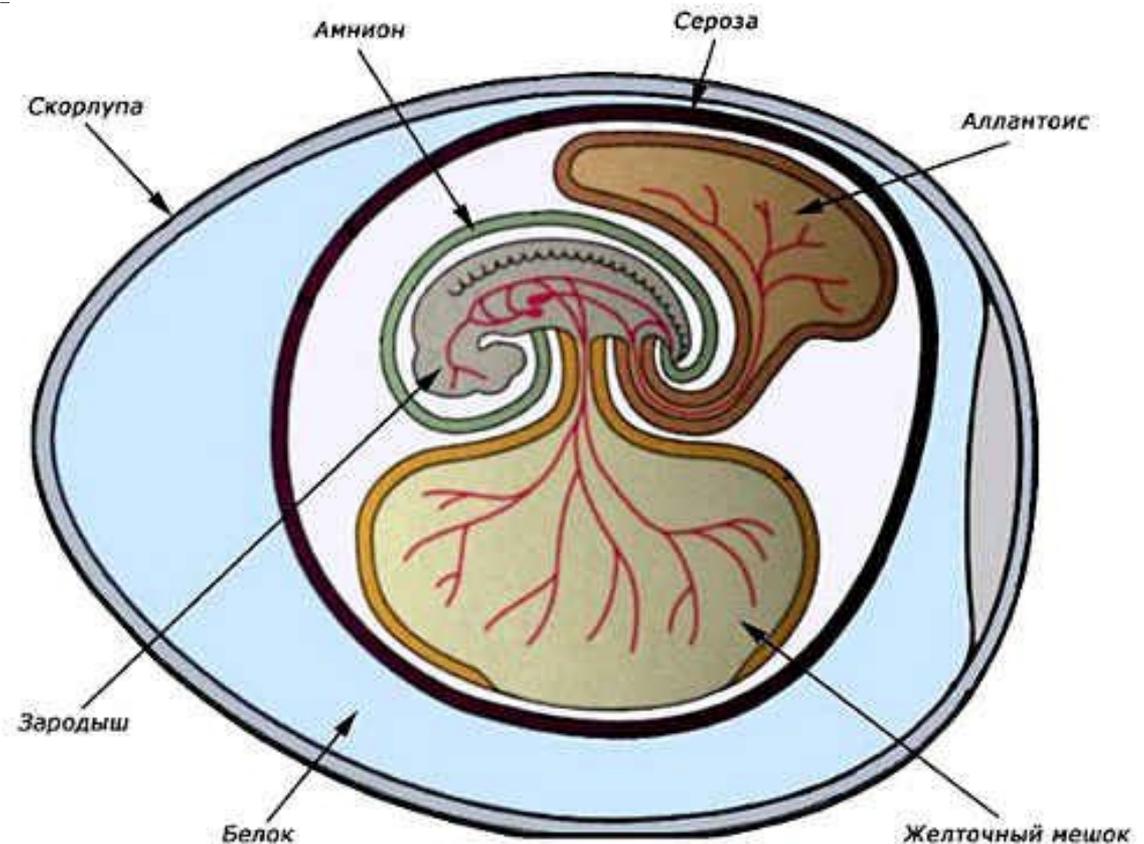


Высшие позвоночные – рептилии, птицы, млекопитающие

Амниоты – имеющие
зародышевую оболочку –
амнион.
Развитие не зависит от
воды



Class Mammalia

Все млекопитающие:

**Имеют постоянную
температуру тела**

Волосы

Специализированные зубы

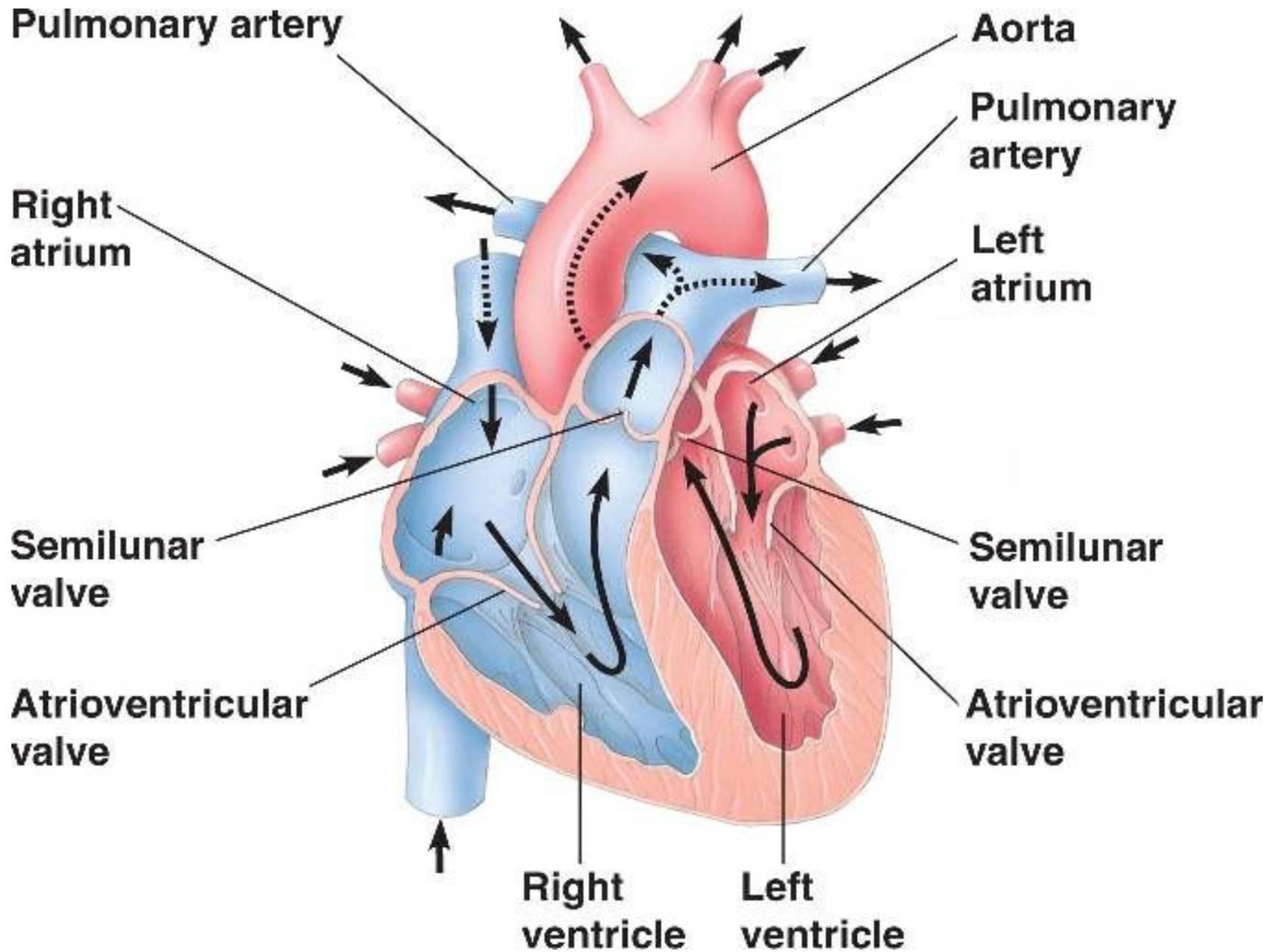
Самки выкармливают
детенышей молоком

4-камерное сердце

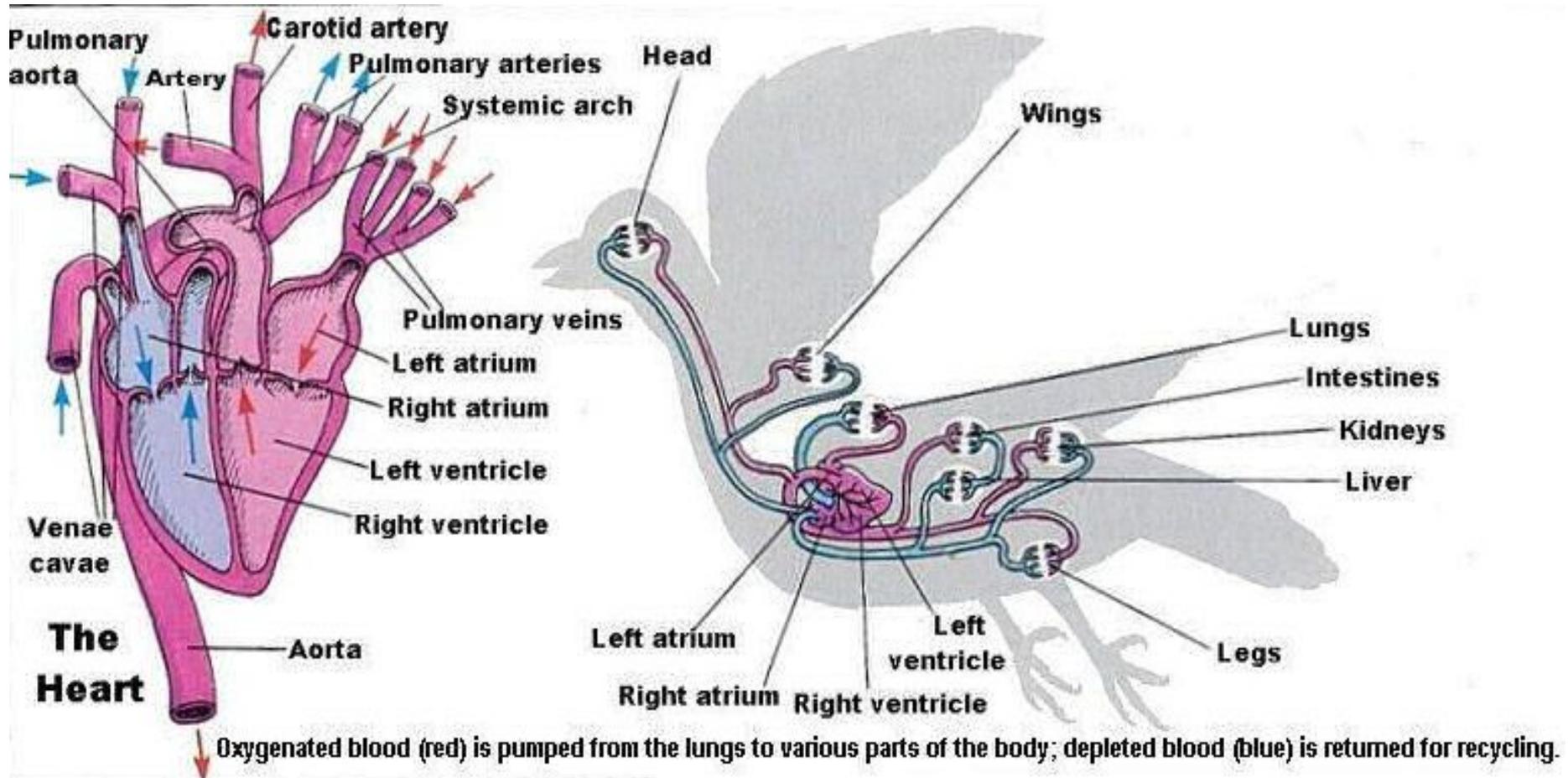
Звукопроводящий аппарат

Из 3 косточек (наковальня,
Молоточек, стремечко)





У птиц одна дуга аорты - правая (несет артериальную кровь)
У млекопитающих одна дуга аорты - левая (несет артериальную кровь).







