# Evolution of the Respiratory System: Through Different Organisms

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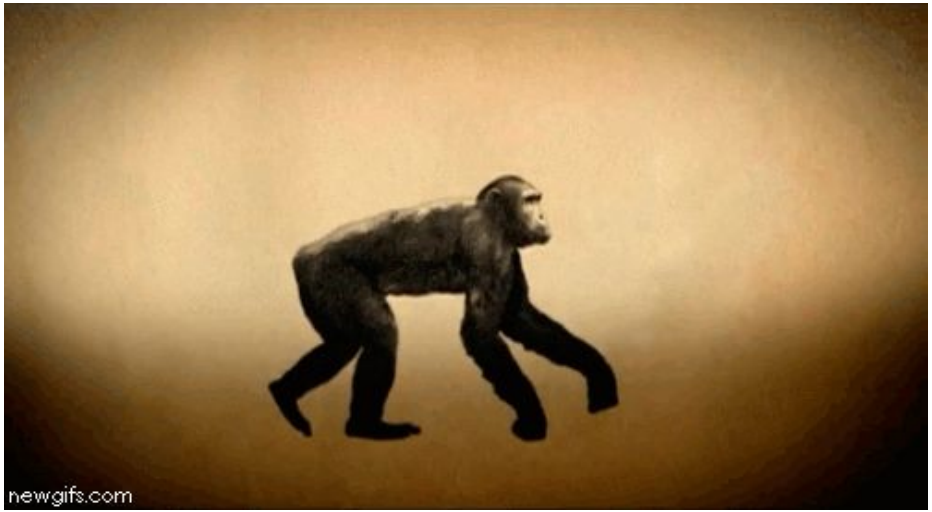
# *Purpose of this presentation?*



# *Organism #1: The Rana Pipiens Frog (AMPHIBIAN)*

- Structure and Function

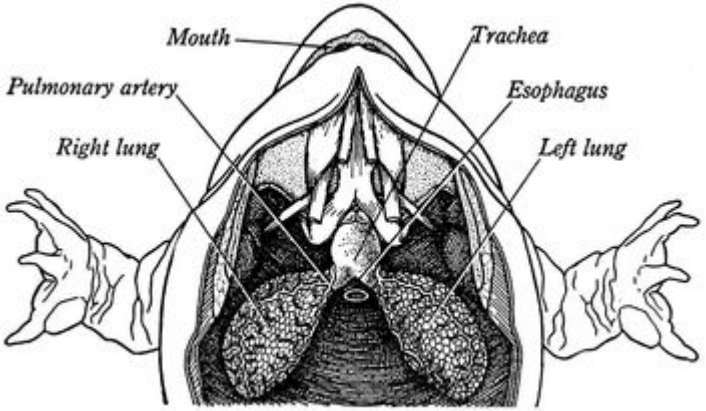
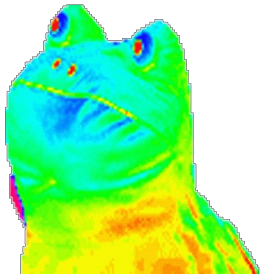
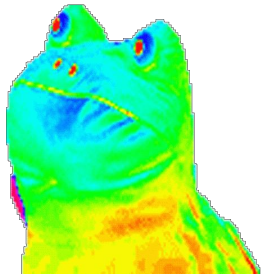



FIG. 388. *Lungs of Frog*

# *Evolution of the Rana Pipien: How and Why?*

- Frogs first born are known as tadpoles. Before the tadpole, was the lungfish which was how the tadpole developed/came to be.
- Based off selective pressure and genetics, tadpoles began making a hormone that turns on various genes allowing itself to grow legs and arms, losing their tails and gills and begin to breathe air through their lungs, developing into a frog. This is the reason why frogs have the ability to use their lungs to leave the water and also live on land and breathe in water through their skin.
- Selective pressure : being able to breathe underwater and land for survival





# *Advantages and Disadvantages*

- Hind limbs allow frogs to swim and not just provide extra jumping power on land

