

# Origem e evolução

- Quem são os mamíferos?
- Quem são os primeiros?
- Linhagens
- Características dos atuais

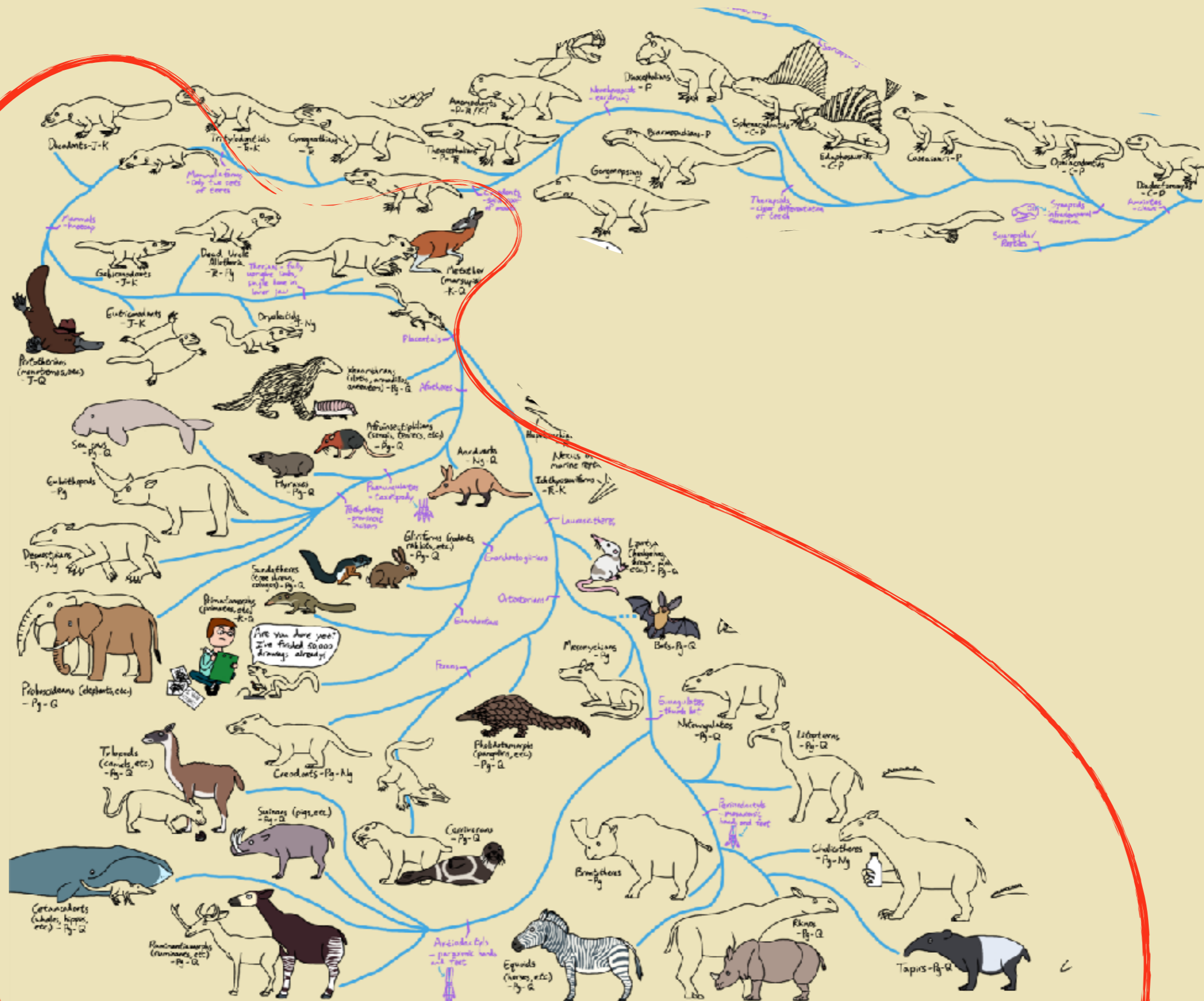






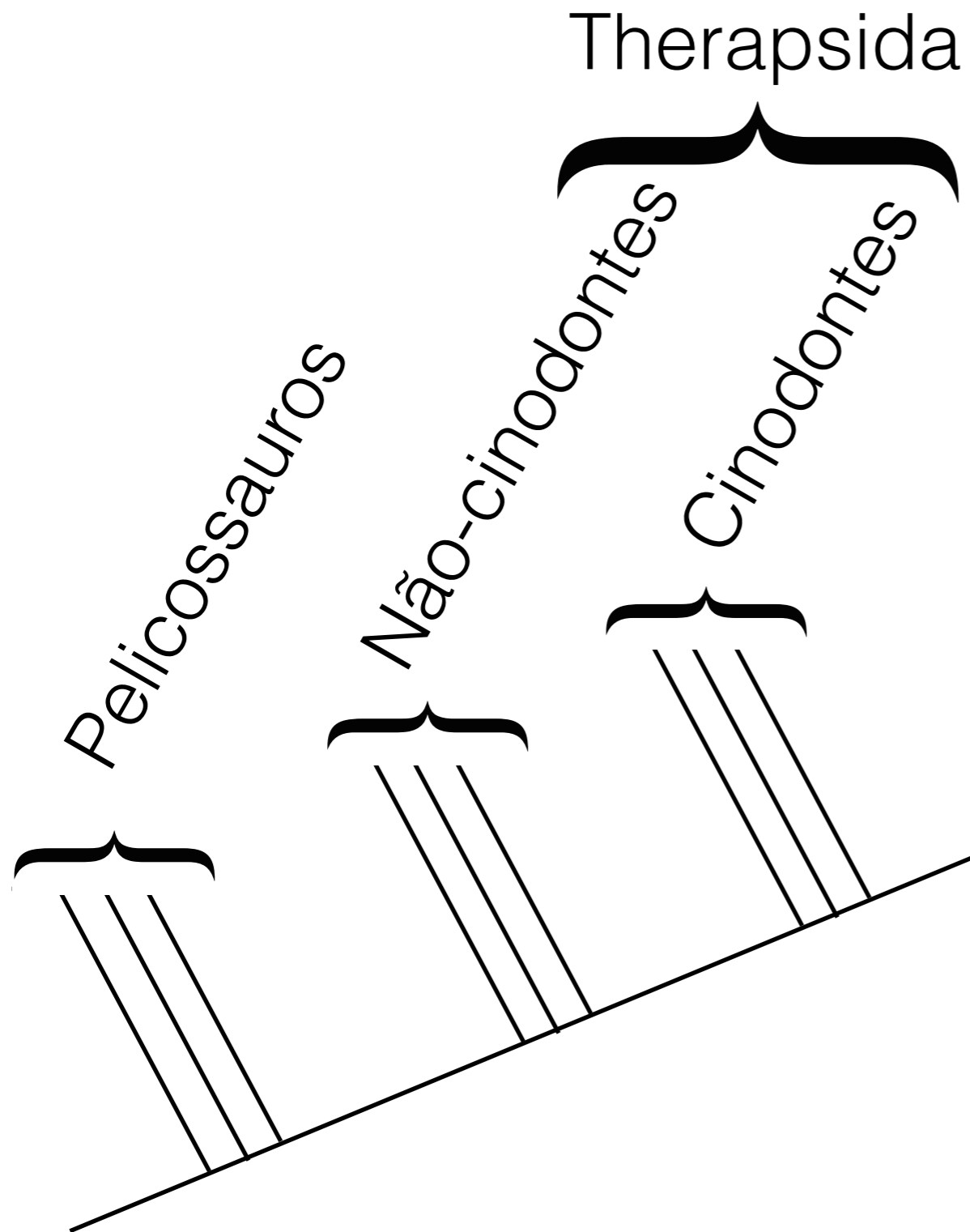


# Quem são os mamíferos?

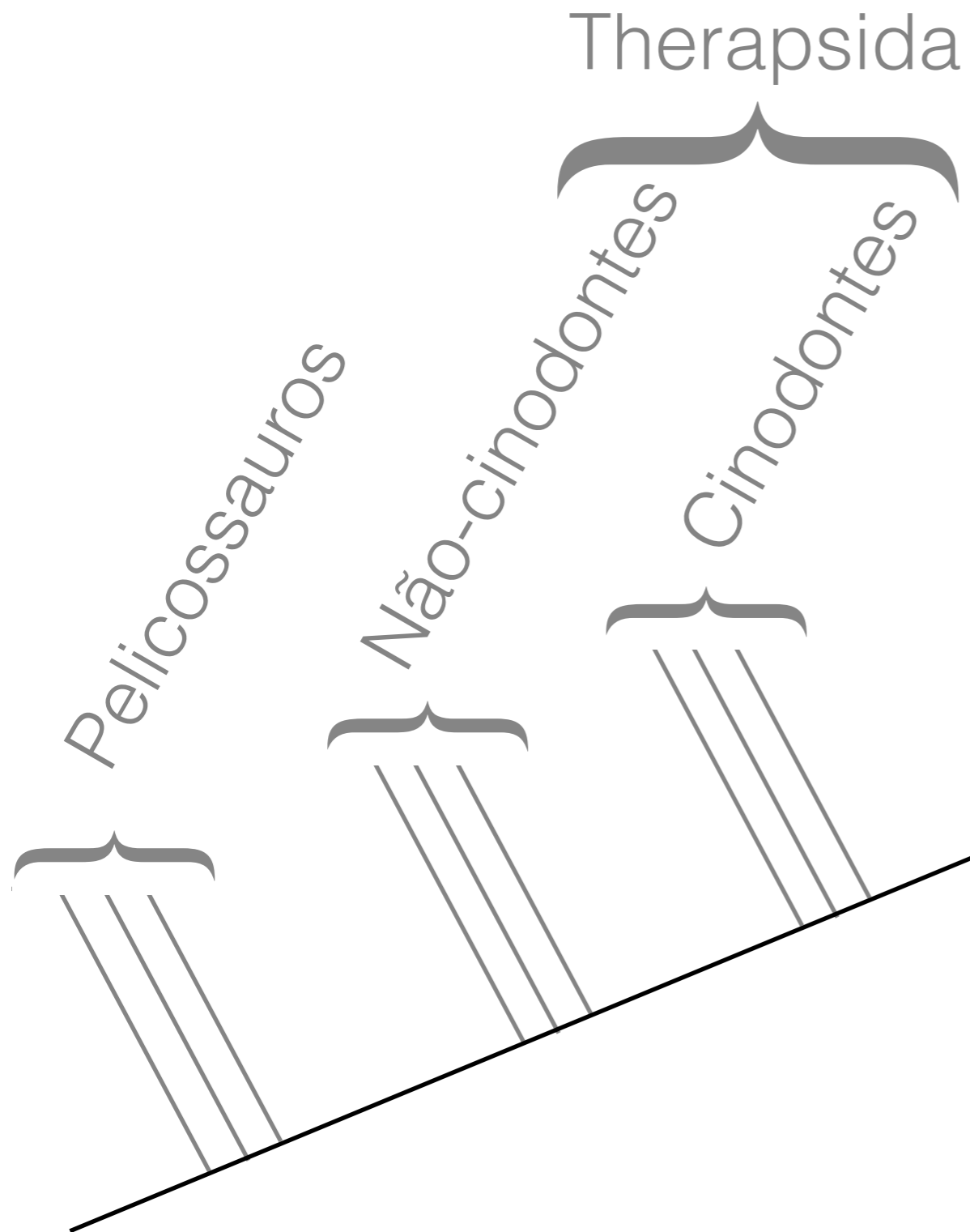




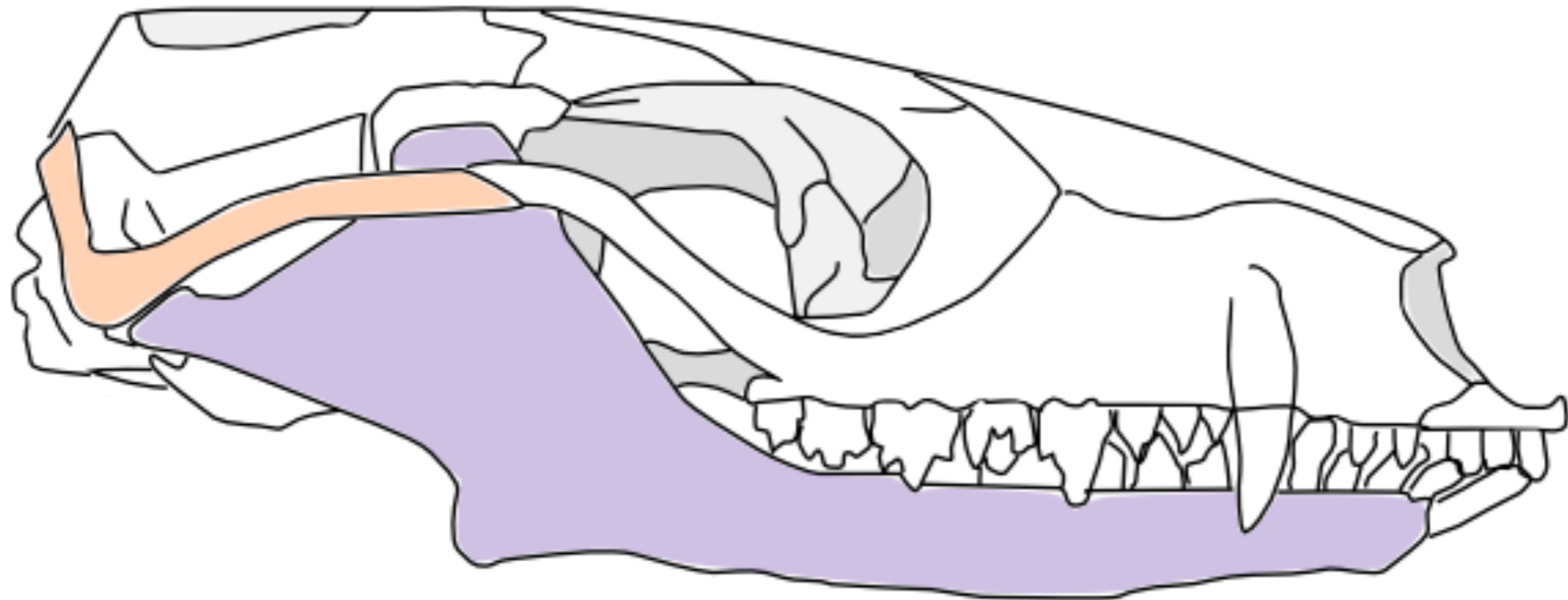
# Mamíferos



# Mamíferos



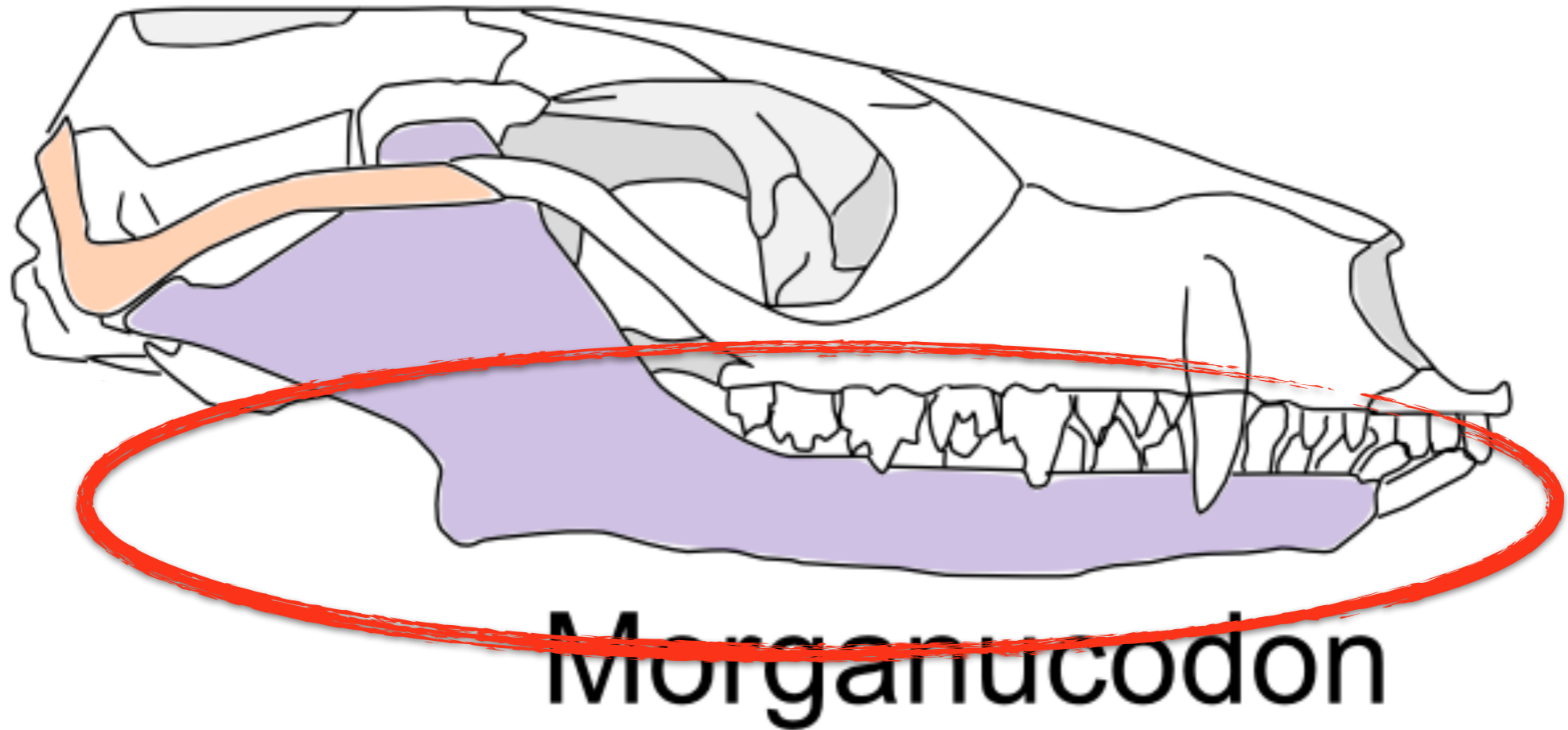
O que caracteriza um mamífero?



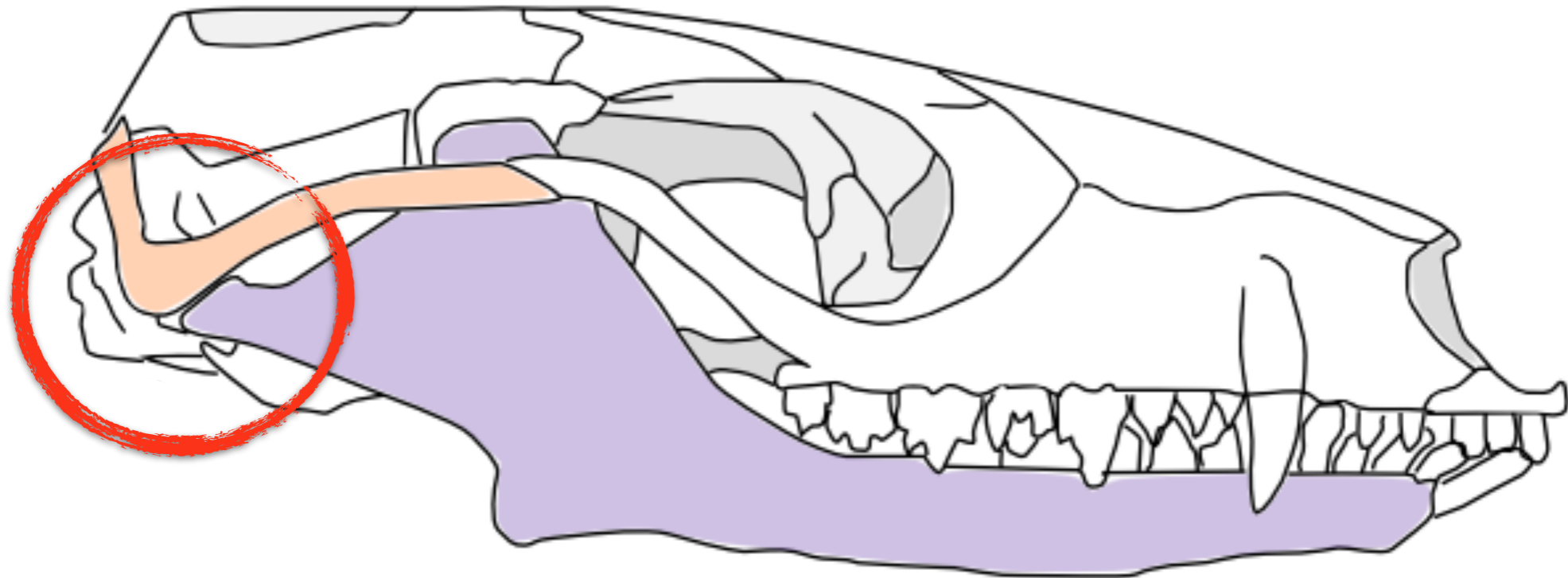
**Morganucodon**



O que caracteriza um mamífero?

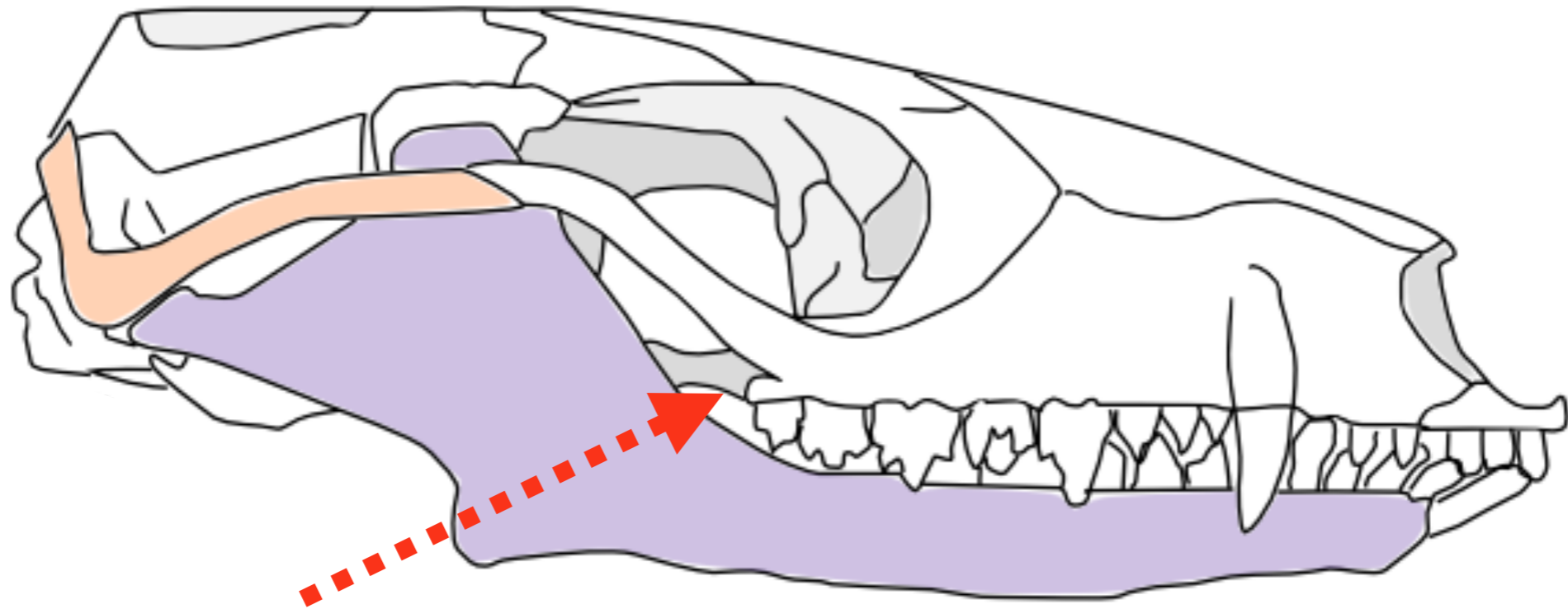


O que caracteriza um mamífero?



