Similarities of Frogs & Humans

Updated March 13, 2018 *By Audrey Farley*

Despite belonging to two different classes within the animal kingdom, frogs (Class: Amphibia) and humans (Class: Mammalia) share similar anatomies and systems. Humans can't live out their childhoods under water like frogs can but our basic needs and bodily functions are comparable.

Body Structure Similarities

Although each may look quite different, frogs and humans have skin, bones, muscles and organs. The head of both frogs and humans contains the brain, mouth, eyes, ears and nose. Frogs possess teeth and a tongue, like humans, but their teeth are weak and function to hold prey rather than chew it. The chest and abdomen of frogs and humans house the other major organs, while the limbs of both enable locomotion.

Common Organ Functions

Frogs and humans share the same basic organs. Both have lungs, kidneys, a stomach, a heart, a brain, a liver, a spleen, a small intestine and a large intestine, a pancreas, a gall bladder, a urinary bladder and a ureter. Males and females of each species have testes and ovaries respectively. On the whole, their organ structure is similar, but frogs have considerably less complex anatomies. They do not have ribs or a diaphragm.

Vertebrate Nervous Systems

Frogs and humans have similar systems, including nervous, circulatory, digestive and respiratory. Both are classified as vertebrates, with a spine and nerves that spread across the body. Both frogs and humans have very developed senses of hearing, managed by the nervous system. However, frogs can only detect high-pitched sounds with their ears; they detect low-pitched sounds through their skin. Both frogs and humans also have well-developed senses of sight and smell.

Circulatory, Digestive and Respiratory Systems

Both creatures possess a circulatory system, which operates as the heart pumps blood throughout the body. However, frogs have a three-chambered heart, with two atria and one ventricle compared to the human's two atria and two ventricles. Additionally, frogs and humans have similar digestive and respiratory systems. Although frogs, as adults, inhale and exhale through the mouth only (while humans inhale and exhale through the mouth and nose), the internal organs involved in the respiratory process function in much the same way.

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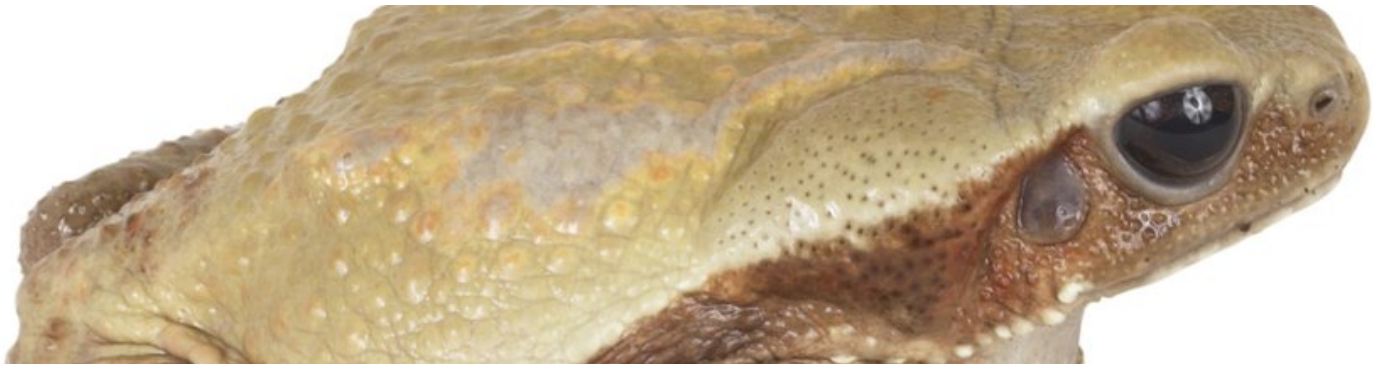

Updated April 24, 2017 *By Steve Johnson*

Natural selection has led to a relationship between all living creatures – some being much more closely related than others. Humans and chimpanzees maintain an extremely close relationship, sharing many physical and skeletal features. Similarities do not stop there. Humans share close relationships with many small amphibians as well, including frogs.