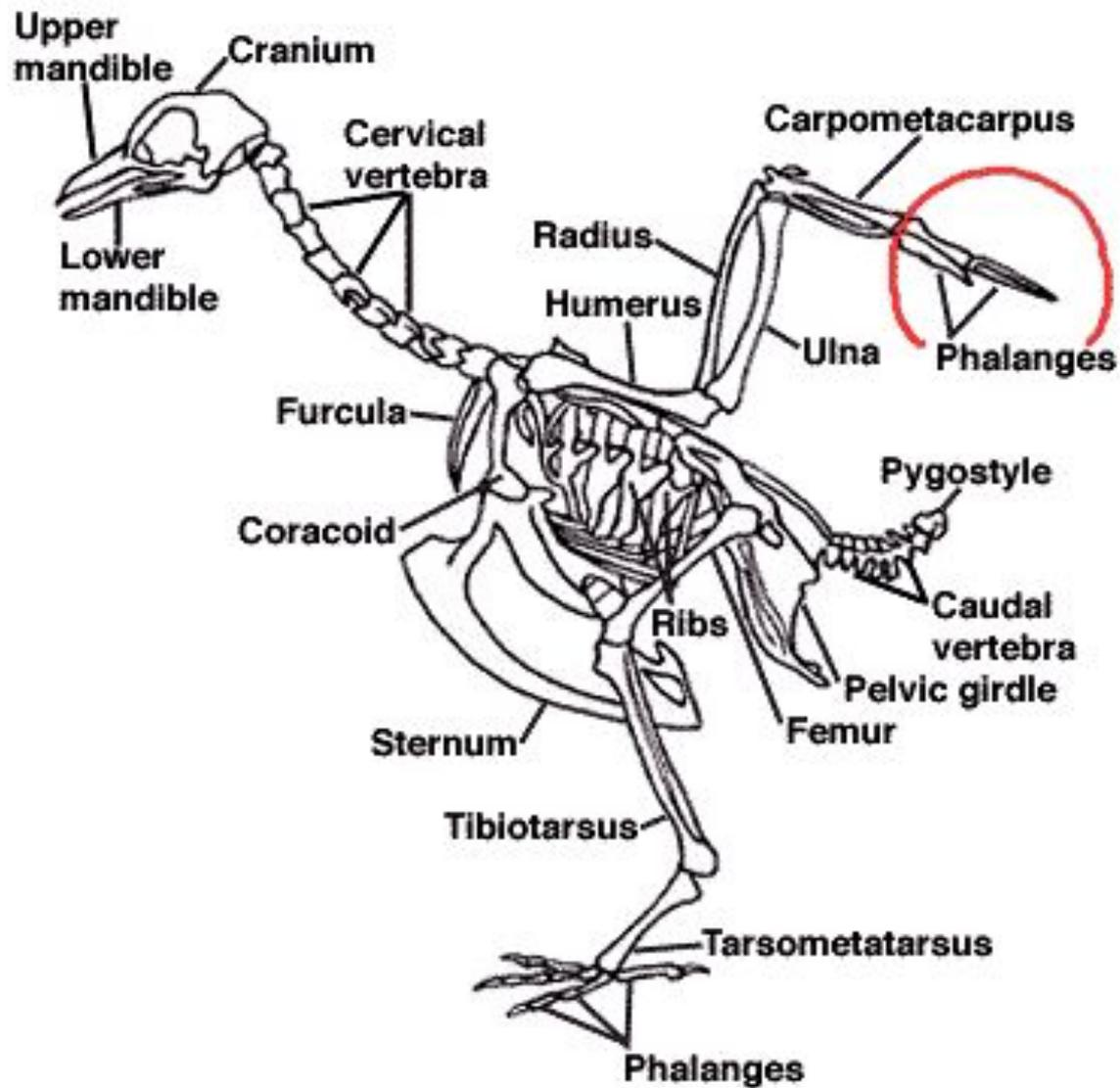
Птицы

4-камерное сердце

Облегченные кости, воздушные полости в костях

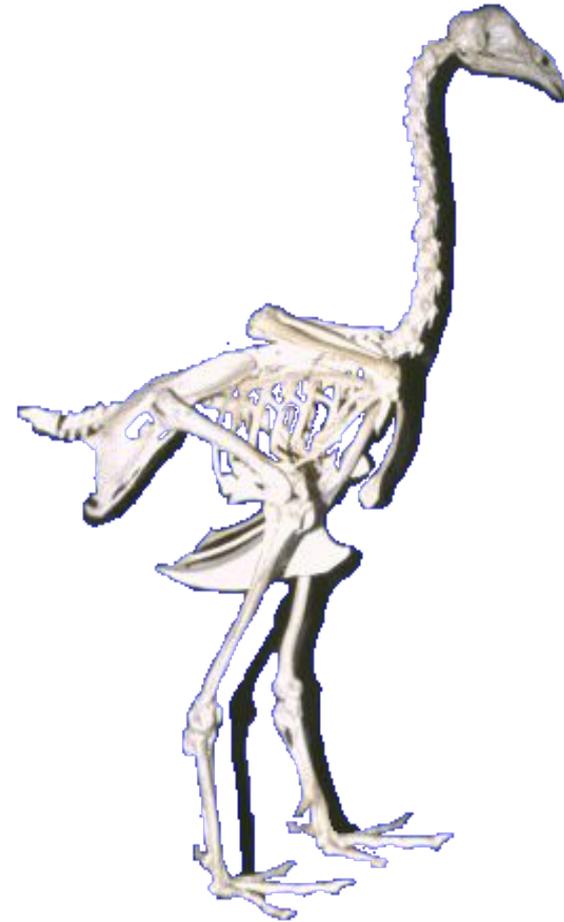
Воздушные мешки между мышцами

Двойное дыхание



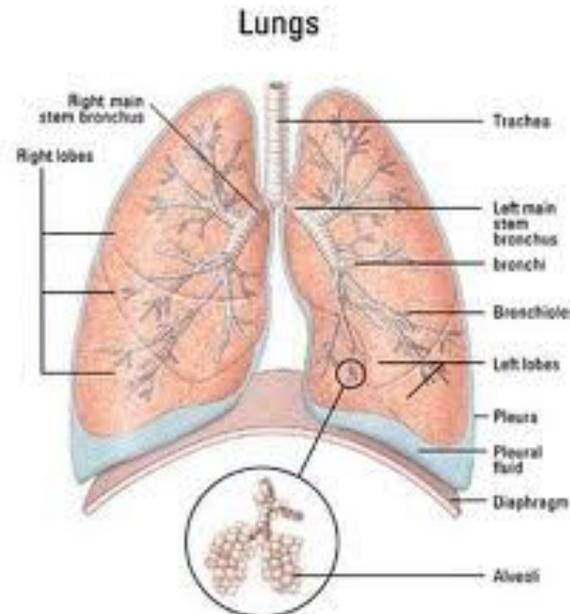
Skeletons and Muscles

- Combine lightness and strength
- Bones are thin and Hallow
- The fused bones of the trunk and hip vertebras and the pectoral and pelvic girdles
- Fused bones form a sturdy frame that anchors the powerful breast muscles during flight and supports the muscles when a bird is walking or at rest.