**Morganucodon**

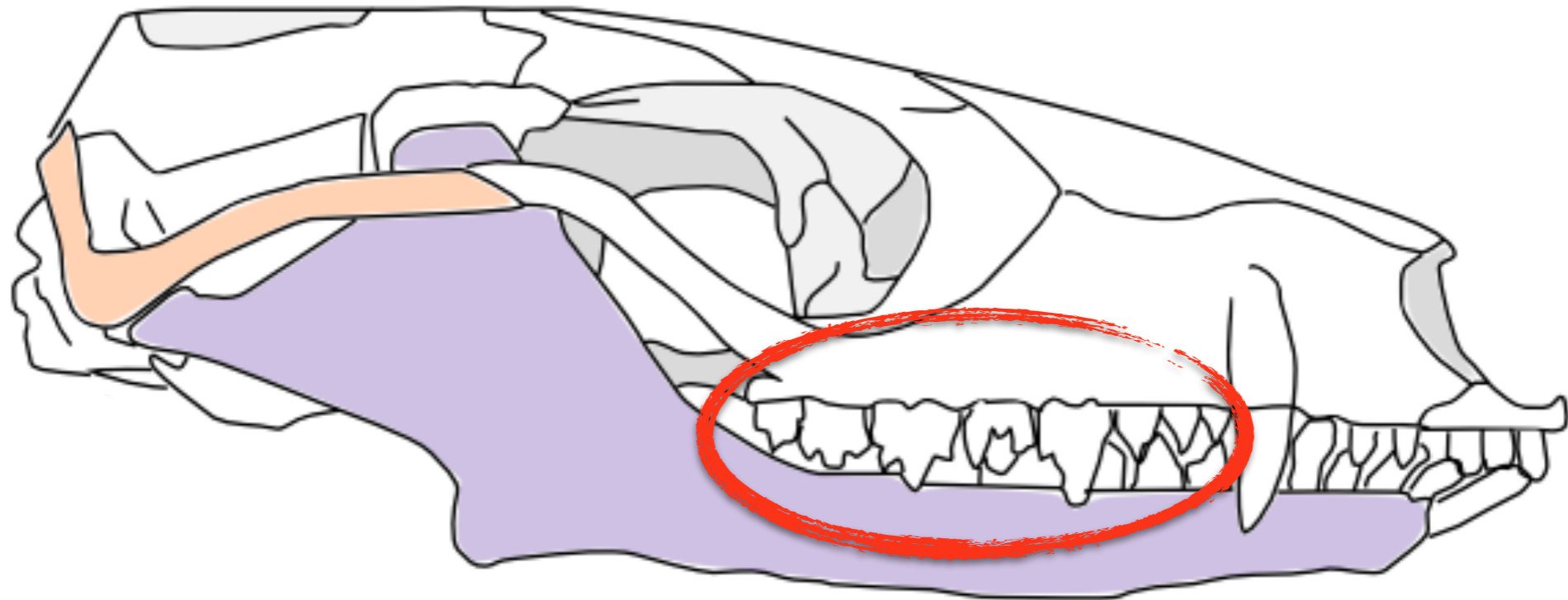
O que caracteriza um mamífero?



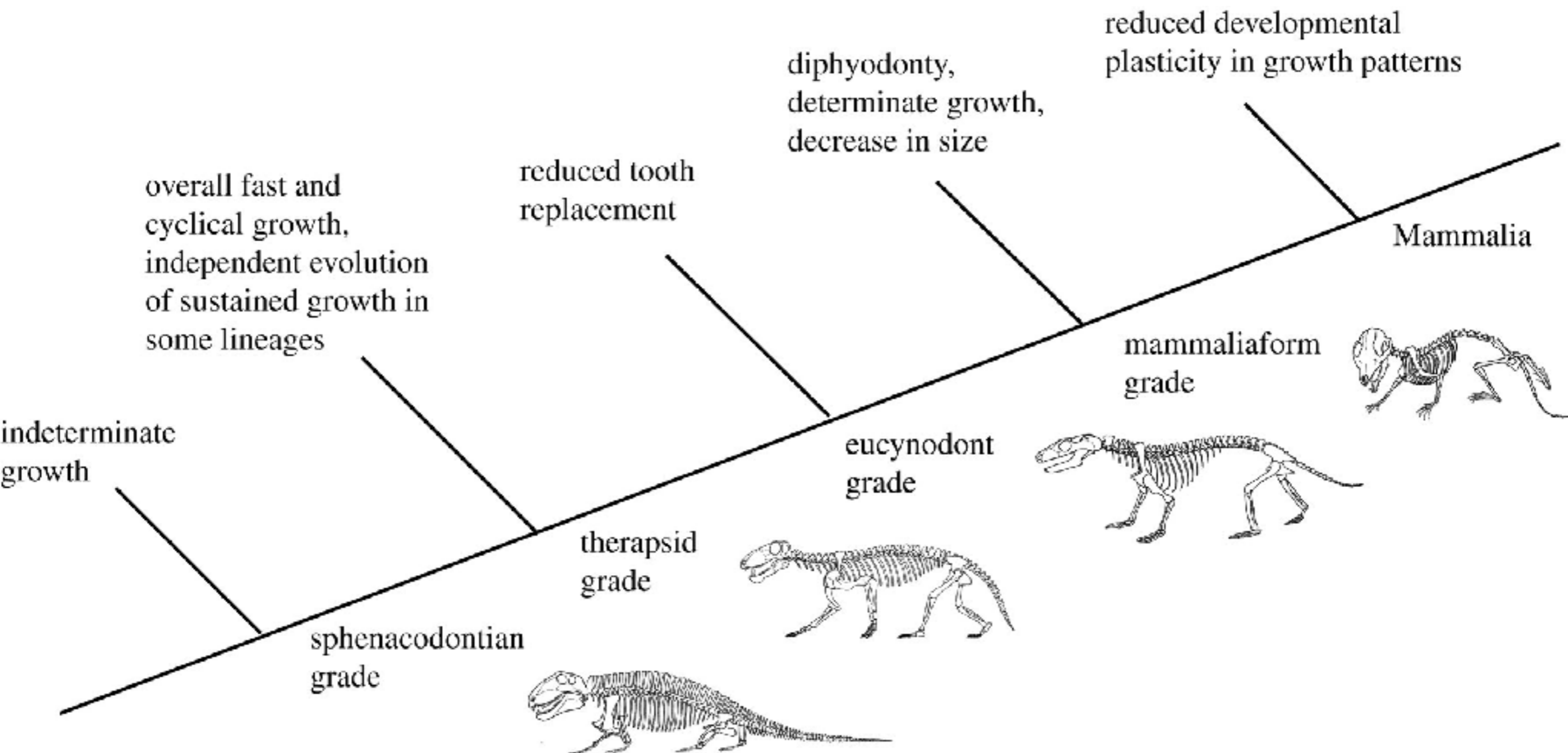
**Morganucodon**



O que caracteriza um mamífero?

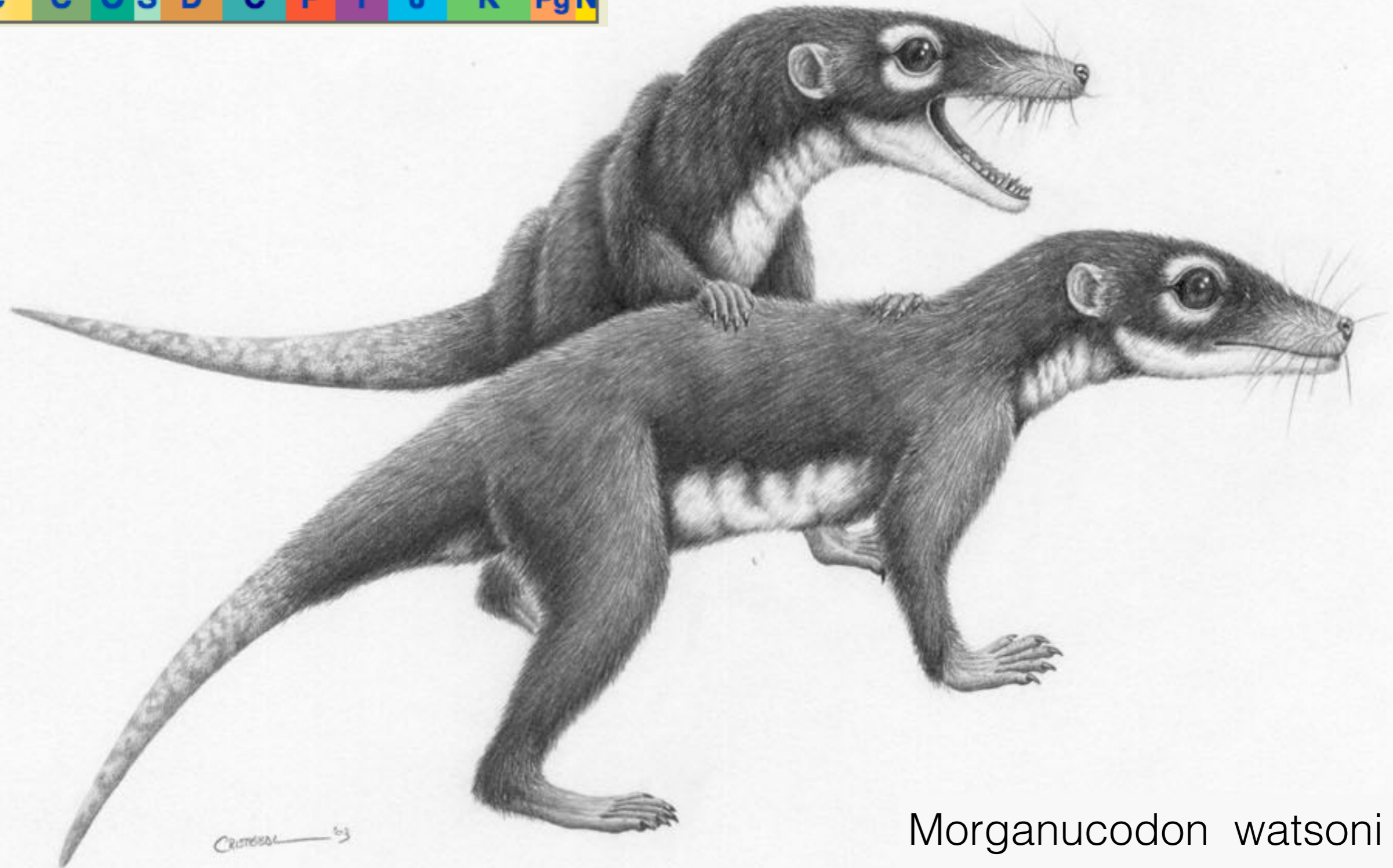


Morganucodon



# Primeiros mamíferos

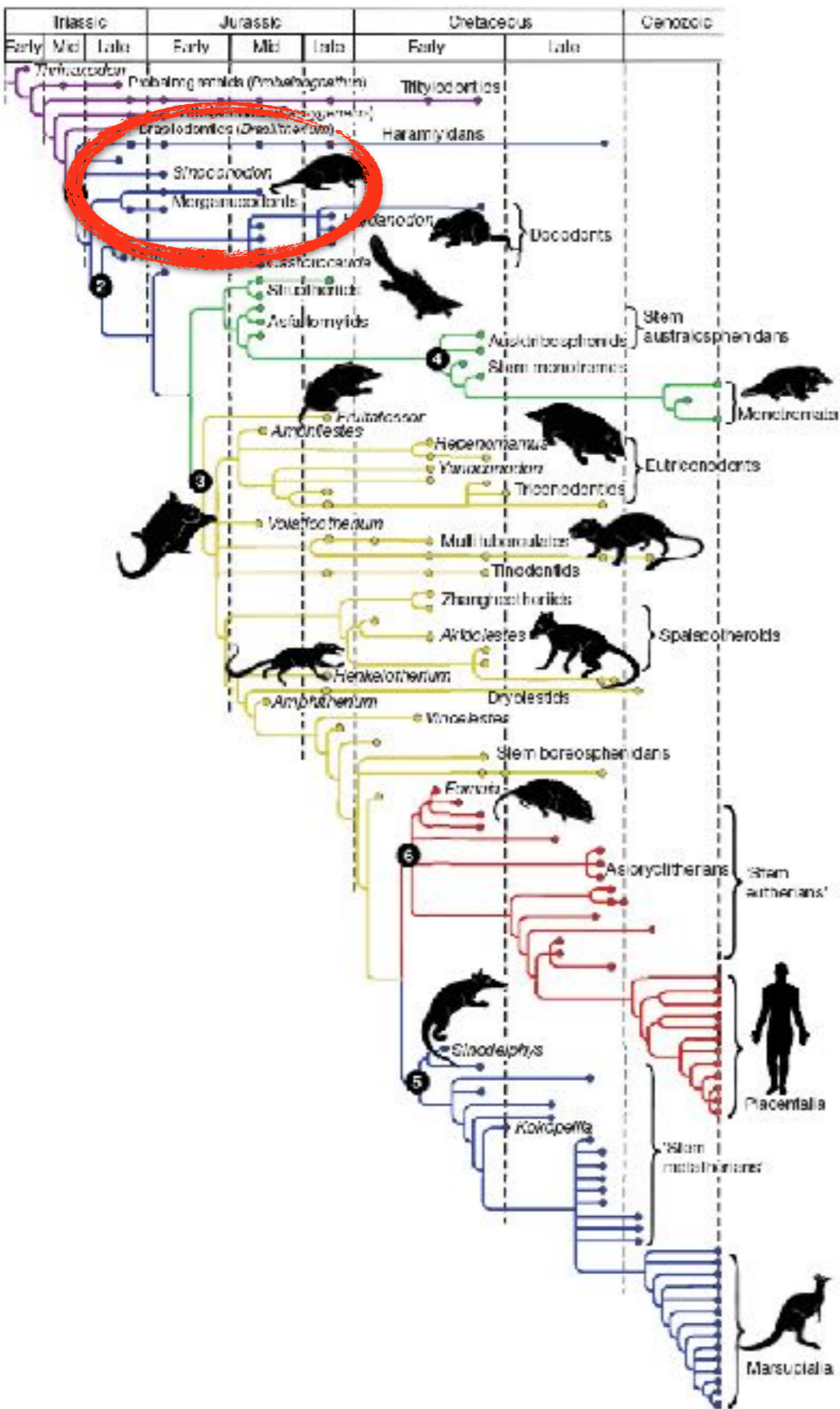
PreЄ Є O S D C P T J K Pg N



Morganucodon watsoni



# Primeiros mamíferos



Morganucodon watsoni

# O que podemos aprender com Morganucodon?



Morganucodon watsoni



# Lactação e amamentação





# Antes de mais nada:



<http://mojcaj.deviantart.com/art/Three-hand-made-gorgonopsians-445564431>



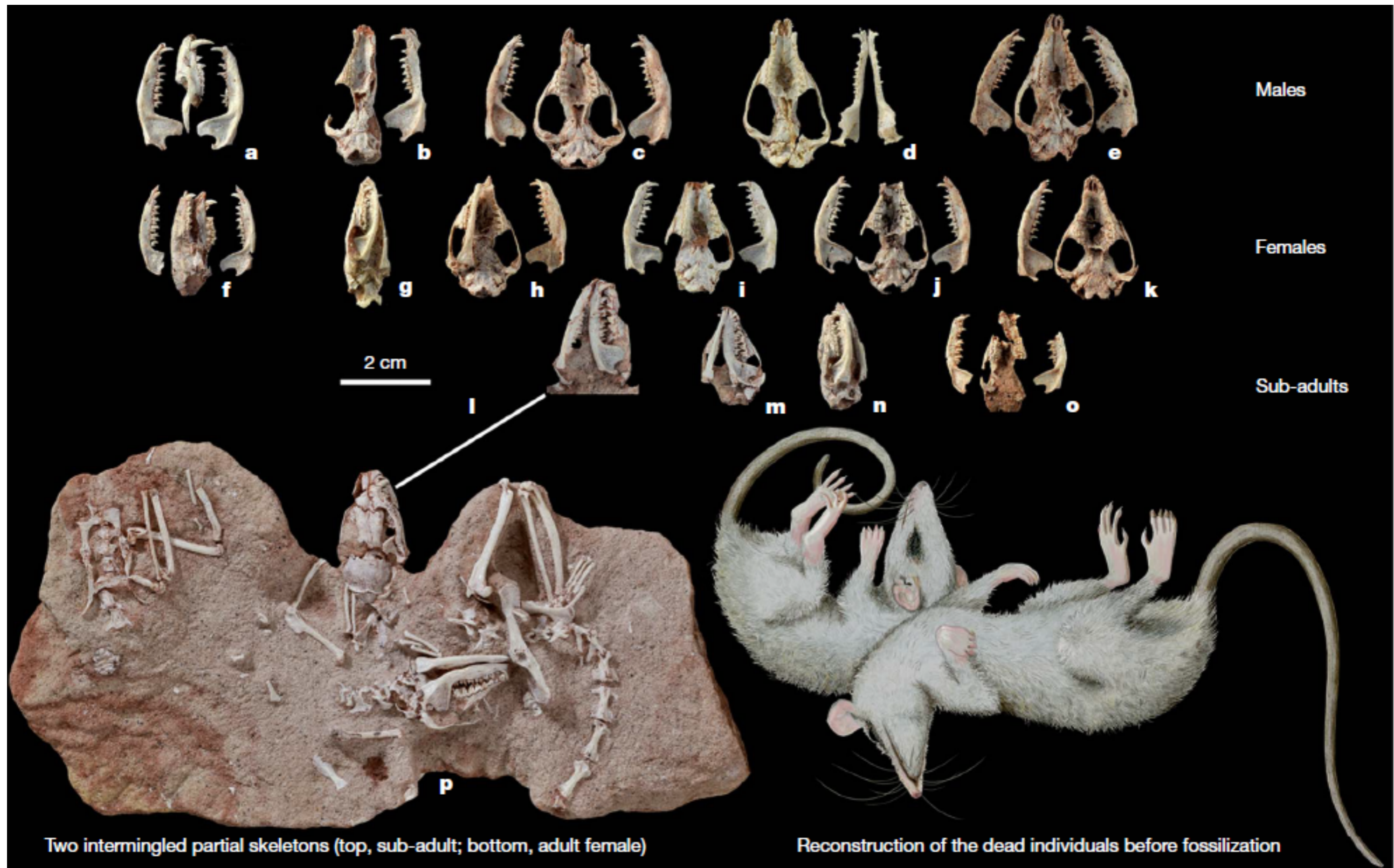
# Antes de mais nada:



<http://www.deviantart.com/art/Gorgonopsid-mother-137368690>



# Antes de mais nada:

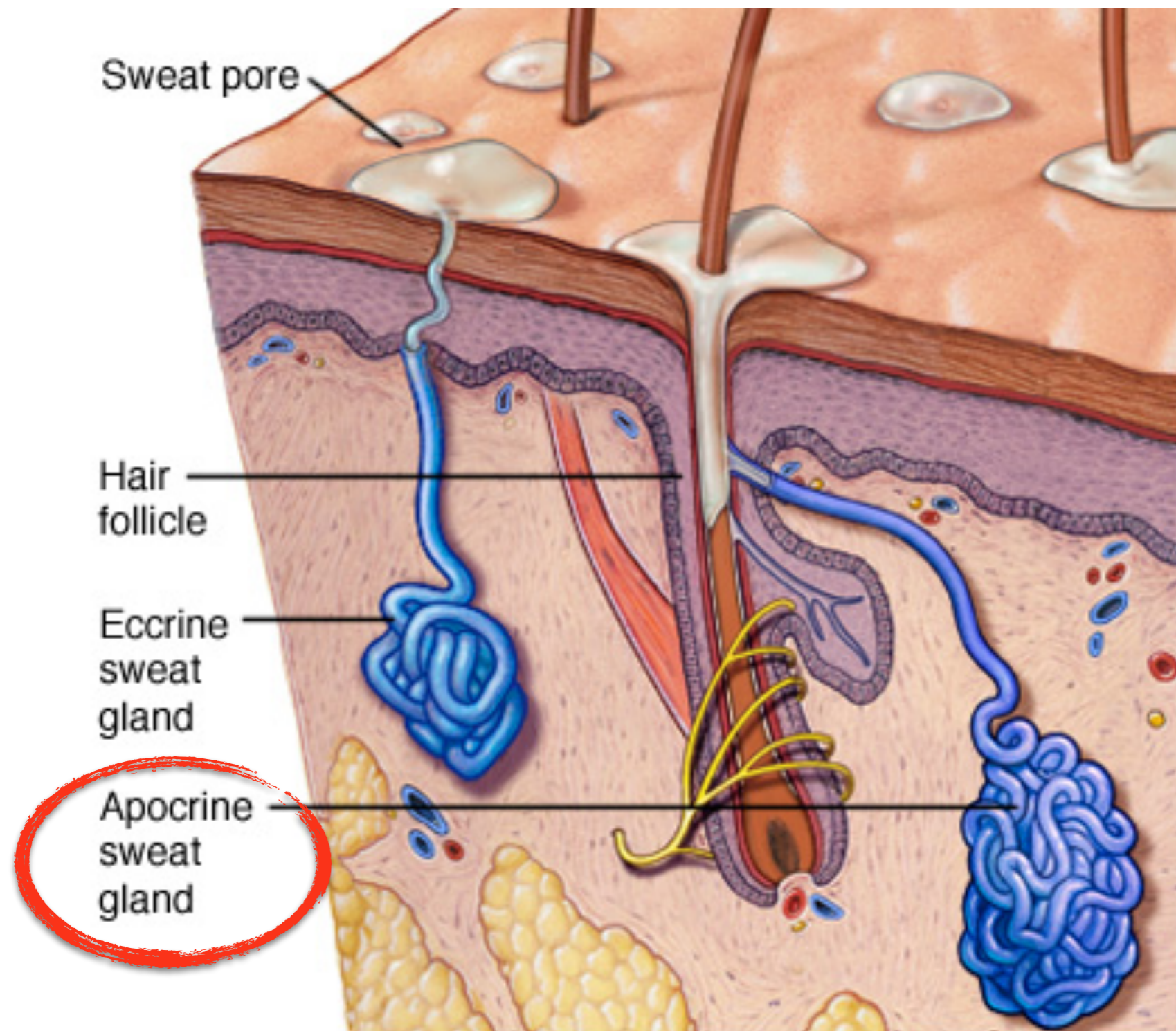




Antes de mais nada:

