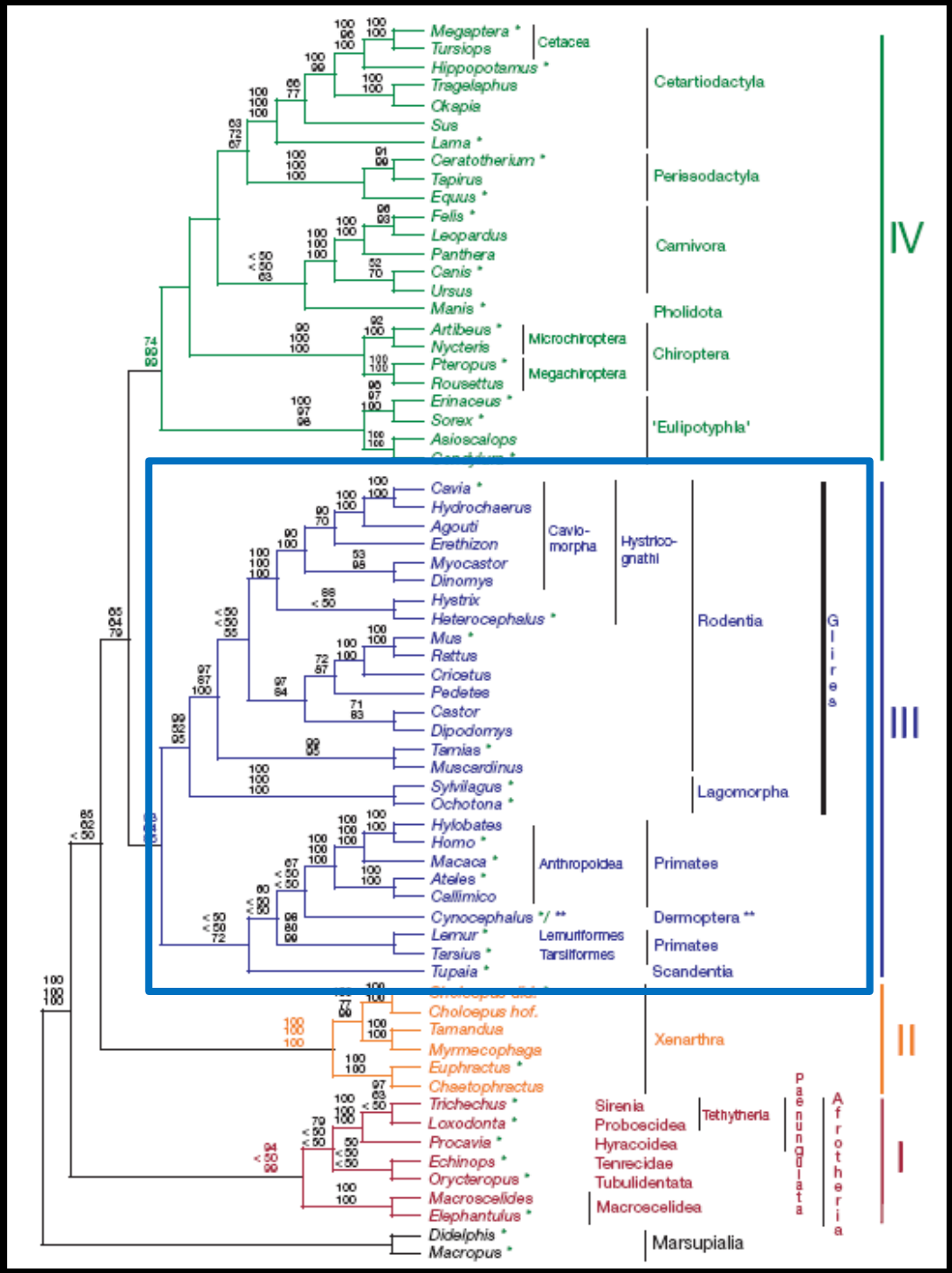
Eremitalpa granti (Grant's desert golden mole)

short-eared elephant shrew,
Macroscelides proboscideus

rock hyrax, *Procavia capensis*



skull of an African elephant, *Loxodonta*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Hippopotamus *
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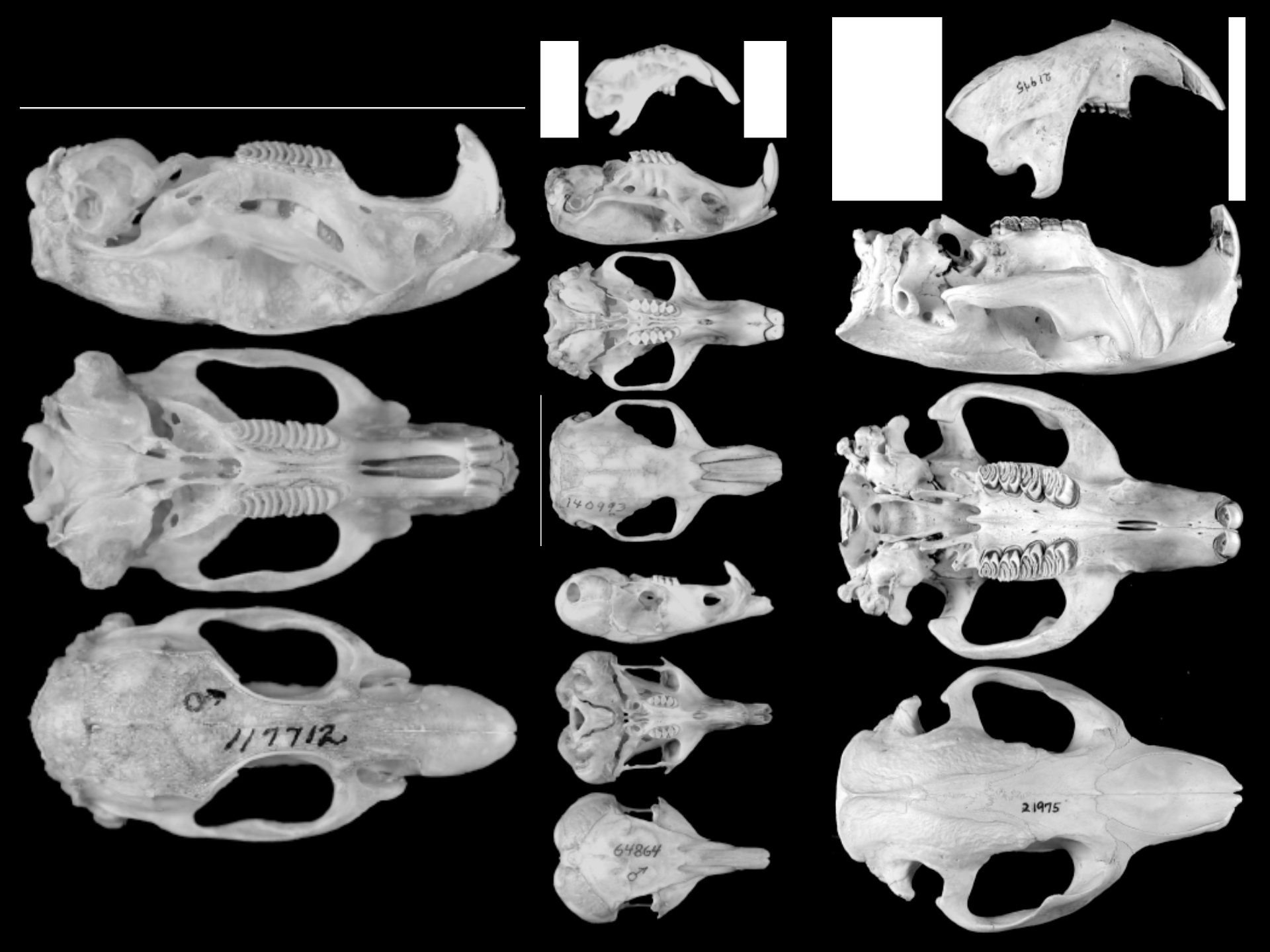
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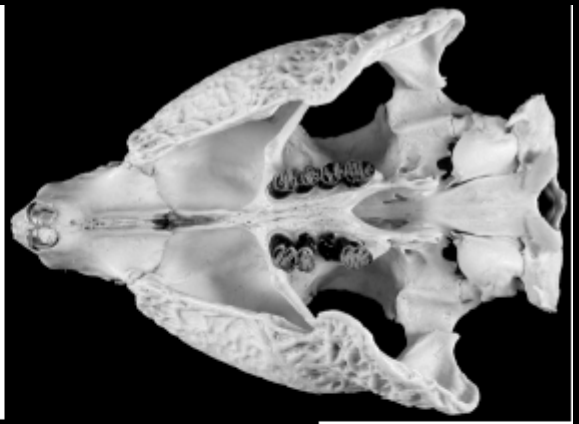