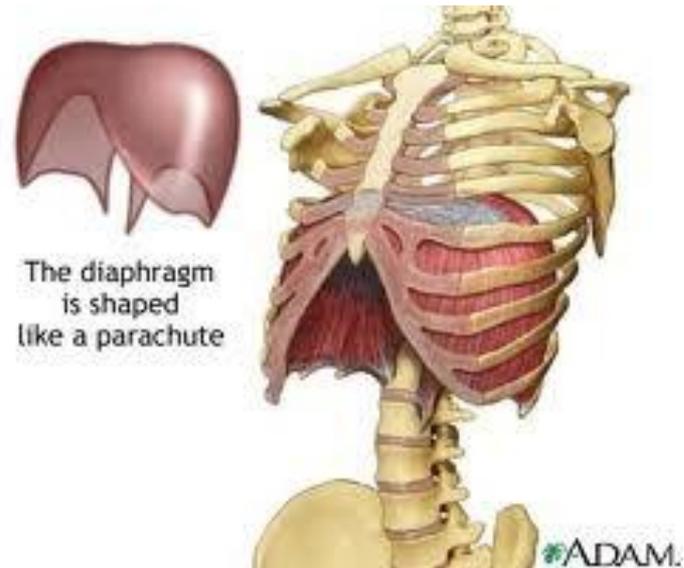
Дыхательная система

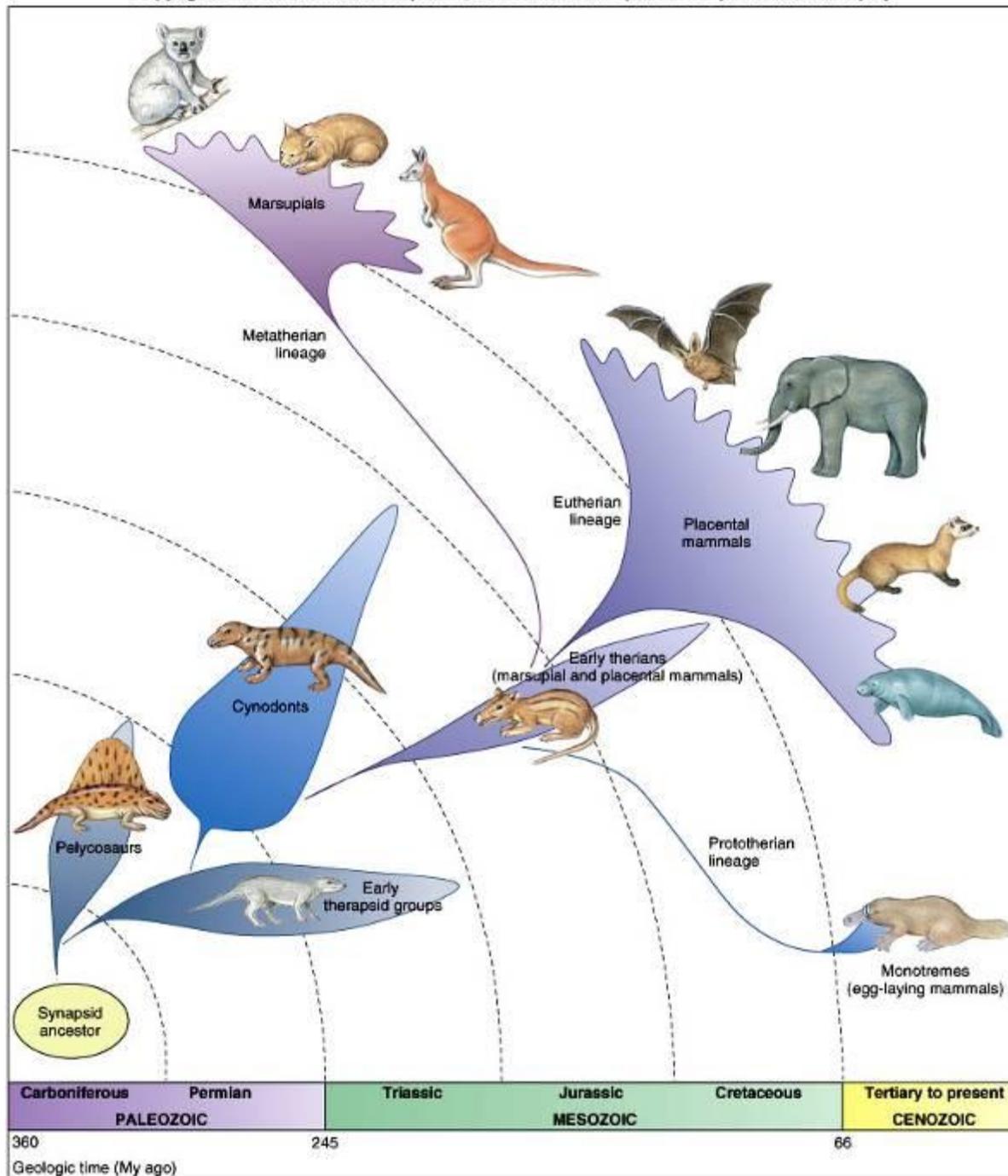
- Площадь поверхности легких млекопитающих больше, чем у птиц и рептилий
- За каждый вдох млекопитающее может получить больше кислорода и отдать больше углекислого газа



Дыхательная система

- Млекопитающие имеют диафрагму
 - Диафрагма – это мышечная перегородка, отделяющая грудную и брюшную полость
 - При сокращении диафрагмы объем грудной полости увеличивается и воздух поступает в легкие





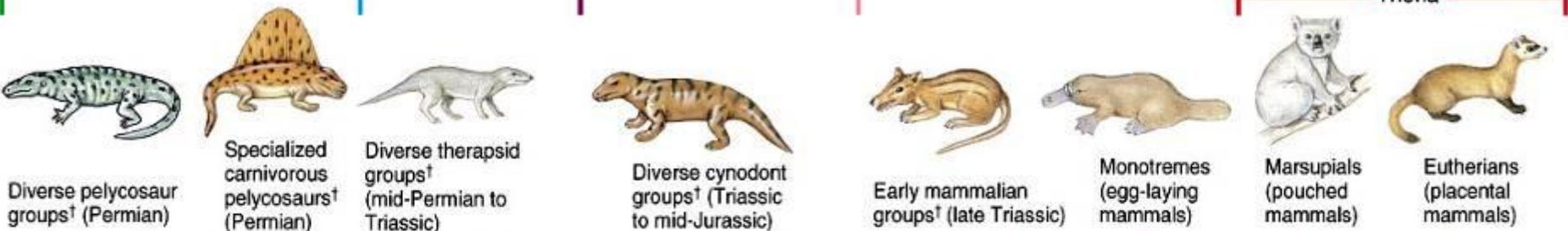
Synapsida

Therapsida

Cynodonta

Mammalia

Theria



Diverse pelycosaur groups† (Permian)

Specialized carnivorous pelycosaur† (Permian)

Diverse therapsid groups† (mid-Permian to Triassic)

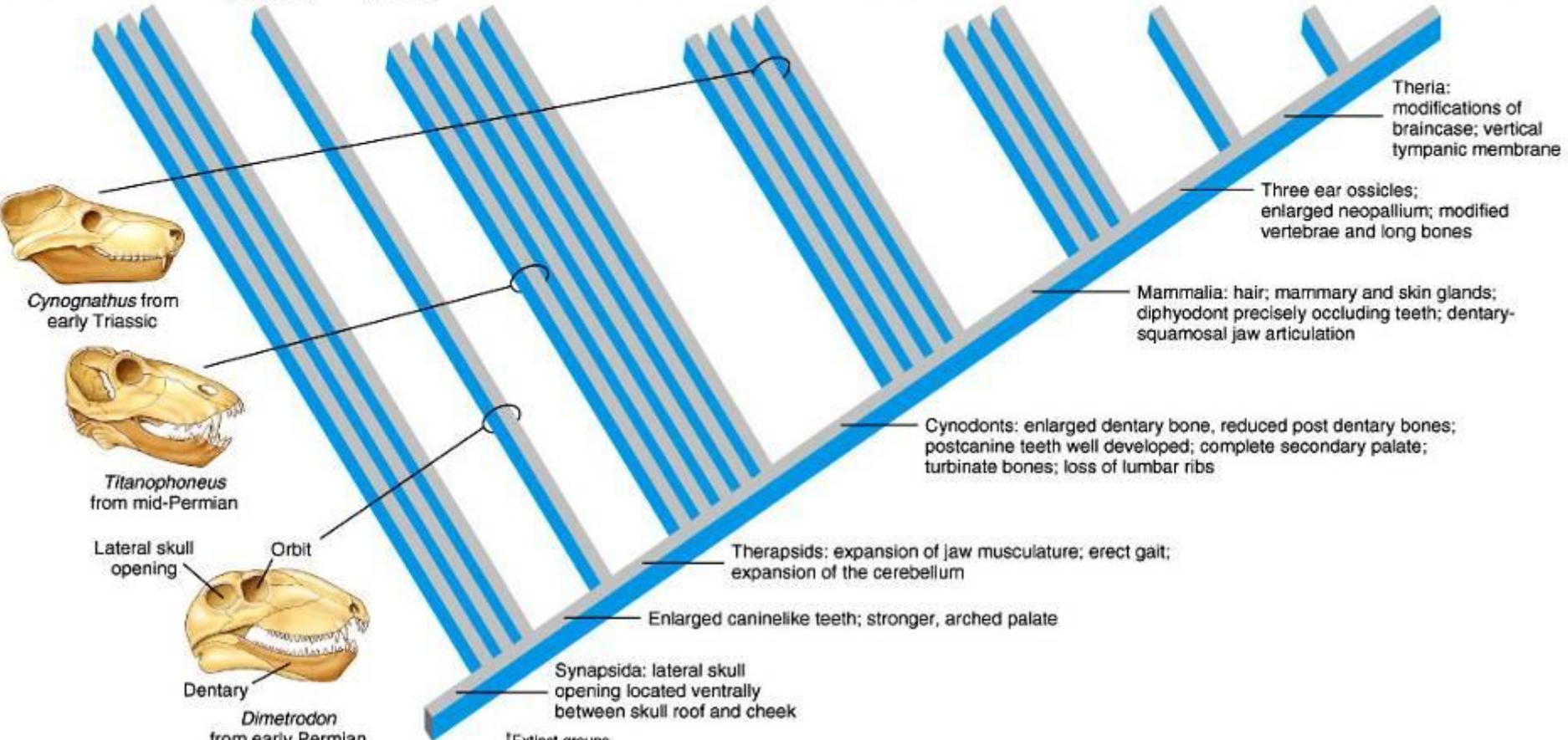
Diverse cynodont groups† (Triassic to mid-Jurassic)

Early mammalian groups† (late Triassic)

Monotremes (egg-laying mammals)

Marsupials (pouched mammals)

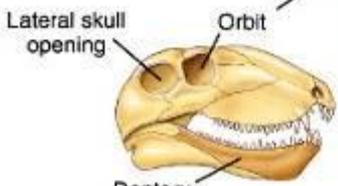
Eutherians (placental mammals)



Cynognathus from early Triassic



Titanophoneus from mid-Permian



Dimetrodon from early Permian

Theria: modifications of braincase; vertical tympanic membrane

Three ear ossicles; enlarged neopallium; modified vertebrae and long bones

Mammalia: hair; mammary and skin glands; diphyodont precisely occluding teeth; dentary-squamosal jaw articulation

Cynodonts: enlarged dentary bone, reduced post dentary bones; postcanine teeth well developed; complete secondary palate; turbinate bones; loss of lumbar ribs

Therapsids: expansion of jaw musculature; erect gait; expansion of the cerebellum

Enlarged caninelike teeth; stronger, arched palate

Synapsida: lateral skull opening located ventrally between skull roof and cheek

† Extinct groups

Mammal Taxonomy

- Class Mammalia
 - Subclass Prototheria
 - Order Monotremata

Ехидна
Tachyglossus
aculeatus



УТКОНОС

long beaked echidna
Zaglossus
bruijni



Mammal Taxonomy

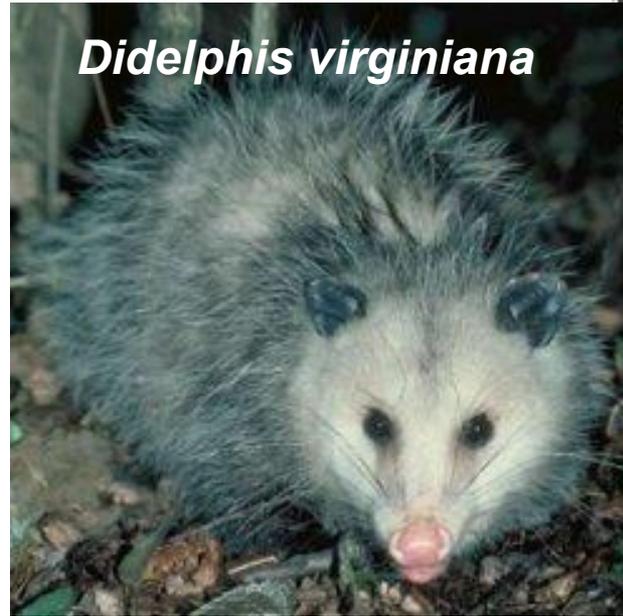
- Class Mammalia
 - Subclass Theria
 - Infraclass Metatheria
 - Order Marsupialia

