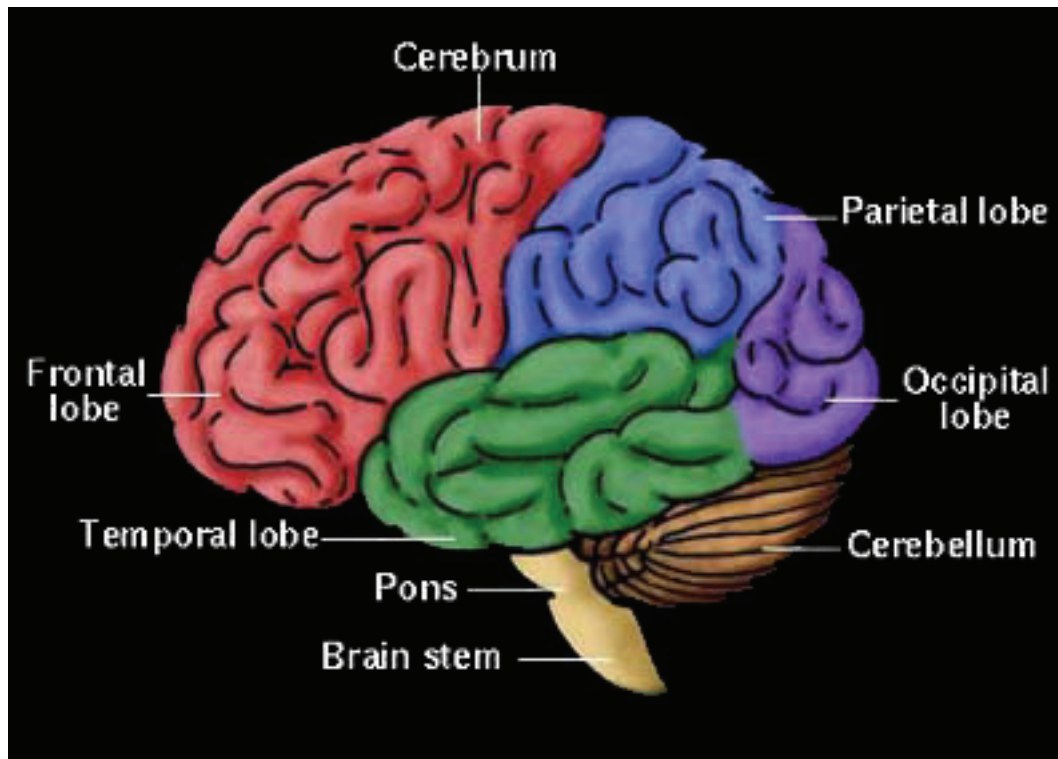


## 13.1A: Animal Functions. Class Notes

- **Unit XIII.1 : Anatomy of Organs**

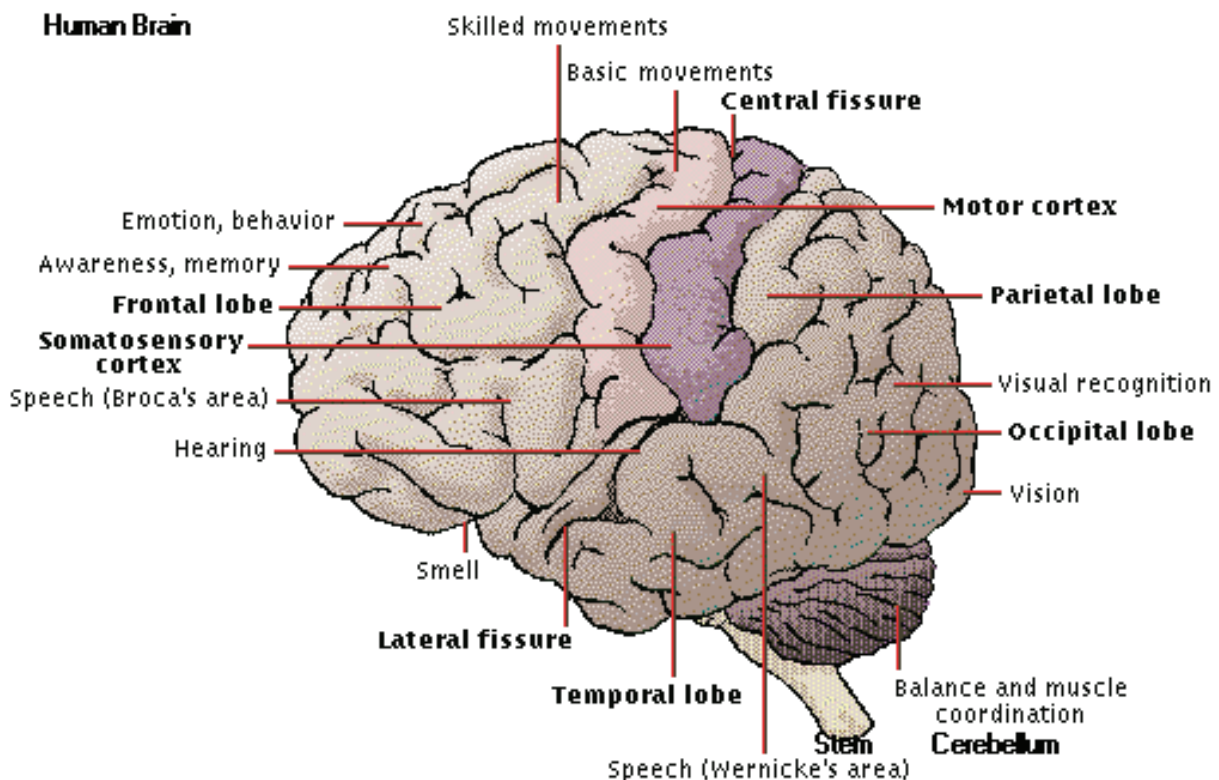
- An **organ** is a specialized area of the body composed of several different tissues.
- Examples include the brain, eye, heart.
- The **brain** consists of three main parts: **forebrain, midbrain** and **hindbrain**.