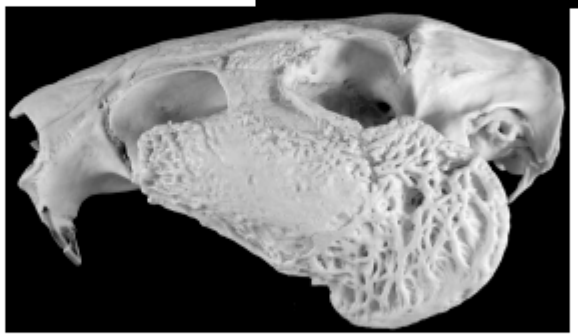


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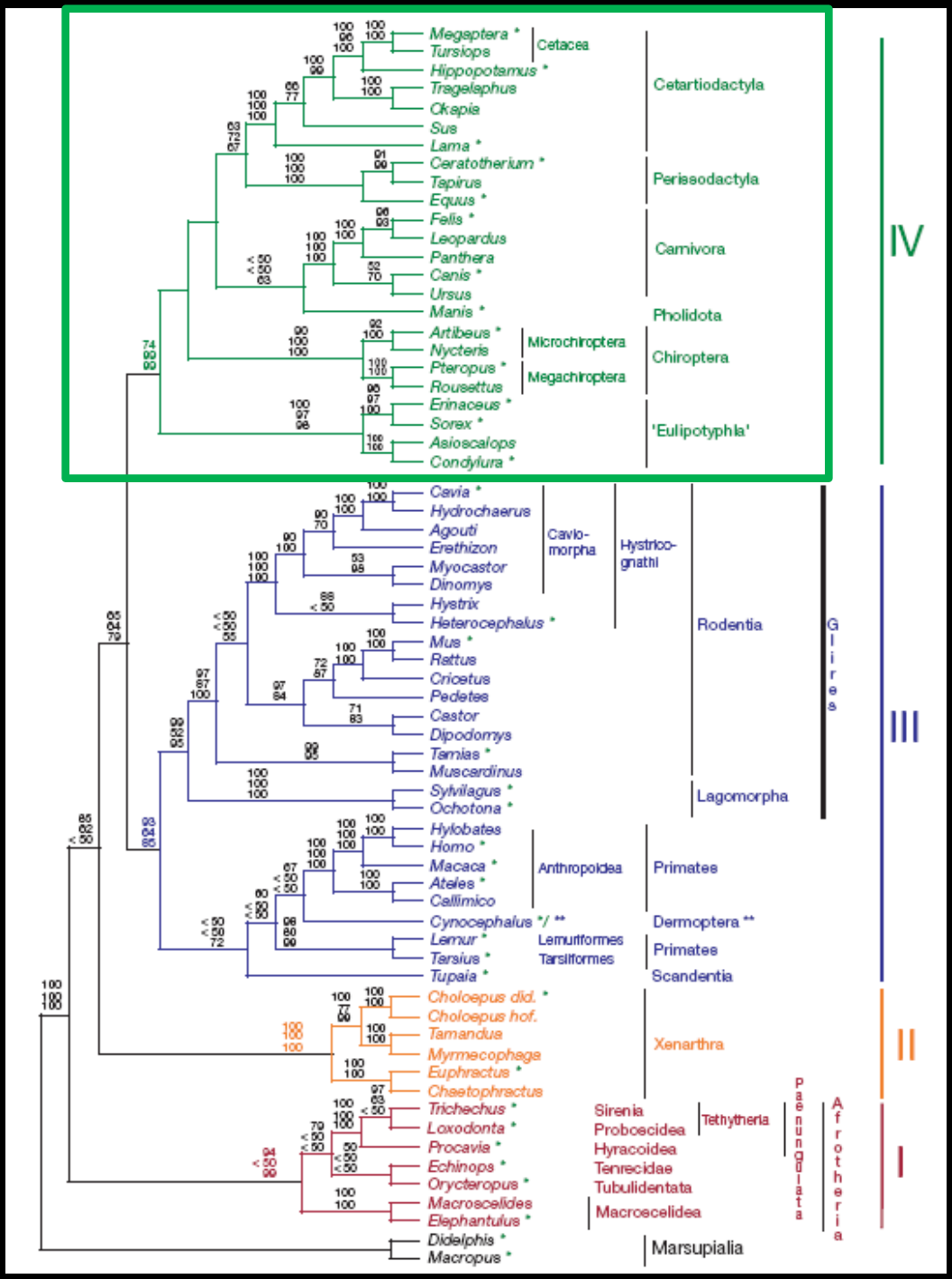
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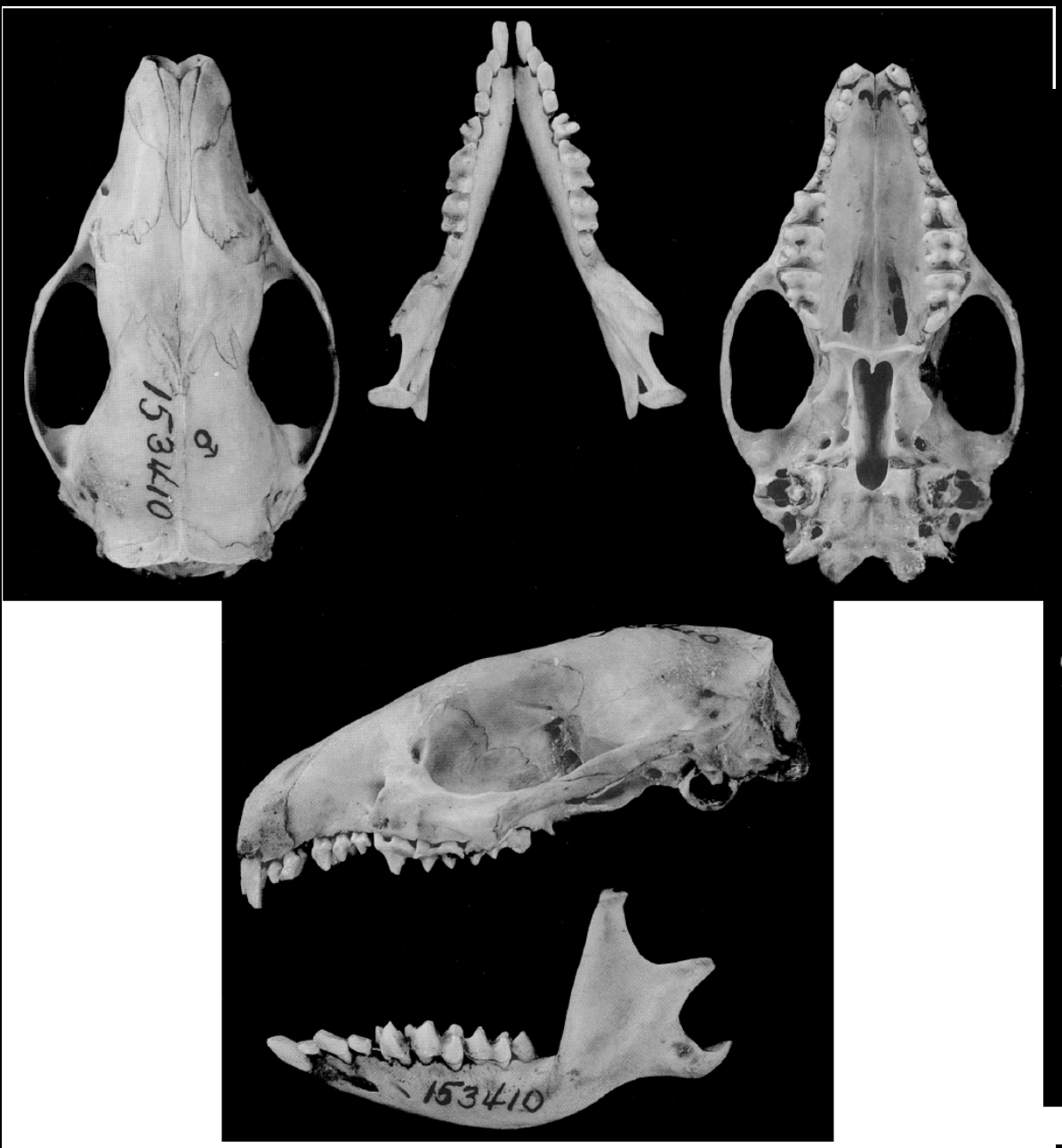
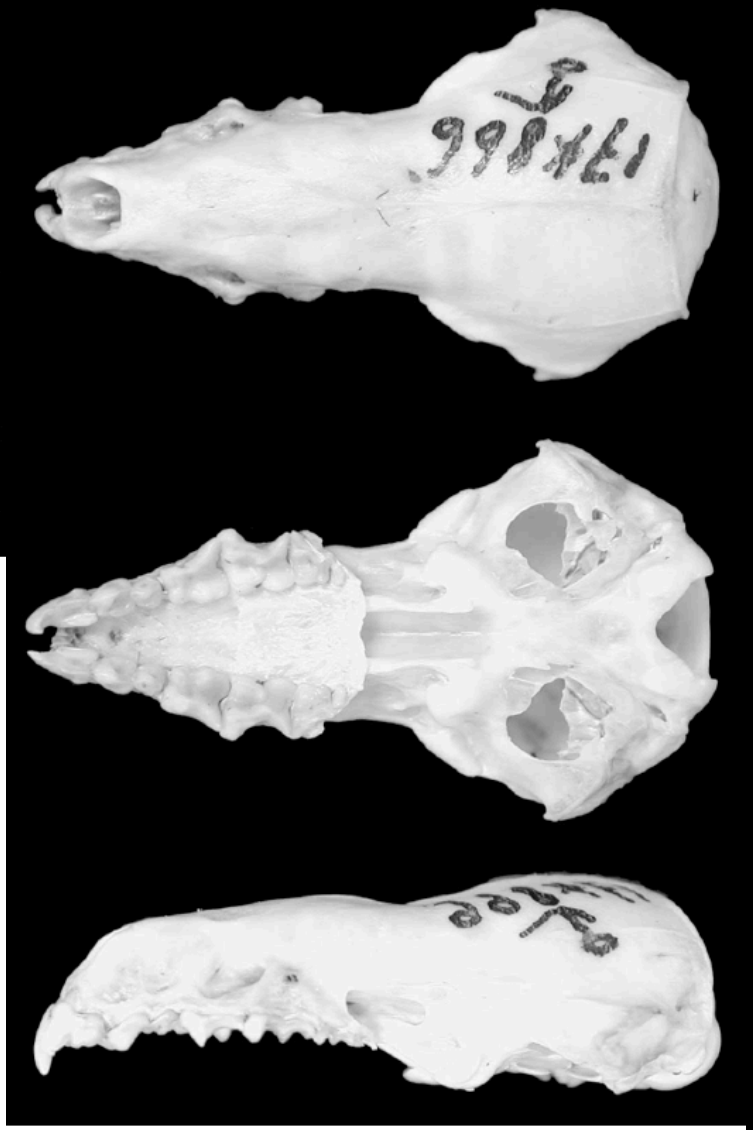
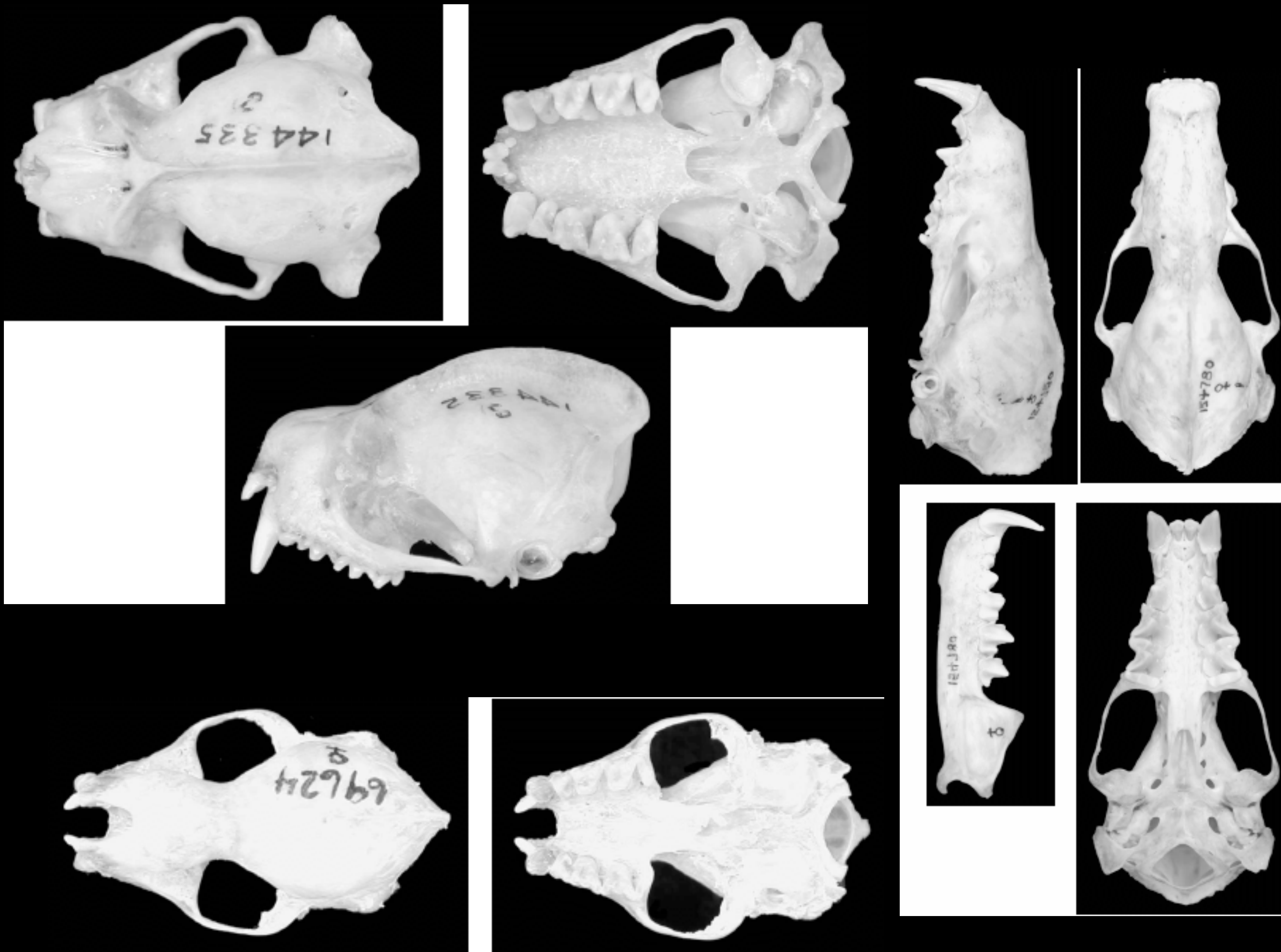