Koala



Possum

Didelphis virginiana



Kangaroo



Tasmanian Devil

Mammal Taxonomy

Order Tubulidentata

- Class Mammalia

- Subclass Theria

- Infraclass Eutheria

- Order Rodentia
- Order Chiroptera
- Order Insectivora
- Order Carnivora
- Order Primates
- Order Artiodactyla
- Order Lagomorpha
- Order Cetacea
- Order Perissodactyla
- Order Sirenia
- Order Proboscidea

Order Pholidota



Pangolin



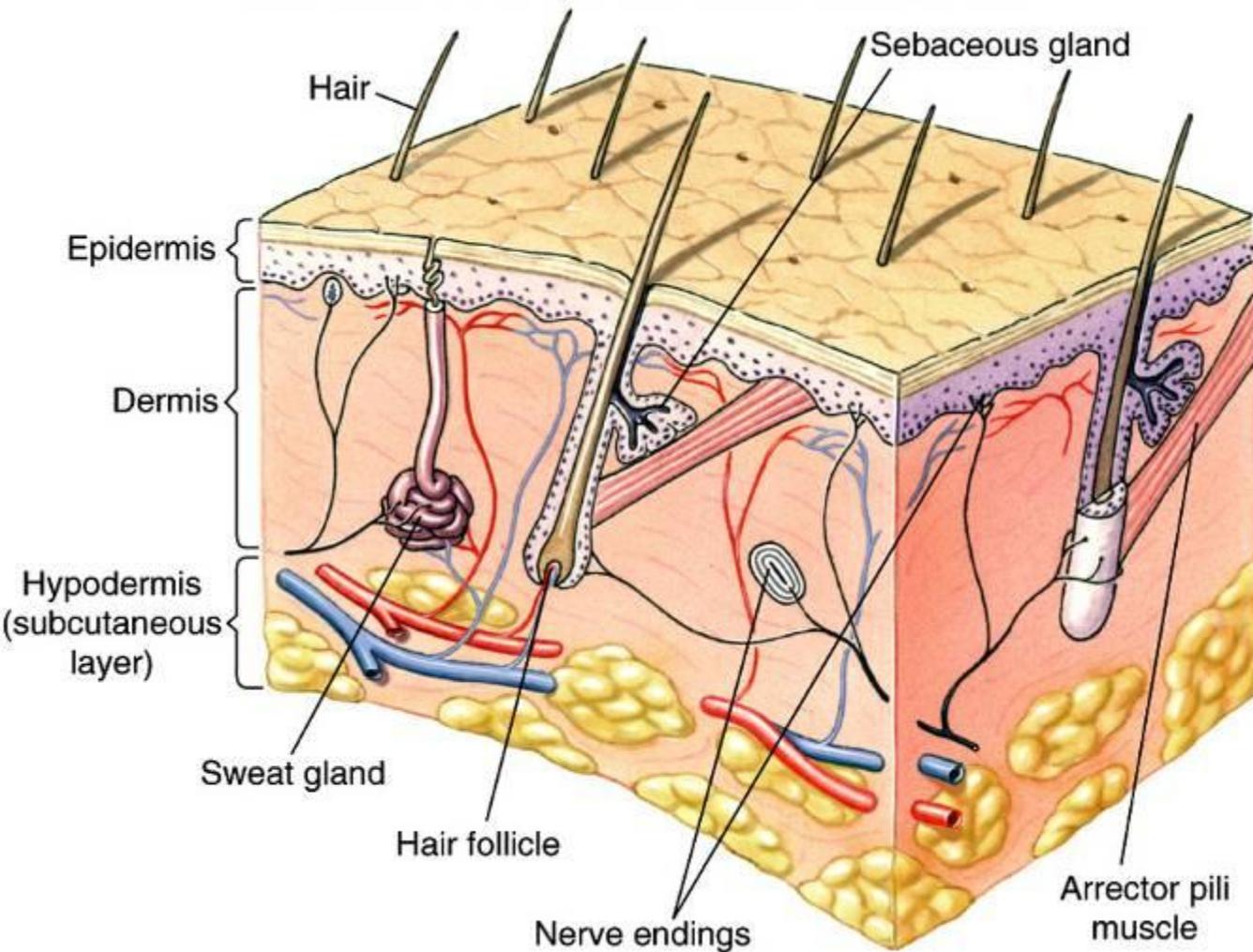
Hyrax



Order Xenartha

Order Hyracoidea

Покровы и железы млекопитающих



- Сальные
- Потовые
- Млечные
- Пахучие

Mammary Glands



Млечные железы