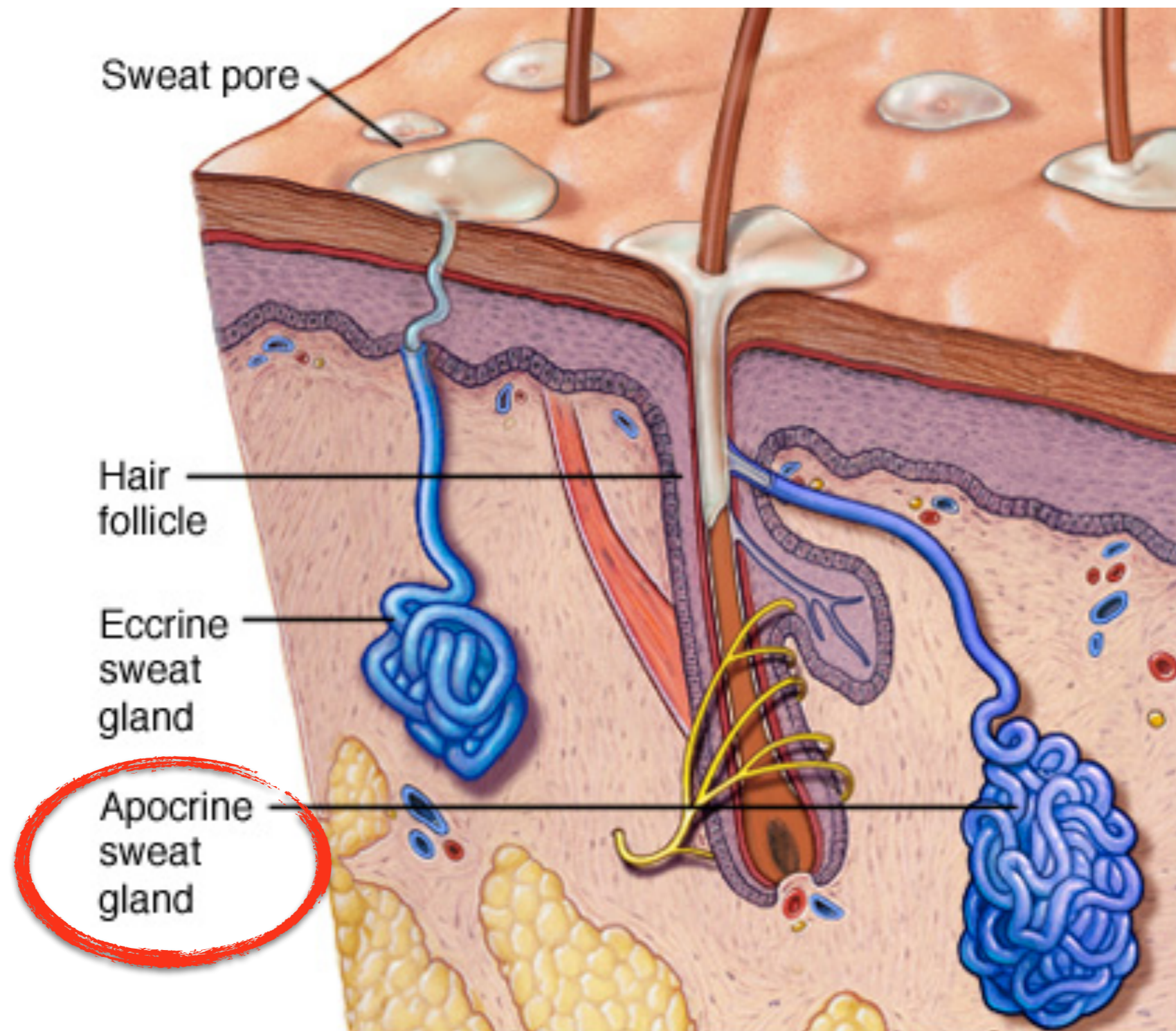


# Origem de glândulas proto-mamárias





# Quando essas secreções se tornaram essenciais?



# Provavelmente por aqui:

PreЄ Є O S D C P T J K PgN

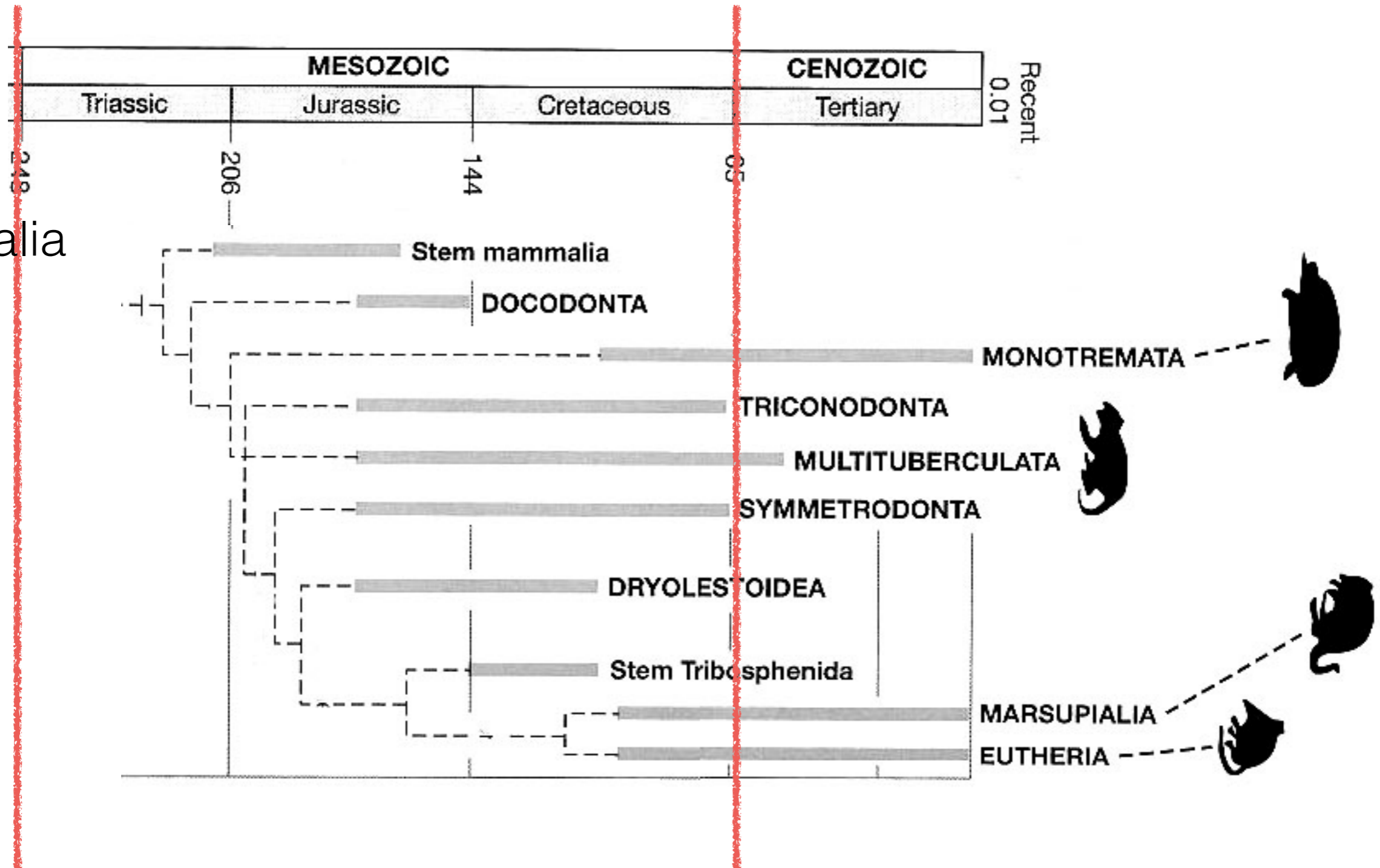


Morganucodon watsoni



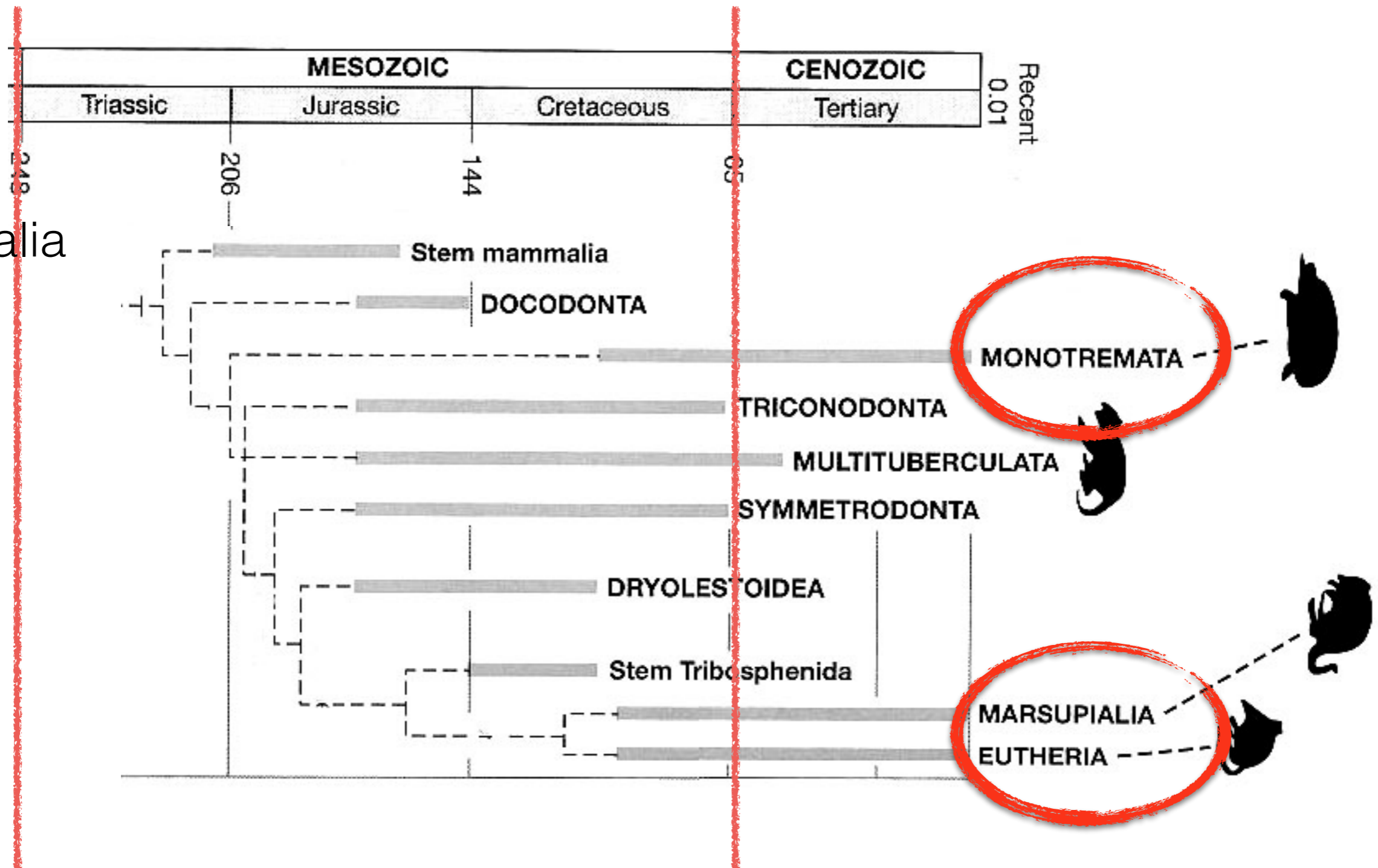
# Linhas de mamíferos:

Mammalia



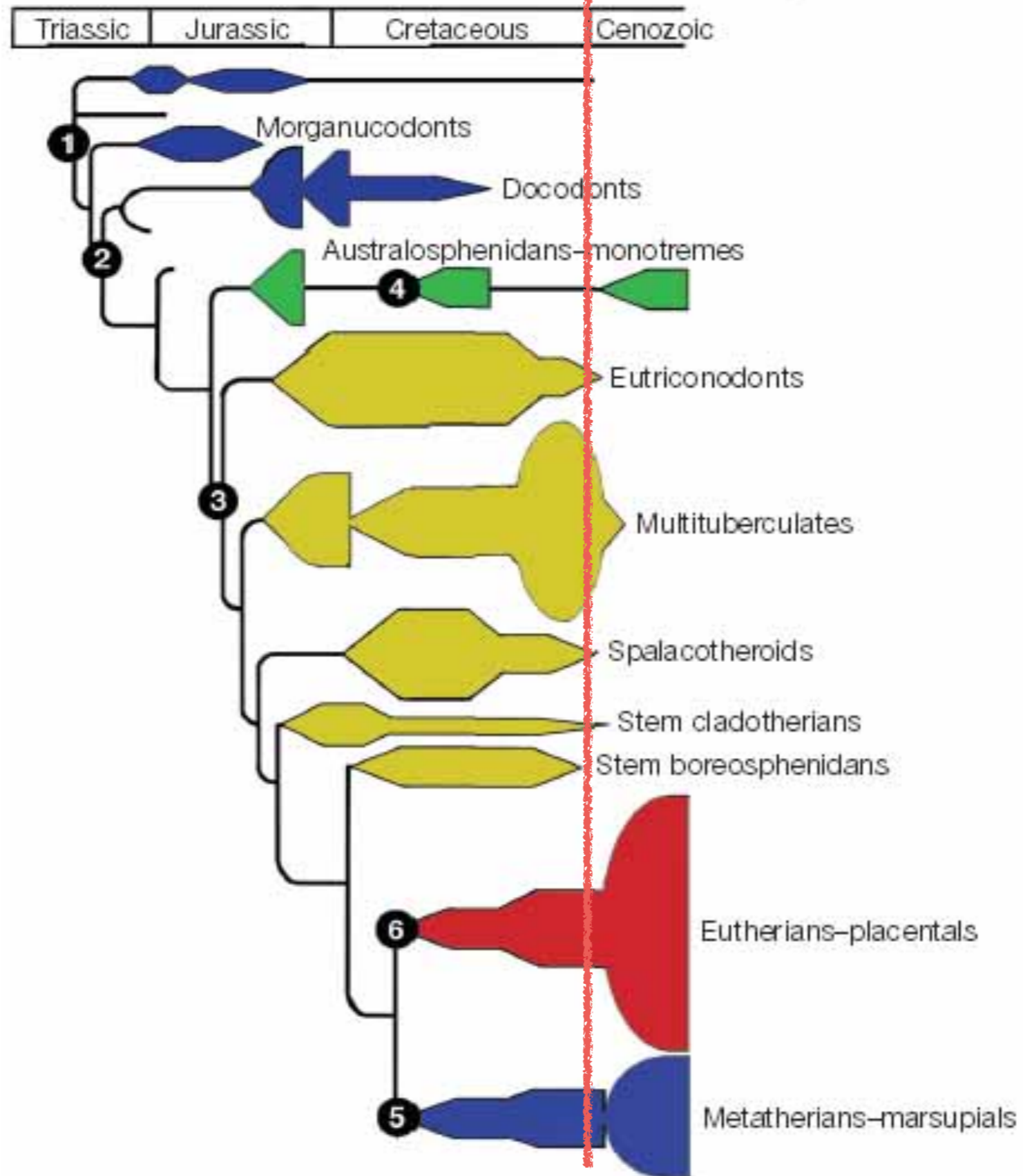
# Linhagens de mamíferos:

Mammalia

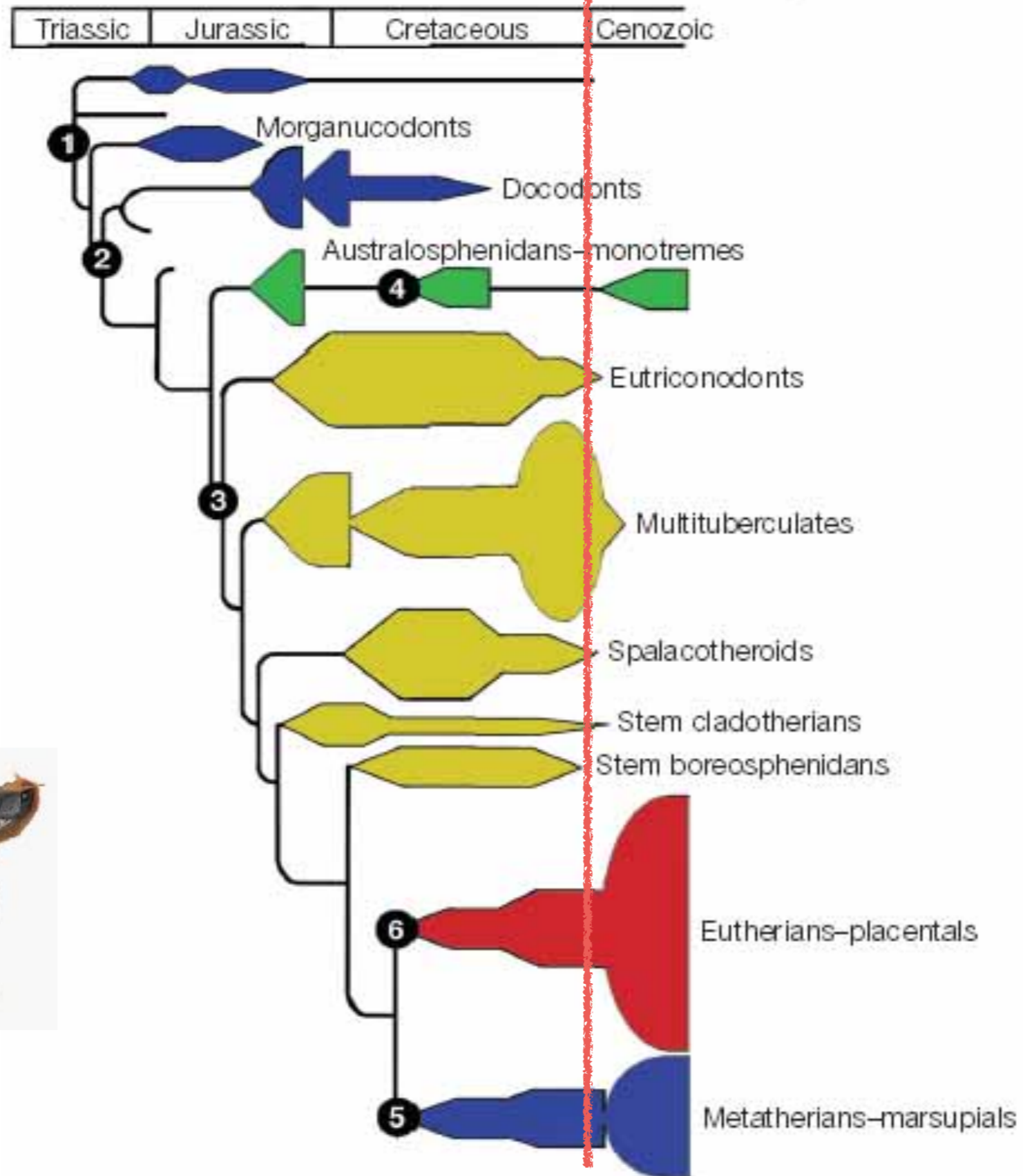




# Linhagens extintas



# Linhagens extintas



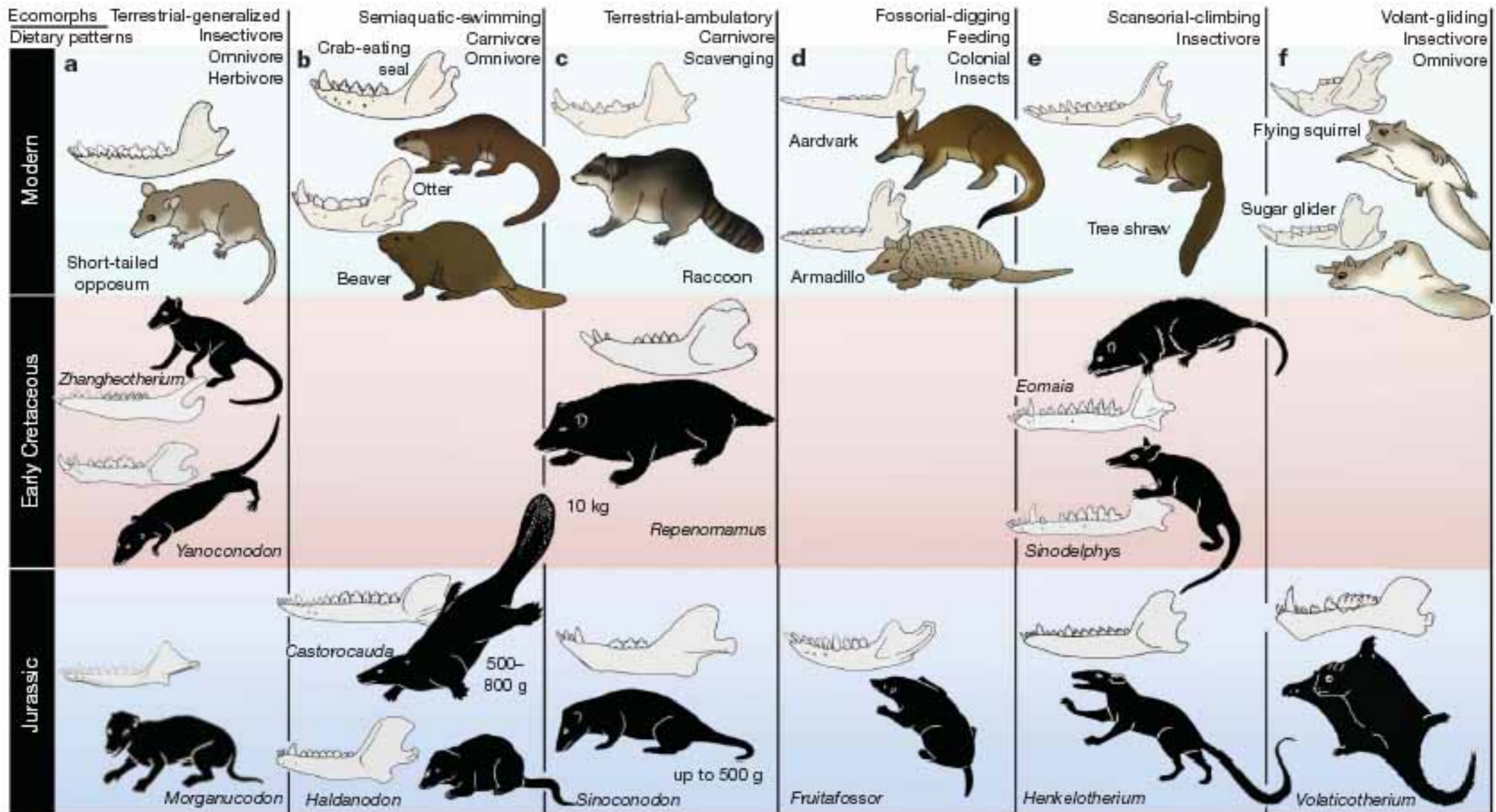
547 gêneros



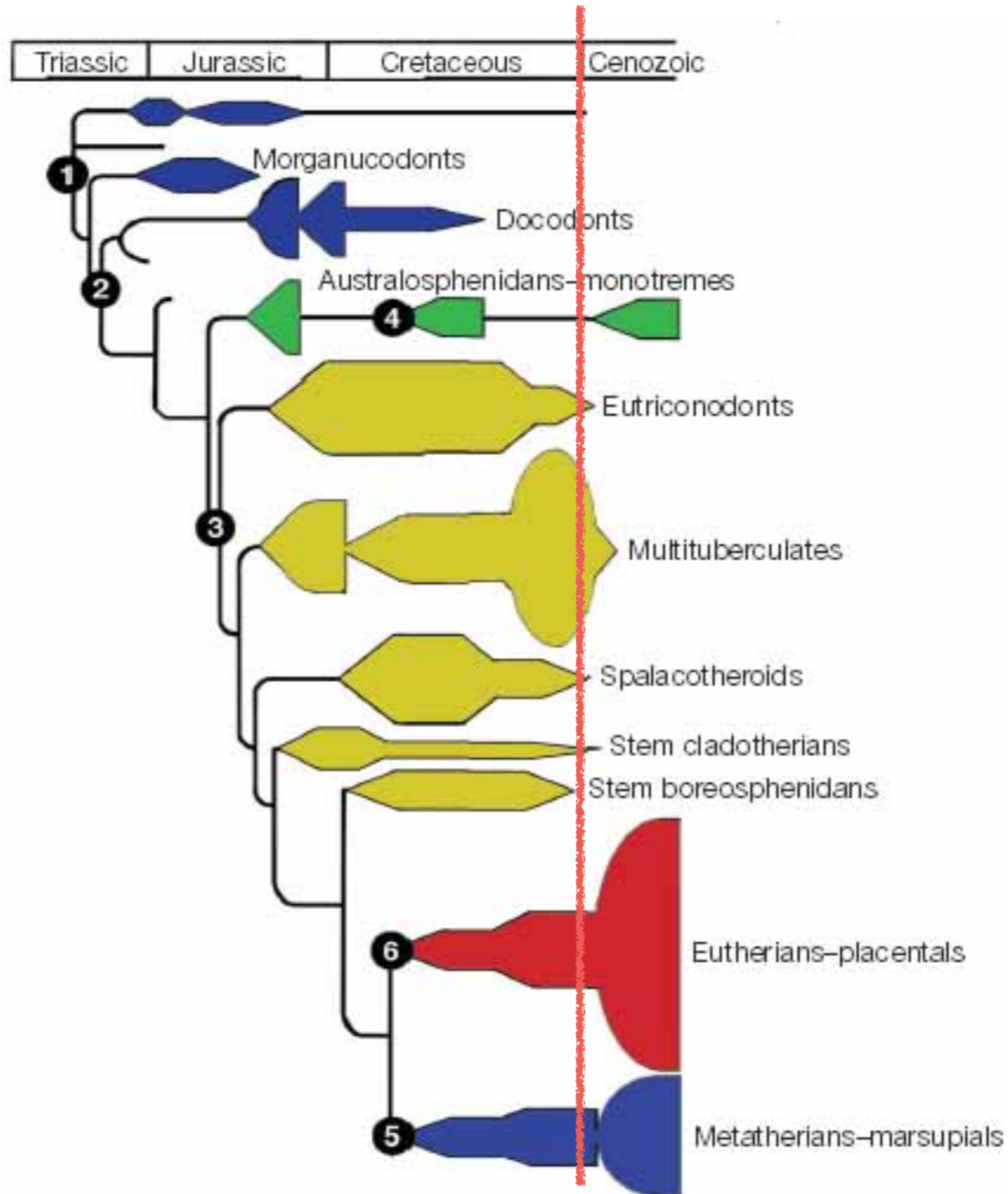
310 gêneros



# Diversidade eco-morfológica

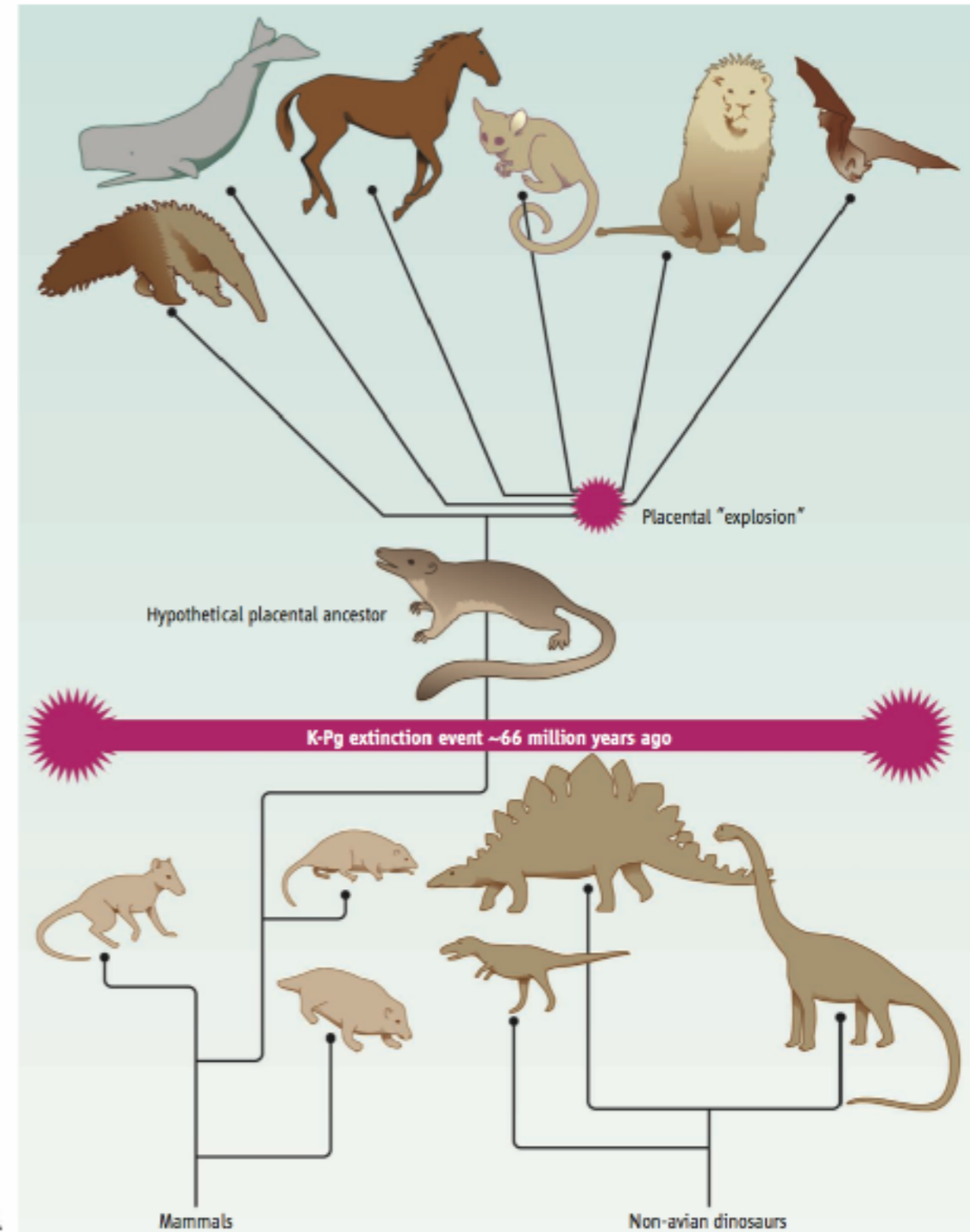
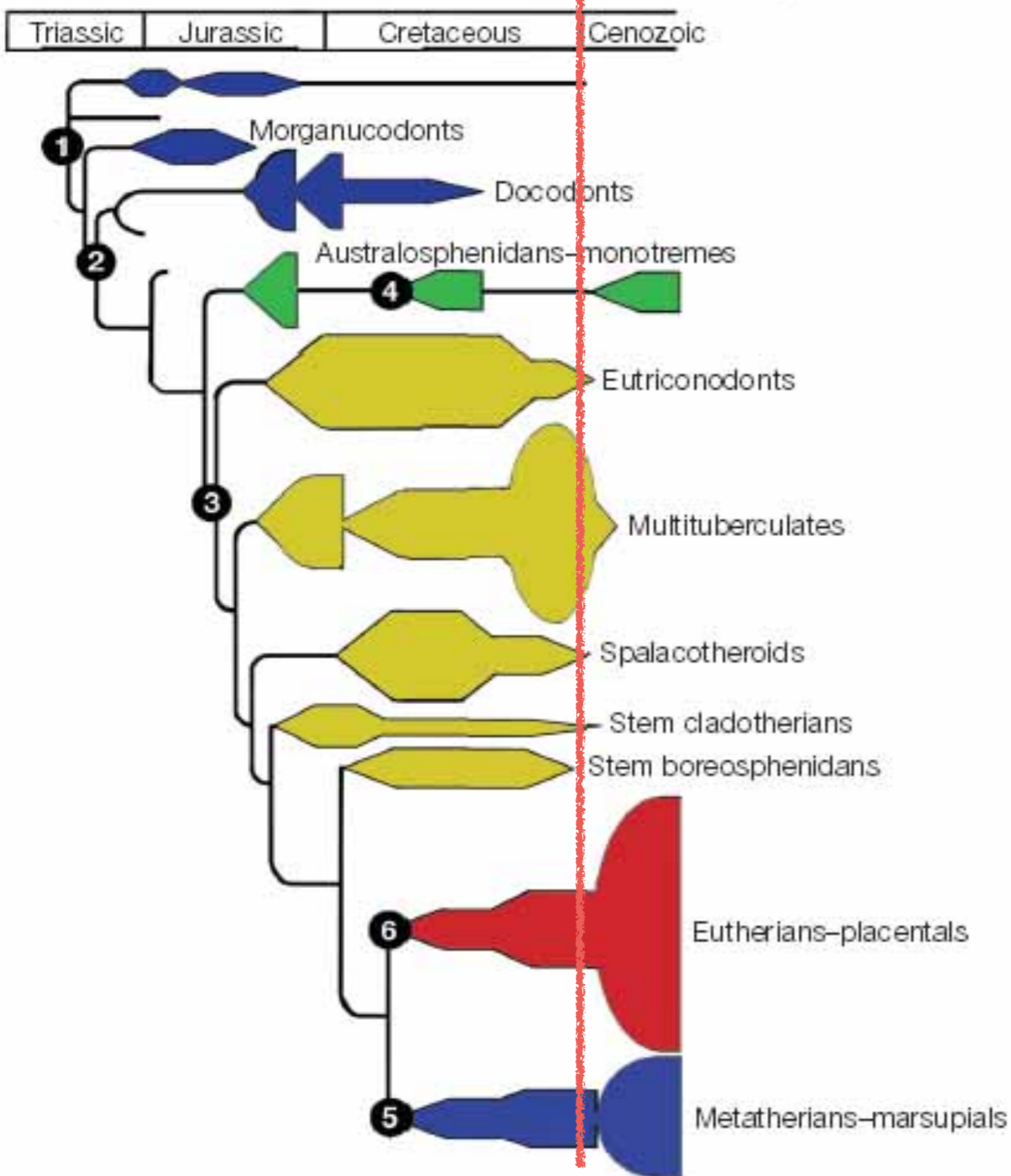


# Diversificação dos theria após K-Pg



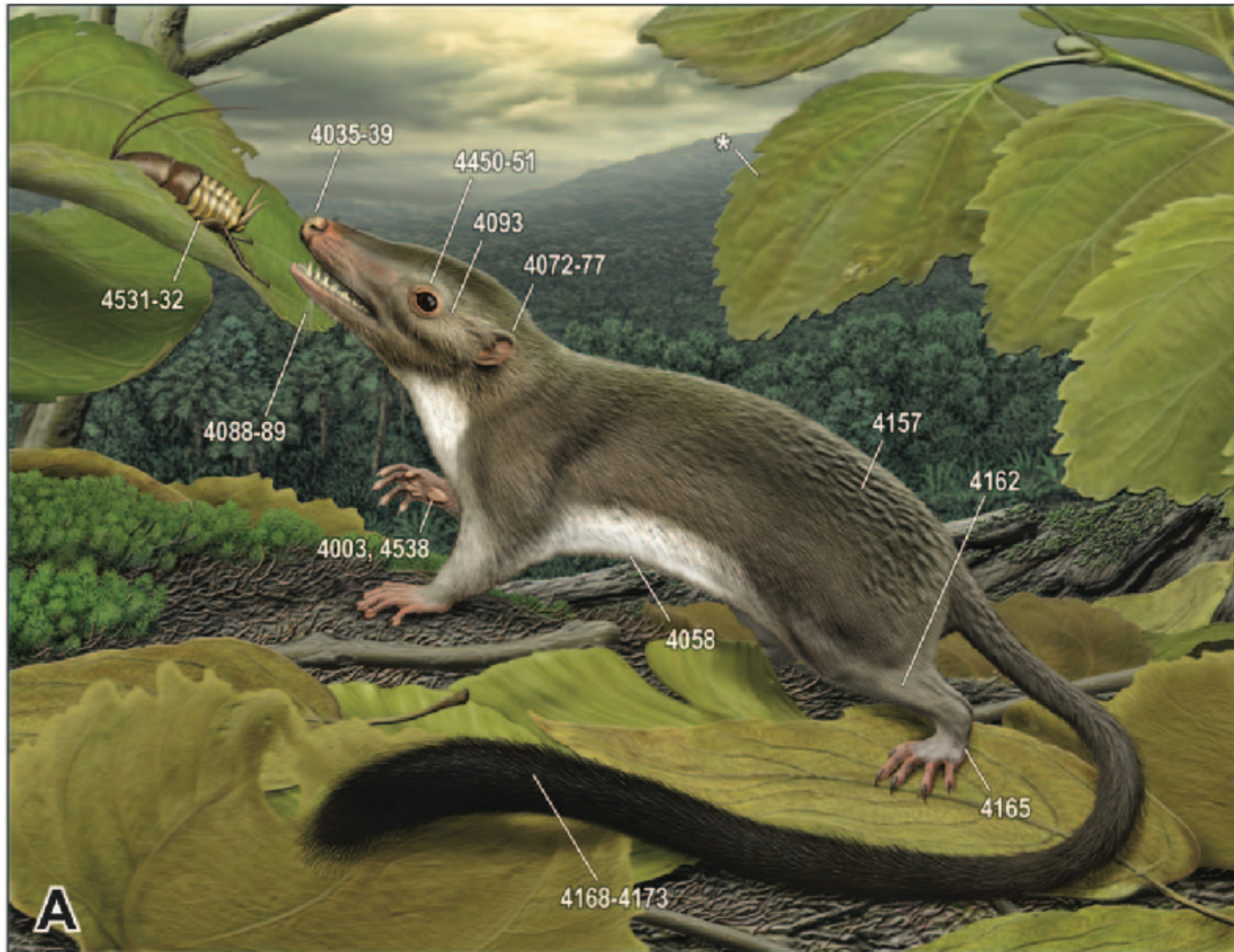


# Diversificação dos theria após K-Pg



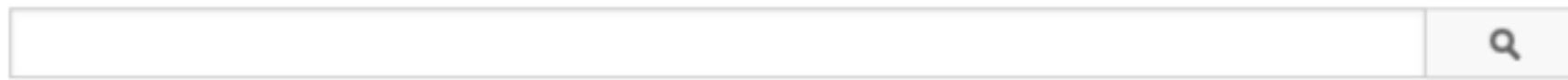


# Tatata...taravó Placentária





# Tatata...taravó Placentária



## Radiolab Live: Apocalyptical FULL SHOW



Radiolab WNYC

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218,493

Up next



**Radiolab - Parasites**  
by Radiolab  
5,504 views

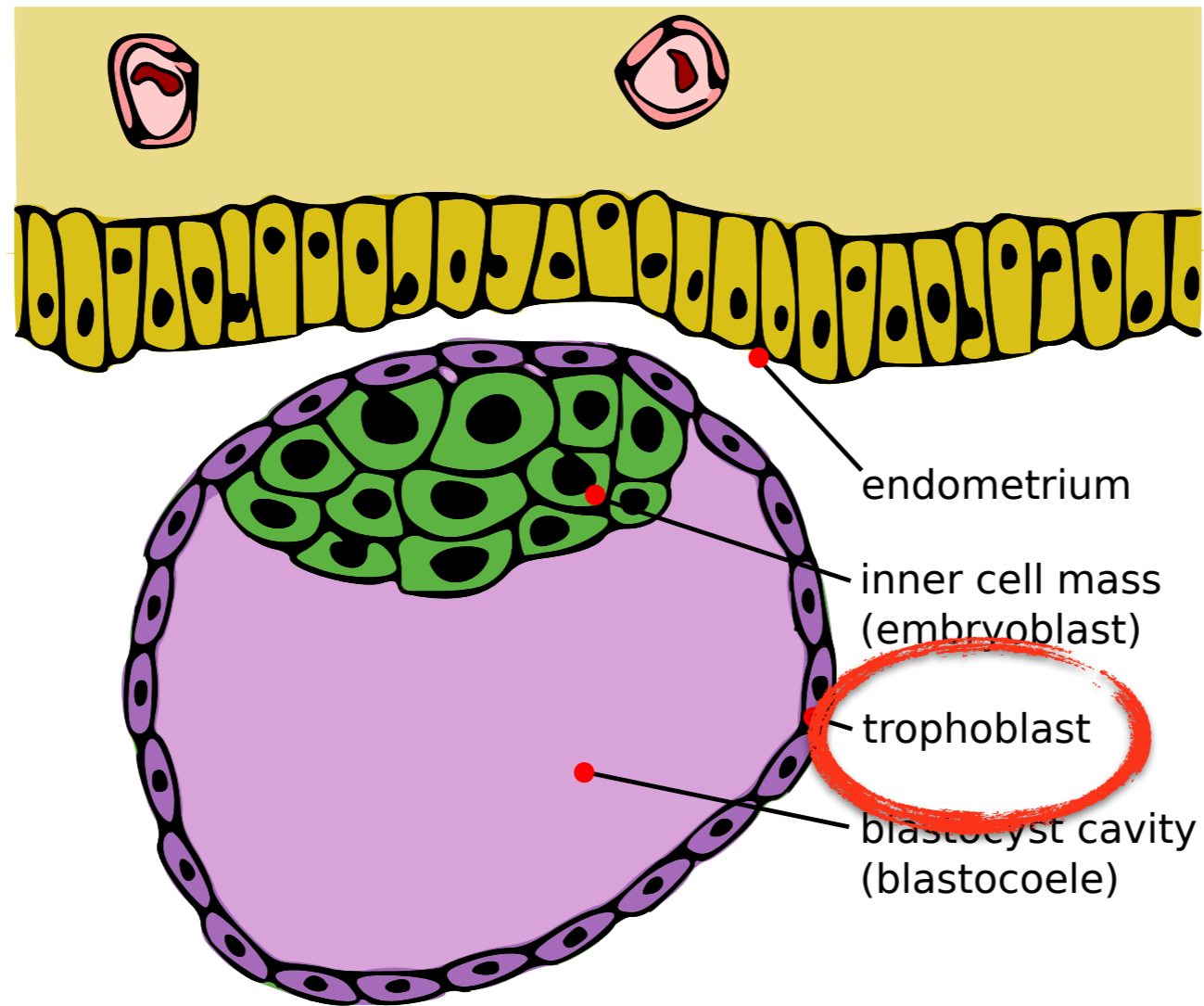
59:44

# Reprodução nos mamíferos

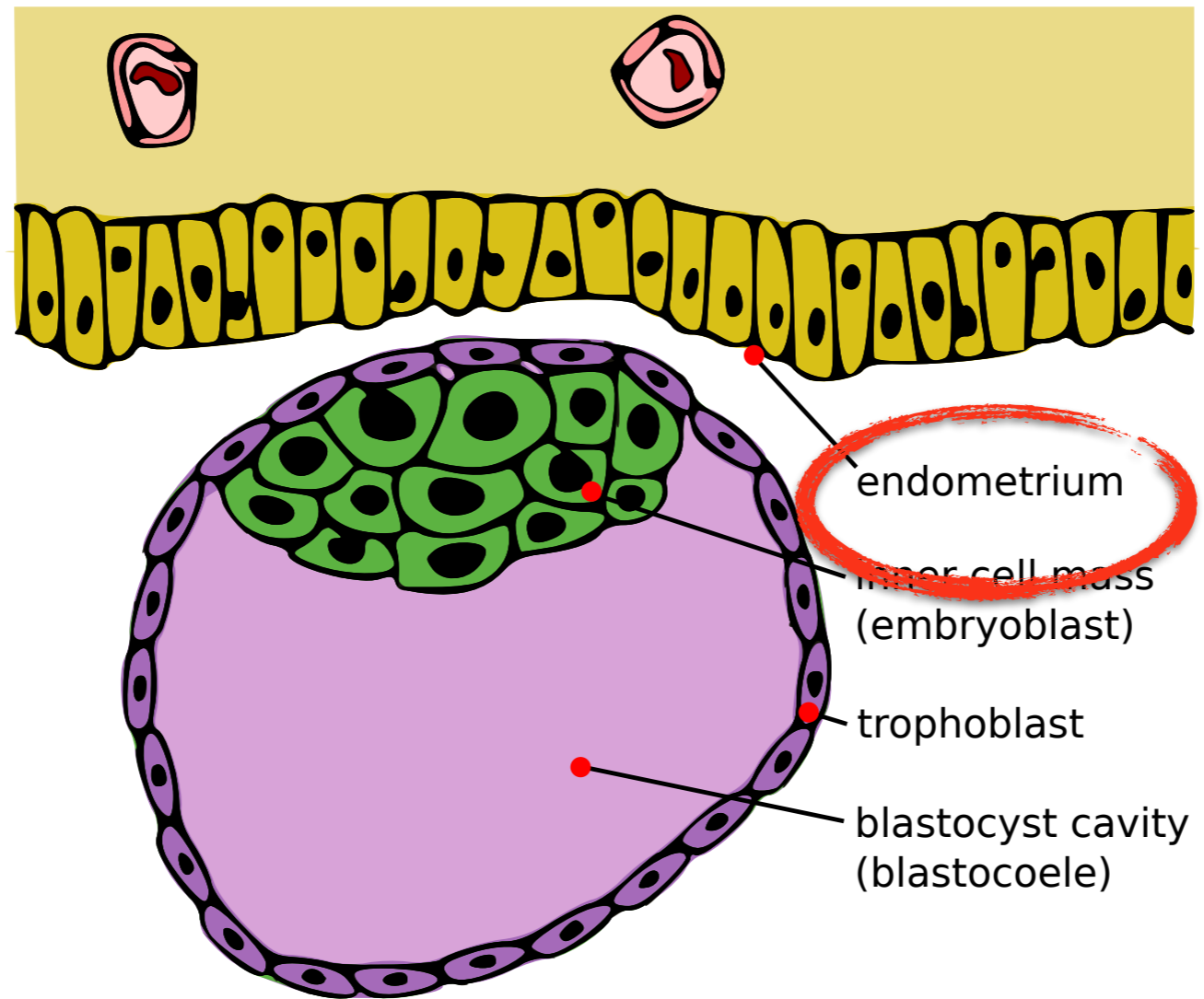




# Reprodução nos mamíferos: todos atuais tem...

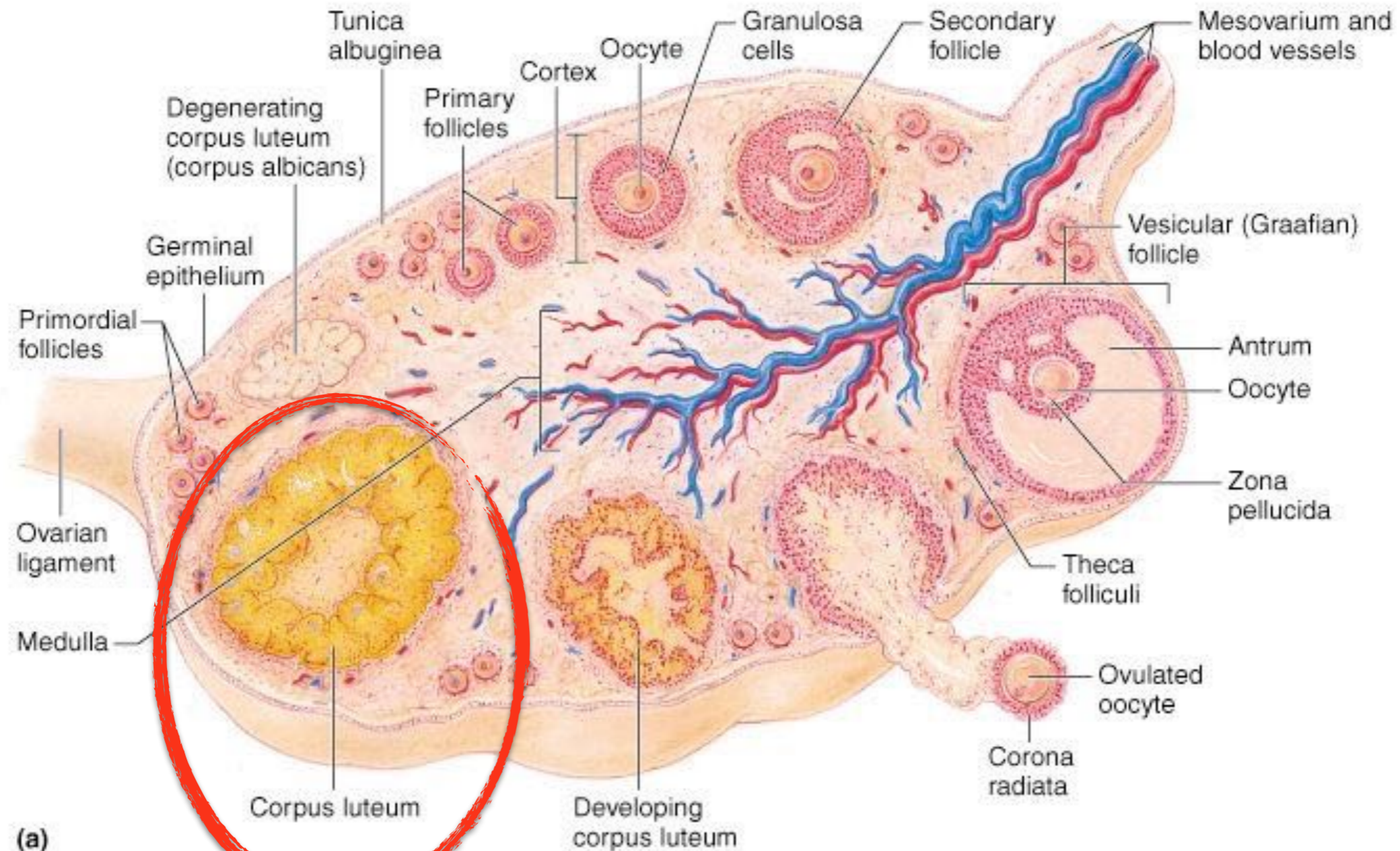


# Reprodução nos mamíferos: todos atuais tem...





# Reprodução nos mamíferos: todos atuais tem...



(a)

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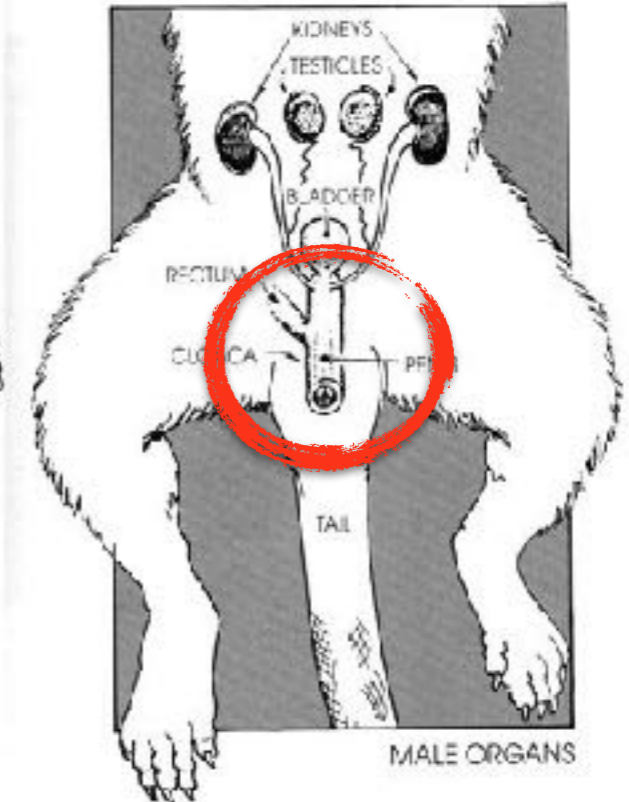
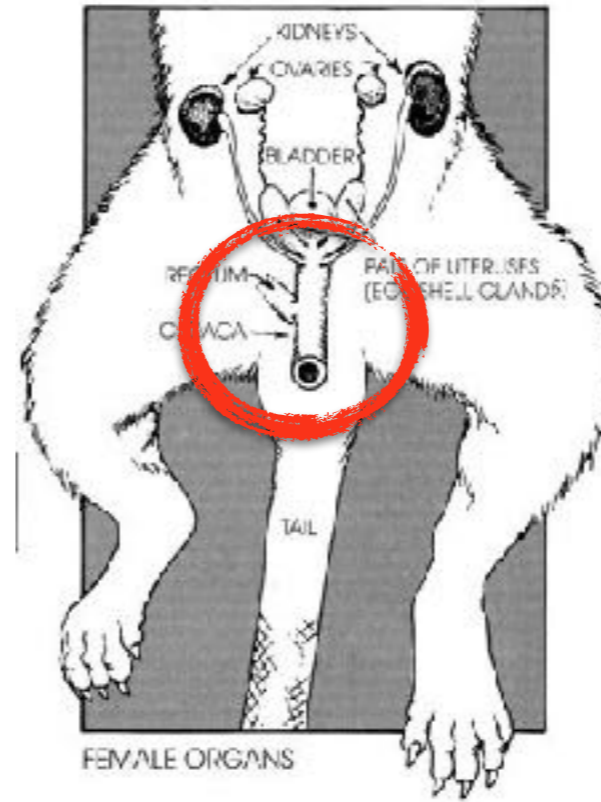