skull of the European hedgehog, *Erinaceus europaeus*



mole shrew, *Anourosorex squamipes*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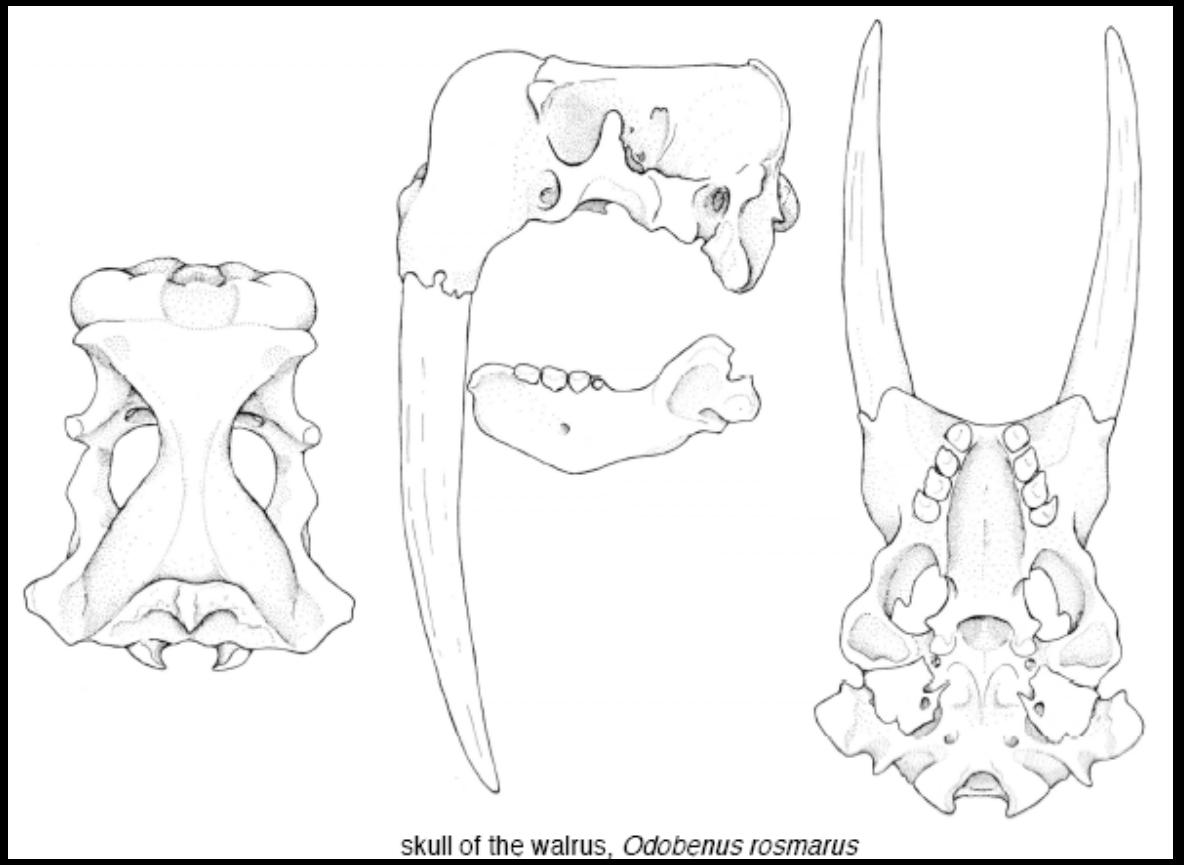
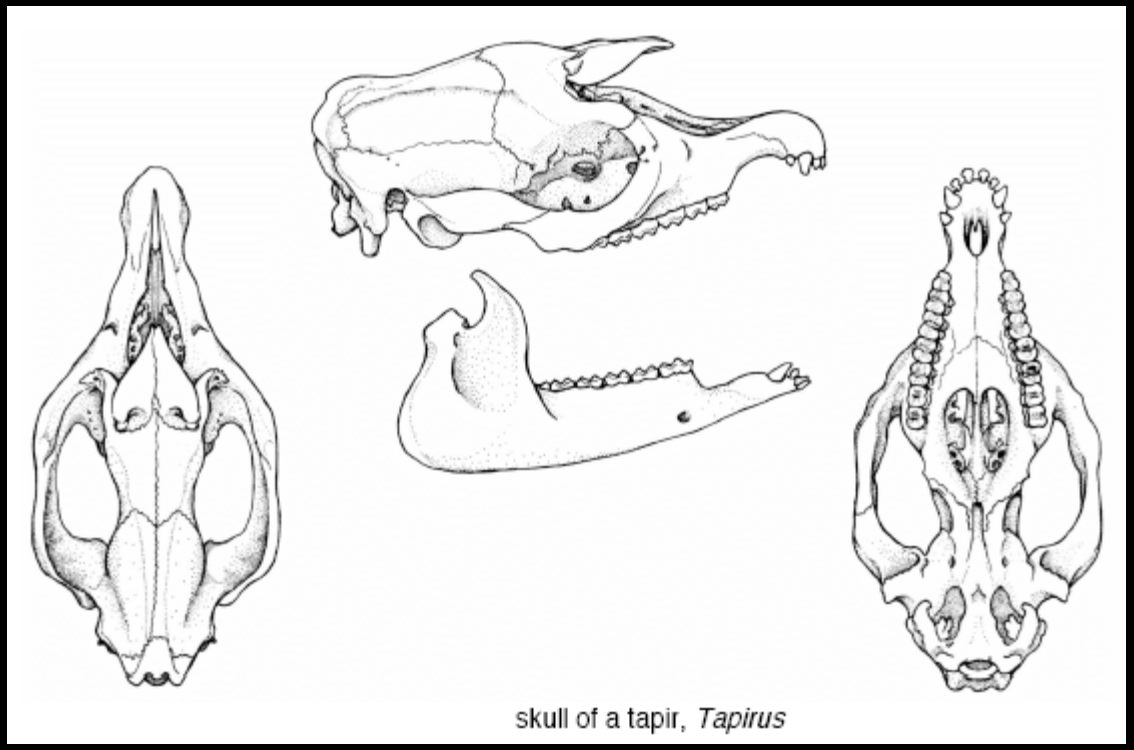
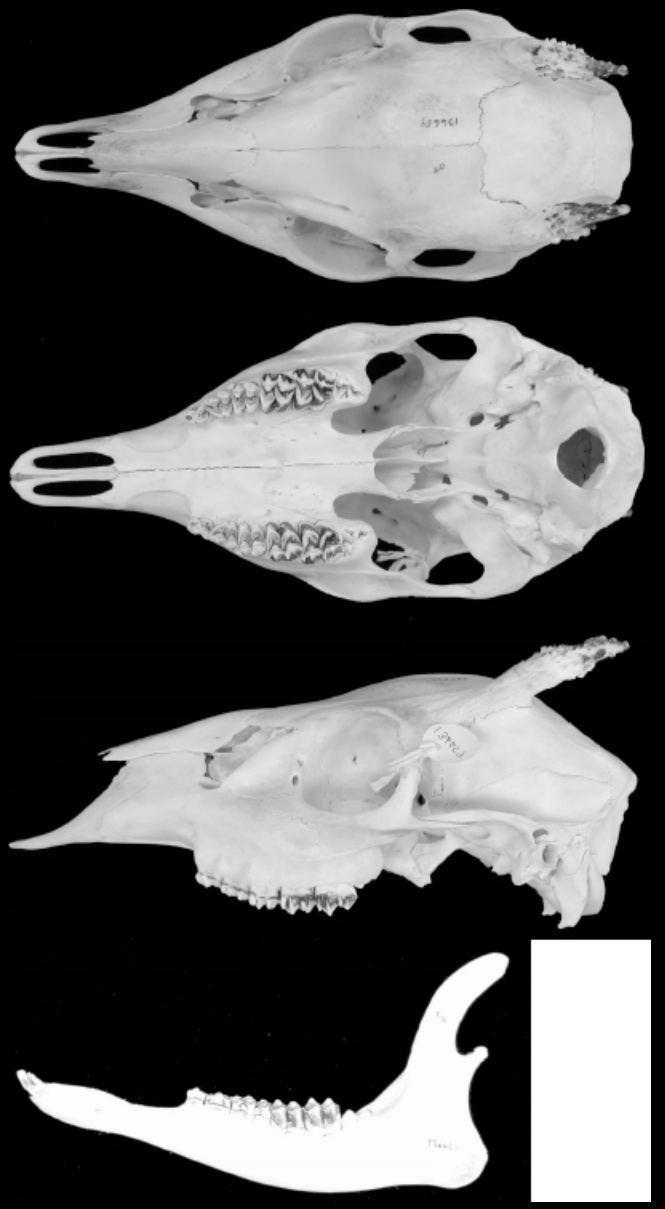
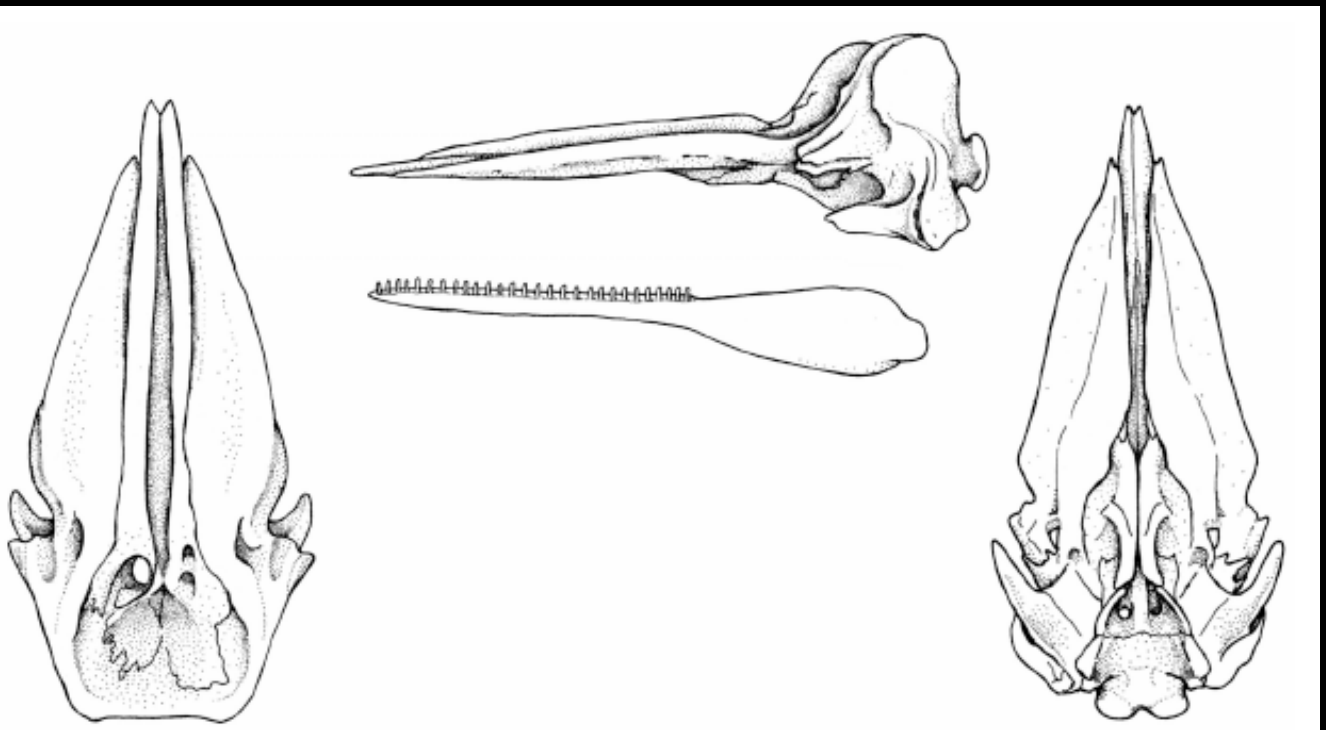


