


Morganucodon (*Intermediate Form*)



Make a hypothesis about the connection between mammal ear bones and reptilian jaw bones:

Nutrition & the Digestive System

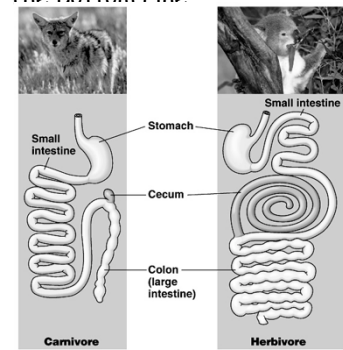
The Bottom Line

Bottom Line:

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Why?

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Small intestine

Stomach

Cecum

Colon (large intestine)

Carnivore

Herbivore

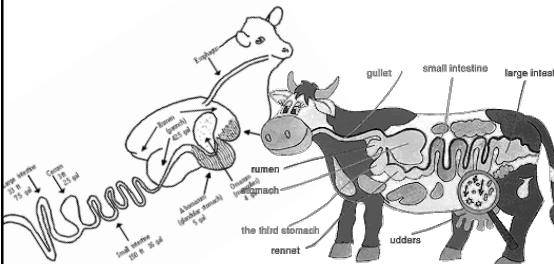
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Nutrition & the Digestive System

- Mammals digestive systems are specialized (teeth) for a variety of needs
 - Ruminants- most herbivores
 - Eat plant material containing cellulose that is hard to digest
 - Have very large digestive tracts that aid in digestion of cellulose. (this is why these animals have very large bellies)

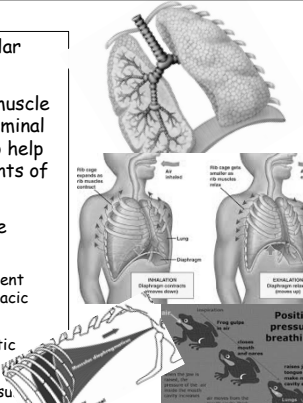
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- Most have 4 stomach chambers filled with special bacteria that help break cellulose down
- Will regurgitate or "chew cud" to continue breaking down cellulose
- Some will eat their fecal pellets (rabbits, elephants) to get more nutrients from the plants they eat



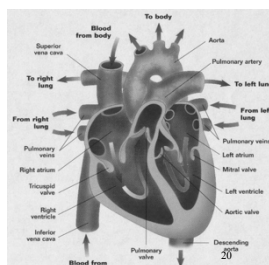
Gas Exchange

- Have larger, more vascular lungs
- Have a diaphragm- the muscle that separates the abdominal and thoracic cavities- to help in drawing in large amounts of air at a time
- Uses a negative pressure system (pulls air in)
 - Diaphragm muscle movement changes pressure of thoracic cavity in mammals
 - Liver pulls in coxcs (hepatic piston)
 - Frogs use a positive pressure




Circulation

- Have a four chambered heart
- Keeps oxygenated blood & deoxygenated blood separate



Temperature Regulation

1. Endotherms
2. Maintain warmth-
 - A. hair
 - B. fat deposits-blubber
3. Cool off-
 - A. panting
 - B. sweat glands
 - C. large ears to dissipate heat (rabbits & elephants)
 - D. nocturnal




Cutting blubber cubes from seal to test for contamination (bioaccumulation)

Mammal Reproduction

MAMMALS

- give birth to live young
- have hair or fur
- mammal mothers nurse their young with MILK.
- warm-blooded

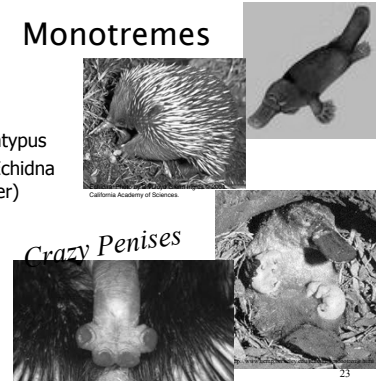


Monotremes

- Three living monotremes
 - Duckbilled platypus
 - 2 species of Echidna (spiny anteater)