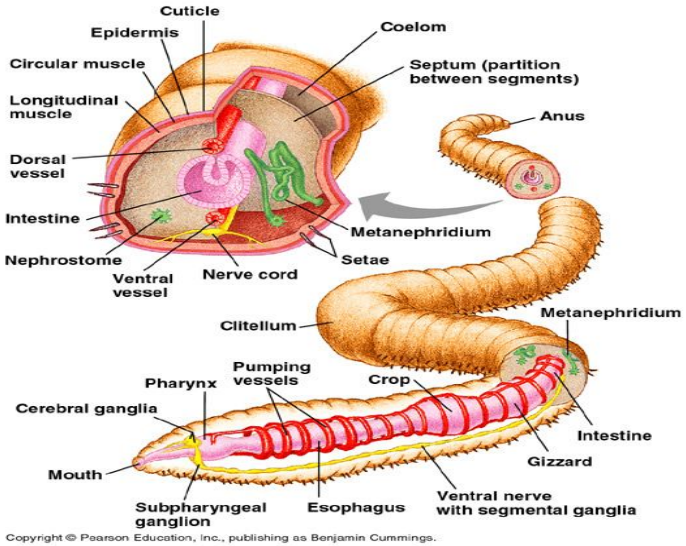
- Frogs moist skin cause gases and liquids to pass through the body which can be a disadvantage although it allows the frog to cary normal respiration.

# *INTRODUCTION OF ANNELID WORM*

The worm is apart of the Animalia kingdom and the phylum is an Annelid. The class the Annelid worm is from is Oligochaeta and the family is the Lumbricoide. The Annelid worms habit is wet moist soil for the worms to survive in. Worms were our first organism that we looked at in our respiratory cladogram.

# *THE STRUCTURE AND FUNCTIONS*

The Annelid worm has 5 hearts that blood through the ventral and dorsal vessels. That allows for oxygen to go through the worm's skin and carbon dioxide to go out.The ventral vessel changes the oxygen that's coming from the dorsal vessel into carbon dioxide. The dorsal vessel takes in the oxygen through the skin and is traveled to the ventral vessel.



# *ANNELID WORM: DISADVANTAGES & ADVANTAGES*

## Disadvantages

- Their skin has to stay moist, for them to be able to breathe.
- They do not have any lungs, they breathe through their skin.

## Advantages

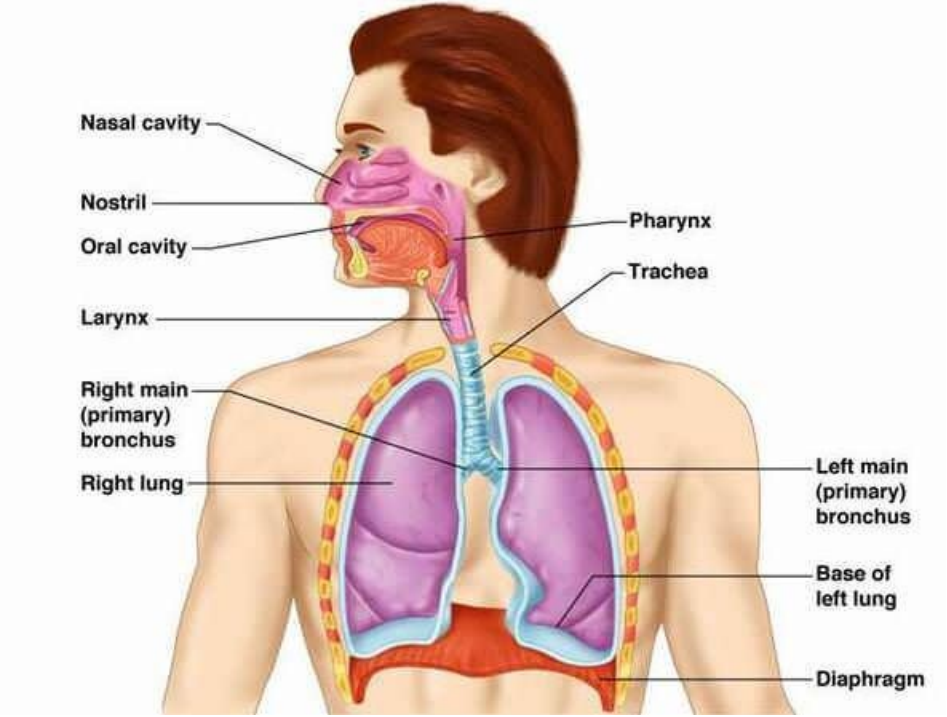
- They’re able to be underground and not suffocate themselves
- Worms are able to moisture themselves, that’s called Aestiviation.