skull of the walrus, *Odobenus rosmarus*

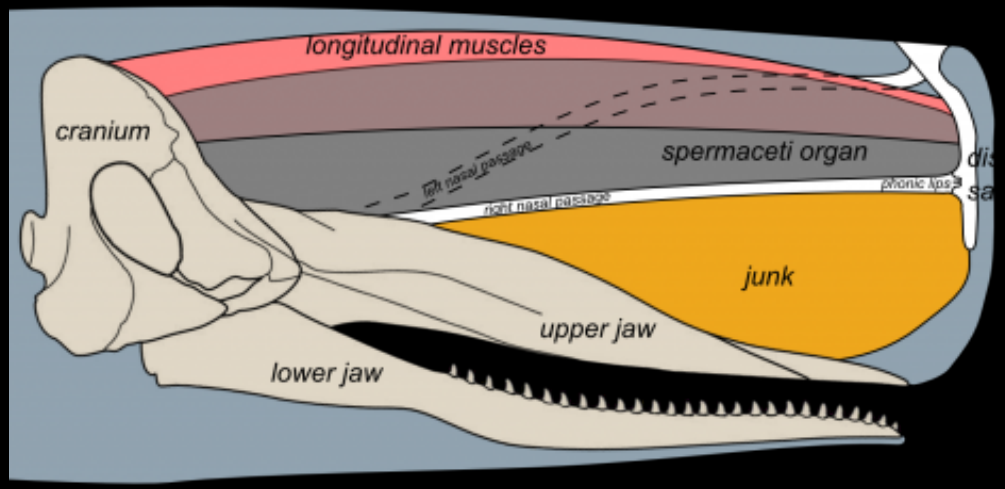


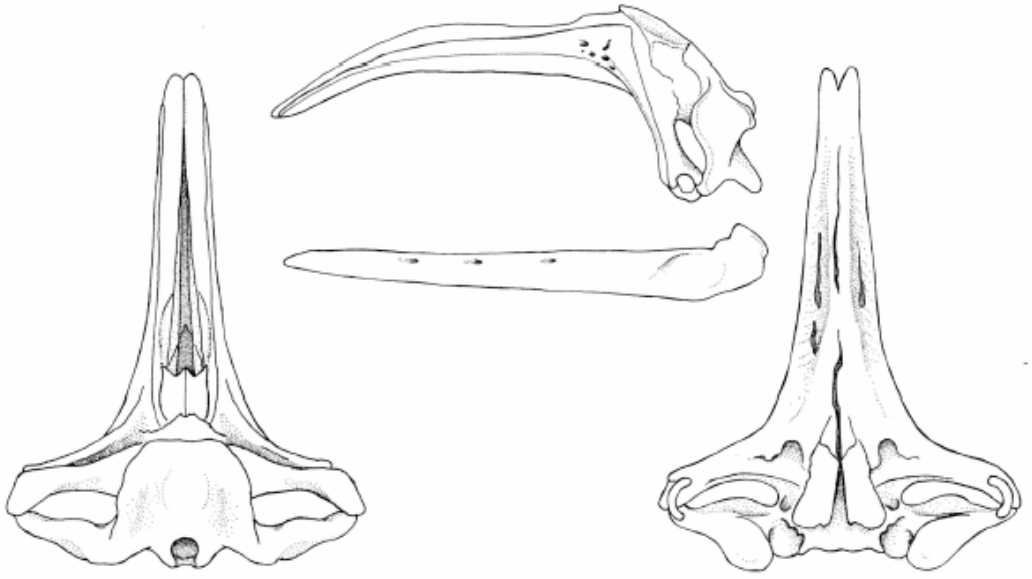
skull of a tapir, *Tapirus*



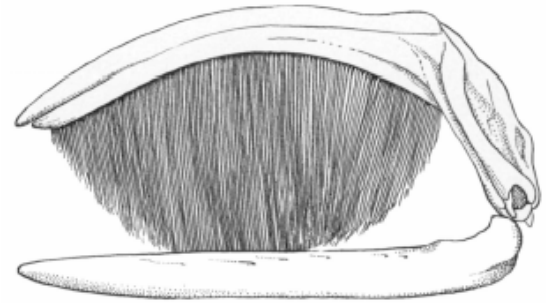


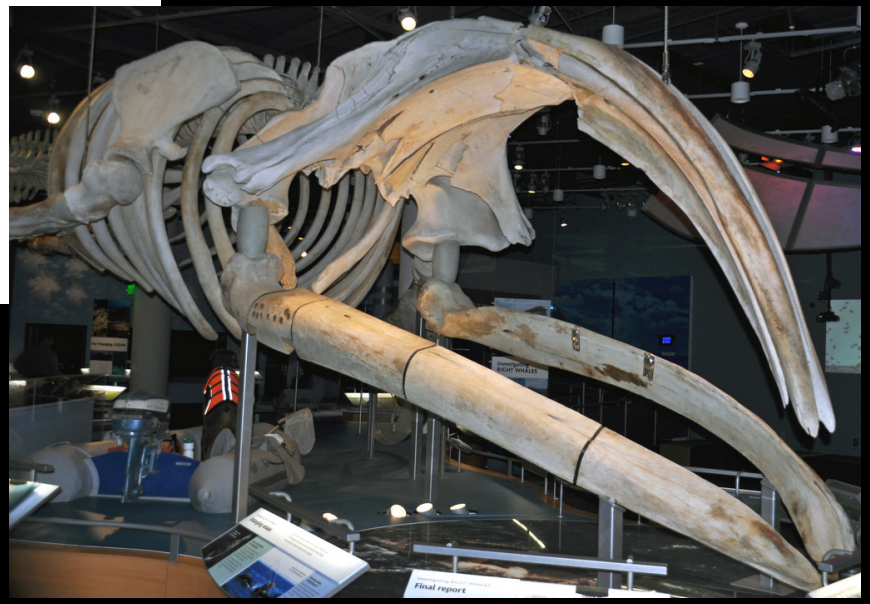
skull of the sperm whale, *Physeter*



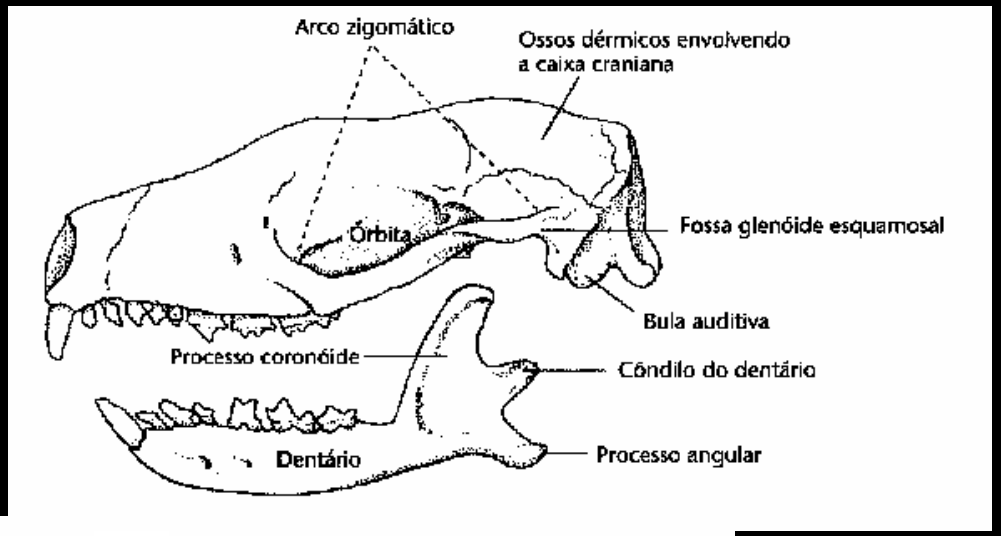


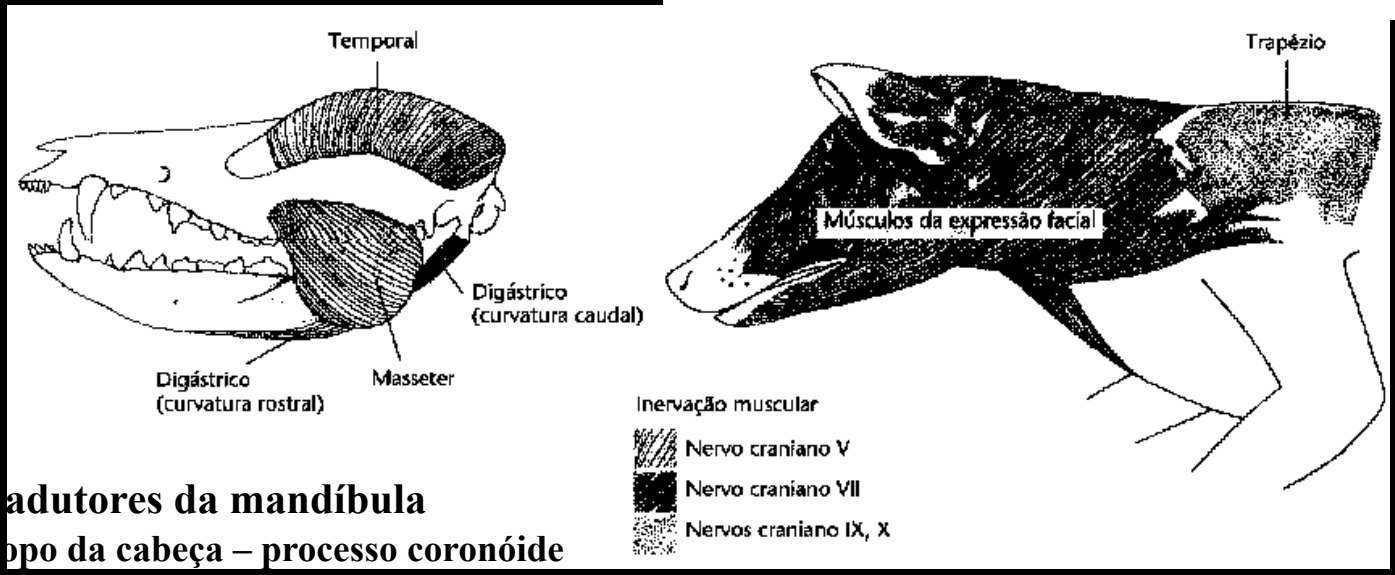
skull of a right whale, *Eubalaena*





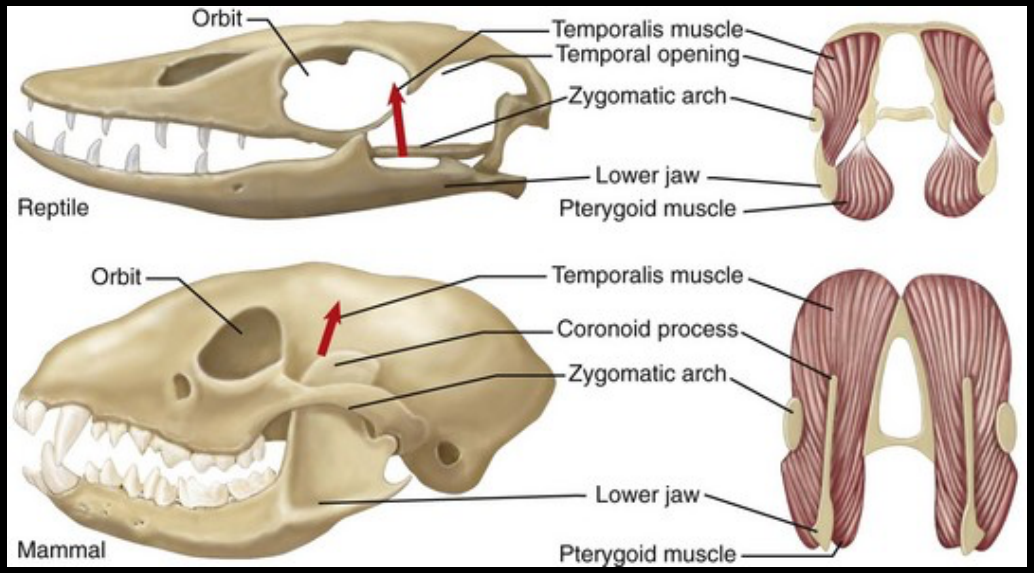
Crânio e Músculos Associados

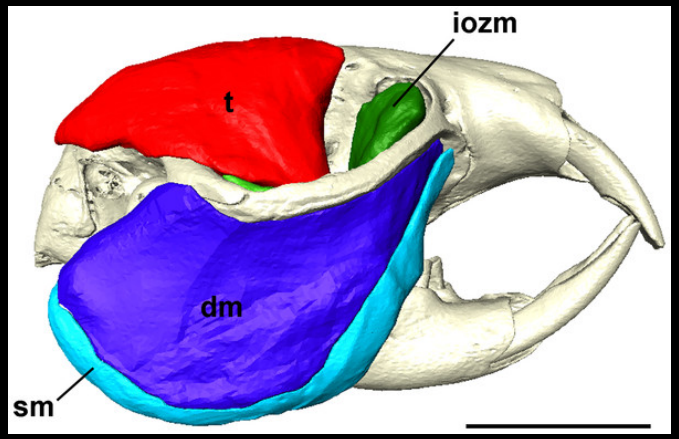




adutores da mandíbula

opo da cabeça – processo coronóide


Orbit
Temporalis muscle
Temporal opening
Zygomatic arch
Lower jaw
Pterygoid muscle
Reptile
Orbit
Temporalis muscle
Coronoid process
Zygomatic arch
Lower jaw
Pterygoid muscle
Mammal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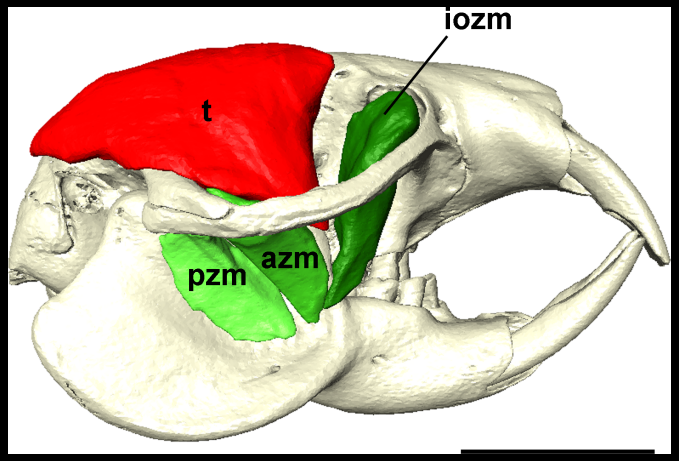
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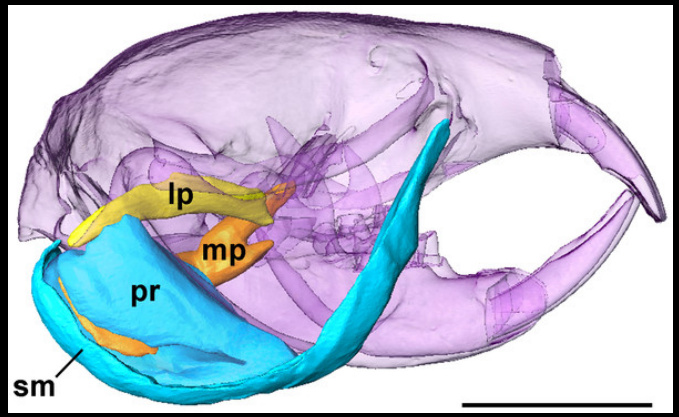
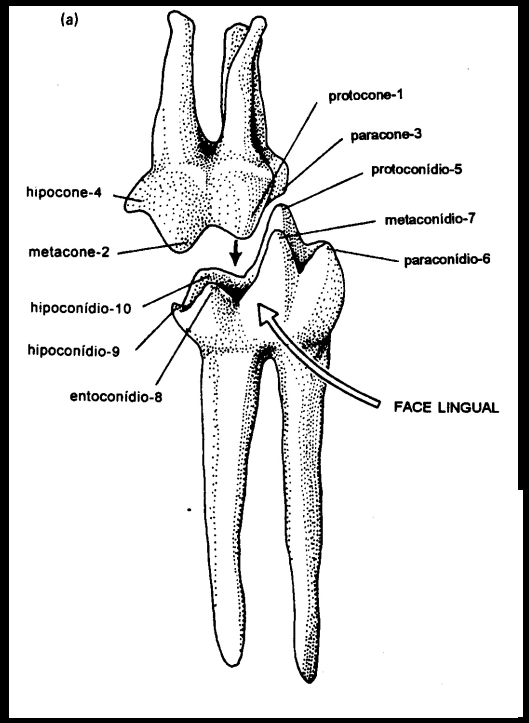
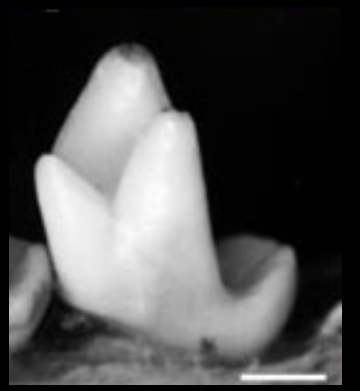
azm
pzm

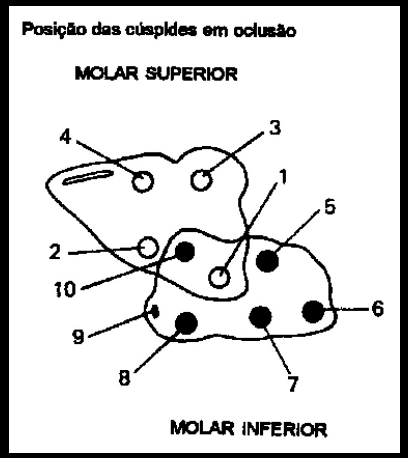

lp
mp
pr
sm

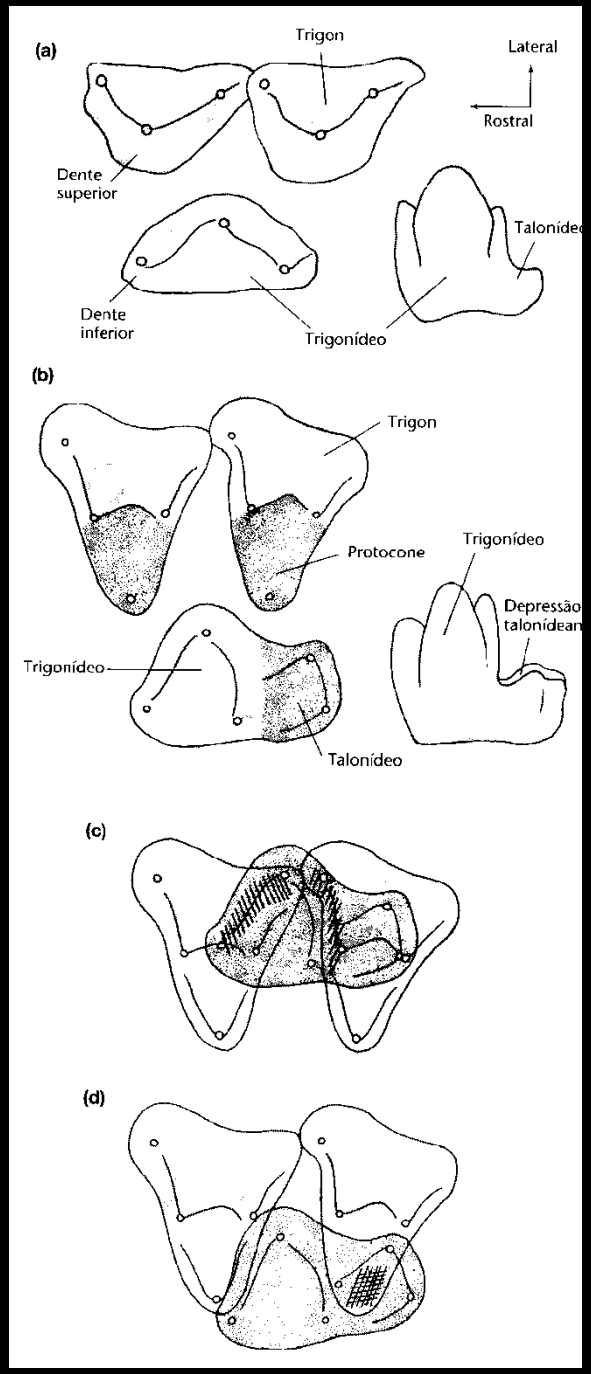
Dentição

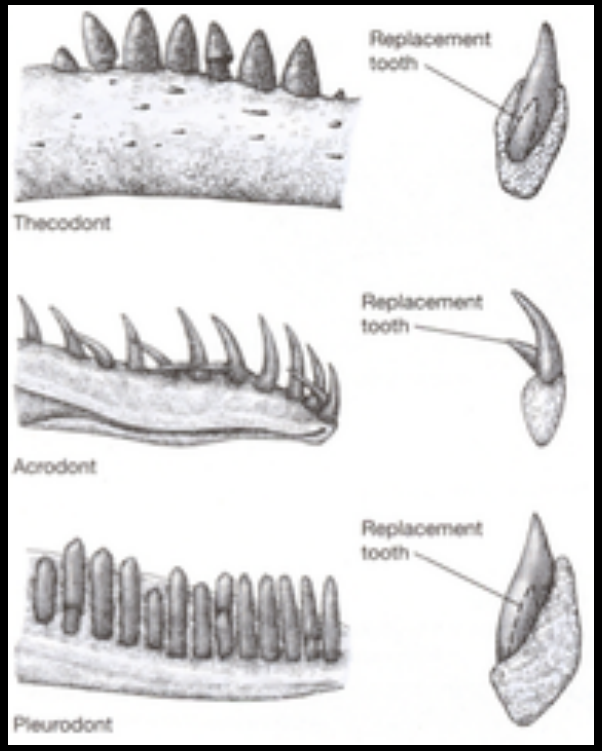
Heterodontia
Difiodontia ("dentes-de-leite", exceto molares)
Mastigação (bochechas)
Oclusão triangular reversa (a)
Molares tribosfênicos (b)
    efeito de corte no início da oclusão (c)
    efeito de esmagamento (d)