# Reprodução nos mamíferos





# Reprodução nos mamíferos

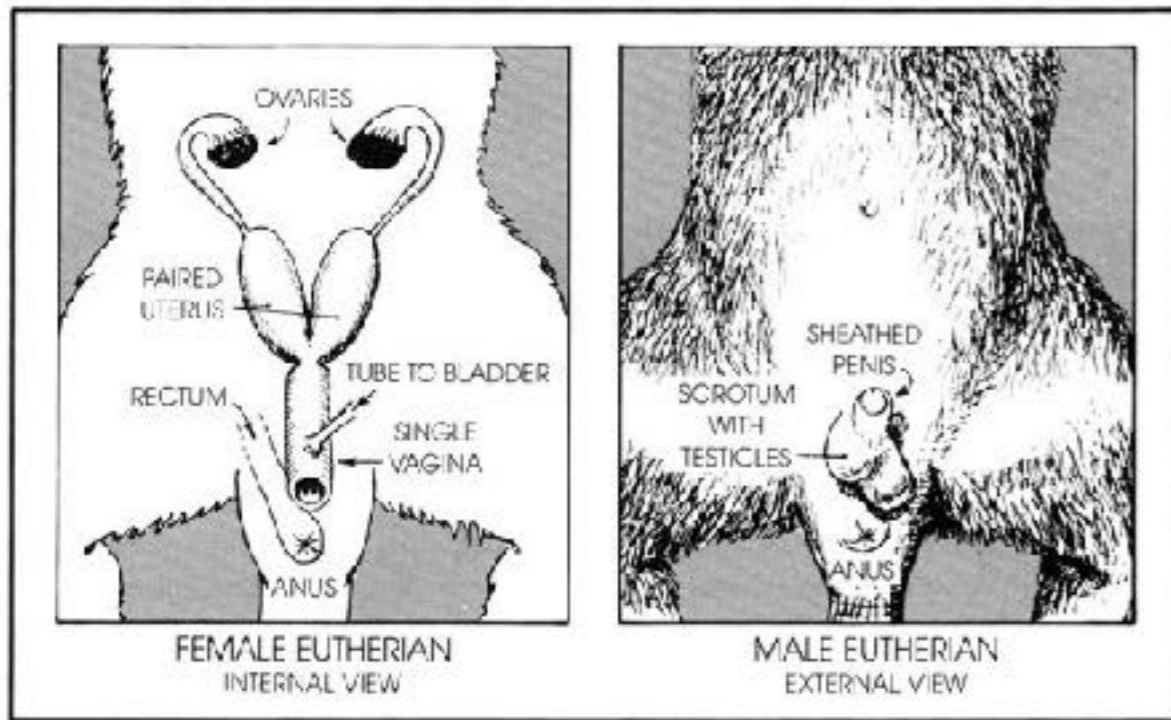
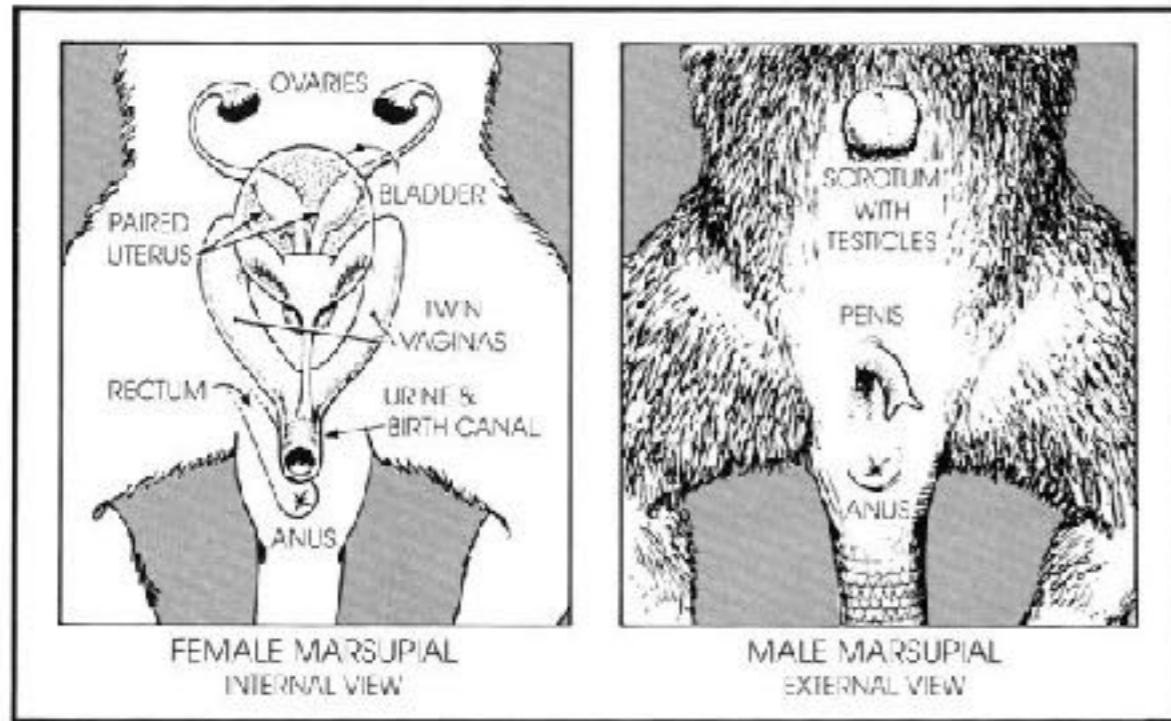


# Reprodução nos mamíferos



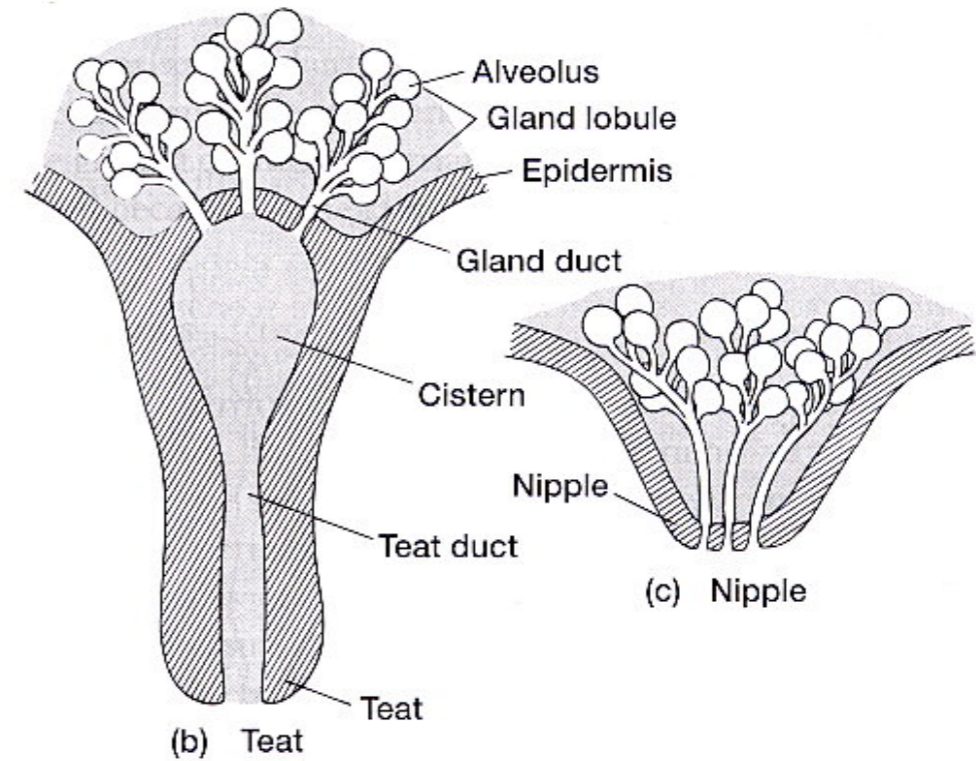
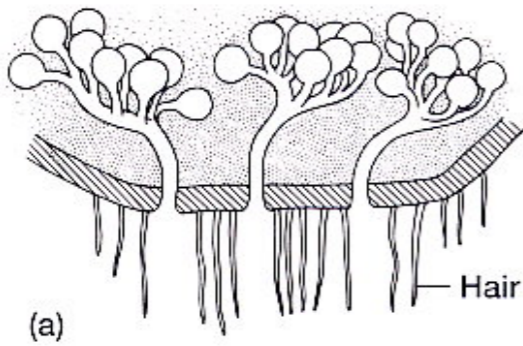


# Reprodução nos mamíferos





# Reprodução nos mamíferos





# Reprodução nos mamíferos



gestação <

lactação >

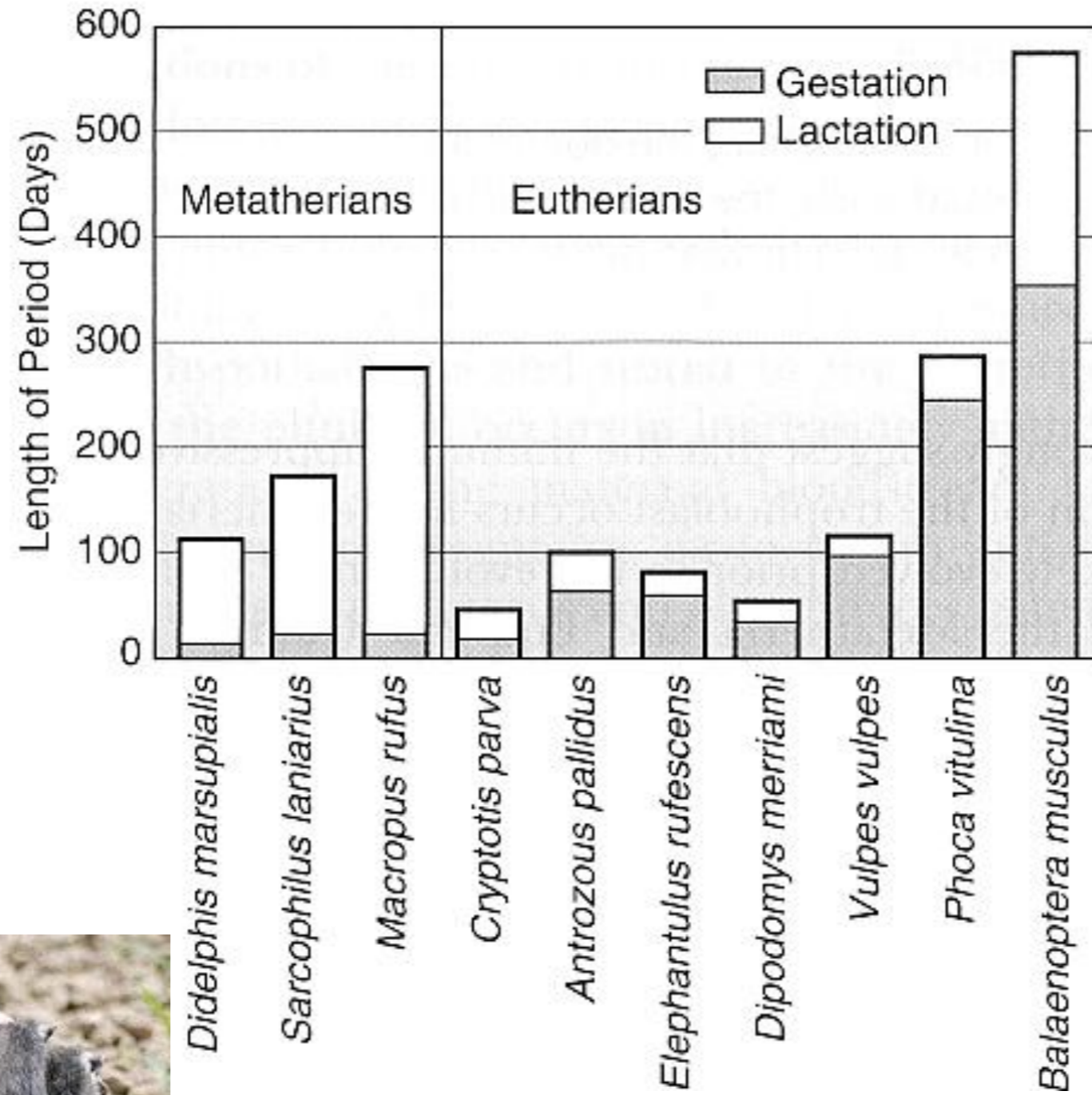


gestação >

lactação <



# Reprodução nos mamíferos





# Origem e evolução

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- Quem são os primeiros?
- Linhagens
- Características dos atuais