# *Evolution of the Annelid Worm: How and Why?*

- Selective pressure: Worms have to stay inside soil so their skin can stay moist. If the worm goes out of the soil then they'll go out at night.
- The worm can now breathe on land and underground. This evolution allows for the worm to hid away from predators.
- Worms are able to keep themselves moist because of aestivation. This evolution allows for the worm to stay moist and moisture themselves. So they won't dry out.
- A worm has a very simple respiratory system, they do not have lungs. Worms are able to breathe through their skin. When the oxygen is taken in through the skin it's taken into the circulatory system. Then Carbon Dioxide is released through the skin. Oxygen and Carbon Dioxide pass through the worm's skin by diffusion. Diffusion can only happen if the worm's skin is moist. If the worm's skin dries out then the worm would suffocate.

# Humans (Homo Sapiens)

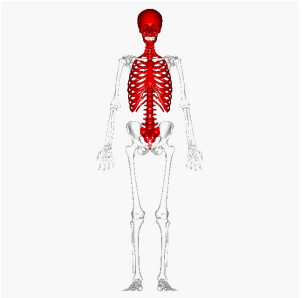
Structure and Function



# Evolution of the Homo Sapien

Humans are first formed as embryos where they originally have a tail, eventually sprouting limbs and then losing their tail before birth.

Based off selective pressure and genetics, humans have ancestors of fish in which they originally had gas bladders, Lung eventually developed tiny pockets alveoli and were covered in blood vessels to promote gas exchange.



Selective Pressure: When humans are able to reproduce they are known as survivors and bring on the next set of generation.

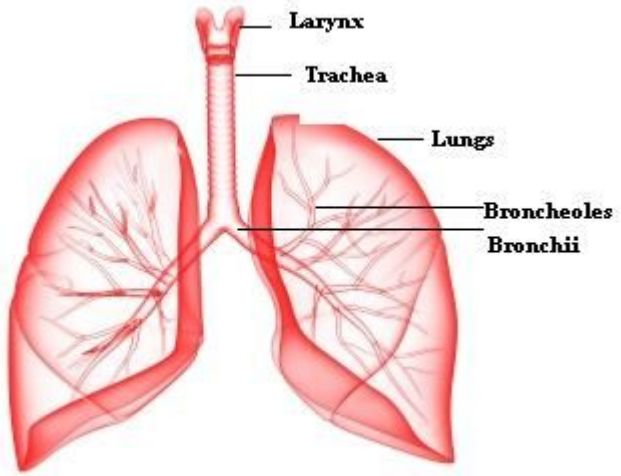
# Advantages & Disadvantages

Homo Sapiens

The human breathing system helps reduce water loss and our energy is savored by having blood vessels shorten their diffusion distance.

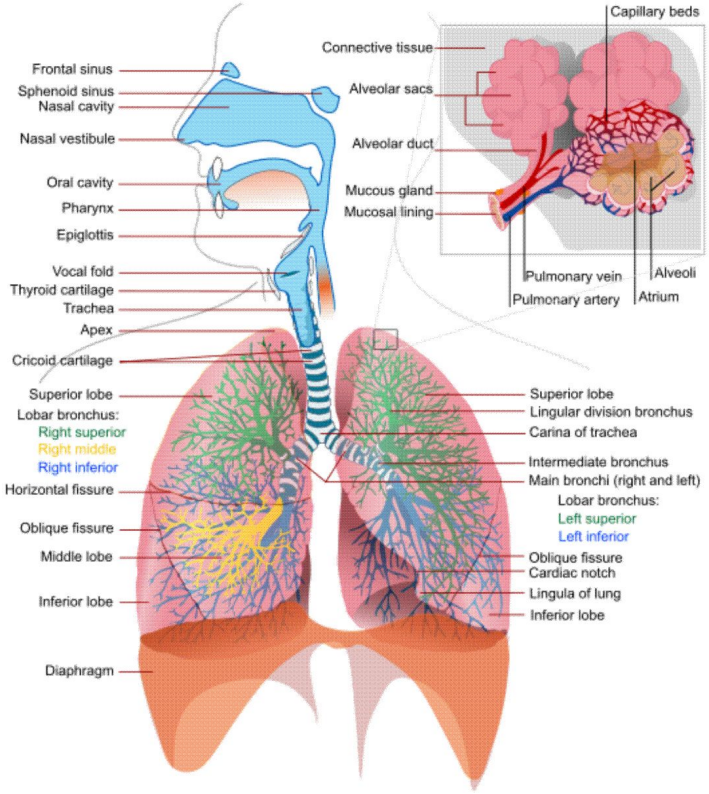
Humans have big brains and opposable thumbs, this has allowed us to build and change the world dramatically. Our larynx or voice boxes sit lower than chimpanzees this allows us to articulate our words when speaking. Our upward posture allow us to use our hands and legs in locomotion.