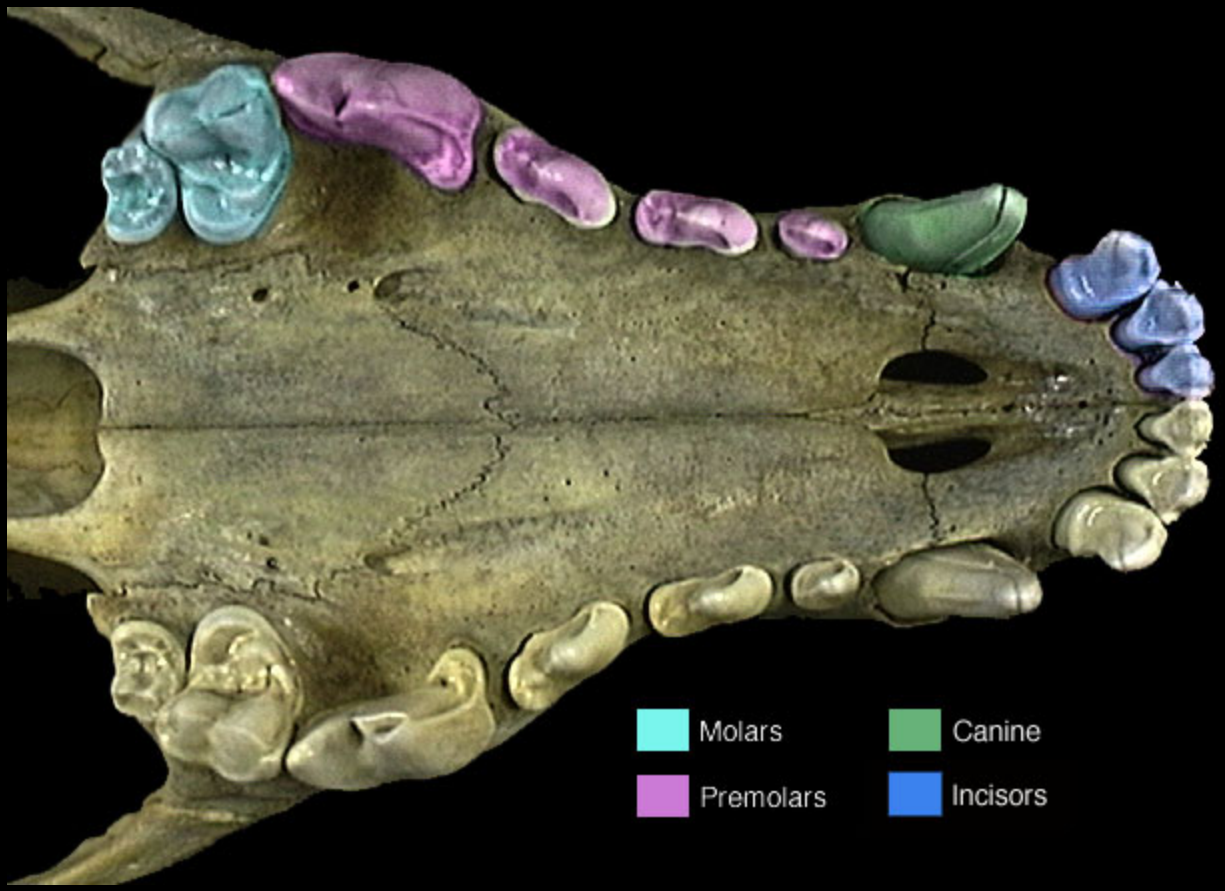









Replacement tooth
Thecodont
Replacement tooth
Acrodont
Replacement tooth
Pleurodont


Molars
Premolars
Canine
Incisors

Fórmula dentária

Números dos diferentes tipos de dentes

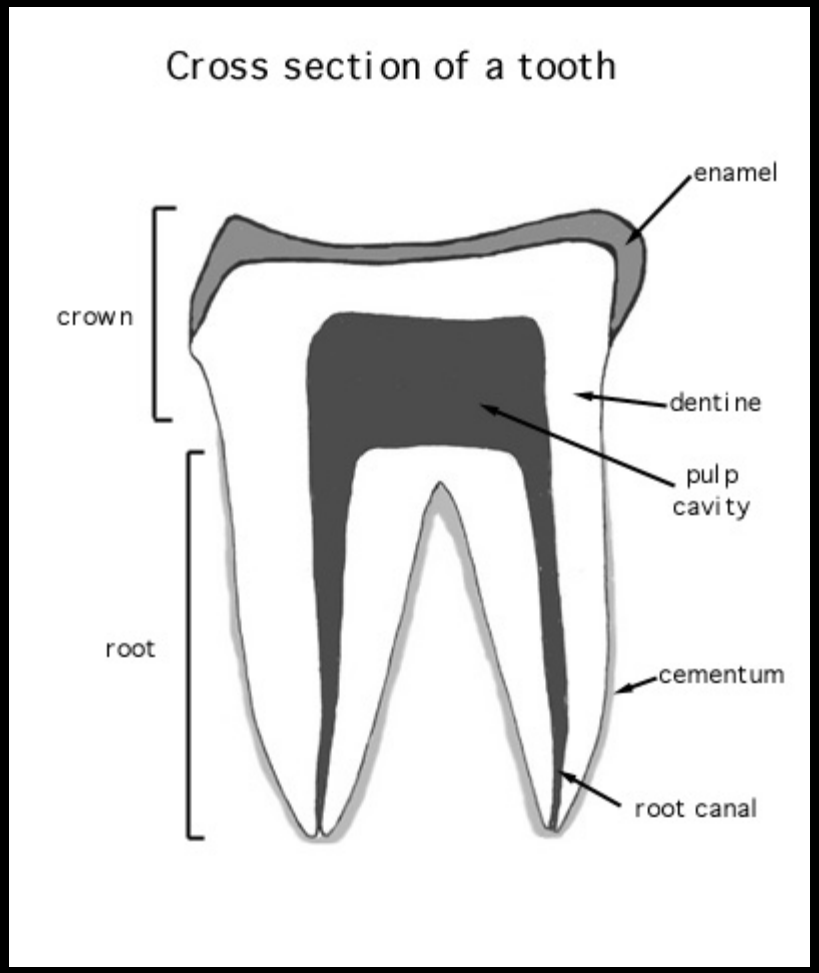
Incisivos

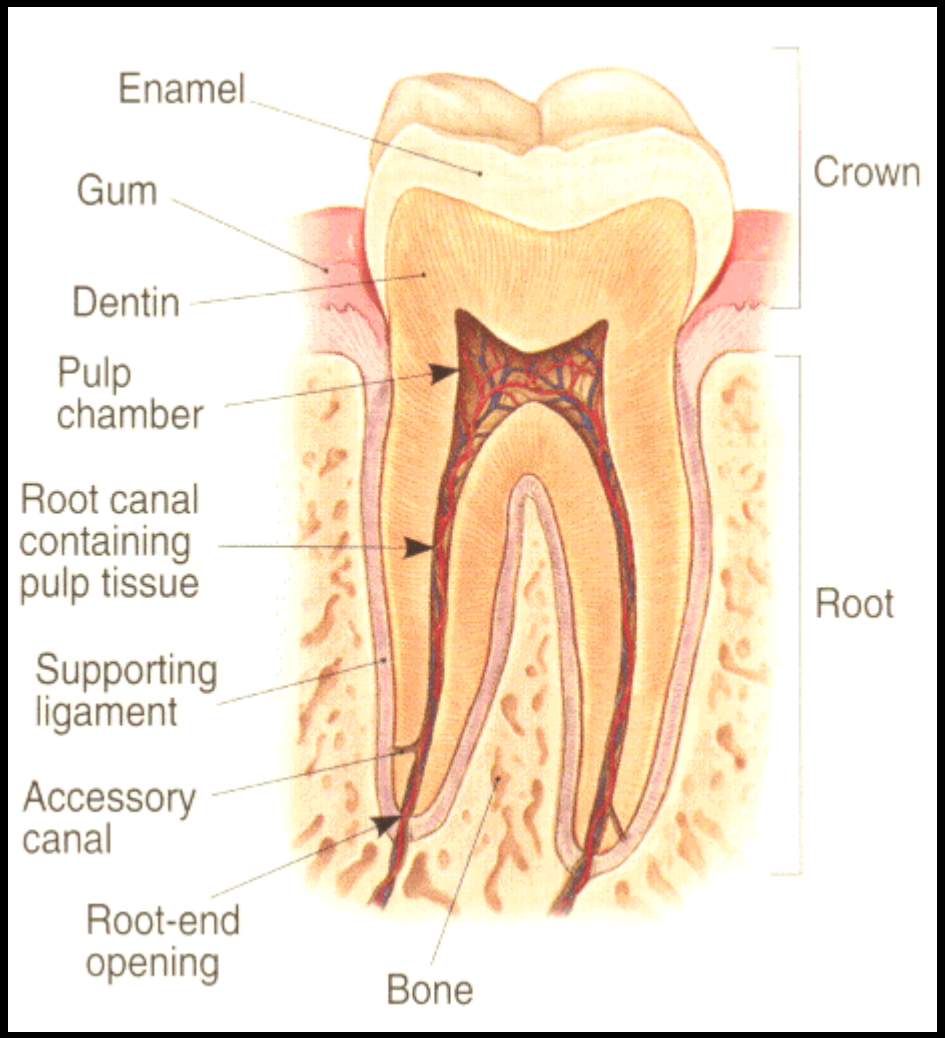
Caninos

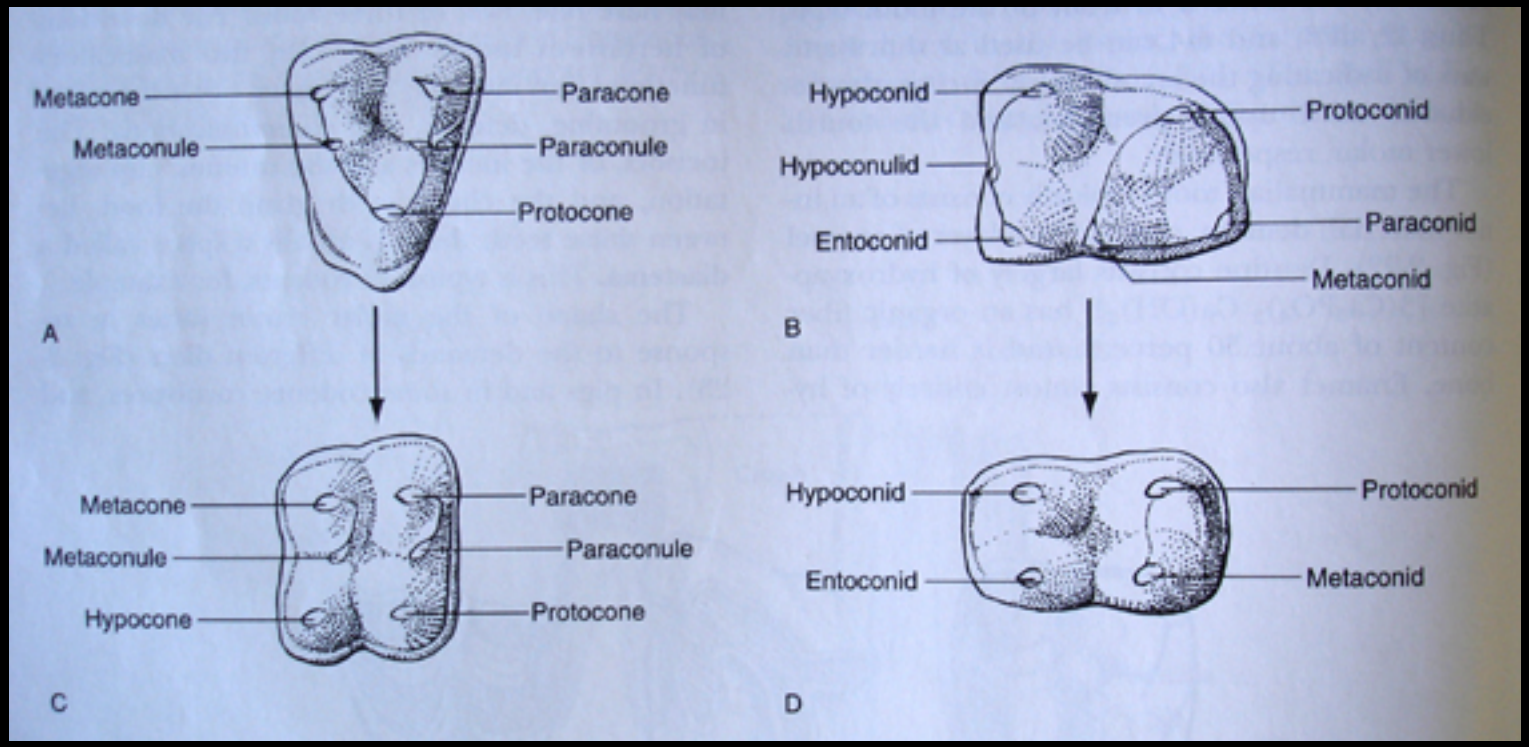
Pré-molares

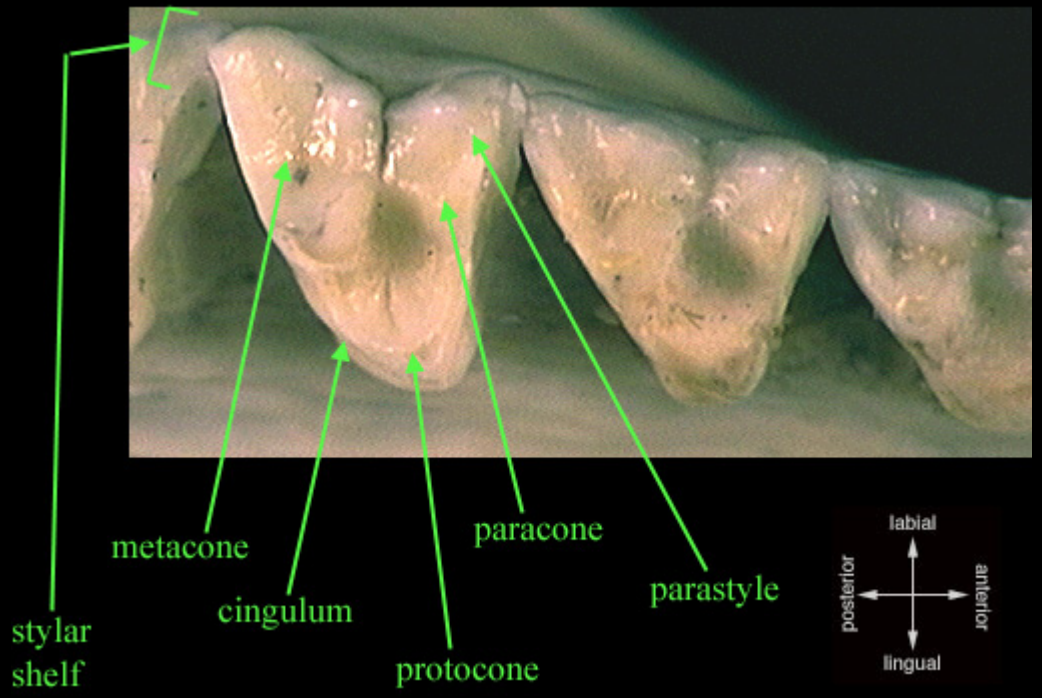
Molares

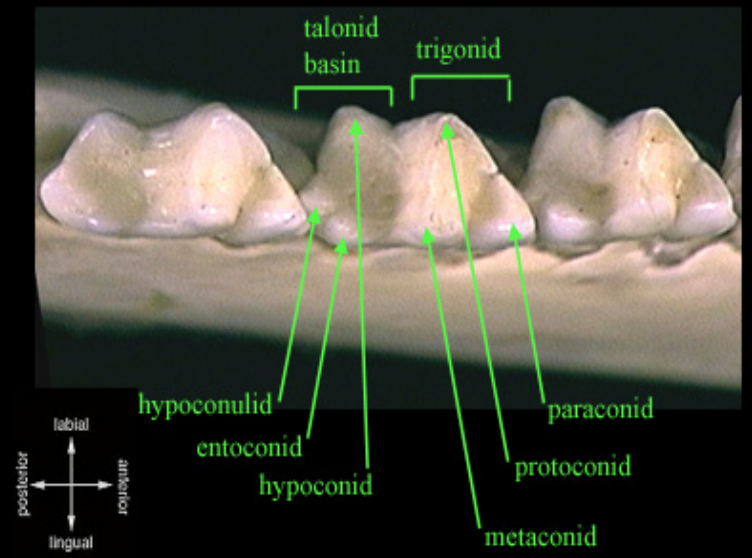
$$\frac{I + C + P + M}{i + c + p + m} = \text{número total de dentes}$$

