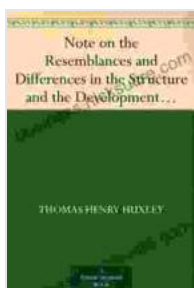


# Note on the Resemblances and Differences in the Structure and Development of Vertebrates

Vertebrates are a subphylum of the phylum Chordata, which are distinguished by the presence of a backbone or vertebral column. They are the most complex and diverse group of animals, and include fish, amphibians, reptiles, birds, and mammals. Despite their diversity, all vertebrates share a number of common features in their structure and development.

## Body Plan

The basic body plan of vertebrates is similar in all groups. The body is divided into three main regions: the head, the trunk, and the tail. The head contains the brain, the sensory organs, and the mouth. The trunk contains the heart, the lungs, and the digestive system. The tail is typically used for locomotion.



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**Apes** by Thomas Henry Huxley

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The body of vertebrates is supported by a skeleton, which is made up of bone or cartilage. The skeleton protects the internal organs and provides support for the body.

## **Muscular System**

The muscular system of vertebrates is made up of muscles, which are attached to the skeleton. Muscles are used for movement, and they are controlled by the nervous system.

## **Nervous System**

The nervous system of vertebrates is made up of the brain, the spinal cord, and the nerves. The brain is the control center of the body, and it receives information from the sensory organs and sends signals to the muscles. The spinal cord carries messages between the brain and the rest of the body. The nerves are responsible for transmitting signals from the brain and spinal cord to the muscles and organs.

## **Circulatory System**

The circulatory system of vertebrates is made up of the heart, the blood vessels, and the blood. The heart pumps blood through the blood vessels, which carry blood to all parts of the body. The blood carries oxygen, nutrients, and hormones to the cells of the body.

## **Respiratory System**

The respiratory system of vertebrates is made up of the lungs, the trachea, and the pharynx. The lungs are the primary organs of respiration, and they are responsible for taking in oxygen and expelling carbon dioxide. The

trachea is a tube that carries air to and from the lungs. The pharynx is a chamber that connects the mouth and the trachea.

## **Digestive System**

The digestive system of vertebrates is made up of the mouth, the esophagus, the stomach, the small intestine, the large intestine, and the rectum. The mouth is the opening into the digestive system, and it is where food is taken in. The esophagus is a tube that carries food from the mouth to the stomach. The stomach is a sac where food is stored and partially digested. The small intestine is a long, coiled tube where food is further digested and absorbed. The large intestine is a short, wide tube where water is absorbed from the food. The rectum is the final part of the digestive system, and it is where waste products are expelled from the body.

## **Urinary System**

The urinary system of vertebrates is made up of the kidneys, the ureters, the bladder, and the urethra. The kidneys filter waste products from the blood and produce urine. The ureters are tubes that carry urine from the kidneys to the bladder. The bladder is a sac where urine is stored. The urethra is a tube that carries urine from the bladder to the outside of the body.

## **Reproductive System**

The reproductive system of vertebrates is made up of the male reproductive organs and the female reproductive organs. The male reproductive organs produce sperm, which are the male gametes. The female reproductive organs produce eggs, which are the female gametes.

## **Development**

The development of vertebrates is similar in all groups. The embryo begins as a single cell, which divides repeatedly to form a blastula. The blastula then folds in on itself to form a gastrula. The gastrula then forms three germ layers: the ectoderm, the mesoderm, and the endoderm. The ectoderm gives rise to the skin, the nervous system, and the sensory organs. The mesoderm gives rise to the muscles, the skeleton, and the circulatory system. The endoderm gives rise to the digestive system, the respiratory system, and the urinary system.

The embryo then undergoes a process of organogenesis, during which the various organs of the body are formed. The embryo then hatches from the egg or is born.

## **Resemblances and Differences**

Vertebrates share a number of common features in their structure and development. However, there are also a number of differences between the different groups of vertebrates.

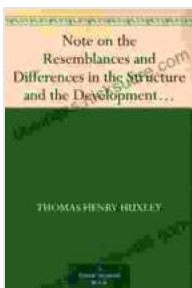
One of the most obvious differences between vertebrates is their size. Vertebrates range in size from the tiny pygmy goby, which is only 8 mm long, to the blue whale, which is over 30 meters long.

Another difference between vertebrates is their habitat. Vertebrates can be found in a wide variety of habitats, including the ocean, the land, and the air.

Vertebrates also vary in their diet. Some vertebrates are carnivores, while others are herbivores or omnivores.

Finally, vertebrates vary in their reproductive strategies. Some vertebrates lay eggs, while others give birth to live young.

Vertebrates are a diverse group of animals that share a number of common features in their structure and development. However, there are also a number of differences between the different groups of vertebrates. These differences are due to the different environments in which vertebrates live and the different adaptations that they have made to survive in those environments.



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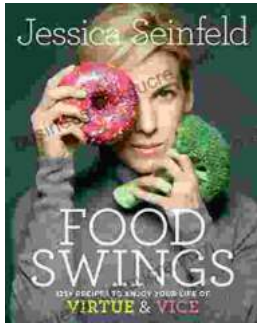
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