Human disadvantage is that we must stay hydrated in order to breathe everyday.

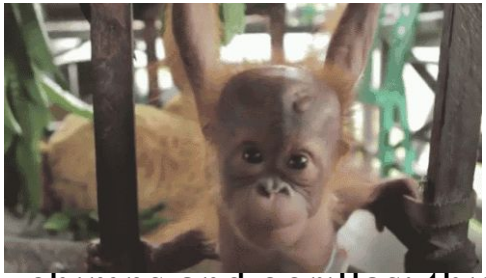


# Orangutan (Pongo)

## Structure and Function



# Evolution of the Pongo



Orangutans developed from the primates of great apes, chimps and gorillas; this is the same group of primates humans evolved from which was a orangutan-like ancestor who originated in Africa. Orangutans have hands that are constructed for their environment where they are climbing amongst canopy trees day in and day out.

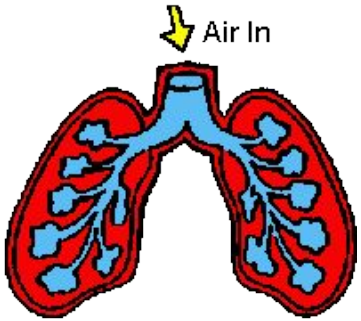
Selective Pressure: An orangutans brown like skin is no coincidence, it is the color of the trees they live among and used to hide from predators.

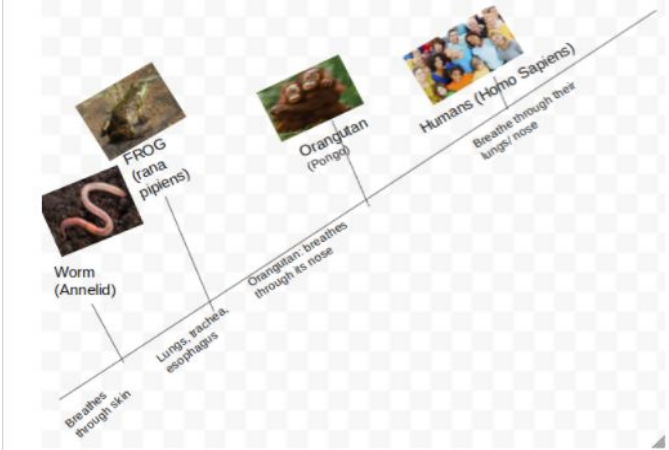
Like Humans, orangutans share the same respiratory system. One of their major similarities is the nasal cavity. The cavity keeps or nose moist so that we avoid nosebleeds; this is a place hair can also be found where its job is to block dirt and debris from getting into their lungs.

# Advantages & Disadvantages

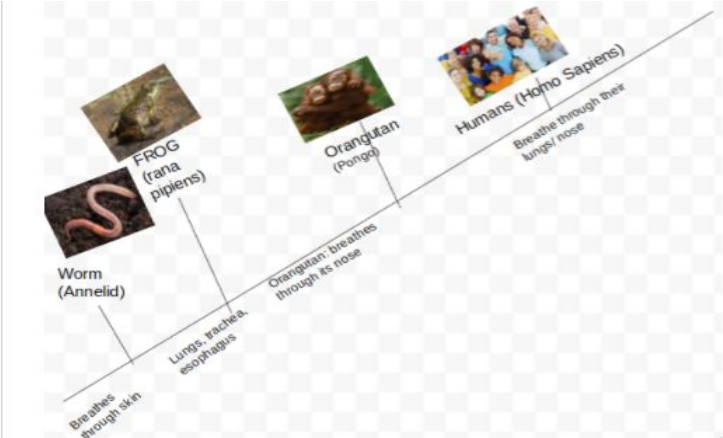
Orangutans have cupped hands and this helps them climb canopy trees. Their lungs help them exchange gases and store oxygen throughout their day. Their respiratory system is just like the human form.