Мех



- Мех
 - Подшерсток
 - Остевой волос
- 1 или 2 линьки в год

Рога



Рога костные



A



B

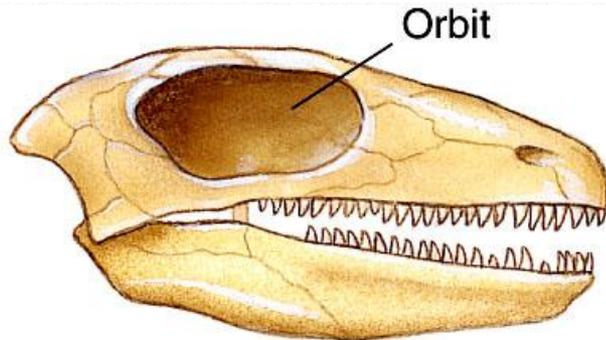


C

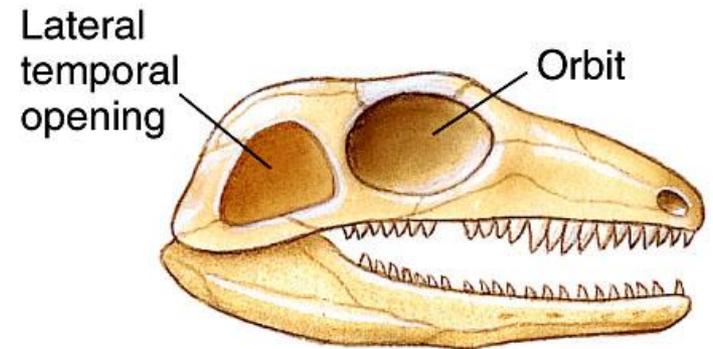


D

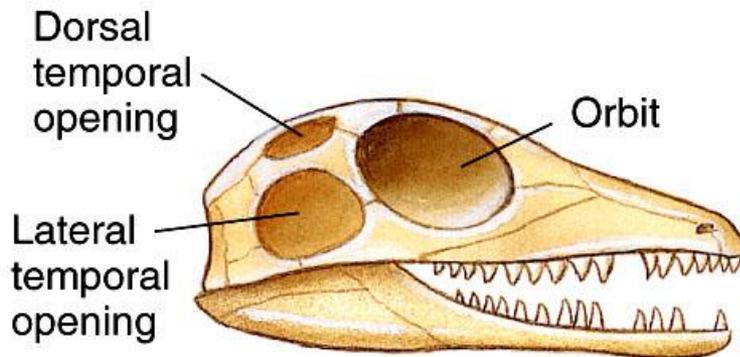
Череп млекопитающих



A Anapsid

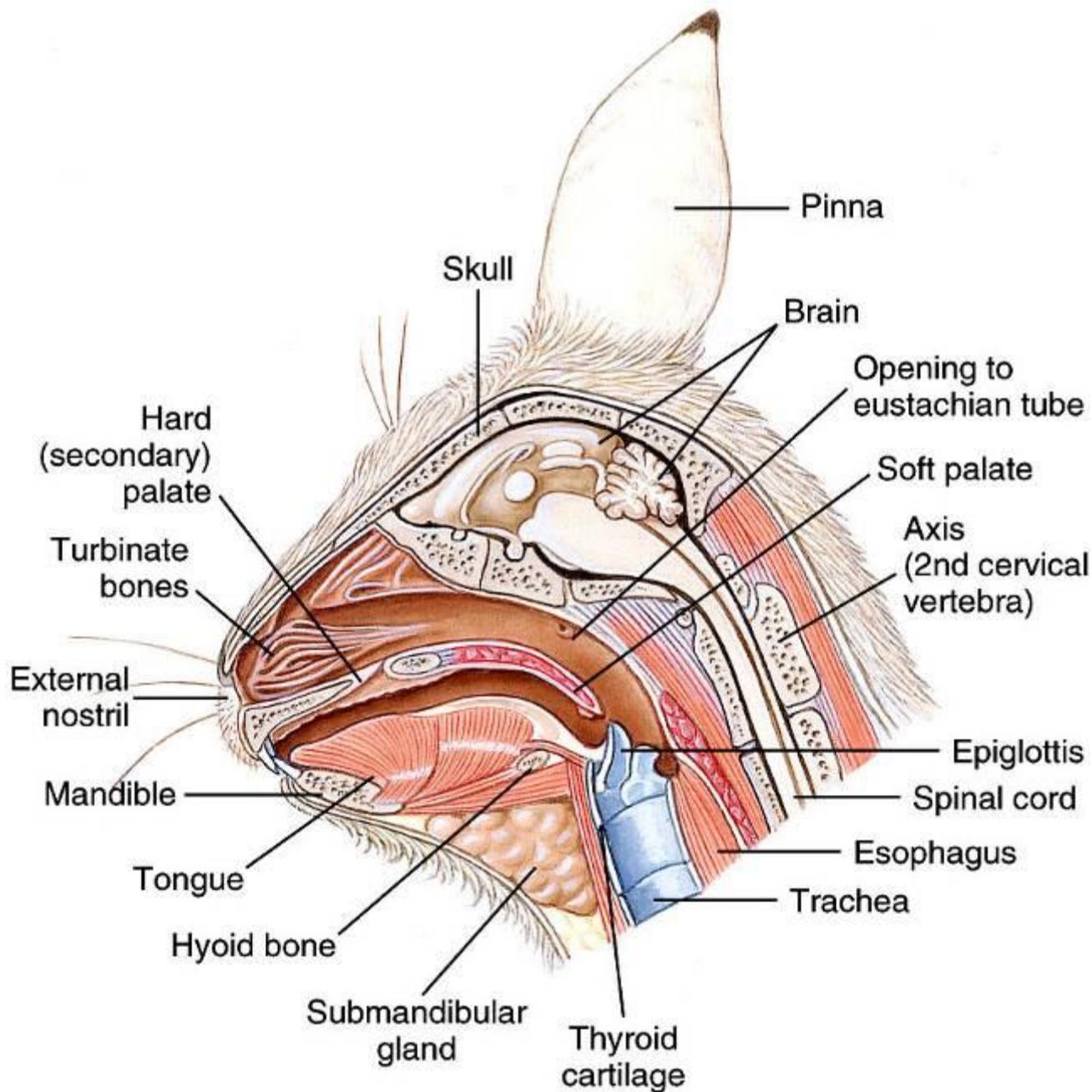


B Synapsid

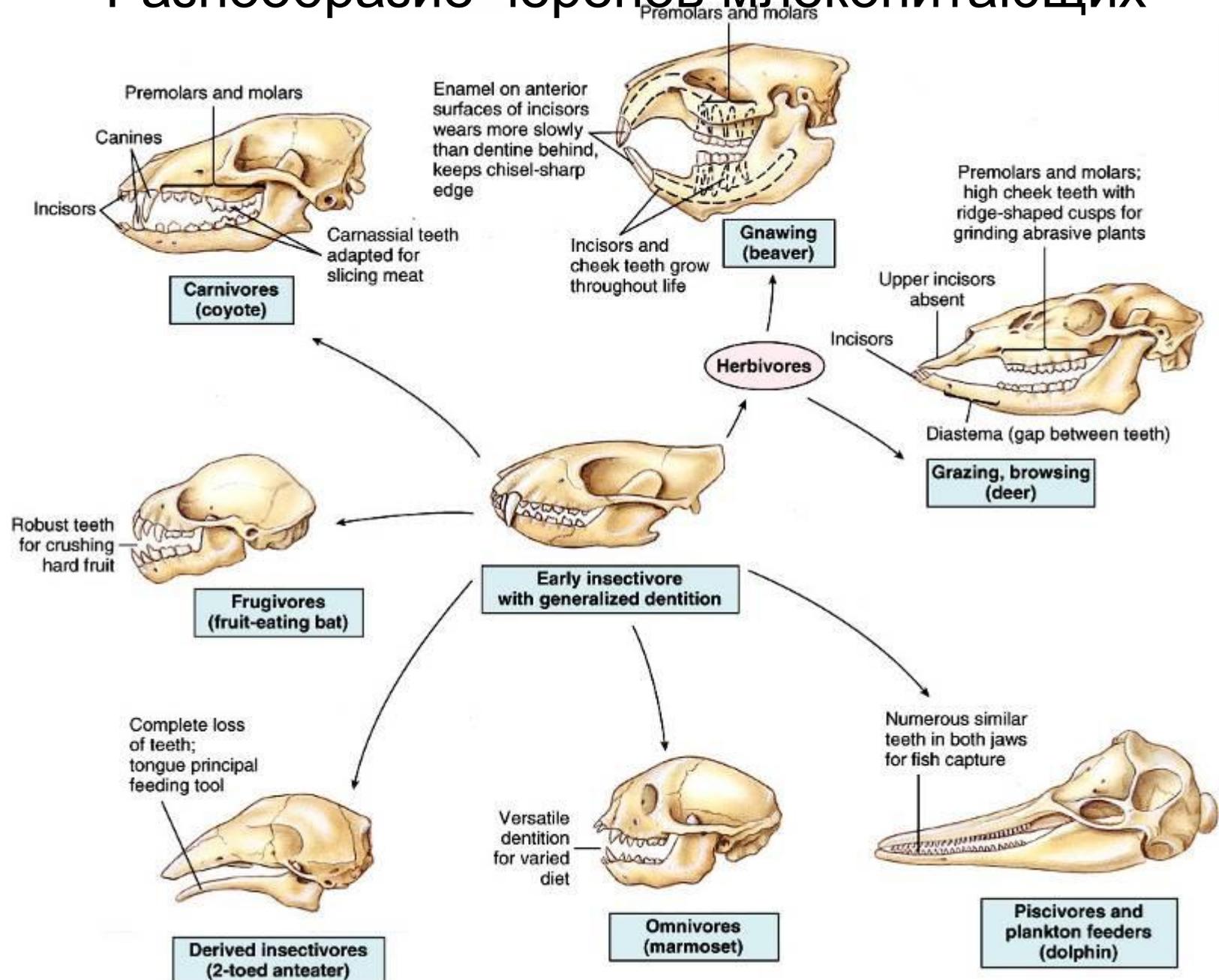


C Diapsid

Формирование твердого неба

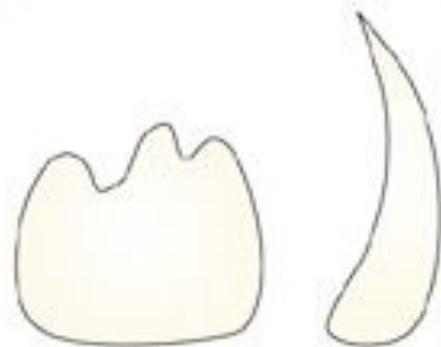
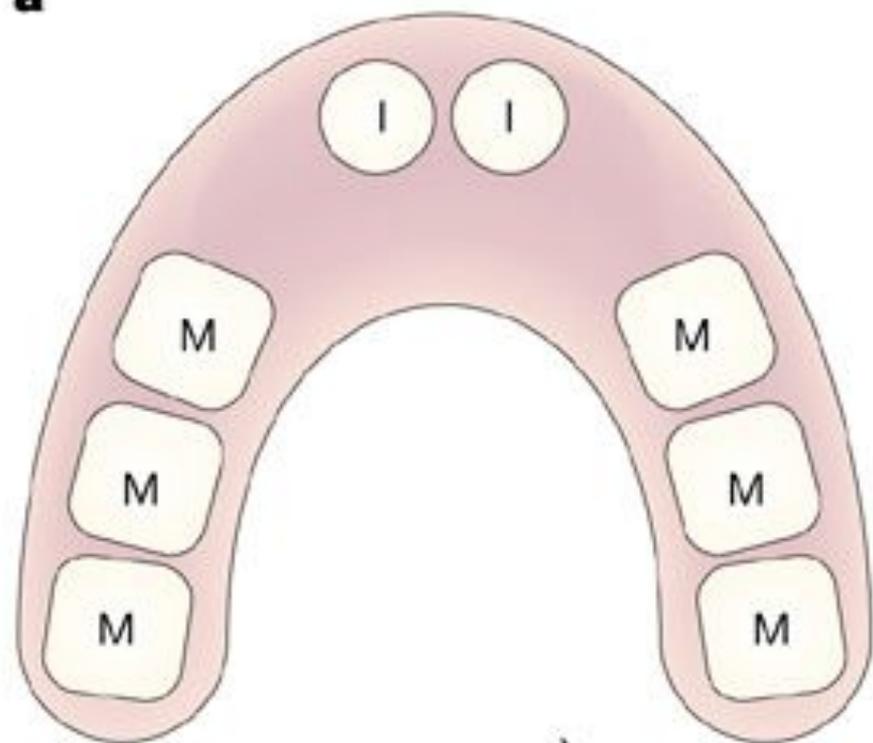


Разнообразие черепов млекопитающих

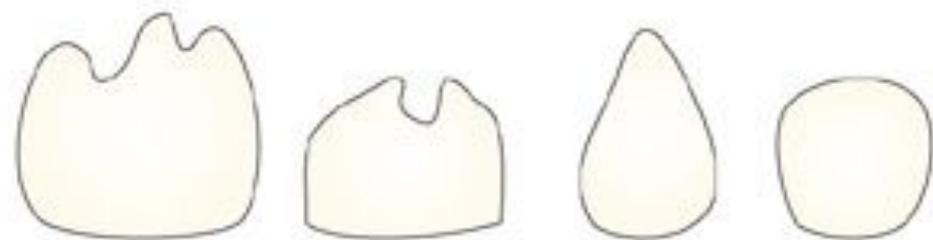
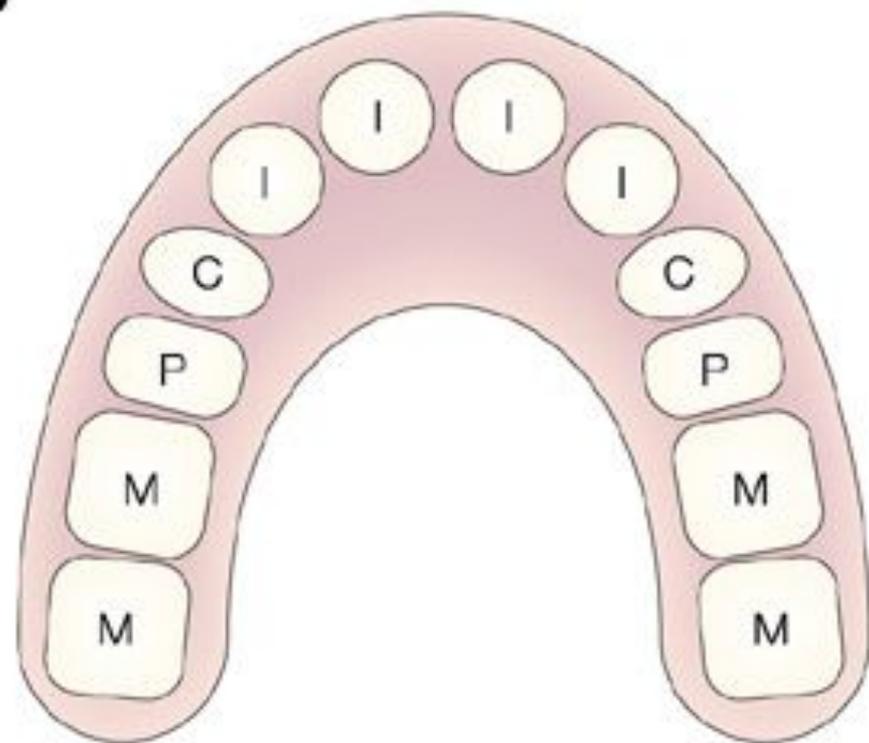