The Legs

The skeletal setup of the limbs of both frogs and humans clearly has an advantageous design – otherwise, natural selection would have stricken the frog from existence long ago. The frog's larger back legs consist of a femur as the strong, upper leg support, just like in humans, albeit on a different-sized scale. The back legs also consist of a fibula, as well as tibia; however, on the frog these two bones are fused together into one.

Arms and Front Legs

The arms of humans have a much different skeletal setup compared with the legs. Like humans, a frog's front legs are also setup very differently from its hind legs, sharing more features in common with human arms than with its own hind legs. The frog's leg bones consist of a humerus, which is also the strong part of human's arms, connecting the shoulder to the elbow. The ulna and radius also exist in the frog's arm, just as it does in humans.

Shoulder Blades

Other similar structures to the human skeleton are the shoulder blades of frogs, which come in sets of two. Also called scapulae, the shoulder blades within both frogs and humans combine with clavicles (collarbones), providing additional support for the movement of the arms.

Toes and Fingers

Another feature of a frog's skeletal makeup that holds similarities to humans (or at least some similarities) is the toes, which are akin to the toes and fingers on humans. Frog feet consist of five different toes, matching the number on human feet; although frog's toes are much longer than those of humans. Frogs' front toes are also much longer and only consist of four toes.

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How to Compare a Frog and a Human Respiratory System

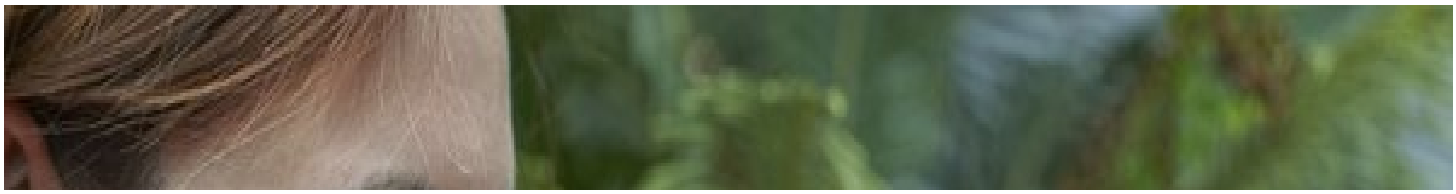
Updated April 25, 2017 *By Mandy Slake*

Frogs and humans have many comparable body systems, including the respiratory system. Both use their lungs to take in oxygen and expel waste gasses like carbon dioxide. There are differences in the way they breathe, and in the way frogs supplement their

oxygen intake through their skin. Understanding the similarities and differences can help you compare and contrast the two.

Explain the similarities between frog lungs and human lungs. Frogs and humans both have a glottis that closes off the trachea when swallowing. They also have a larynx that contains vocal cords, and bronchial tubes that divide into a pair of air sacs called lungs. The lungs are made of elastic tissue and can expand and contract.

Discuss the differences in the mechanics of respiration. Mammals have a sheet of muscle called a diaphragm that is attached to the ribs and the bottom of the lungs. When the diaphragm contracts, it expands the chest cavity and the difference in air pressure sucks air into the lungs. Frogs do not have a diaphragm, and instead they pump air in and out of the lungs by expanding and contracting their throat sac.



Discuss the differences in the skin of frogs and humans. Frogs have a moist, permeable skin, which can transfer gasses such as carbon dioxide and oxygen. Humans have dry skin that is impermeable to gas exchange, so almost all gas exchange takes place in the lungs. This means human lungs must be more efficient than frog lungs.

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What Are the Differences & Similarities Between Mammals & Reptiles?

What Are the Differences & Similarities Between Mammals & Reptiles?

Updated April 24, 2018 *By Nathalie Alonso*

Mammals and reptiles, two of the five classes of vertebrates, are among the most complex animals on Earth. There are approximately 8,240 species of reptiles, including snakes, turtles and lizards, which make it a more diverse group than mammals, of which there are about 5,400 species. Mammals, which include whales, bears and primates, are believed to have evolved from reptiles 240 million years ago.

TL;DR (Too Long; Didn't Read)

Mammals and reptiles have some similarities -- for example, they both have spinal cords -- but have more differences, especially with respect to skin and temperature regulation.