Orangutans need to stay dehydrated to keep a stable breathing pattern, lucky they live near water to maintain.






# *How have these organisms changed over time?*



# Evolution

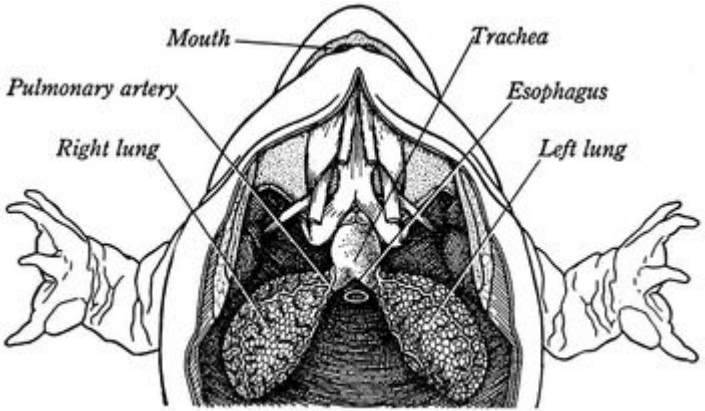
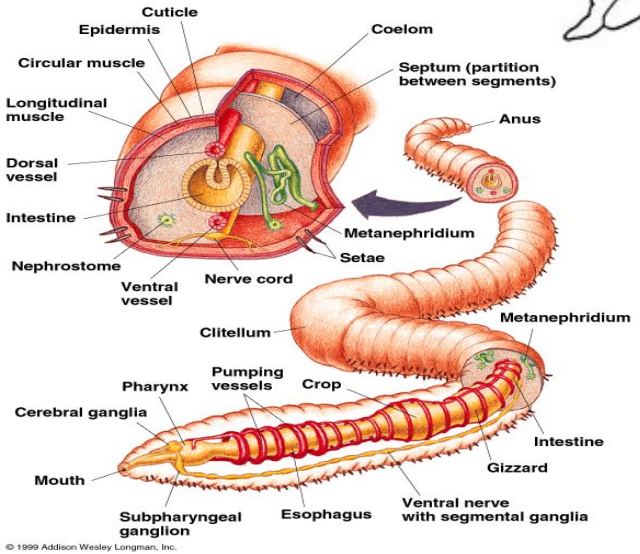
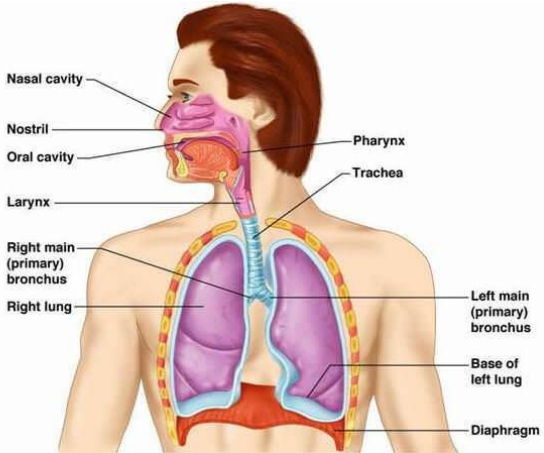



FIG. 388. *Lungs of Frog*



# *THINGS WE LEARNED!*

# Citations

Figure 2f from: Menezes E, Bravo F (2015) A New Species of Margaromantis Piza, 1982 (Insecta: Mantodea) from Brazil. Biodiversity Data Journal 3: e4343. Https://Doi.org/10.3897/BDJ.3.e4343." doi:10.3897/bdj.3.e4343.figure2f.

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frog/worm assignment/dissection