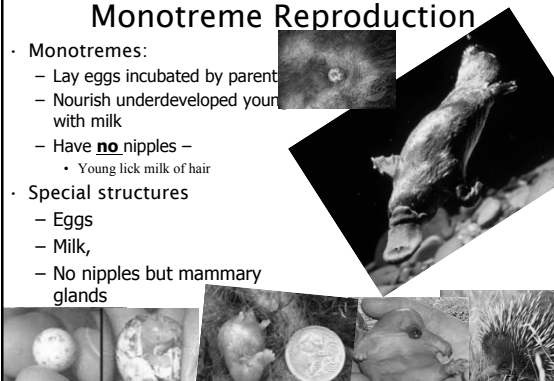
California Academy of Sciences.

Crazy Penises

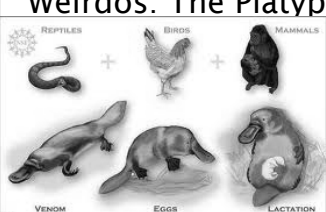



Monotreme Reproduction

- Monotremes:
 - Lay eggs incubated by parent
 - Nourish underdeveloped young with milk
 - Have **no** nipples -
 - Young lick milk of hair
- Special structures
 - Eggs
 - Milk,
 - No nipples but mammary glands

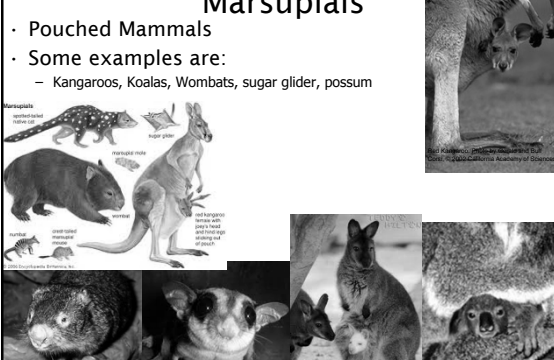


Weirdos: The Platypus (a monotreme)

Marsupials

- Pouched Mammals
- Some examples are:
 - Kangaroos, Koalas, Wombats, sugar glider, possum



Marsupial Reproduction

- Marsupials give birth to live young
 - Offspring are under-developed
 - Continue to grow in pouch
 - Attached to nipple
- Nourished by milk
- Special structures
 - Nipples
 - Pouch
 - Mammary Glands



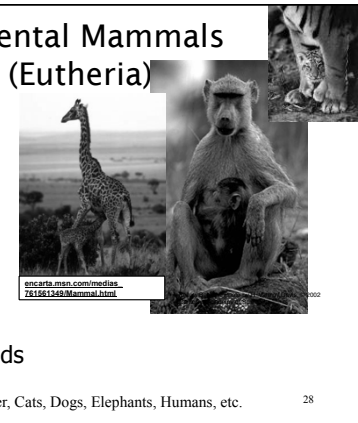
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Placental Mammals (Eutheria)

Most mammals reproduce with placenta.

- Special structures
 - Uterus
 - Placenta
 - Nipples
 - Mammary Glands


A few examples are:
- Giraffe, Monkeys, Tiger, Cats, Dogs, Elephants, Humans, etc.



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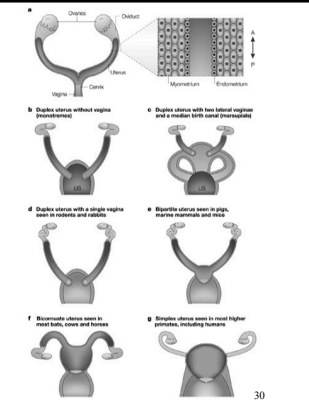
Placental Reproduction

- Placental mammals give birth to live young
- Young develop in uterus and are nourished by the placenta
- Placenta - allows diffusion of nutrients and oxygen into the fetus
- MEGA INVESTMENT:
 - Long gestation period: - time when fetus is developing
 - Nourished by milk through nipples after birth



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Compare the uteruses



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