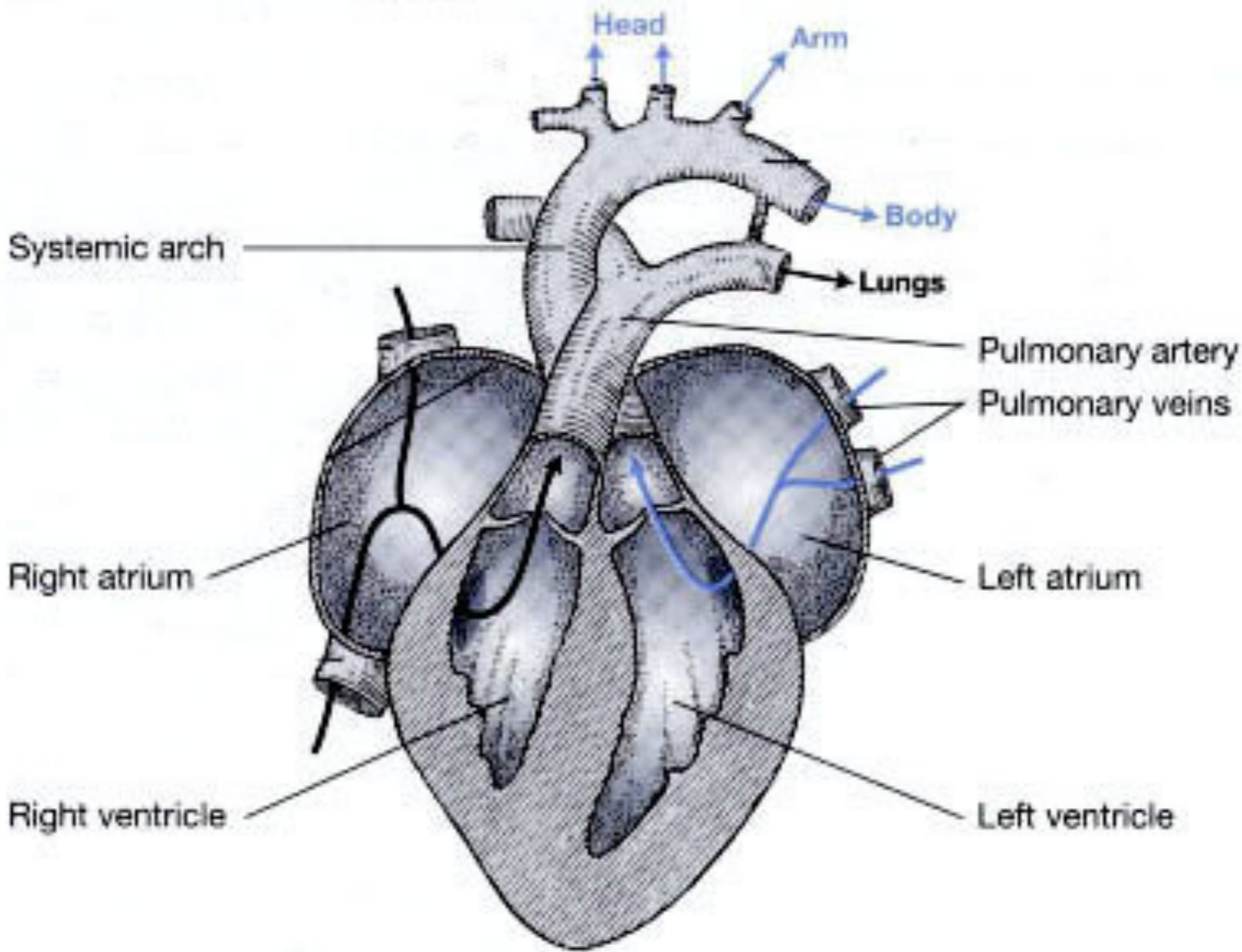


# Ativos e endotérmicos: tecido adiposo

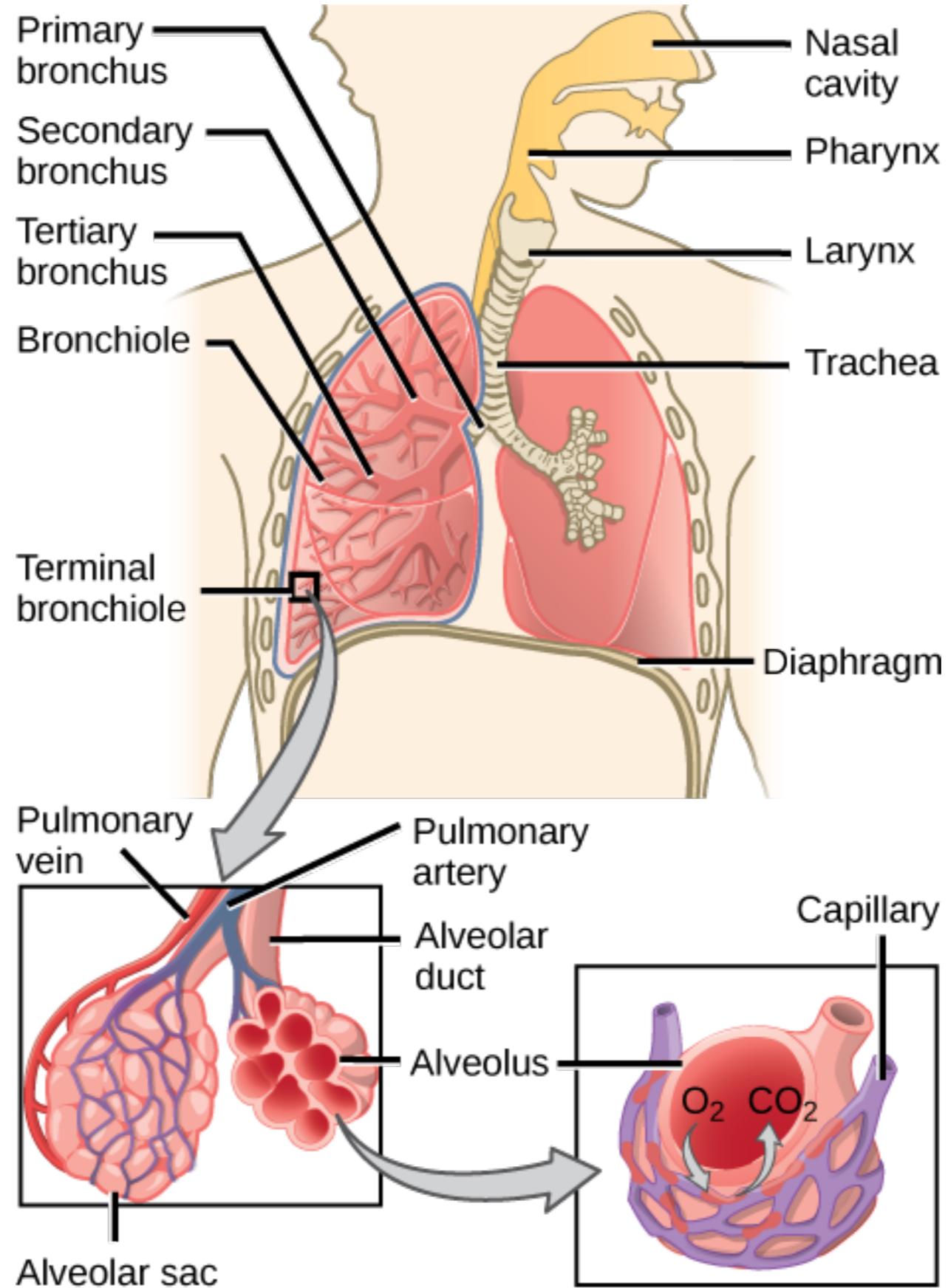




# Ativos e endotérmicos: sistema circulatório



# Ativos e endotérmicos: sistema respiratório

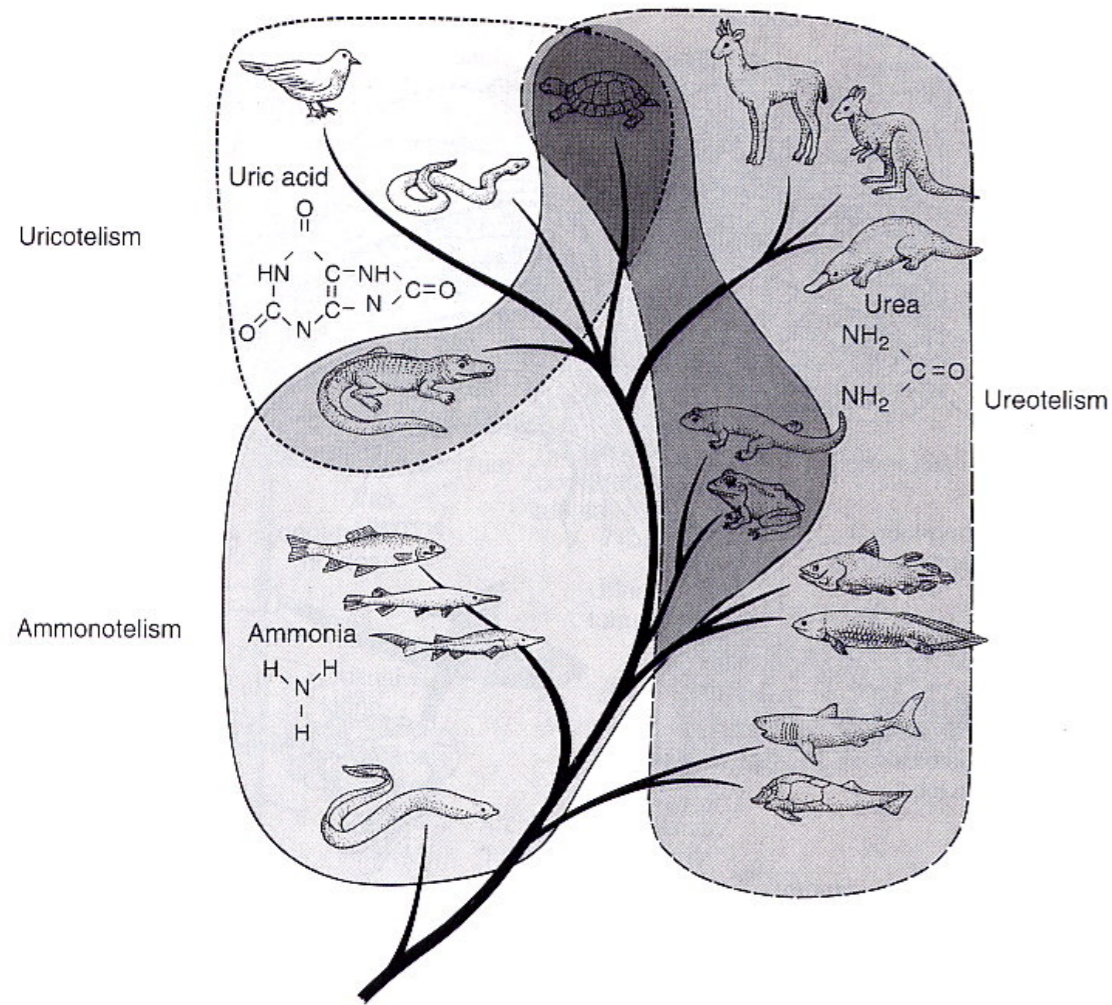




# Ativos e endotérmicos: sistema excretor

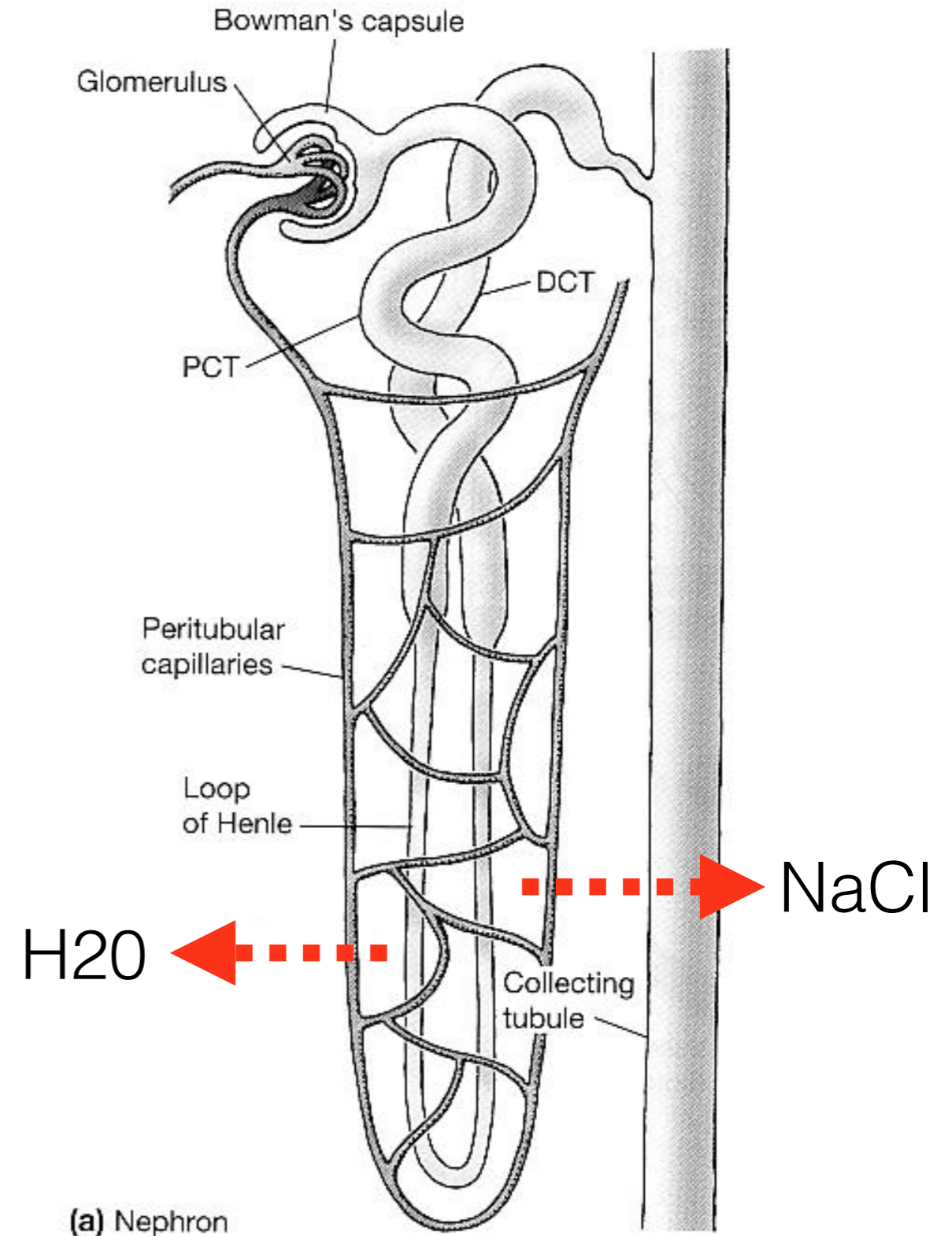
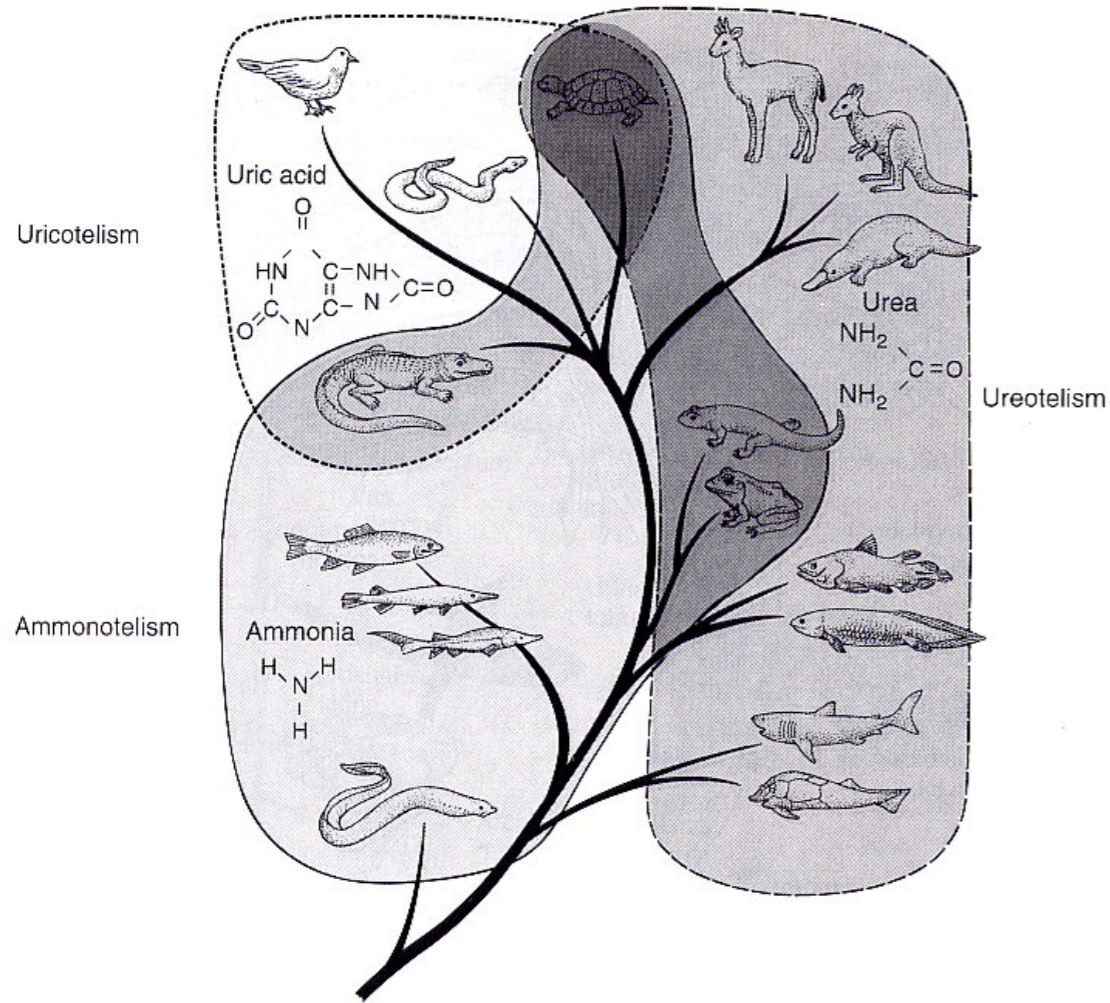


# Ativos e endotérmicos: sistema excretor





# Ativos e endotérmicos: sistema excretor



(a) Nephron





# Ativos e endotérmicos: sistema excretor

<i>Species</i>	<i>Maximum Observed Urine Concentration (mmole • kg<sup>-1</sup>)</i>	<i>Approximate Urine: Plasma Concentration Ratio</i>
American alligator ( <i>Alligator mississippiensis</i> )	312	0.95
Desert iguana ( <i>Dipsosaurus dorsalis</i> )	300	0.95
Desert tortoise ( <i>Gopherus agassizii</i> )	622	1.8
Pelican ( <i>Pelecanus erythrorhynchos</i> )	700	2
House sparrow ( <i>Passer domesticus</i> )	826	2.4
House finch ( <i>Carpodacus mexicanus</i> )	850	2.4
Human ( <i>Homo sapiens</i> )	1430	4
Bottlenose porpoise ( <i>Tursiops truncatus</i> )	2658	7.5
Hill kangaroo ( <i>Macropus robustus</i> )	2730	7.5
Camel ( <i>Camelus dromedarius</i> )	2800	8
White rat ( <i>Rattus norvegicus</i> )	2900	8.9
Marsupial mouse ( <i>Dasycercus eristicauda</i> )	3231	10
Cat ( <i>Felis domesticus</i> )	3250	9.9
Desert woodrat ( <i>Neotoma lepida</i> )	4250	12
Vampire bat ( <i>Desmodus rotundus</i> )	6250	20
Kangaroo rat ( <i>Dipodomys merriami</i> )	6382	18
Australian hopping mouse ( <i>Notomys alexis</i> )	9370	22

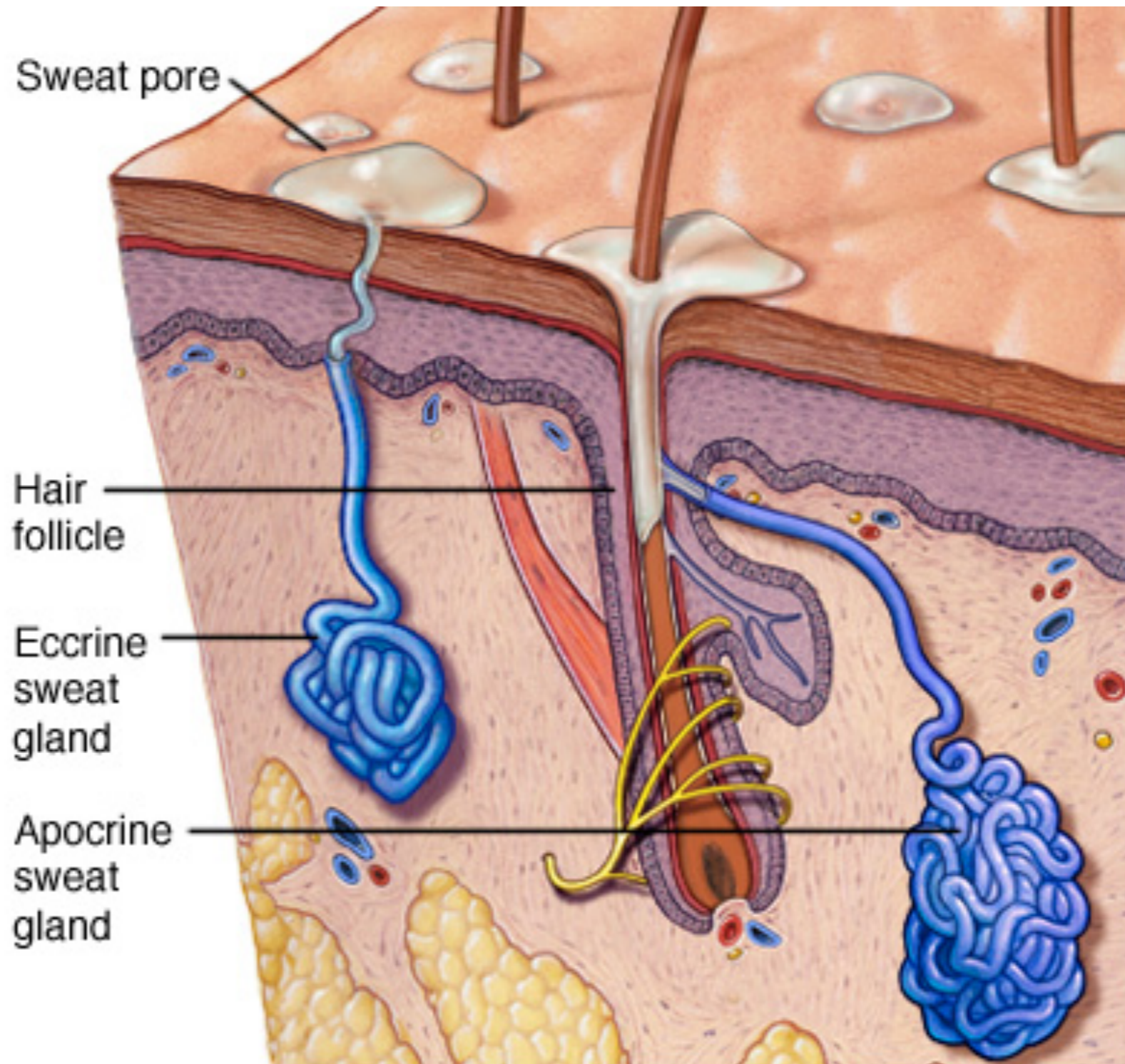


Tegumento glandular coberto por pelos





# Tegumento glandular coberto por pelos

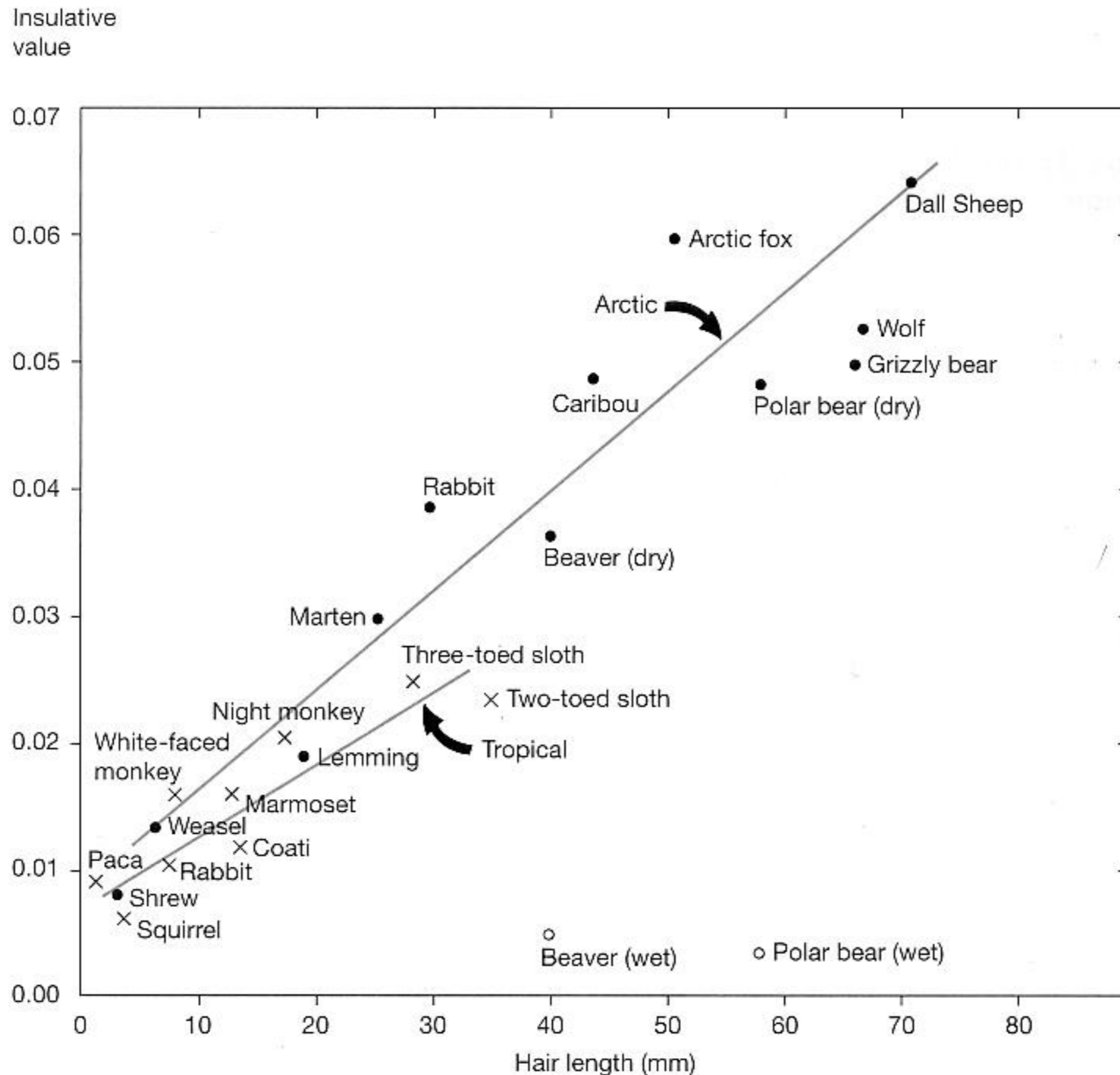




Tegumento glandular coberto por pelos

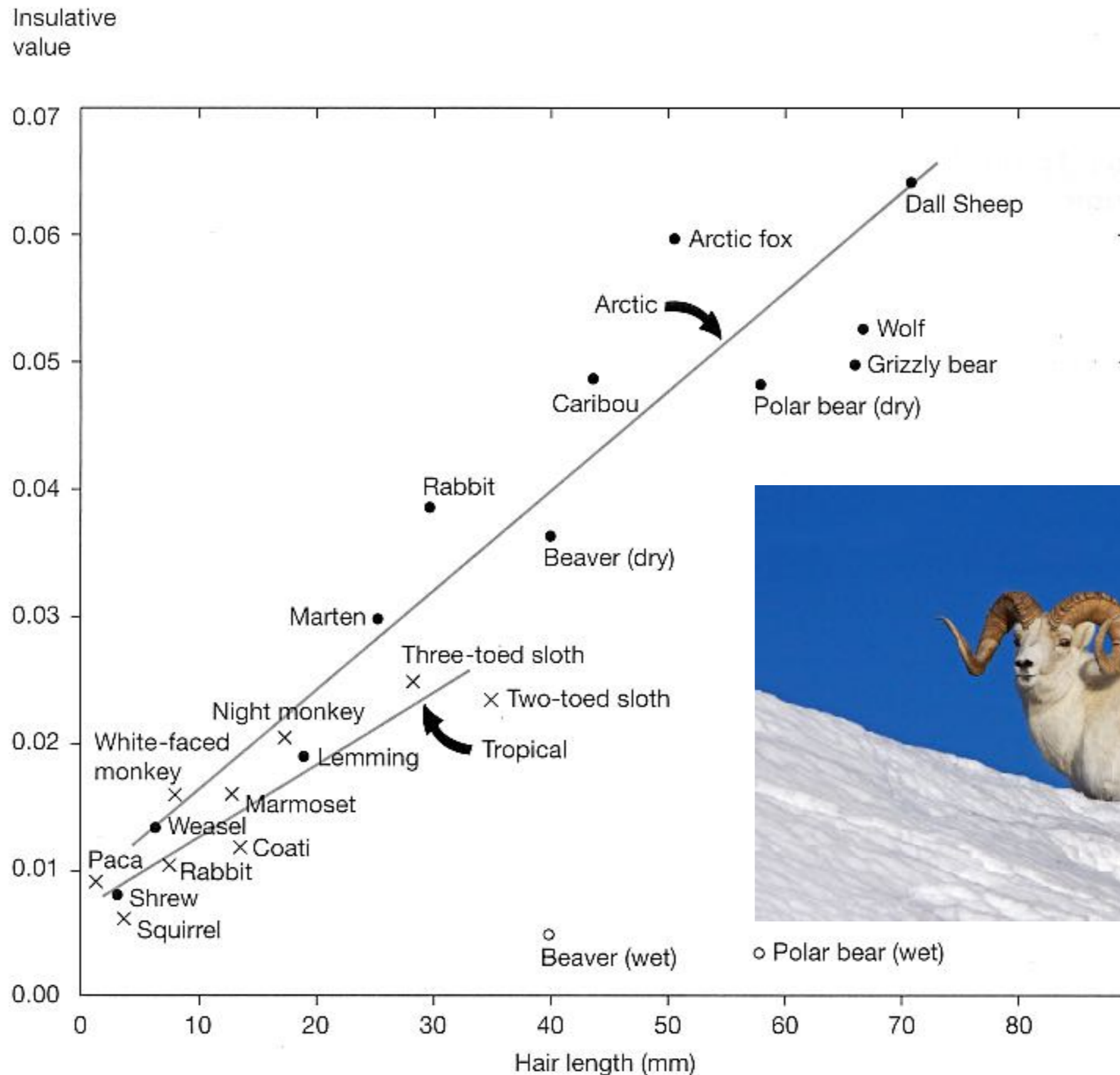


# Tegumento glandular coberto por pelos





# Tegumento glandular coberto por pelos



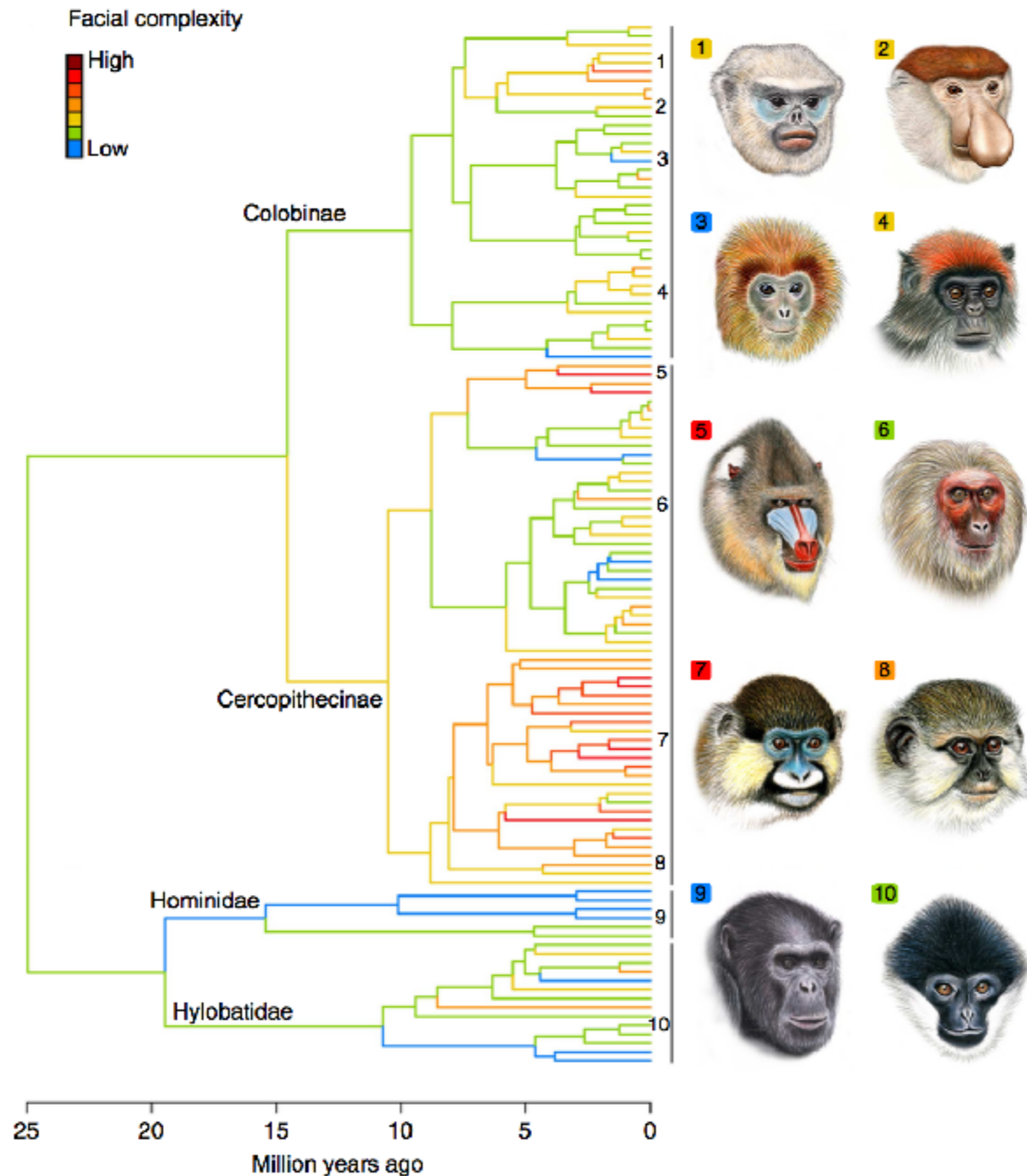


Tegumento glandular coberto por pelos





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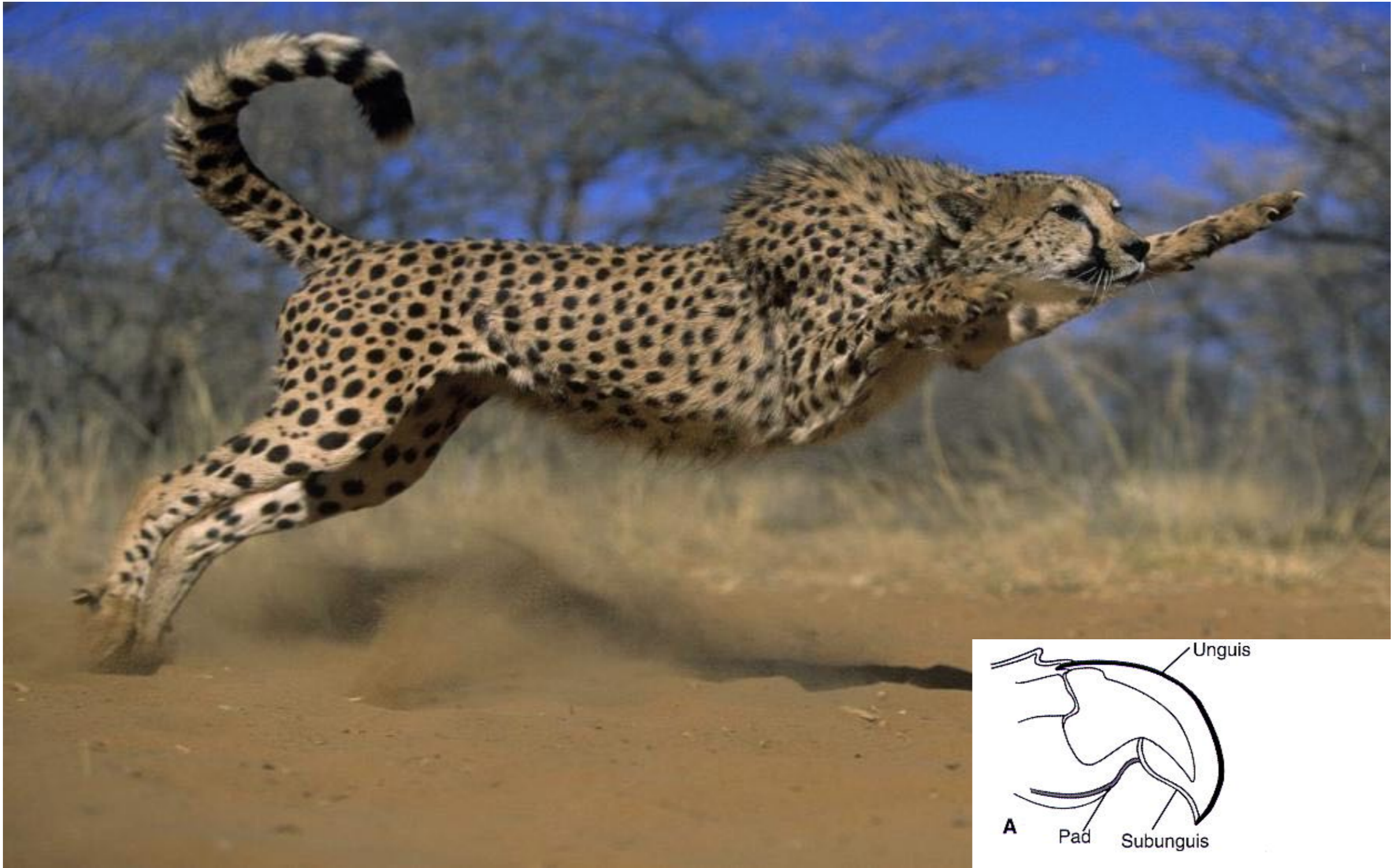