Зубы

- 2 набора
 - Молочные
 - Постоянные
- Грызуны и зайцеобразные
 - Зубы постоянно растут

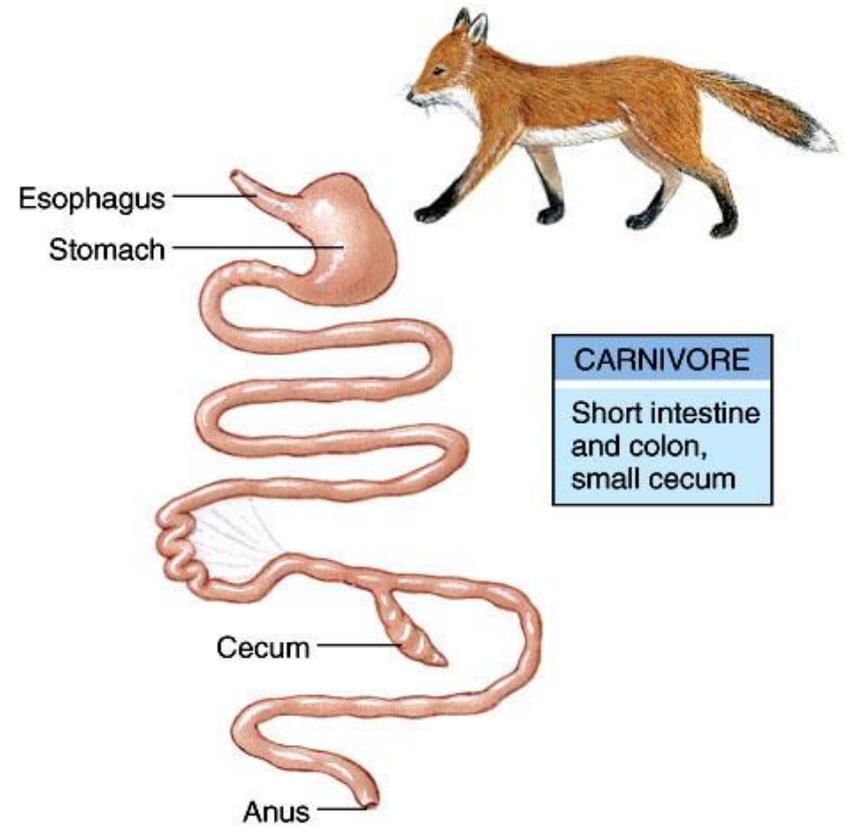
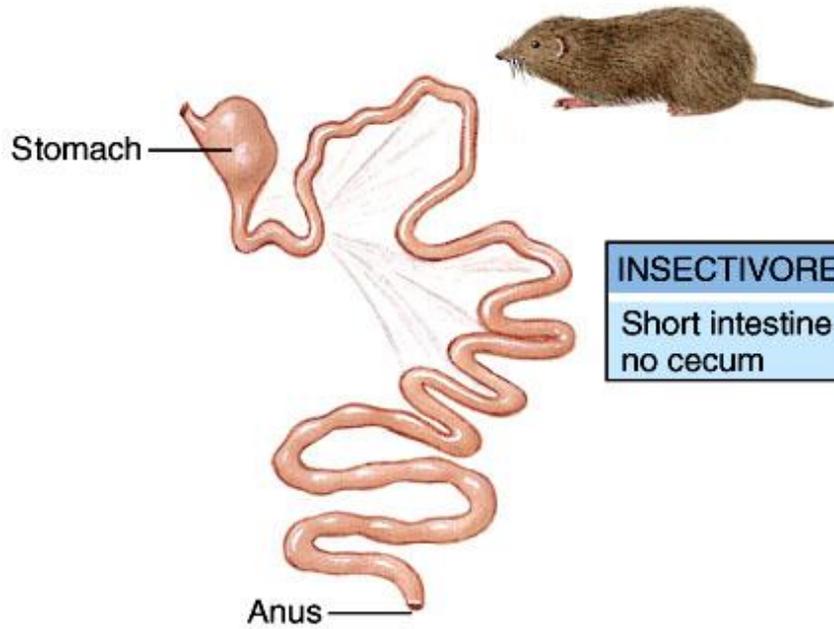
a

Molar (M) Incisor (I)

b

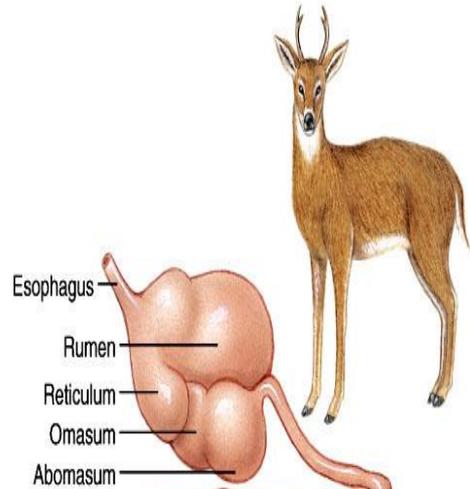
Molar (M) Premolar (P) Canine (C) Incisor (I)

Пищеварительный тракт плотоядных

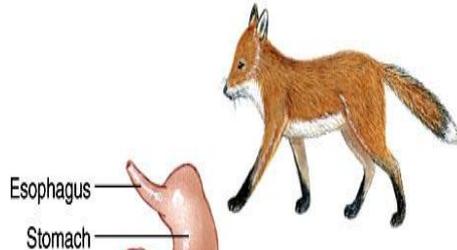


Пищеварительный тракт травоядных

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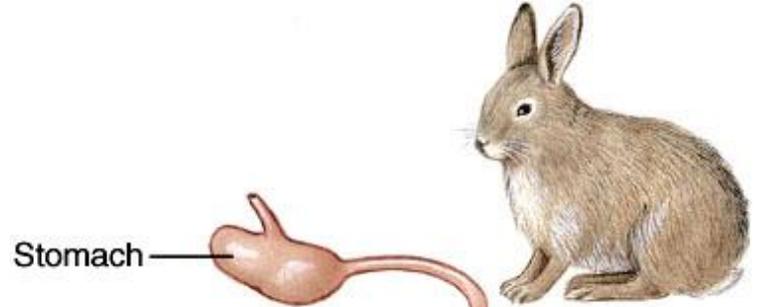
RUMINANT HERBIVORE
Жвачные травоядные
 stomach with large rumen; long small and large intestine



CARNIVORE
 Short intestine and colon, small cecum

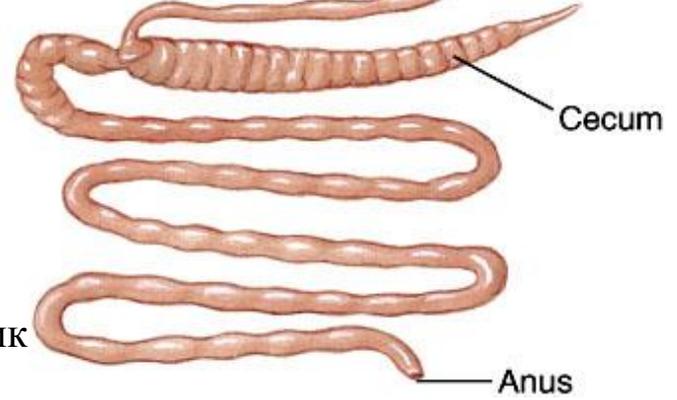
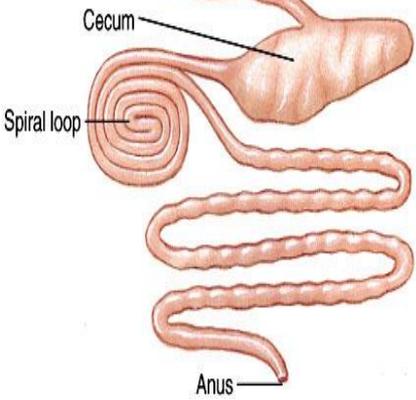
4-камерный Желудок с рубцом,
 Длинный тонкий И толстый кишечник