Body Plan

As vertebrates--animals with backbones that protect a nerve cord that runs the length of the body--mammals and reptiles have a common body plan. Among the characteristics they share are bilateral symmetry, a sophisticated nervous system, well-developed sense organs, a respiratory system that involves the pharynx or throat, a complex internal skeleton, and reproductive and excretory systems that overlap. Like most vertebrates, mammals and reptiles reproduce sexually.

Ear and Jaw Bones

The lower jaw of mammals consists of one bone that is firmly attached to the skull. Conversely, the lower jaw of reptiles is made up of multiple bones. Biologists believe that the bones that constitute the reptilian jaw evolved into the three middle ear bones found in mammals. Reptiles have only one ear bone.

Reproduction

Fertilization is internal in most reptiles and mammals. The majority of reptiles lay eggs; most mammals give birth to live young. There are exceptions, however. Some snakes, including boas, produce live offspring. Two primitive kinds of mammals--the echidna and the duck-billed platypus, known collectively as monotremes--lay leathery eggs similar to those of reptiles.

All female mammals, including monotremes, have mammary glands that produce milk, allowing them to nurse their young. Female reptiles lack mammary glands, and most species abandon their offspring soon after they hatch.

Cardiovascular System

The mammalian heart consists of four chambers, two ventricles and two atria. One channel delivers oxygenated blood to the organs, while the other directs blood to the lungs for re-oxygenation. As a result, mammals are warmblooded, which means that they can generate heat and keep their body temperature constant regardless of their environment.

By contrast, reptiles have three-chambered hearts with two ventricles and only one atrium. (Crocodilians are sometimes considered to have four-chambered hearts because the atrium is partially divided.) Unlike mammals, reptiles are exothermic or coldblooded, which means their body temperature depends on external conditions. As a result, mammals can survive in habitats that are too frigid to support reptile life.

Teeth

Mammals have specialized teeth, such as canines for tearing through meat and molars for grinding food. Reptile teeth are uniform in shape, though they might vary in size. Although reptiles' teeth grow continually throughout their lives, mammals grow only two sets. The first set, known as milk teeth, are distinct to mammals.

Skin

Hair is a defining characteristic of all mammals. Reptiles do not have hair, but they do have scales, which--unlike fish scales--arise in the upper layer of skin, the epidermis, rather than in the dermis layer underneath. Both hair and scales are made of a substance known as keratin. Mammals also have sweat glands; reptiles do not.

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Role of the Lungs

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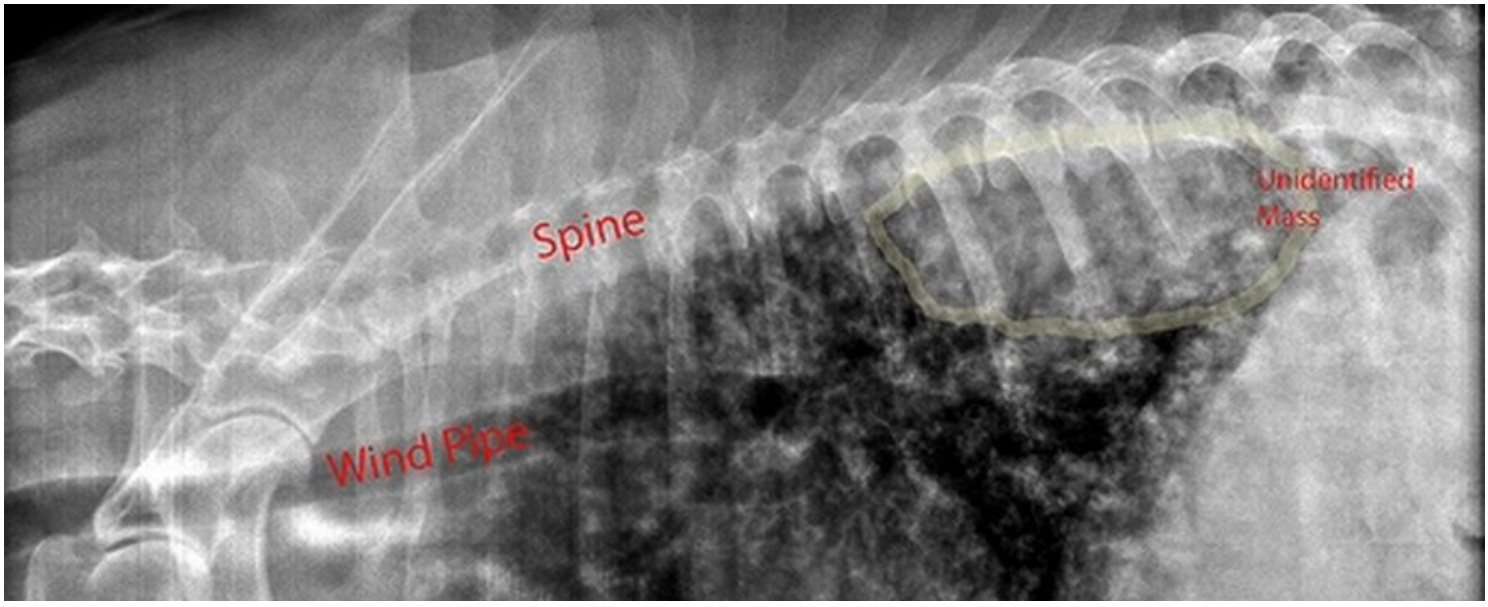