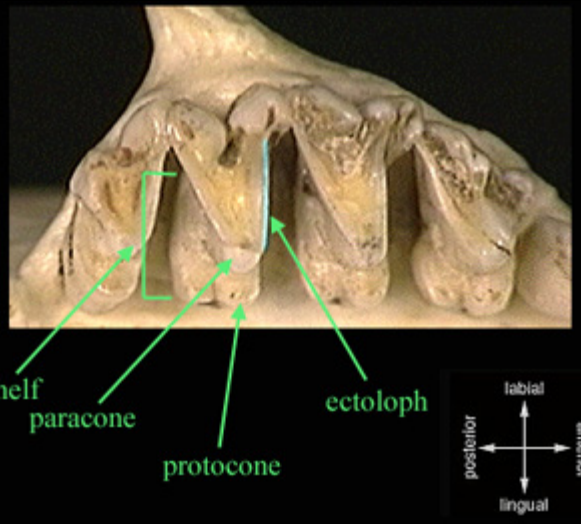

Cross section of a tooth
enamel
crown
dentine
pulp
cavity
root
cementum
root canal

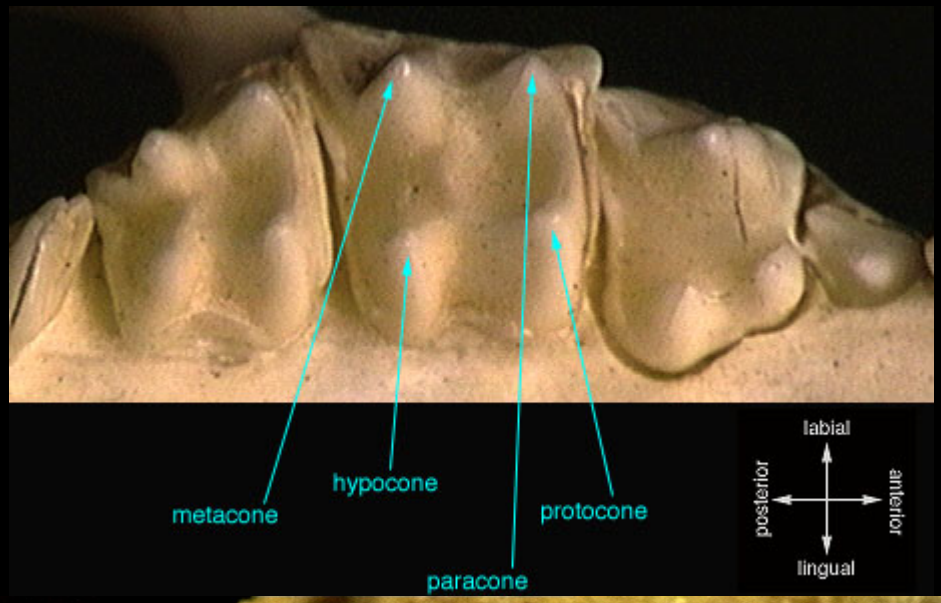

Enamel
Gum
Dentin
Pulp
chamber
Root canal
containing
pulp tissue
Supporting
ligament
Accessory
canal
Root-end
opening
Bone
Crown
Root

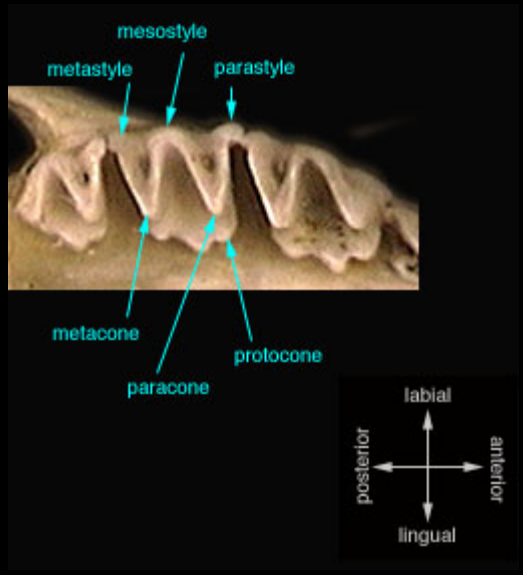

Metacone
Paracone
Metaconule
Paraconule
Protocone
A
Hypoconid
Protoconid
Hypoconulid
Paraconid
Entoconid
Metaconid
B
Metacone
Paracone
Metaconule
Paraconule
Hypocone
Protocone
C
Hypoconid
Protoconid
Entoconid
Metaconid
D

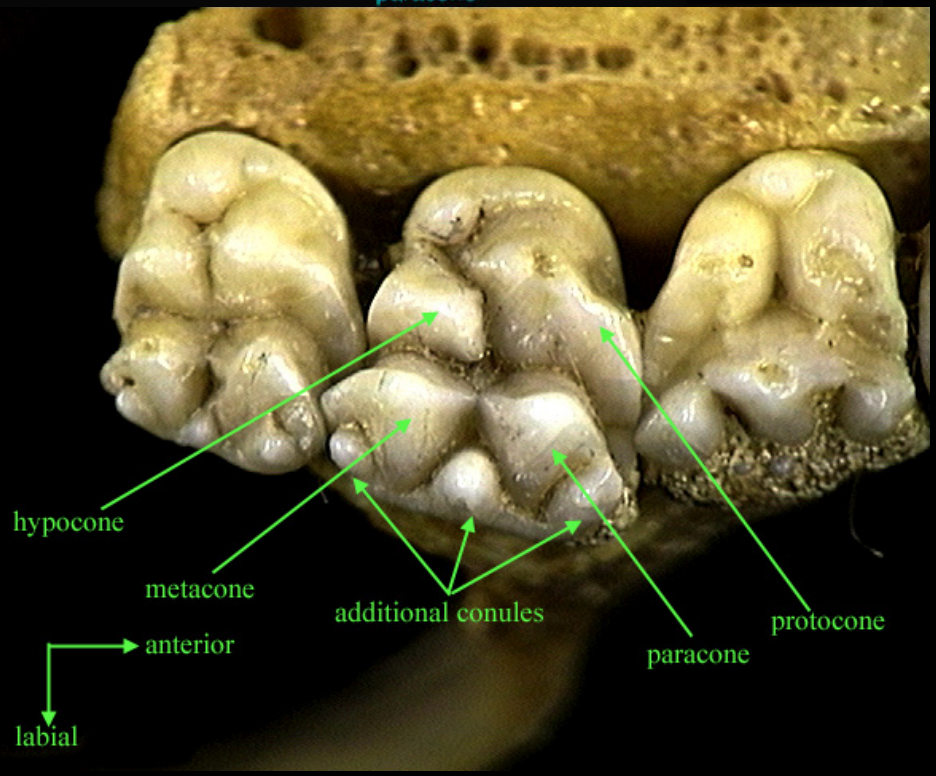

stylar shelf
metacone
cingulum
protocone
paracone
parastyle
labial
posterior
anterior
lingual


talonid basin
trigonid
hypoconulid
entoconid
hypoconid
paraconid
protoconid
metaconid
labial
posterior
anterior
lingual


stylar shelf
paracone
protocone
ectoloph
labial
posterior
anterior
lingual


metacone
hypocone
protocone
paracone
labial
posterior
anterior
lingual


mesostyle
metastyle
parastyle
metacone
protocone
paracone
labial
posterior
anterior
lingual


hypocone
metacone
additional conules
protocone
paracone
anterior
labial

Lophodont teeth

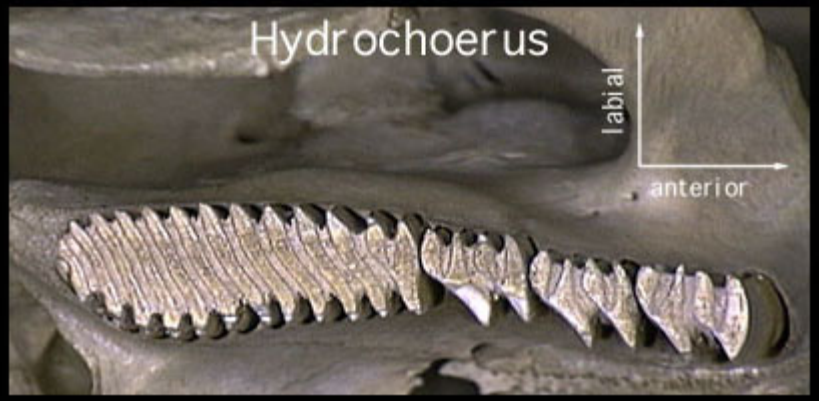
Tapirus
(Tapiridae)

Chinchilla
(Chinchillidae)

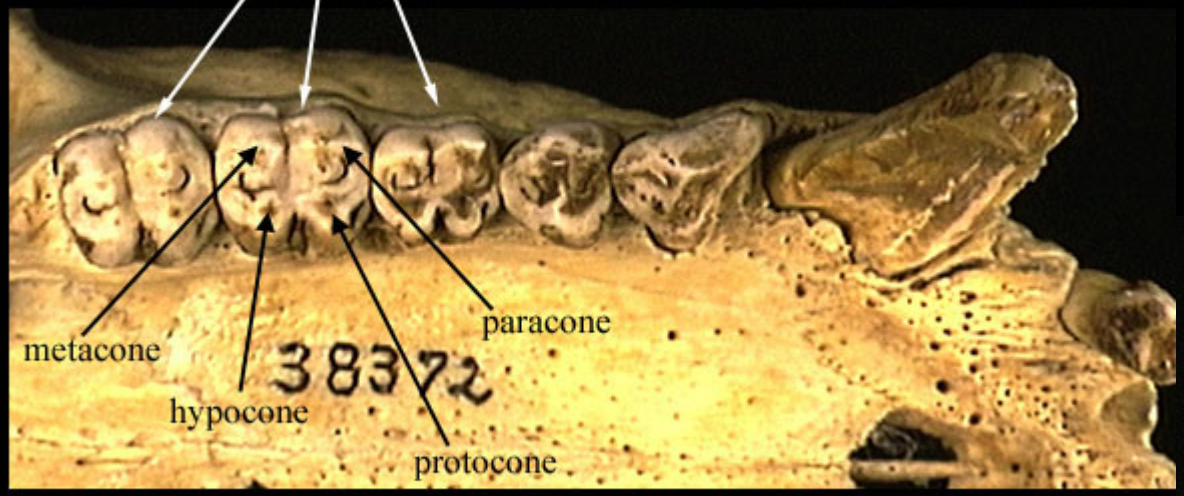
Phloeomys
(Muridae)

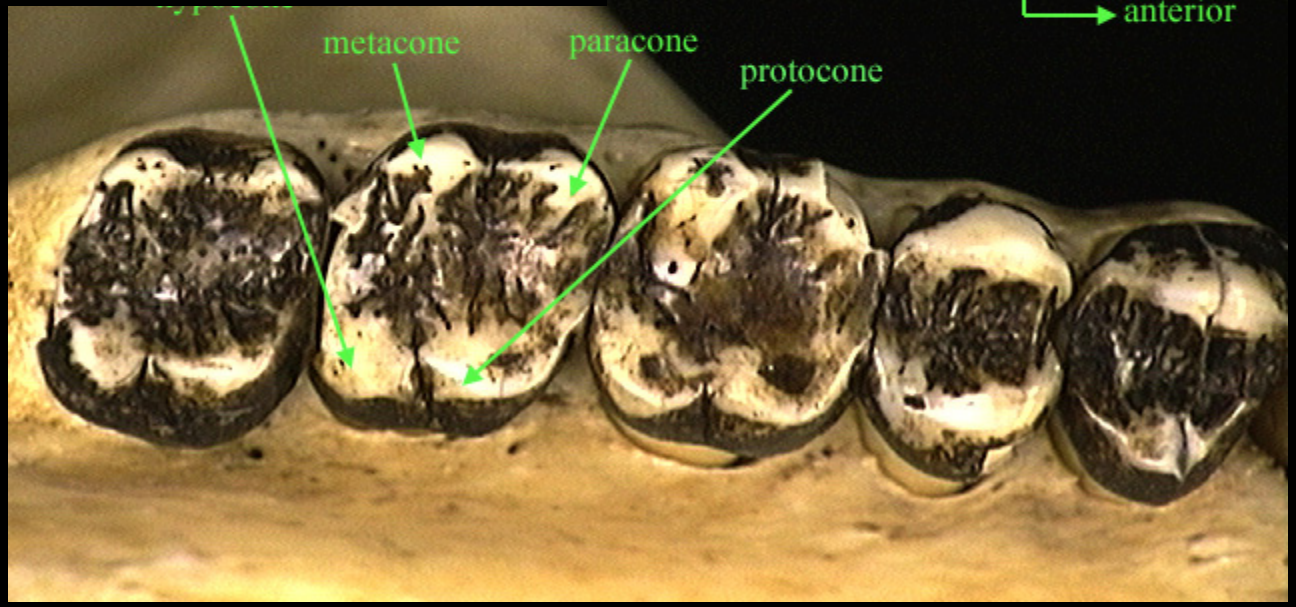
Rattus
(Muridae)