Нежвачные травоядные



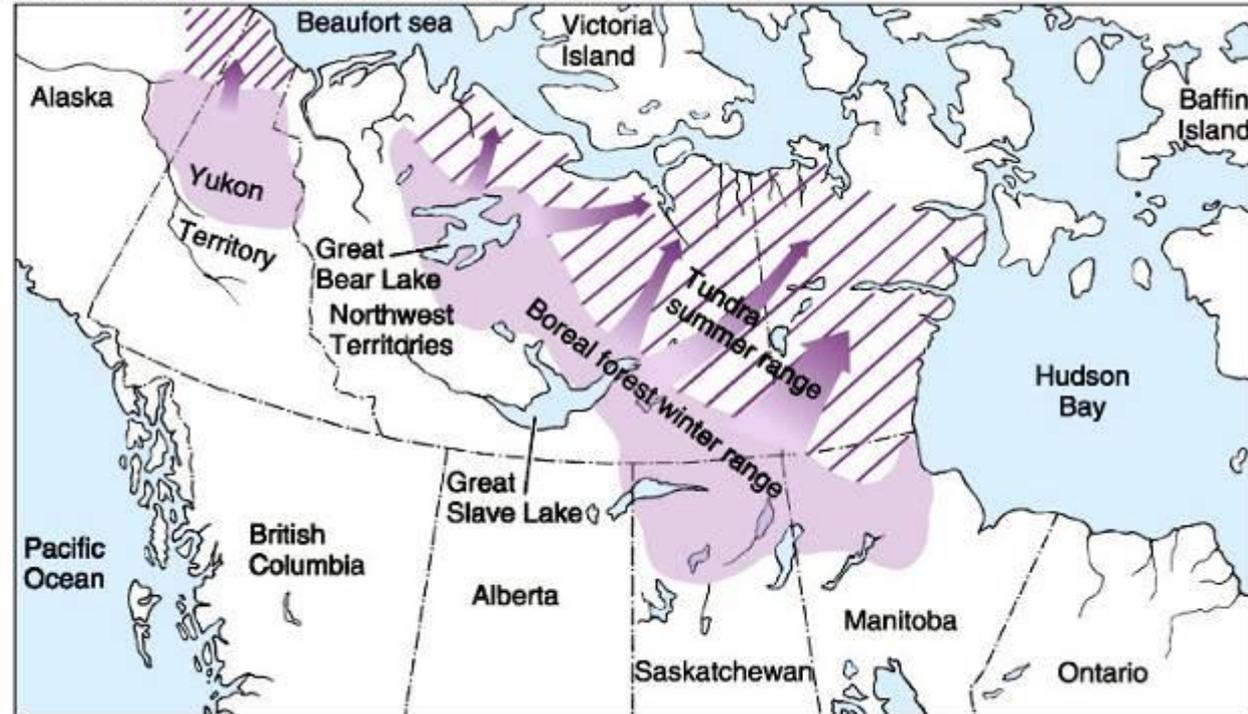
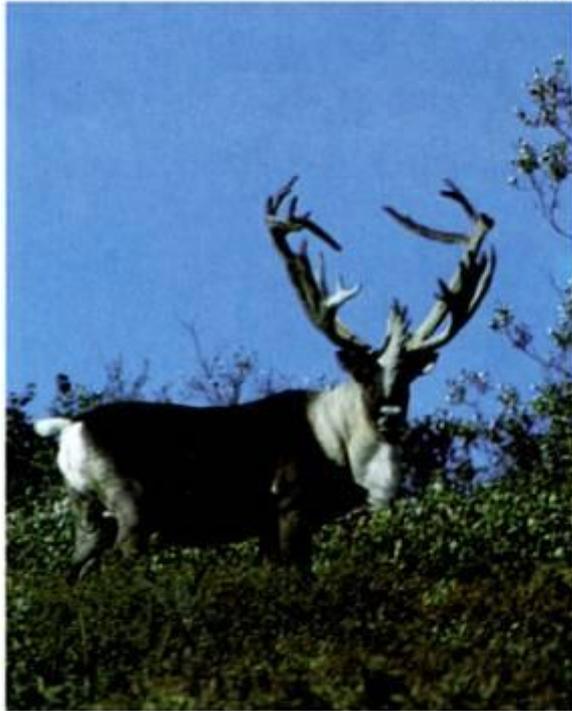
NONRUMINANT HERBIVORE
 Simple stomach, large cecum

Слепая кишка



Migratory Land Mammals

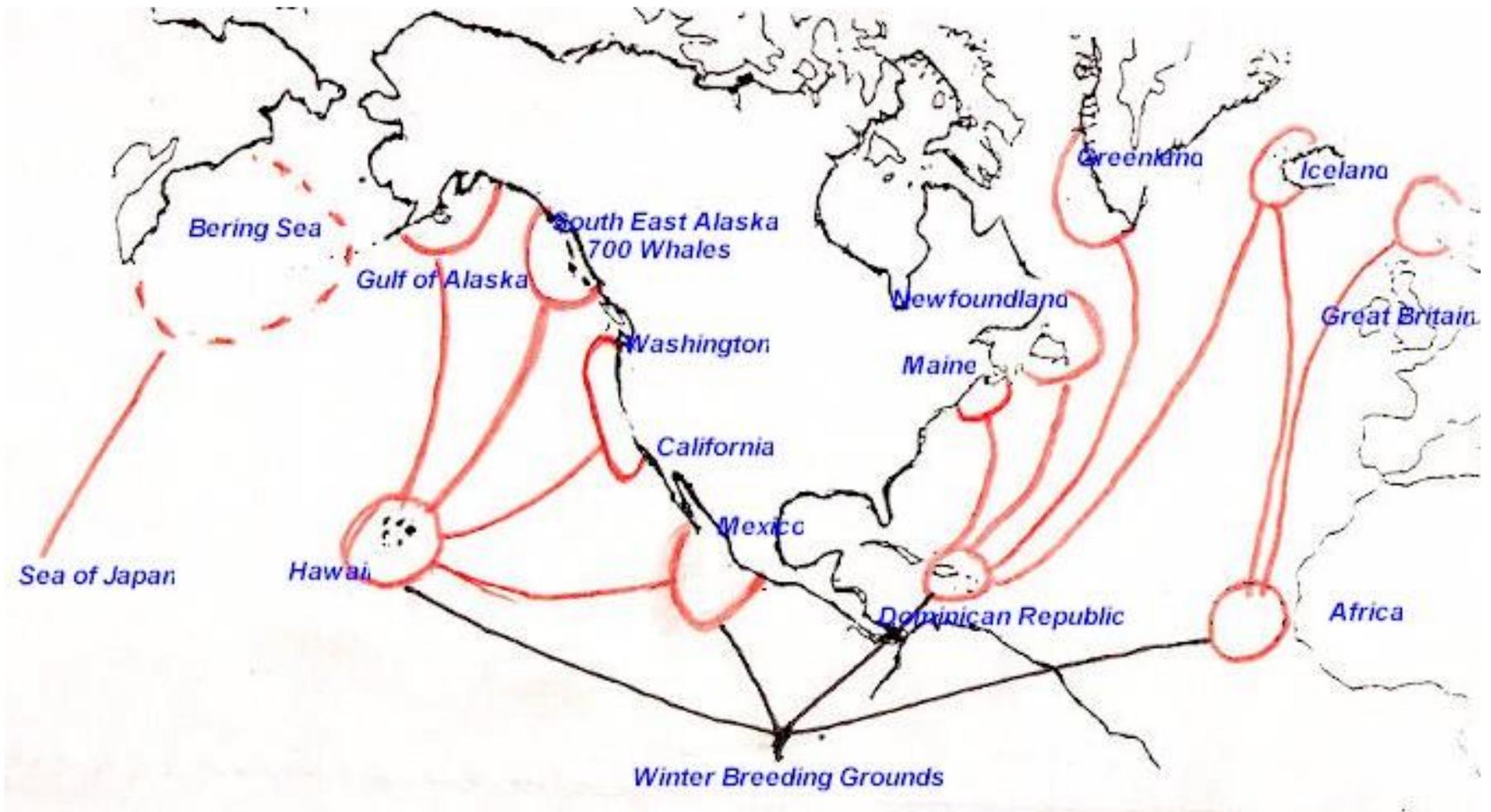
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A

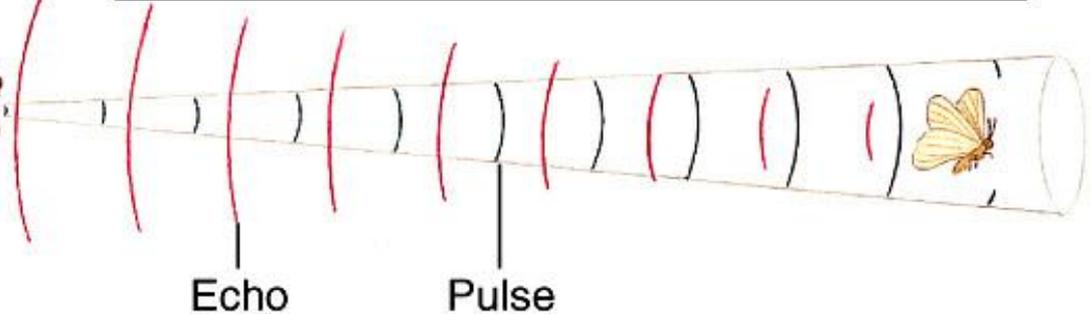
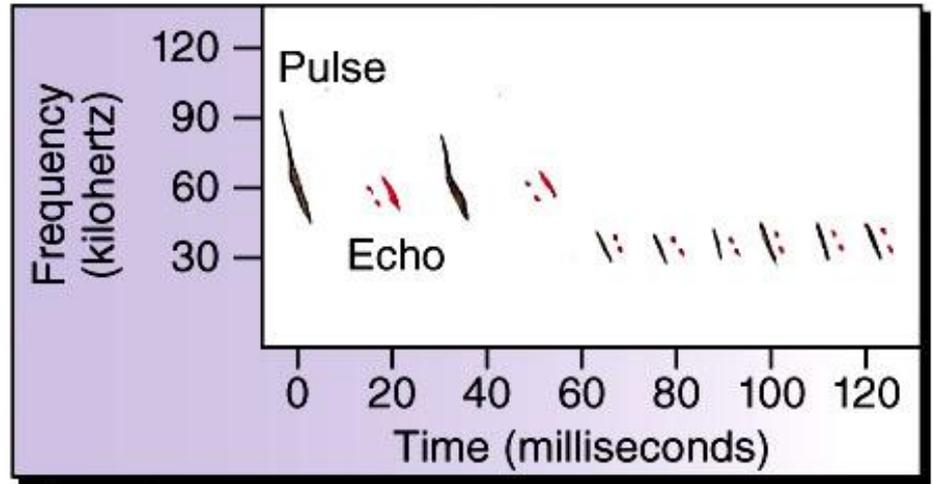
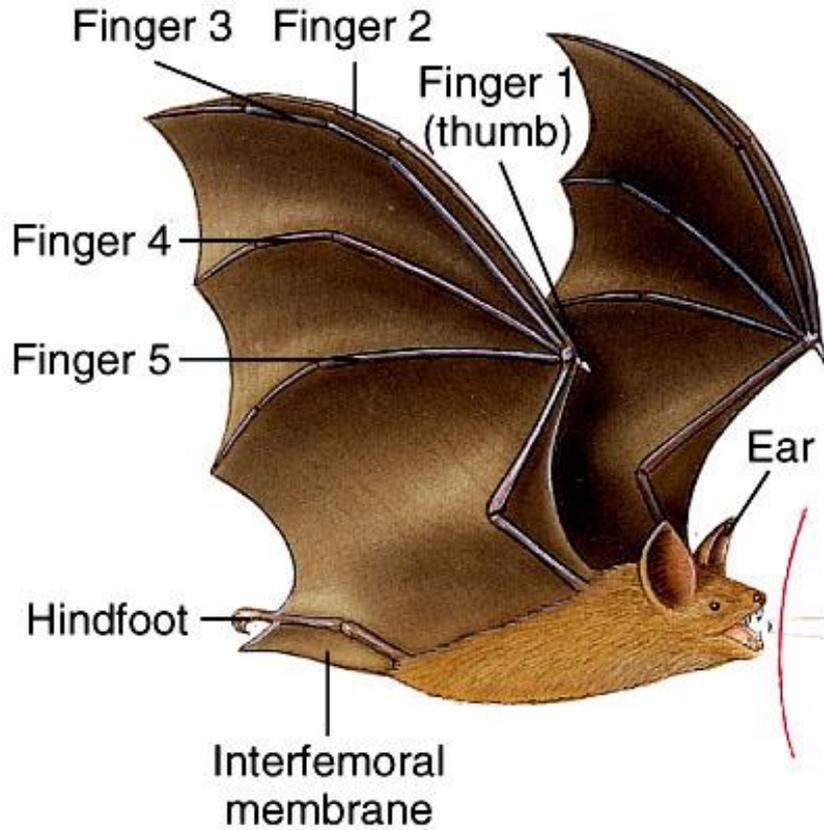
B