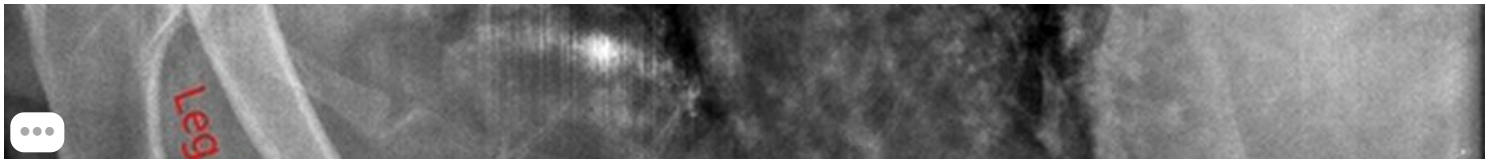

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The lungs are the organs that are responsible for gas exchange. Oxygen enters the body through the trachea and down to the lungs, where blood is pumped in from the heart. The lungs are also responsible for removing carbon dioxide from the blood. The process exchanges oxygen for the waste product carbon dioxide. This is why it's given the term "gas exchange." The lungs are a major organ of the respiratory system, and they are a secondary organ for the cardiovascular system.

Basic Anatomy

There are two lungs, and each surrounds the heart in the chest cavity. The right lung is made of three lobes: the upper, middle and lower sections. The left lung is slightly smaller than the right lung because it is embedded in the chest cavity with the heart. The left lung only has two lobes, upper and lower.

Inhaling

When a person inhales, the chest expands and the diaphragm pushes against the lungs. This causes the lungs to expand and air enters into the cavity. Air enters the lungs through the trachea, which is connected to the mouth. Air travels through the trachea into alveoli, which are balloon-like structures responsible for gas exchange. The alveoli are surrounded by blood vessels that deliver blood for the exchange of oxygen.

Exhaling

Exhaling is the body's way of removing the carbon dioxide after gas exchange. When the body exhales, the diaphragm relaxes and the lungs are able to return to the previous position. The air is pushed out by the lungs and sent back through the trachea and out of the mouth. This process happens autonomously and without effort.

Gas Exchange

Gas exchange is processed in the alveoli. The alveoli are round structures that fill with air when a person inhales.These tiny, balloon-like structures are surrounded by capillaries. The blood is pumped by the heart and through the pulmonary vein. This deoxygenated blood is then sent to the capillaries, where the very thin membrane allows red blood cells to pick up the available oxygen in the alveoli. Once the blood has the oxygen, it returns to the heart, where it is pushed back to the body via the arteries.

Protection

The lungs and heart are in the rib cage to protect them from damage. The lungs also have internal mechanisms to rid the airways of germs. Tiny hair-like structures called cilia move back and forth and push germs and mucous out of the airways. Additionally, the lungs are protected by the white blood cells, which destroy viruses and bacteria as they enter the body. Types of white blood cells that circulate in the lungs are macrophages and natural killer cells.

References

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