Loxodont teeth in rodents

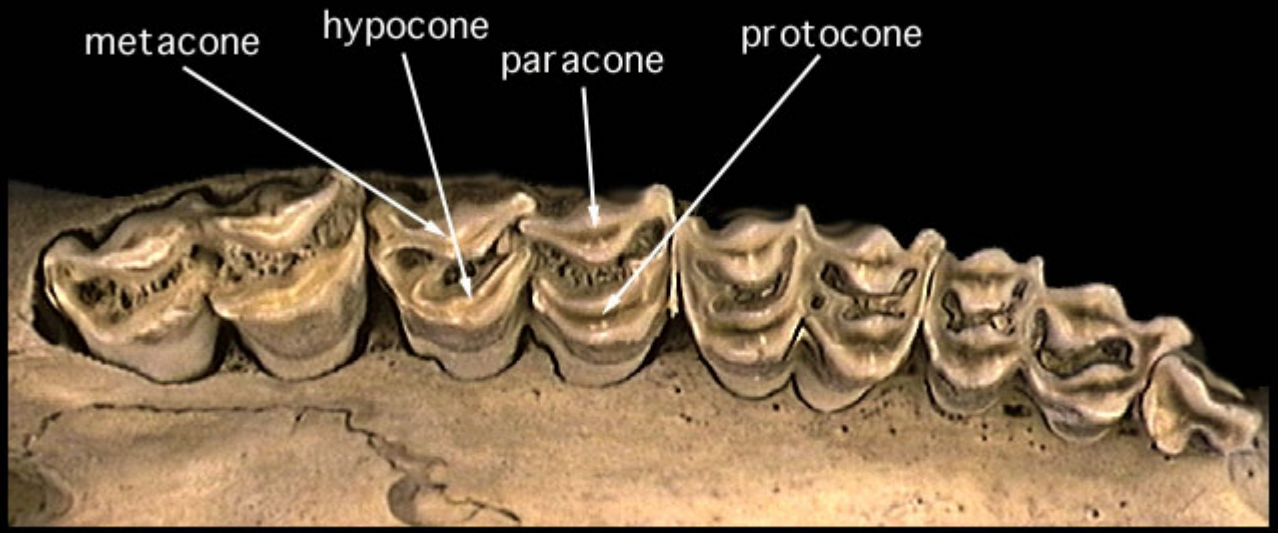


bilophodont cheek teeth of a baboon

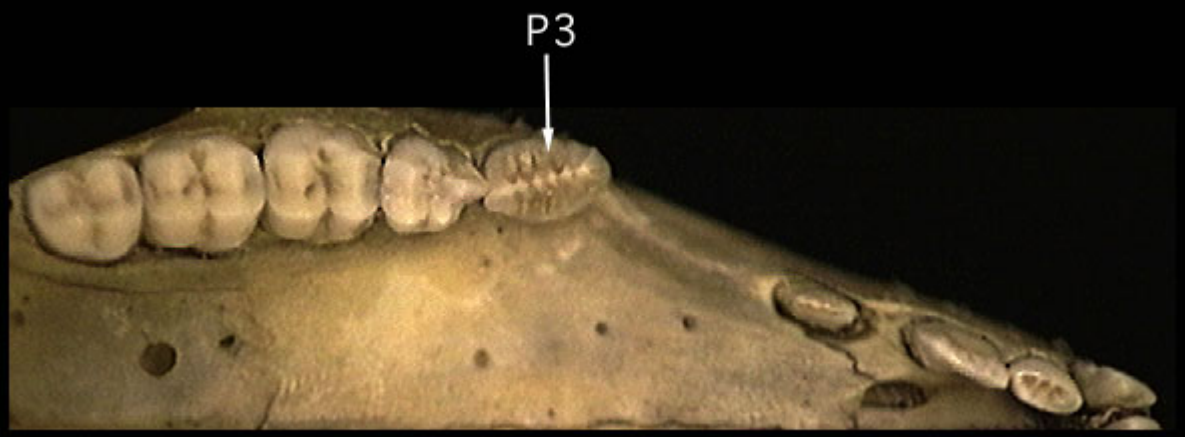




Selenodont teeth of a gazelle

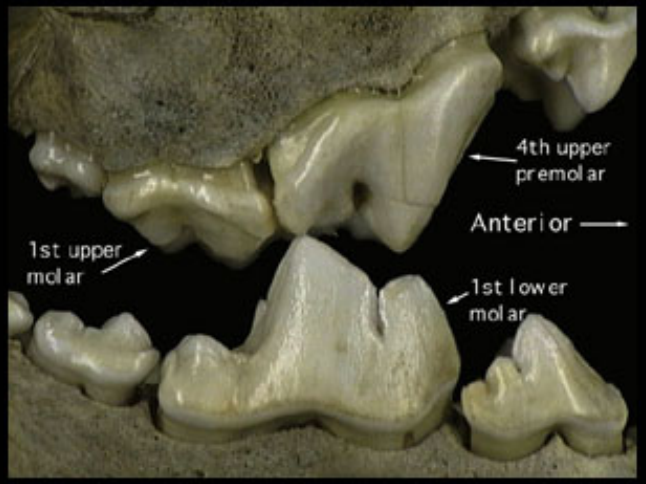


Plagiaulacoid P3 of a macropodid (Bettongia)