Tegumento: unhas, garras, cascos





# Tegumento: unhas, garras, cascos



Tegumento: unhas, garras, cascos





# Tegumento: unhas, garras, cascos

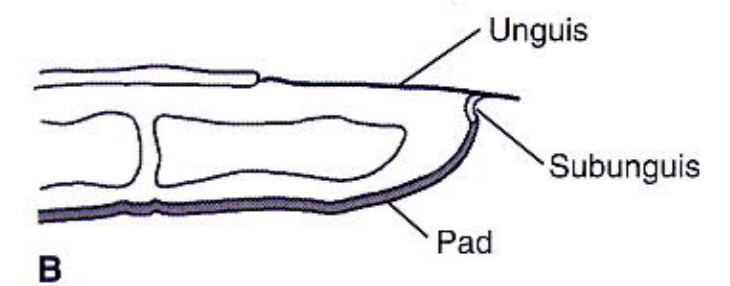


Tegumento: unhas, garras, cascos





# Tegumento: unhas, garras, cascos

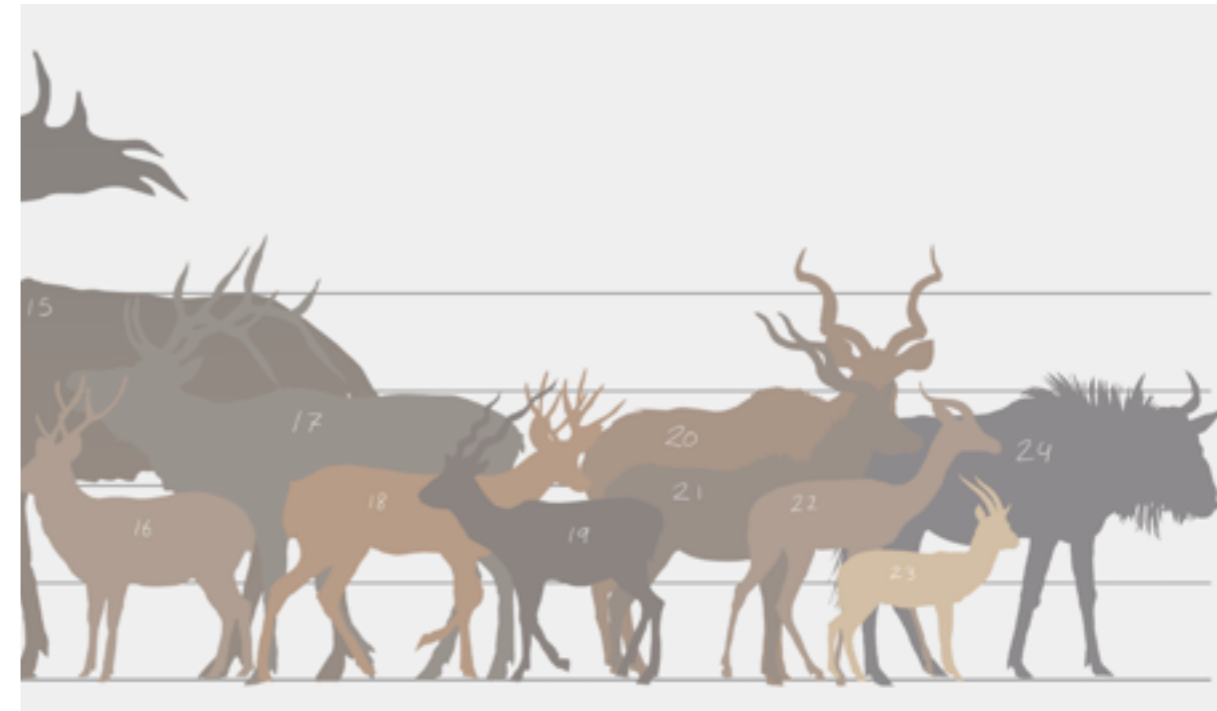


# Tegumento: chifres, cornos





# Tegumento: chifres, cornos



**Figure 1 | Horn morphology variation with *RXFP2* genotype.** Examples of adult male horn morphology with their corresponding *RXFP2* genotypes. **a**, Four-year-old normal-horned  $Ho^+Ho^+$ . **b**, Five-year-old normal-horned  $Ho^+Ho^P$ . **c**, Five-year-old normal-horned  $Ho^PHo^P$ . **d**, Three-year-old scurred  $Ho^PHo^P$ .

# Tegumento: chifres, cornos

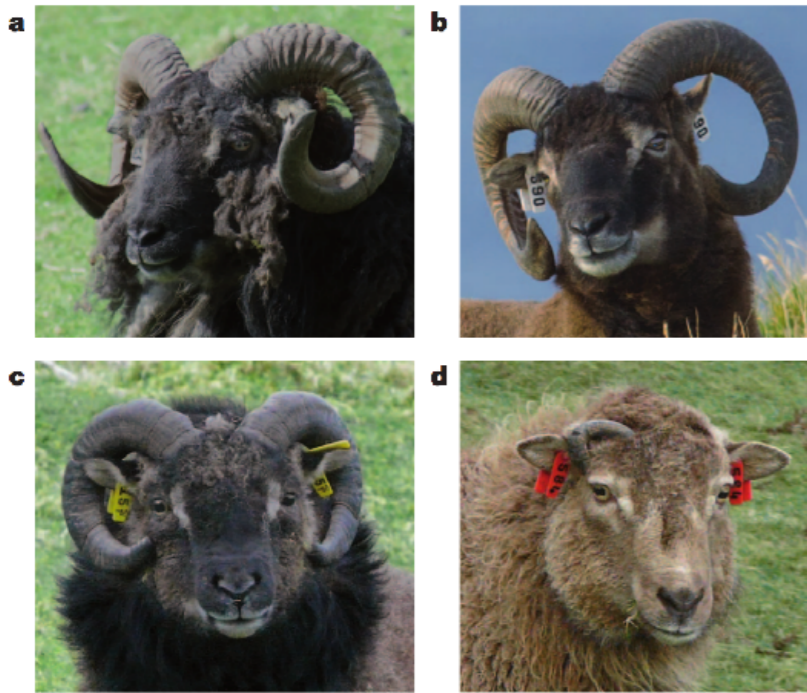
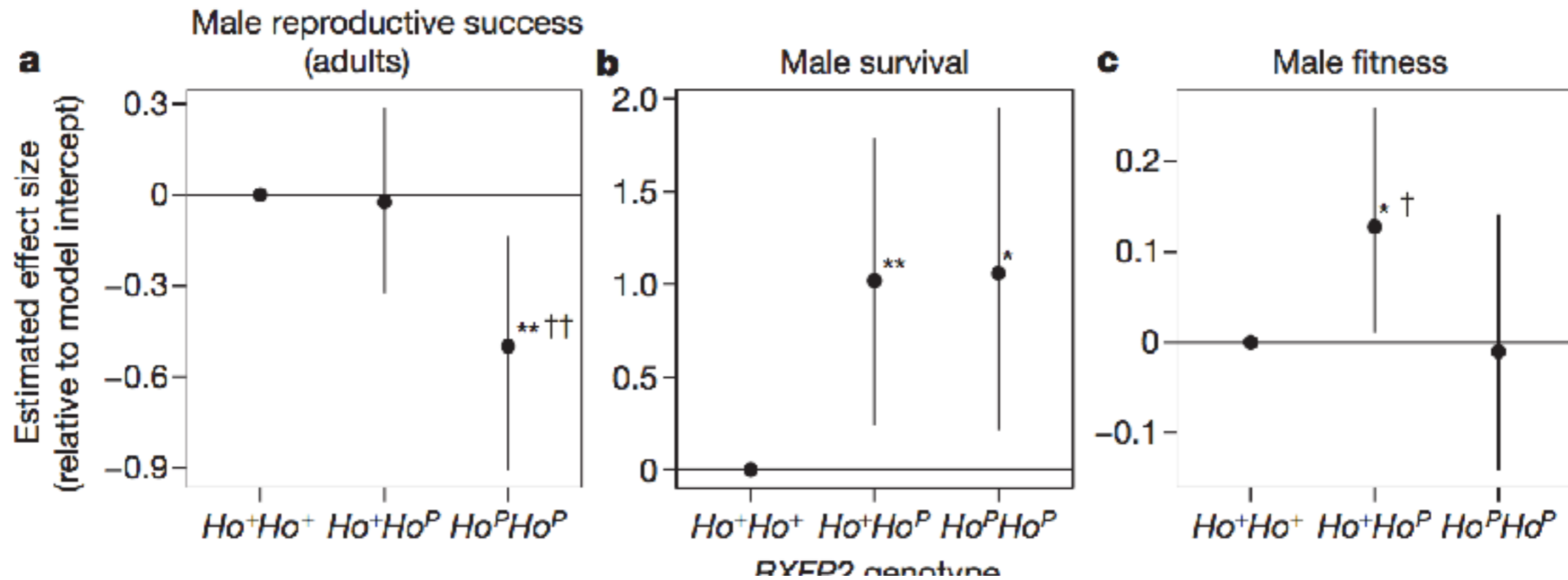


Figure 1 | Horn n adult male horn n a, Four-year-old n  $Ho^+Ho^P$ . c, Five-y  $Ho^PHo^P$ .





Tegumento: glândulas





# Tegumento: glândulas/lactação





# Tegumento: lactação





# Tegumento: lactação





# Tegumento: lactação

**Ancestral condition:  
Solitary females,  
roaming males**

This block illustrates the ancestral condition of solitary females and roaming males. It features a central diagram with a dashed circle containing five female symbols (♀) and two male symbols (♂). Surrounding the diagram are four photographs: a red squirrel, a cheetah, a striped fox, and an armadillo.

Female competition  
Female intolerance  
Low female densities

**Social monogamy**

This block illustrates social monogamy. It features a central diagram with three pairs of male (♂) and female (♀) symbols, each pair enclosed in a circle. Surrounding the diagram are three photographs: a gazelle, a mole, and a lemur.

Unpredictable environments  
Reproductive suppression  
Production of litters

**Singular  
cooperative breeders**

This block illustrates singular cooperative breeders. It features a central diagram with two large circles, each containing a pair of male (♂) and female (♀) symbols. Surrounding the diagram are three photographs: a white bear, a sloth, and a wolf pack.



# Tegumento: lactação/músculos faciais

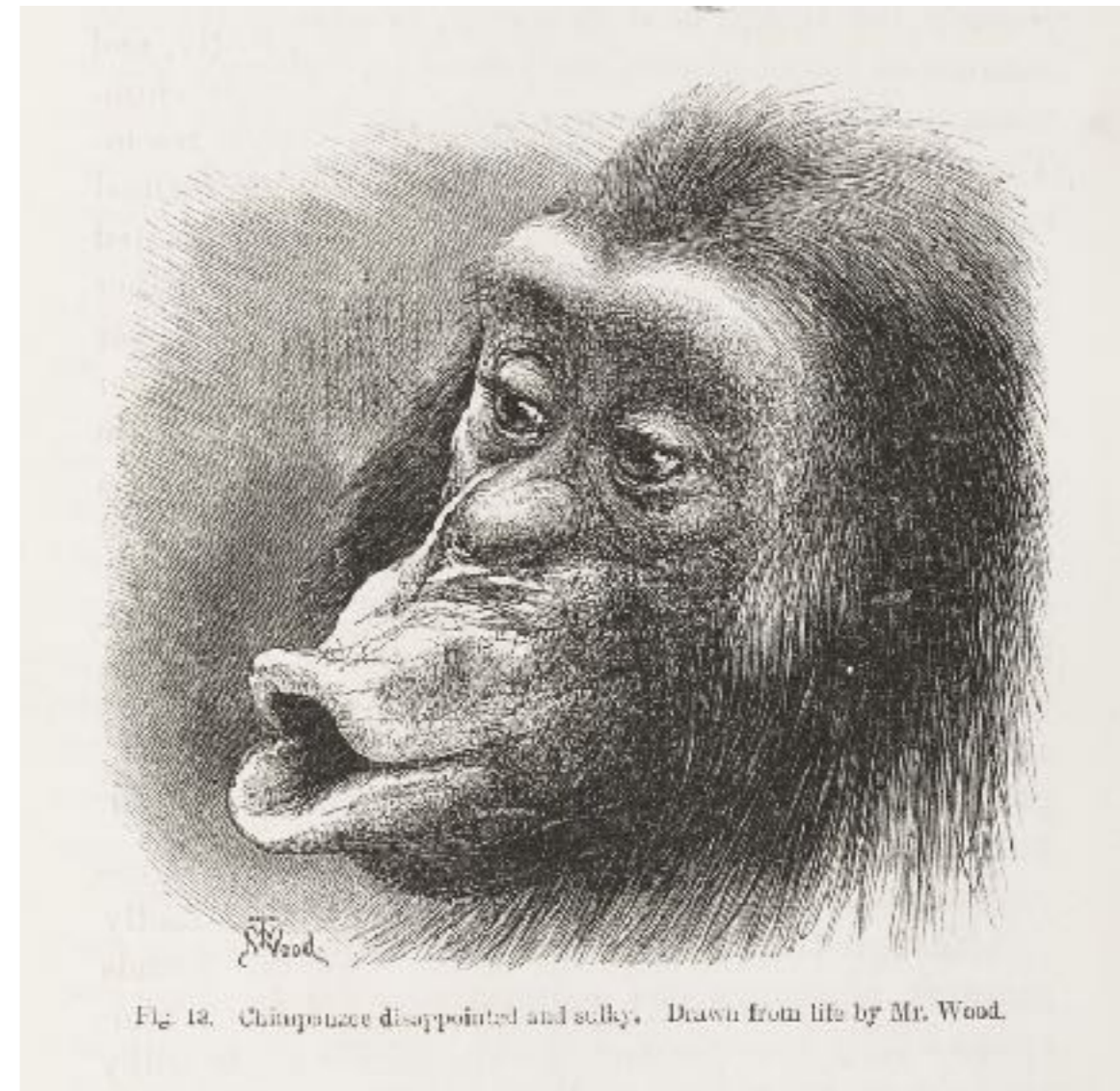
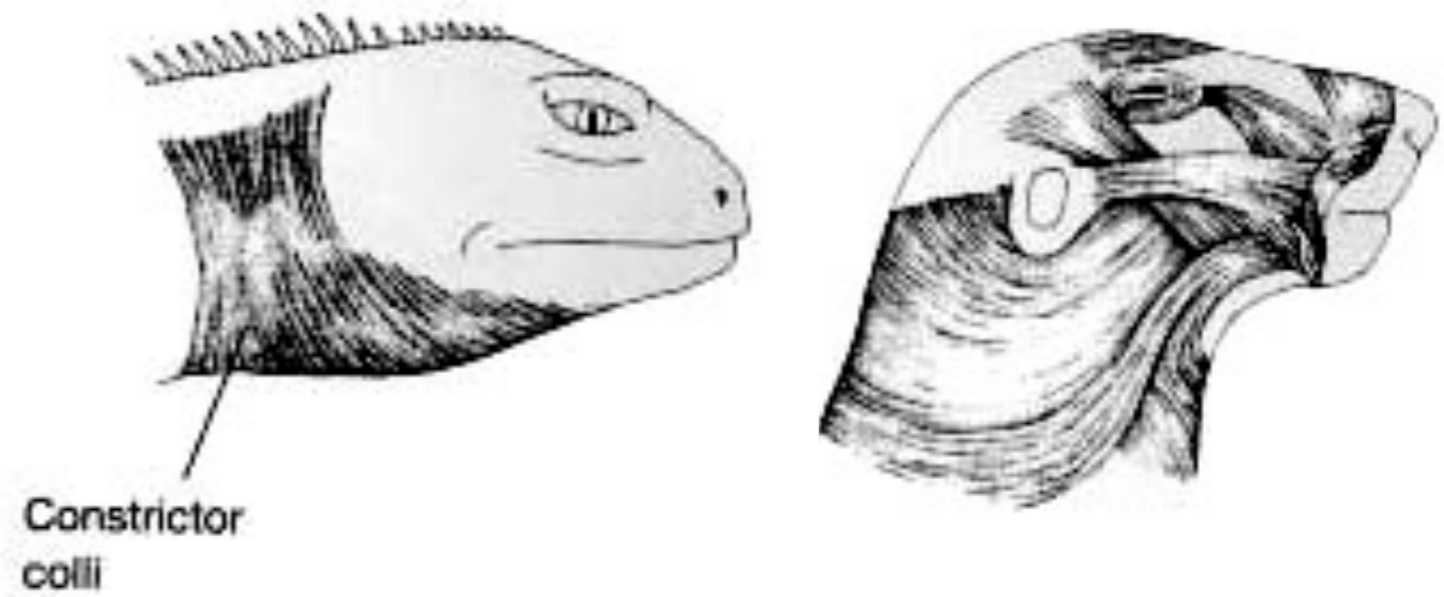
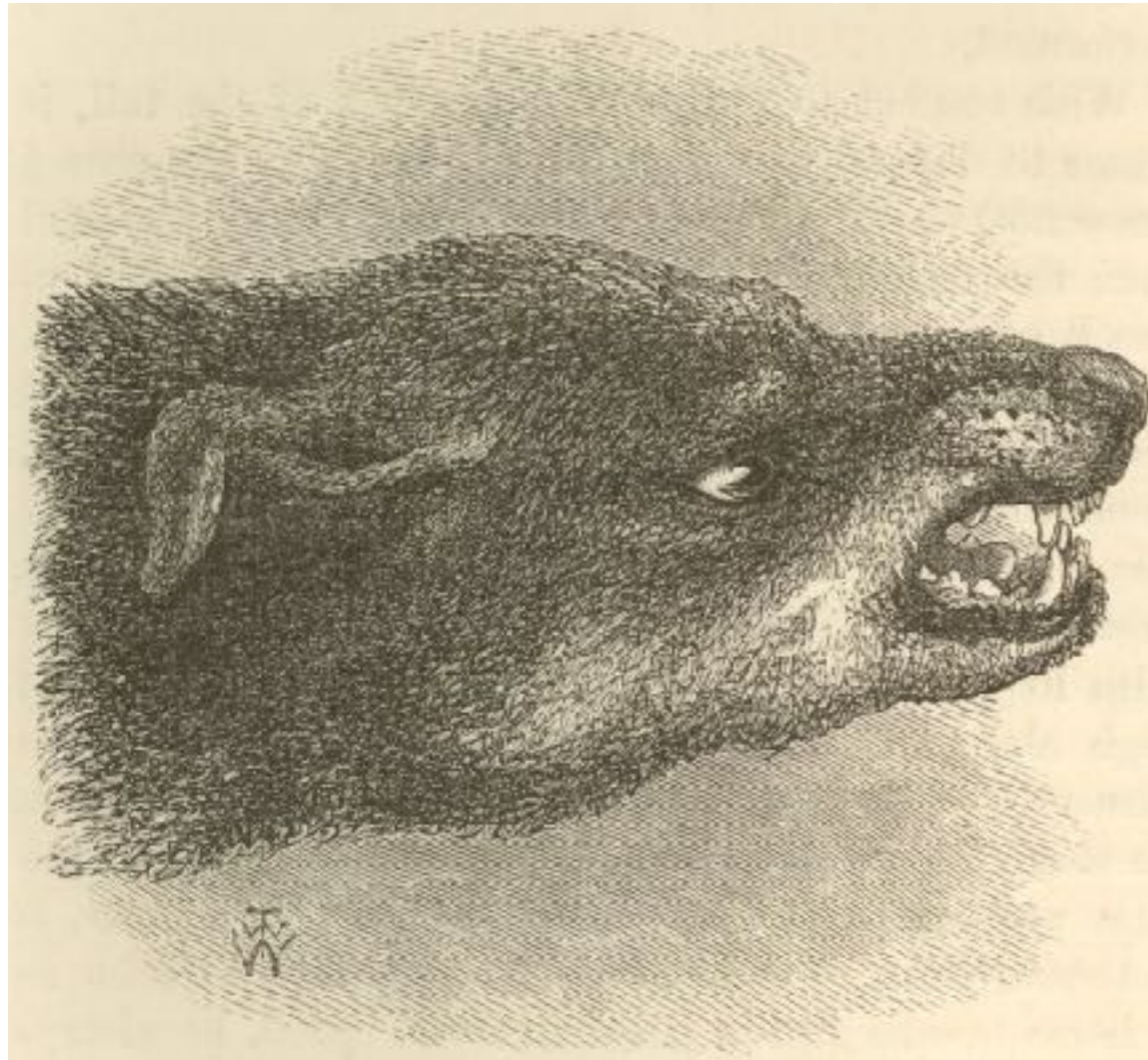


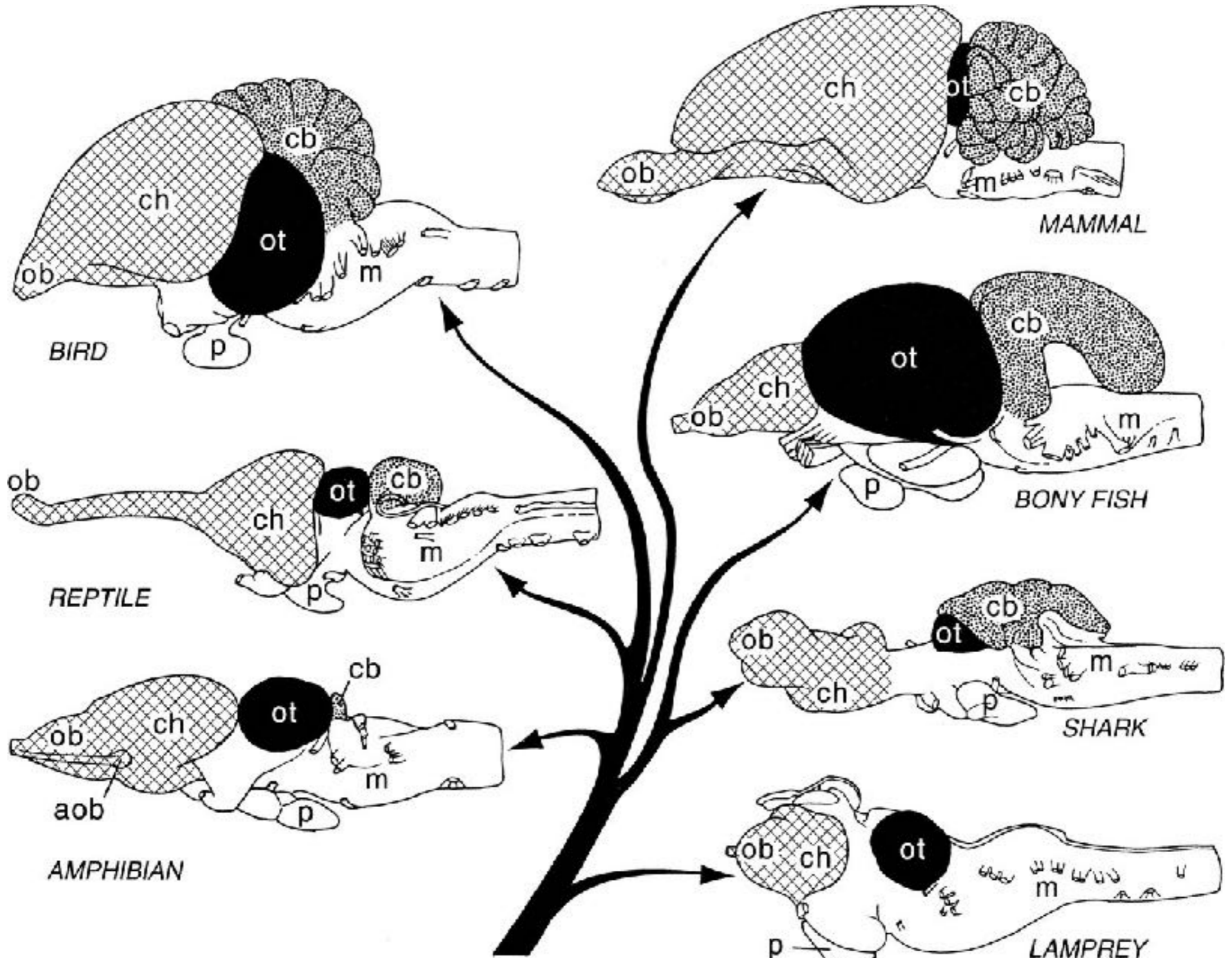
Fig. 12. Chimpanzee disappointed and sulky. Drawn from life by Mr. Wood.