Migratory Sea Mammals



Sonar

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Размножение млекопитающих

- Prototherians (однопроходные)
 - Яйцекладущие
 - Вылупляются из яиц, но питаются молоком
- Metatherians (сумчатые)
 - Живородящие
 - Незрелый зародыш созревает в сумке и питается молоком

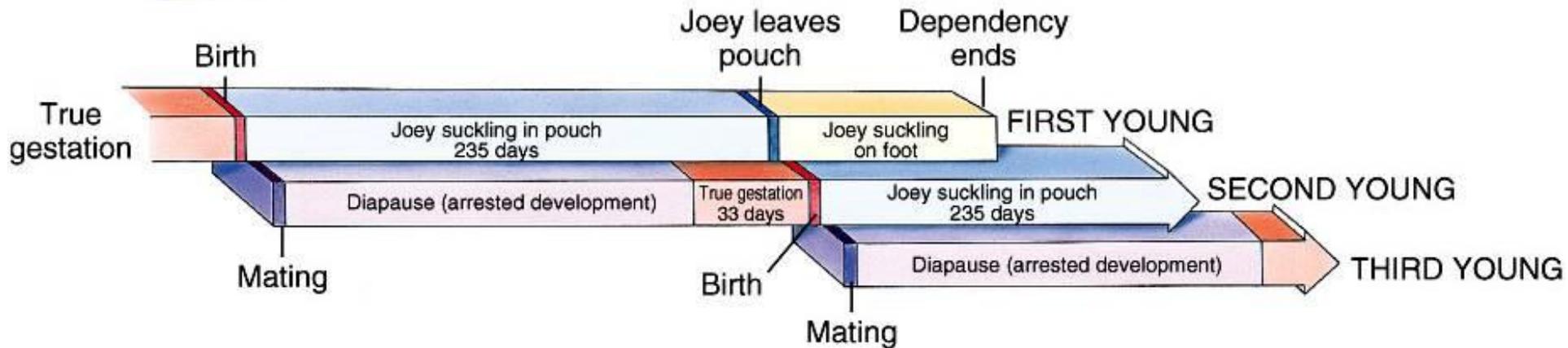
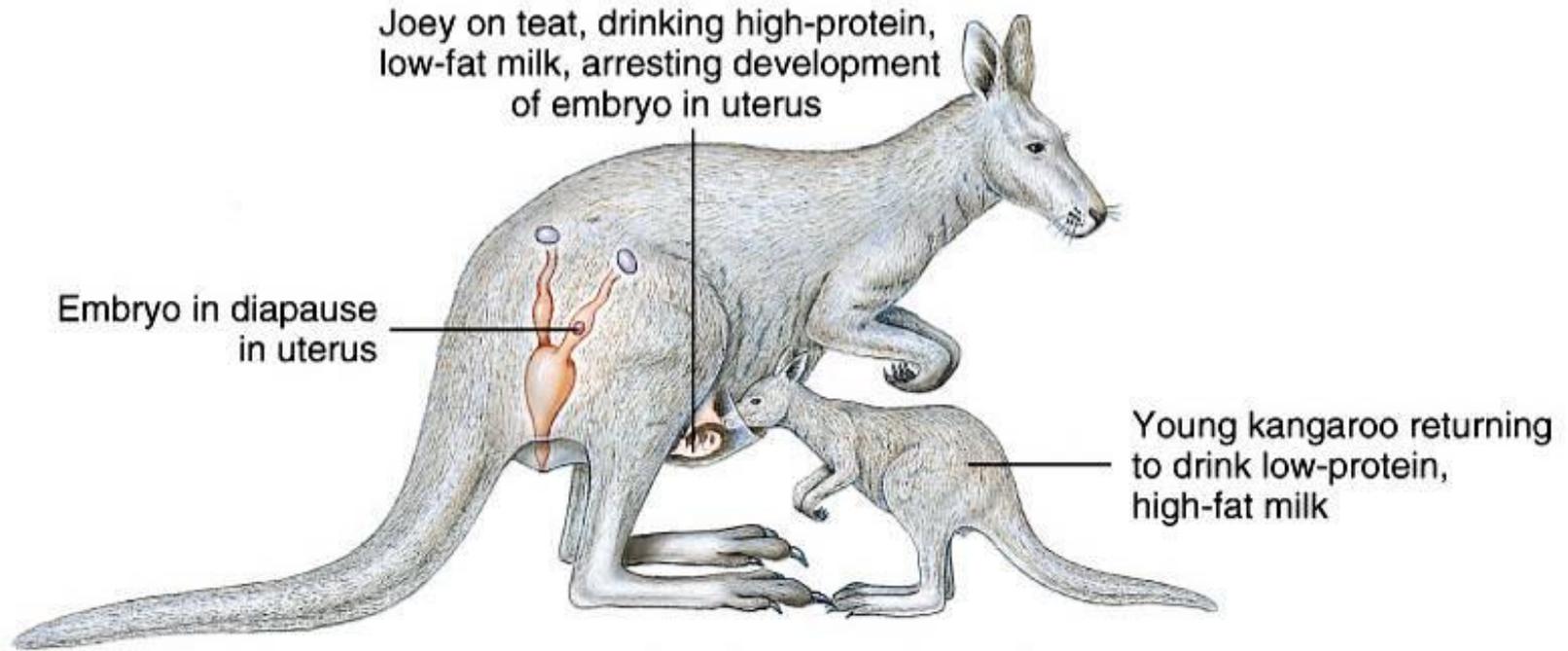
Eutherian (плацентарные)

- Живородящие
- Зрело-(копытные) и незрело (грызуны, хищные) рождающиеся детеныши
- Сосут материнское молоко

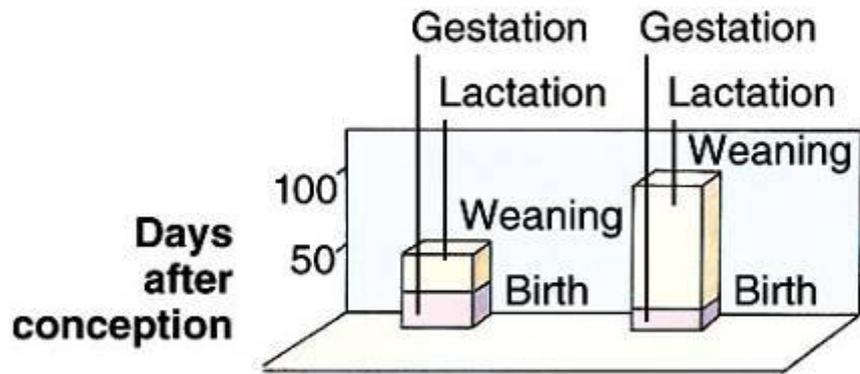
Reproductive Cycles

- Estrous cycle
 - Time of ovulation following a peak in estrogen production (estrus)
 - Monestrous
 - 1 ovulation period per year
 - Polyestrous
 - Multiple ovulation periods per year
- Menstrual cycle
 - Estrus followed by menstruation
 - Shedding of uterine lining
 - Only in humans, apes, & old world monkeys

Marsupial Reproductive Cycles



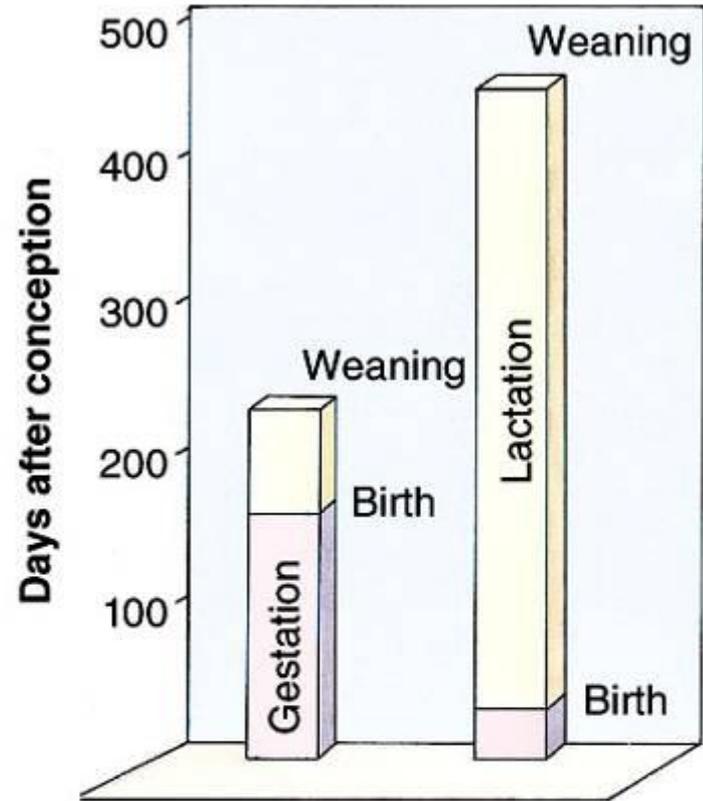
Gestational & Lactational Differences between Marsupials & Mammals



Southern grasshopper mouse



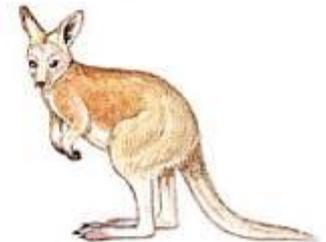
Marsupial mouse



Thompson gazelle



Wallaroo



Gestation Periods

- Large mammals (herbivores)
 - Longer gestations
 - Precocial newborns
- Small insectivores, rodents, carnivores
 - Shorter gestations
 - Altricial newborns
 - Sightless
 - Hairless

Domestication



Prosimian Primates



Hominidae



© 2001 MountainWerk's Photography

Human Taxonomy

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Class	Mammalia
Order	Primates
Family	Hominidae
Genus	<i>Homo</i>
Species	<i>sapiens</i>

Human Ancestral Lineages