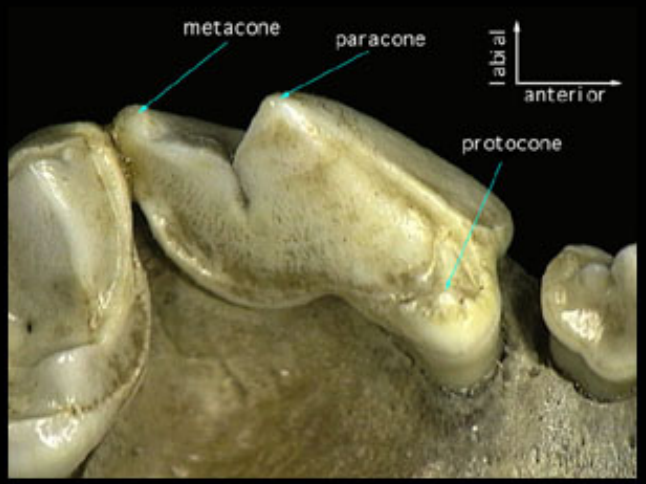


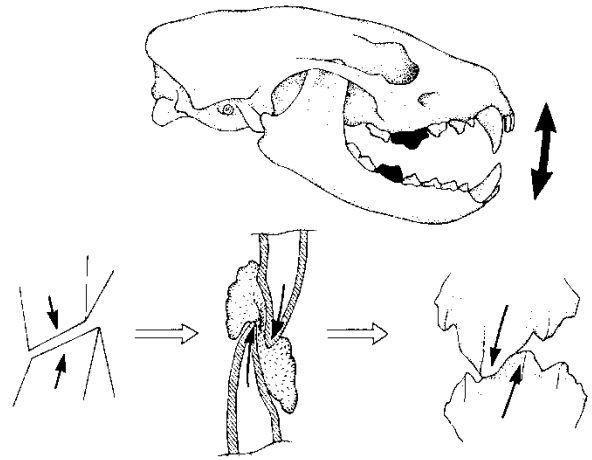
Canis lupus carnassials

view from side

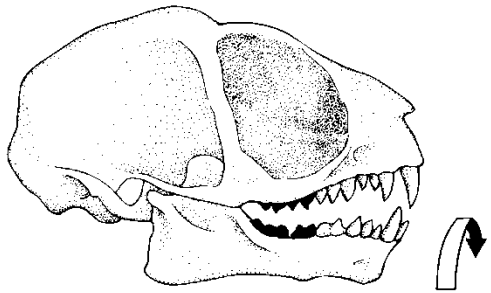


upper P4

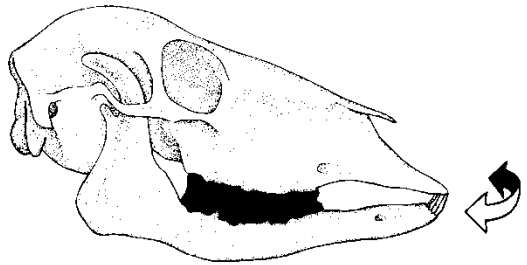


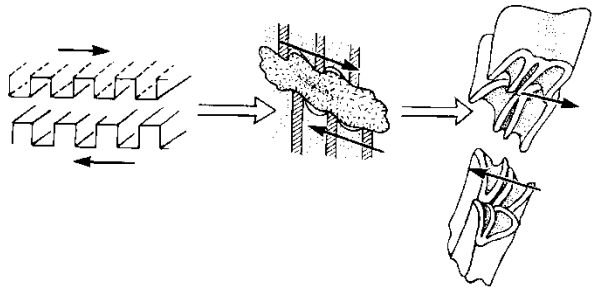


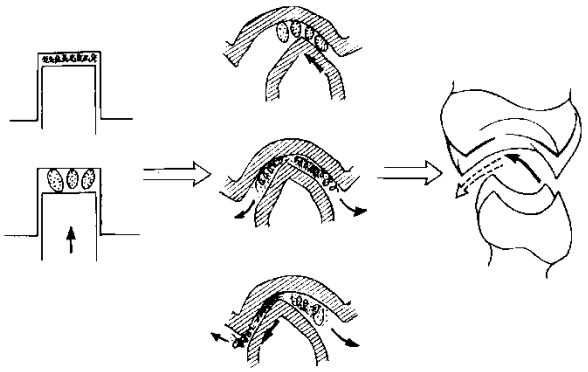
(a) Carnassial teeth



(b) Grinding teeth



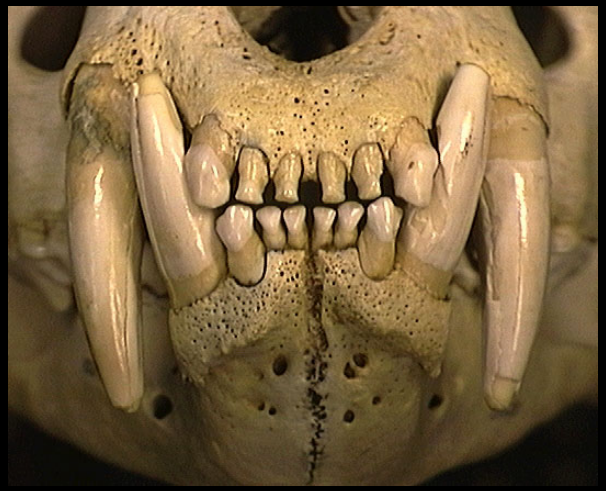




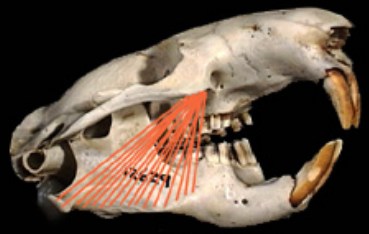
(c) Compression teeth


incisor
canine

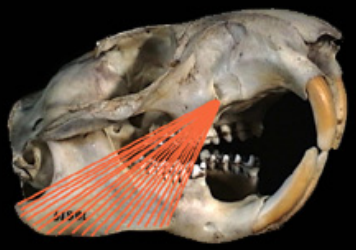

canine
incisors



Superficial masseter



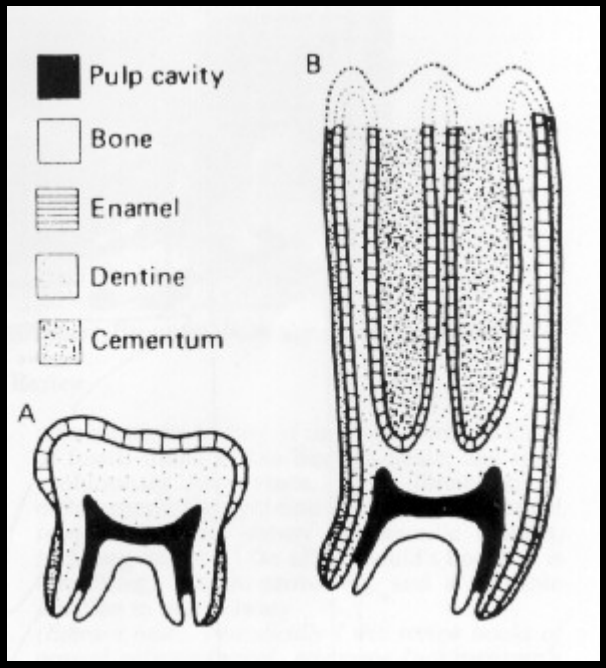
Protrogomorphous



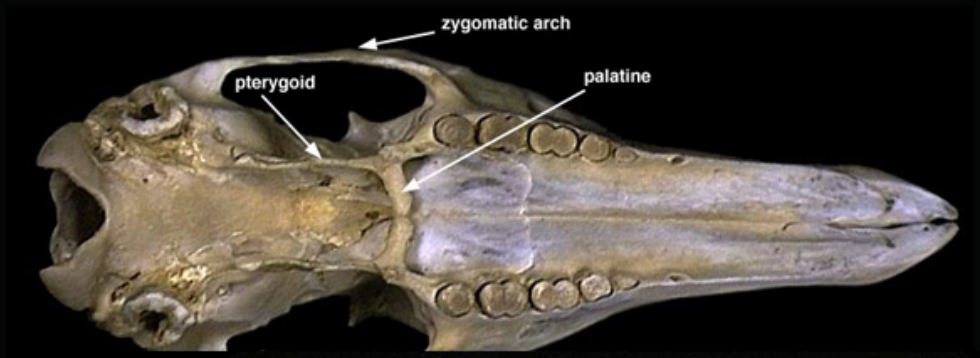
Sciuromorphous

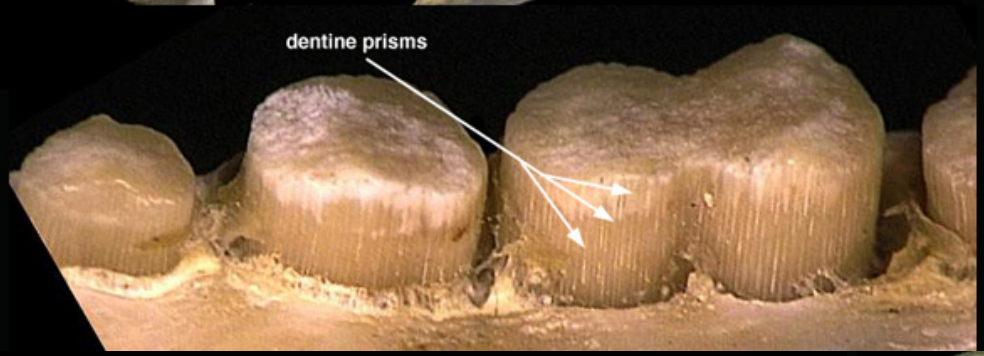
Myomorphous

Hystricomorphous

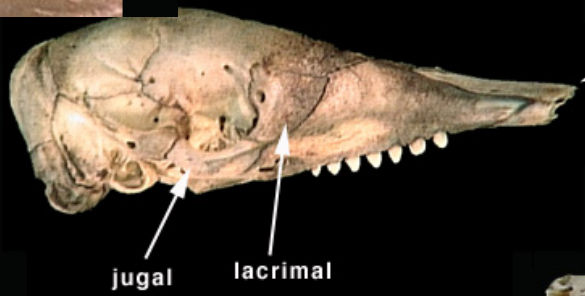


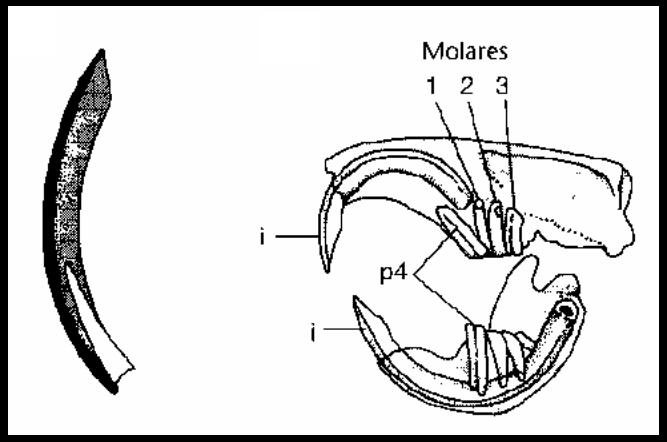
Tubulidentata



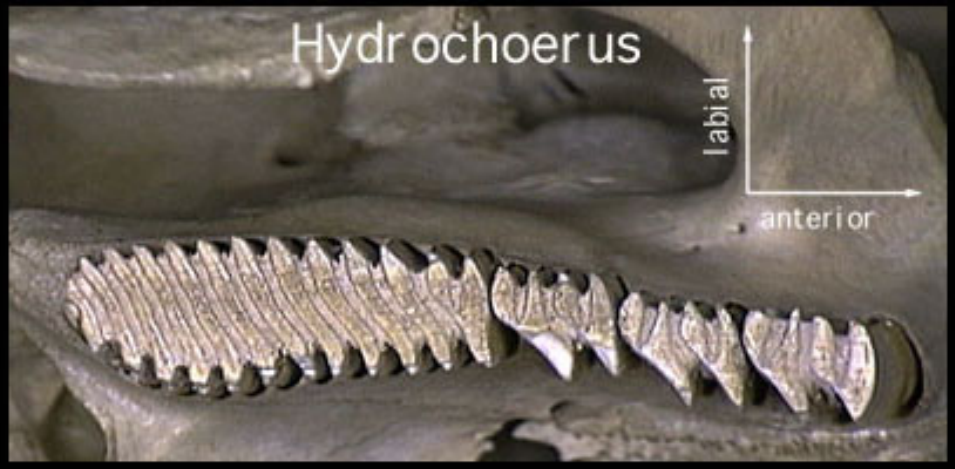


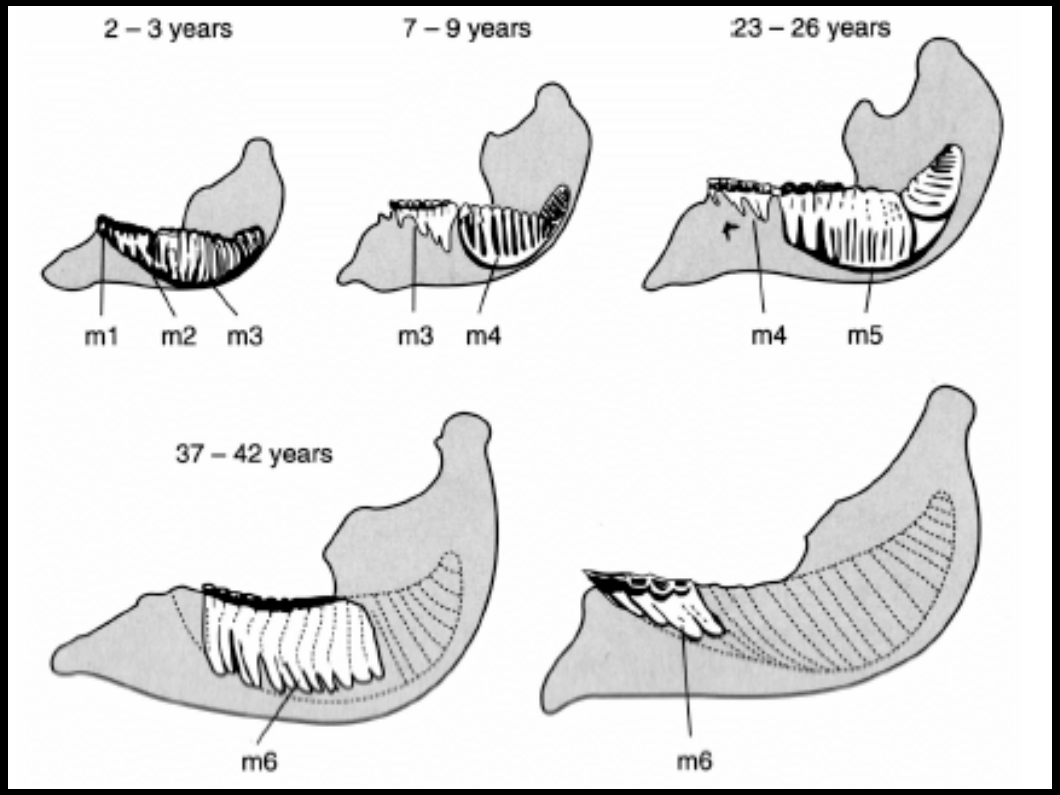
Dasypodidae



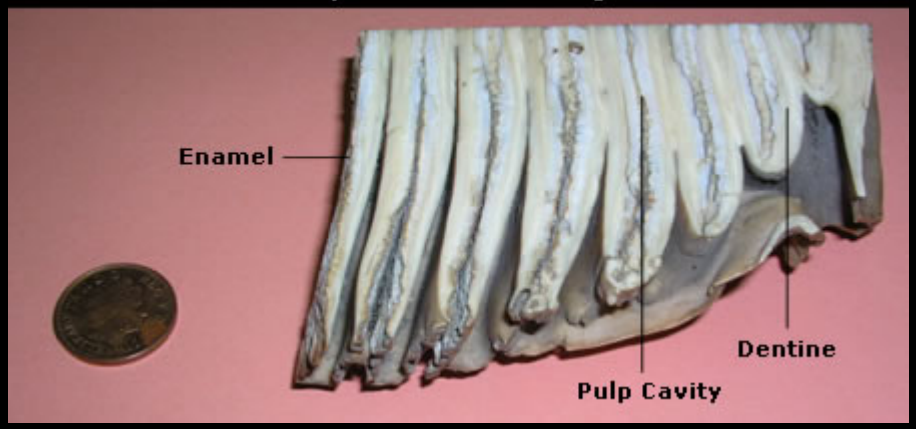


Loxodont teeth in rodents

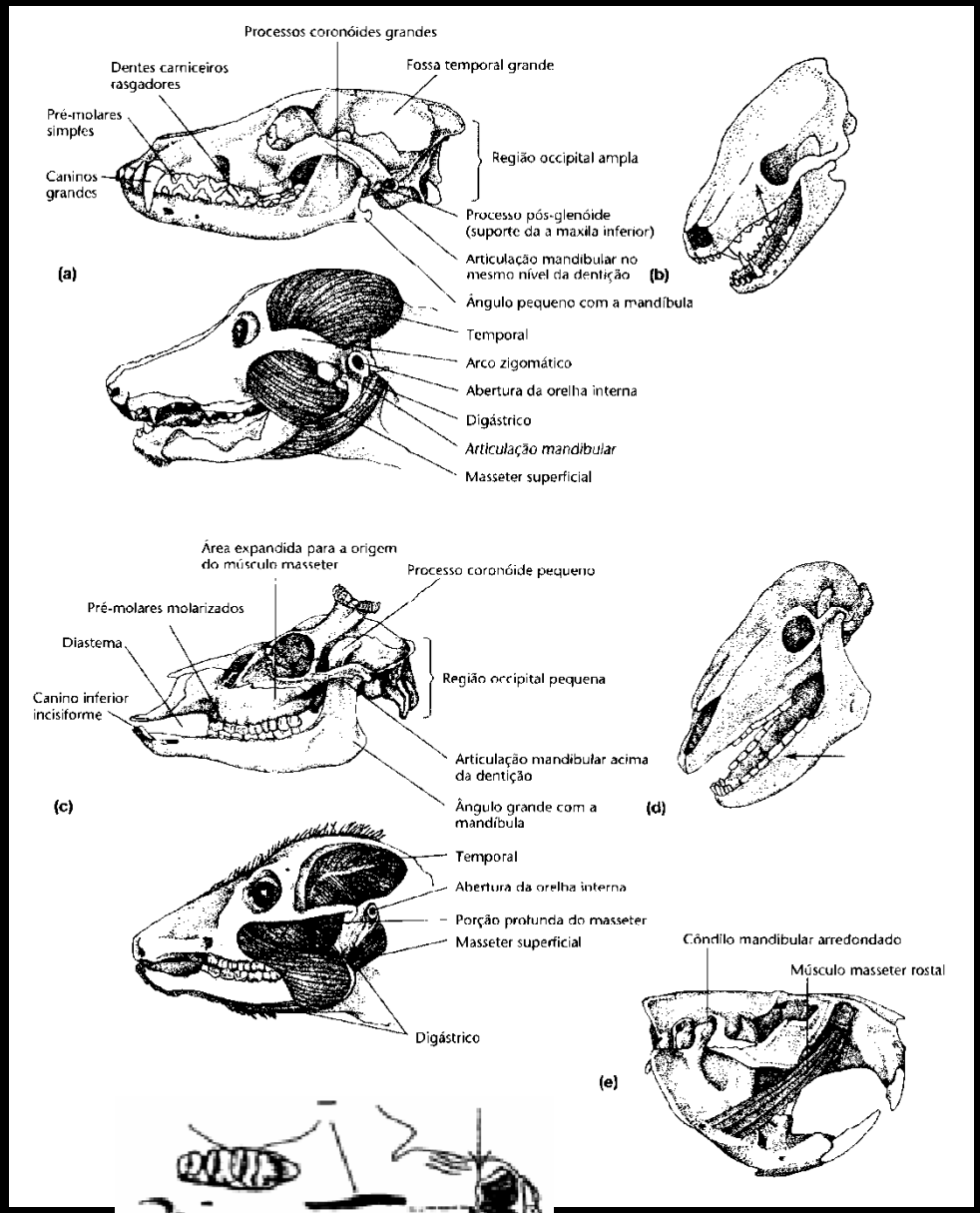




Cross section of an elephant molar showing the tooth structure

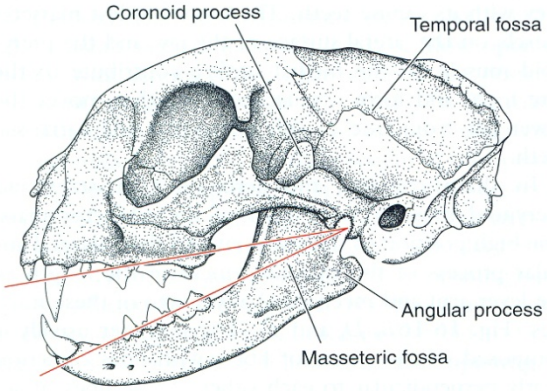


Especializações Crânio-Dentígeras

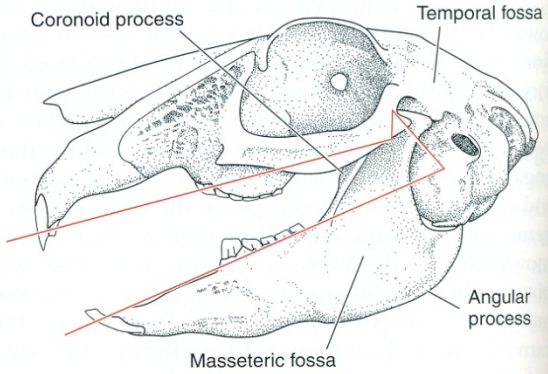


<u>Carnívoros</u>
Articulação no mesmo nível dos dentes
Temporal grande (caninos e incisivos)
Processo coronóide grande
Crista sagital
Região occipital bem-desenvolvida

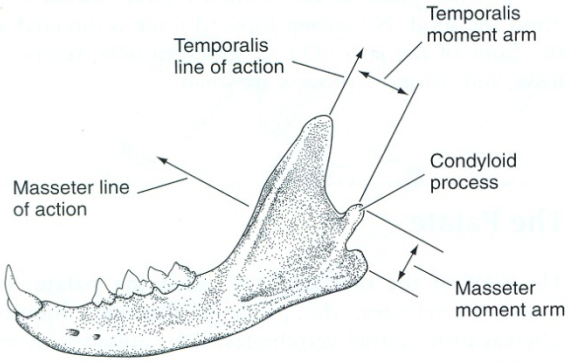
<u>Herbívoros</u>
Articulação mais alta (oclusão simultânea)
Masseter grande (pré-molares e molares, movimento lateral)
Diástema
alongamento das maxilas
seleção do alimento com a boca
Roedores
movimento para frente e para trás em oclusão
mastigação de ambos os lados ao mesmo tempo



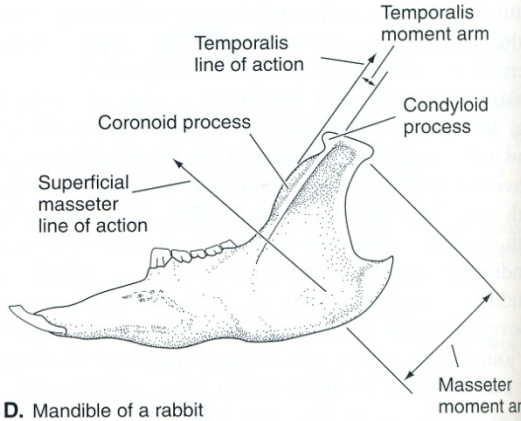
A. Cat skull



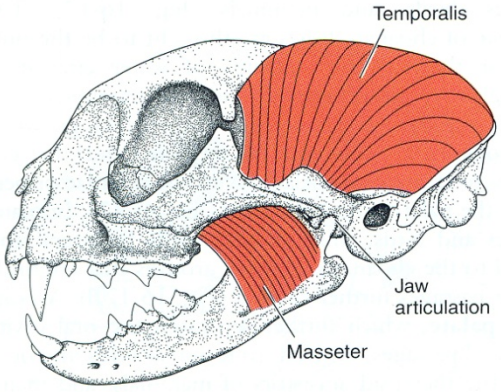
B. Rabbit skull



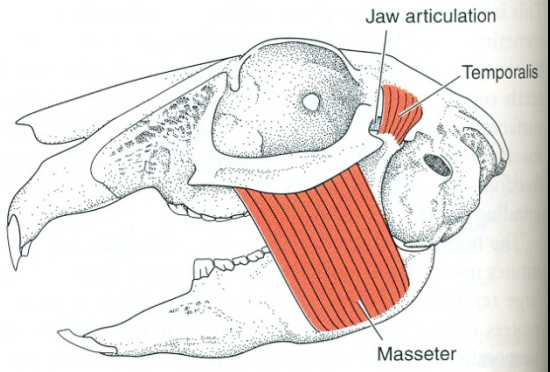
C. Mandible of a cat



D. Mandible of a rabbit



E. Jaw-closing muscles of a cat



F. Jaw-closing muscles of a rabbit