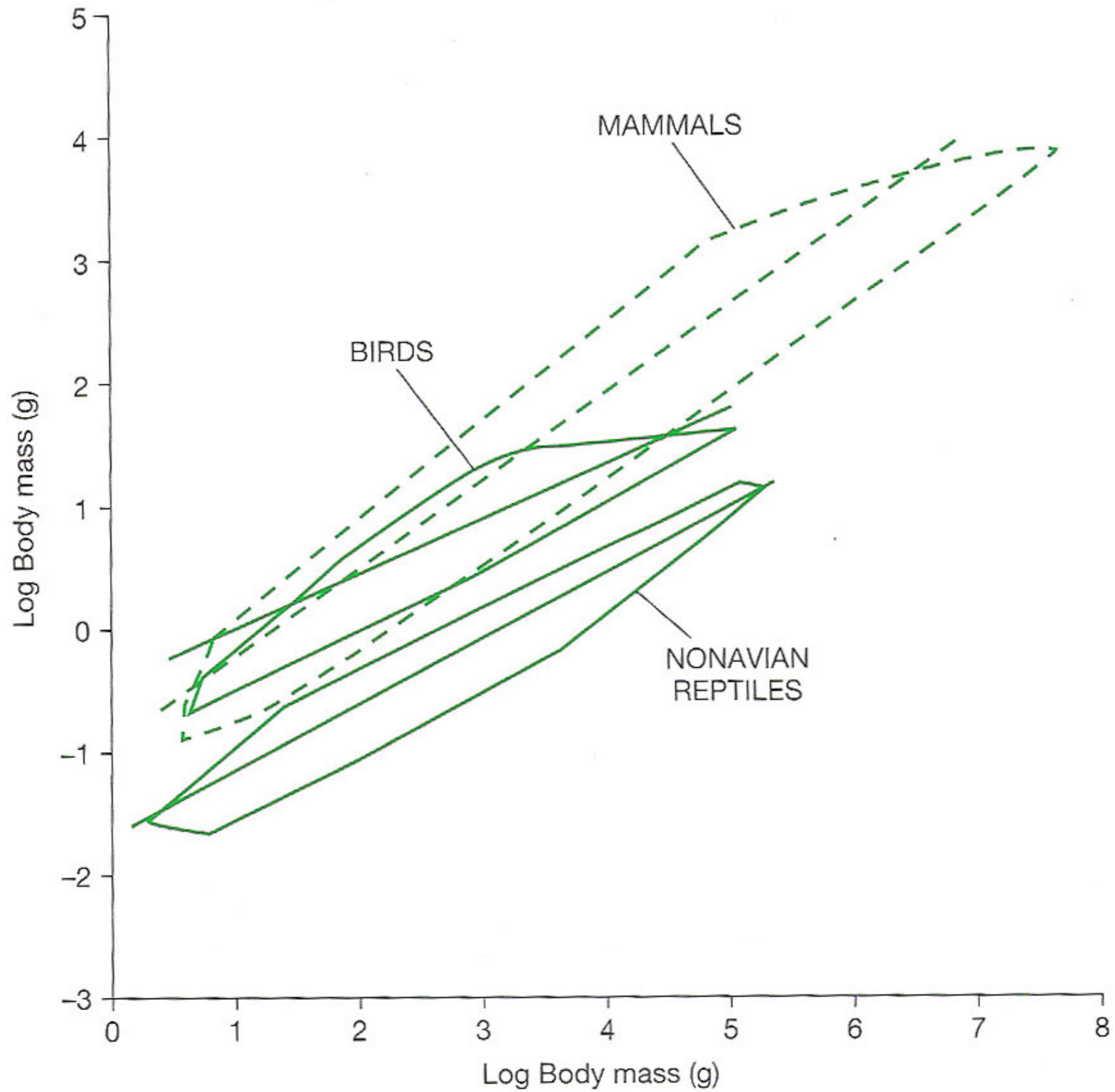
**BRAINS**

# Encéfalo

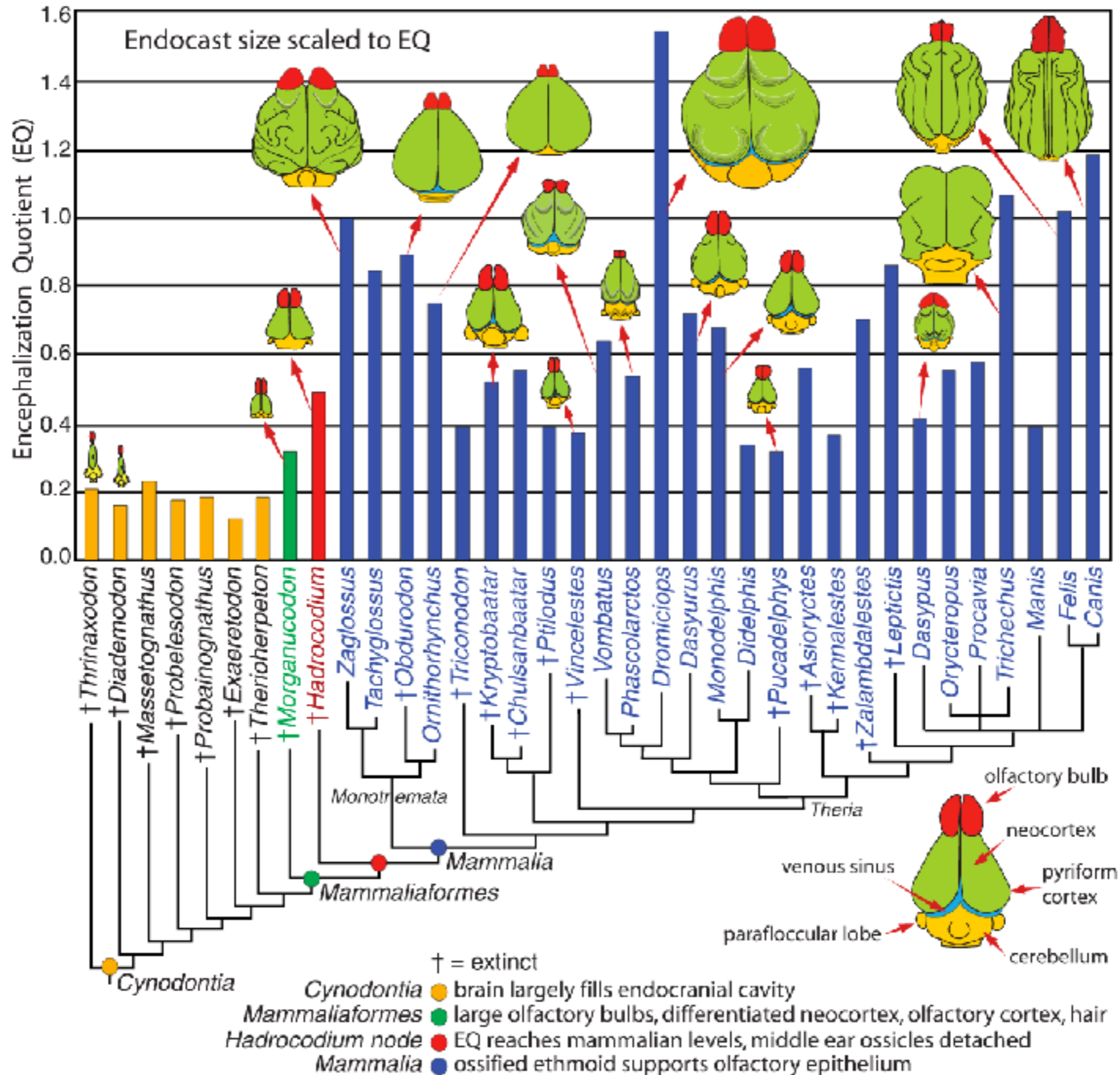




# Encéfalo

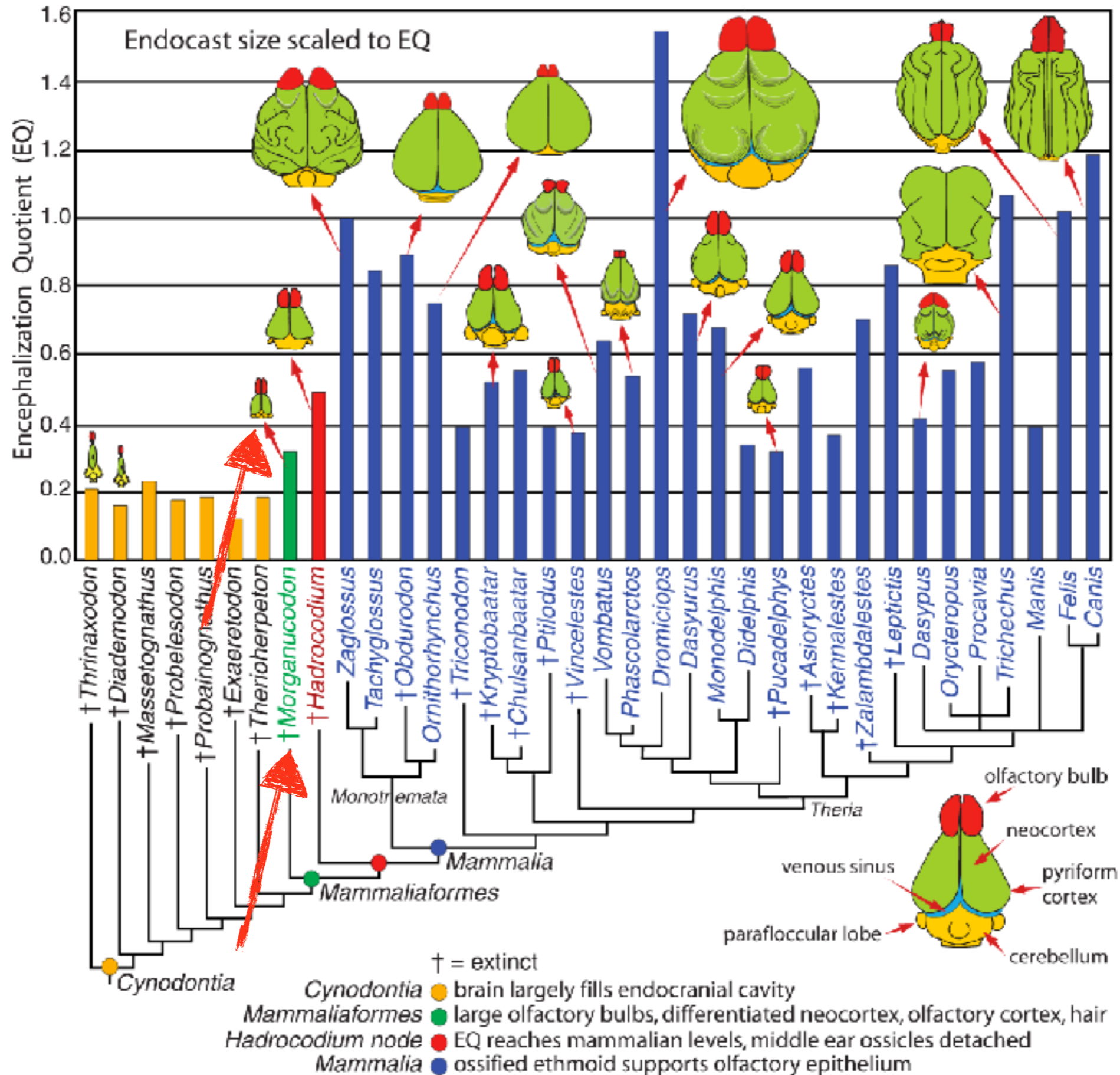


# Encéfalo

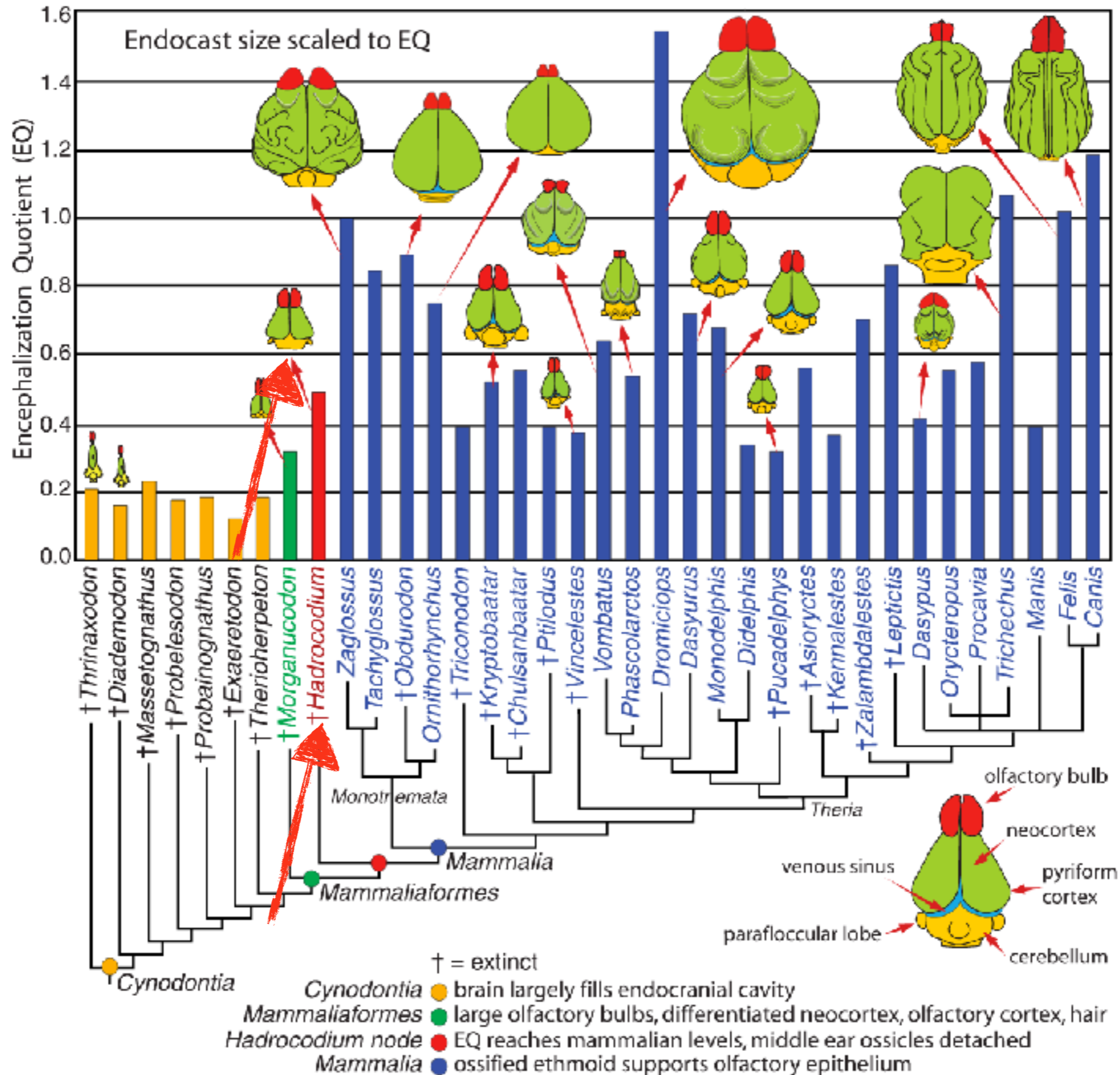




# Encéfalo

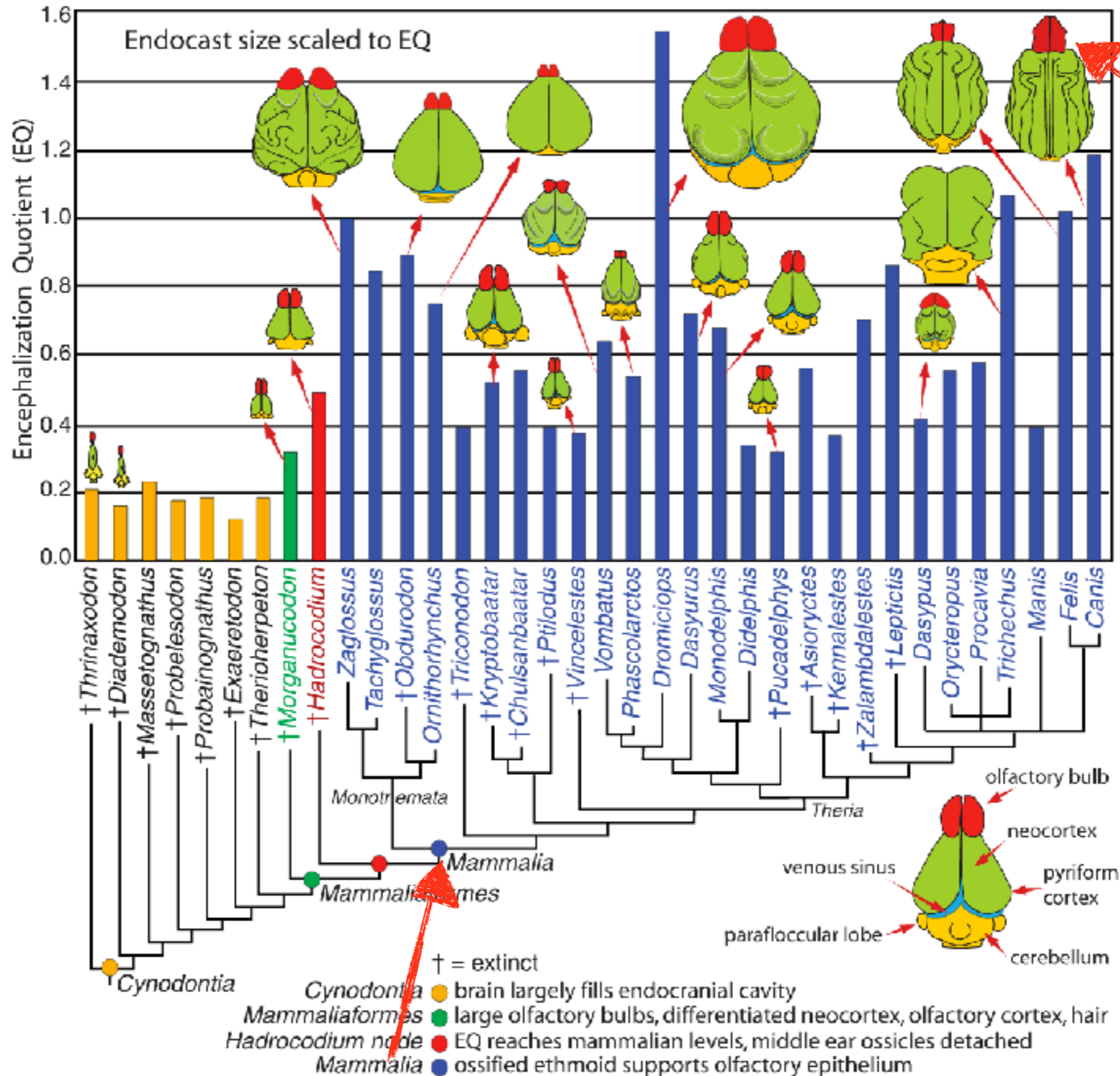


# Encéfalo





# Encéfalo



# Encéfalo

aumento nas espécies mais sociais

## **tipo de sistema social**

- habitat
- distribuição de recursos \*

## **vantagens da vida social**

- predação \*
- defesa
- comportamento aloparental - criação dos filhotes, cuidado com adultos doentes

## **comportamentos que estabilizam os grupos**

- catação \*
- marcação odorífera
- coloração da pelagem
- chifres e cornos \*
- vocalizações



# Encéfalo



*Acinonyx jubatus*



# Encéfalo

*Helogale parvula*



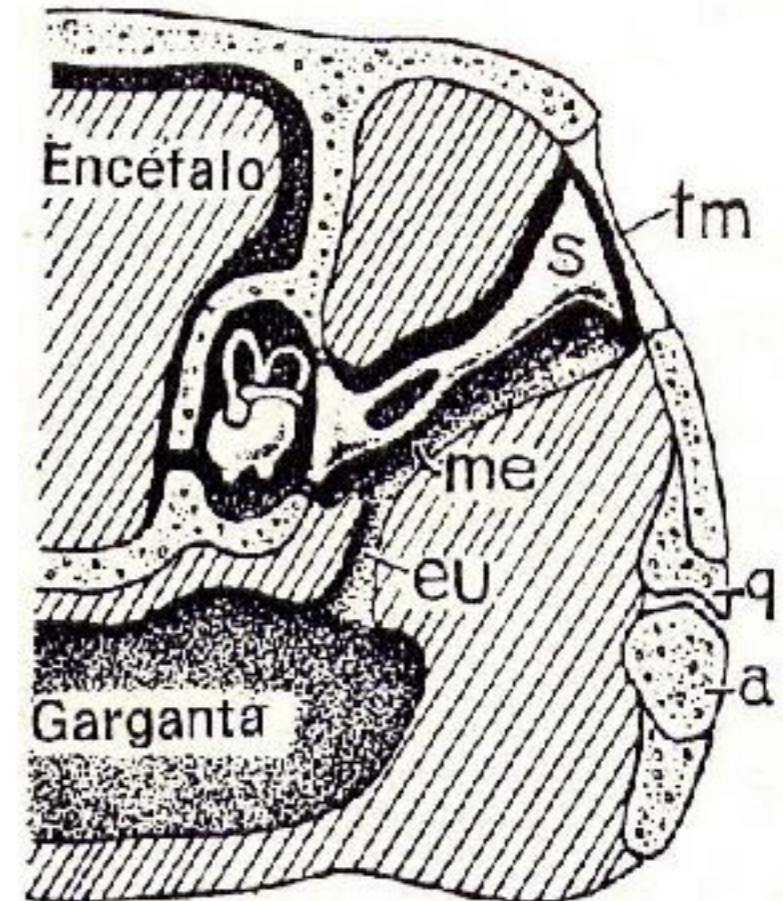
*Leontopithecus chrysomelas*



# Órgãos sensoriais



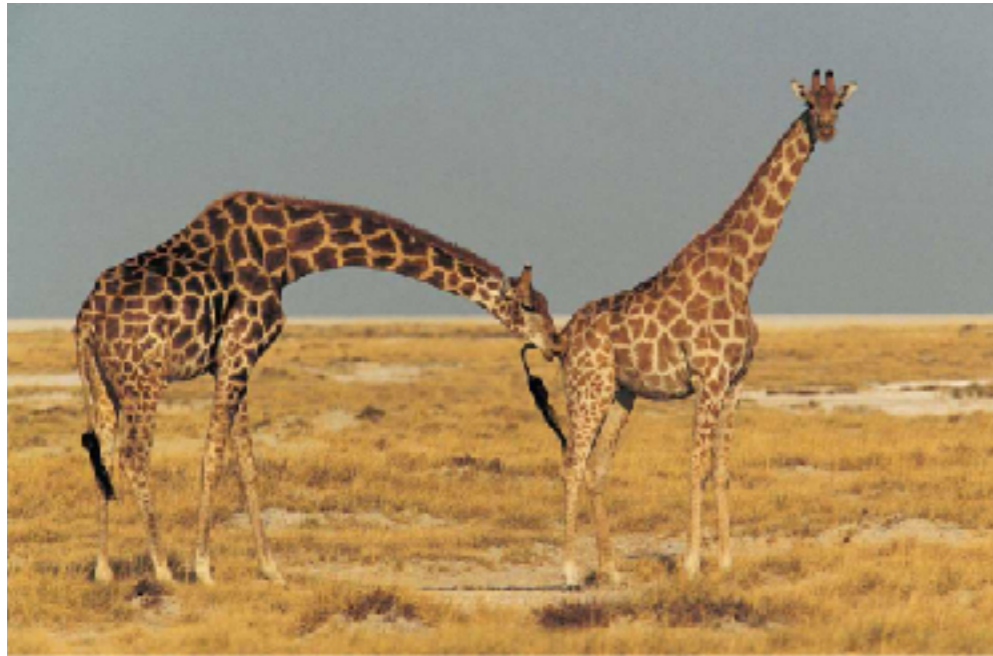
mamífero



amniota generalizado



# Órgãos sensoriais



*Oreotragus oreotragus*



*Tupaia belangeri*



*Hydrochaeris hydrochaeris*



✓

## Sauropsida

(diurnos, visão, coloração e movimento)



# Estilo de vida comum dos mamíferos

- apenas dentário
- articulação dentário-esquamosal
- dentição heterodonte/ difiodonte/ oclusão perfeita

tecido adiposo

sistema respiratório, circulatório e excretor eficientes

ativos – endotérmicos

tegumento glandular coberto por pelos

camuflagem

lactação, músculos faciais

comunicação por  
marcação odorífera

cuidado parental  
materno

cérebro grande e olfato e  
audição bem desenvolvidos

sistemas sociais e de acasalamento

comportamento complexo,  
comunicação baseada no olfato