- The hindbrain is the brain stem and cerebellum
- The brain stem is divided into the **medulla** and **pons**, which control automatic functions such as breathing, blood pressure and swallowing. This simple area of the brain is found in most animals.
- The **cerebellum** coordinates movement and balance. Birds have a large cerebellum to control flight muscles.

## 13.1B: Animal Functions. Class Notes

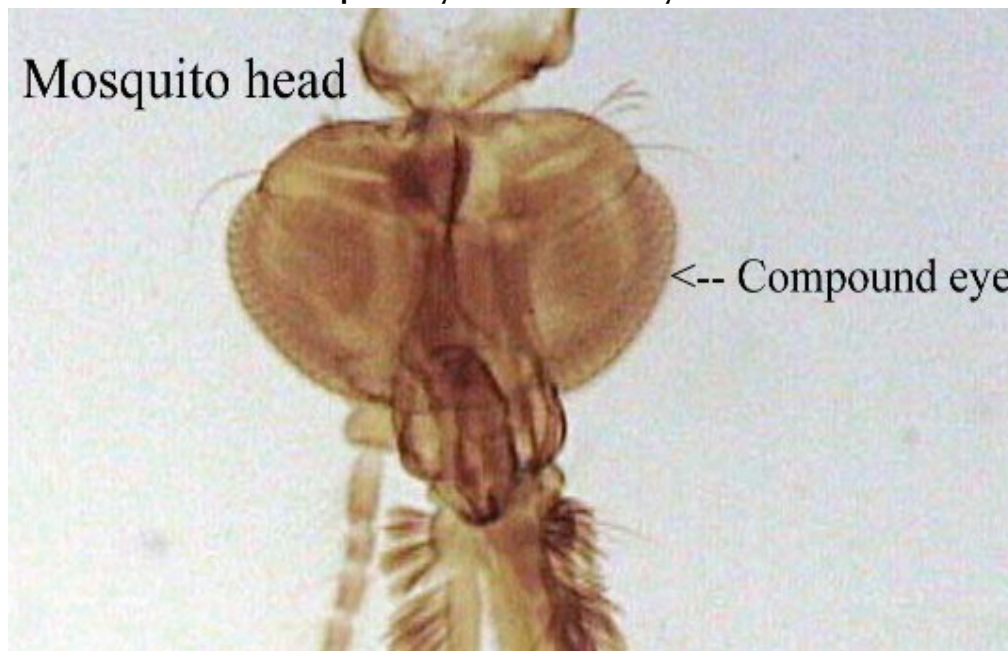
- The **midbrain** in some animals controls sight, but in mammals it mainly connects the forebrain to the hindbrain, and coordinates eye reflexes.
- The **forebrain** is the largest and most complicated part of the brain in mammals.



- The center of the forebrain has the **thalamus**, which relays information to the **cerebrum**. It also holds the **hypothalamus** which controls hormones, homeostasis and the biological clock.
- [The Human Brain: Dissections of the Real Brain](#)
- The **cerebrum** is the outer part of the forebrain, divided into the two **cerebral hemispheres**.

## 13.1C: Animal Functions. Class Notes

- The cerebrum holds memories, and determines how we react to sensory signals from around us.
- The outer part of the hemispheres is the gray matter or **cerebral cortex**, which is divided into lobes.
- Fish have no cerebral cortex, and reptiles have only a rudimentary part of one.
- Different areas of the cerebral cortex coordinate speech, vision, other senses and movement of the voluntary muscles.
- [Introduction to Psychology](#)
- **The eye**
- Some animals, such as flatworms, can detect light with a photoreceptor, so they can distinguish light from dark, but cannot see like we can.
- Insects either have a **compound** eye, with many tiny lenses, or a simple eye with only one lens.

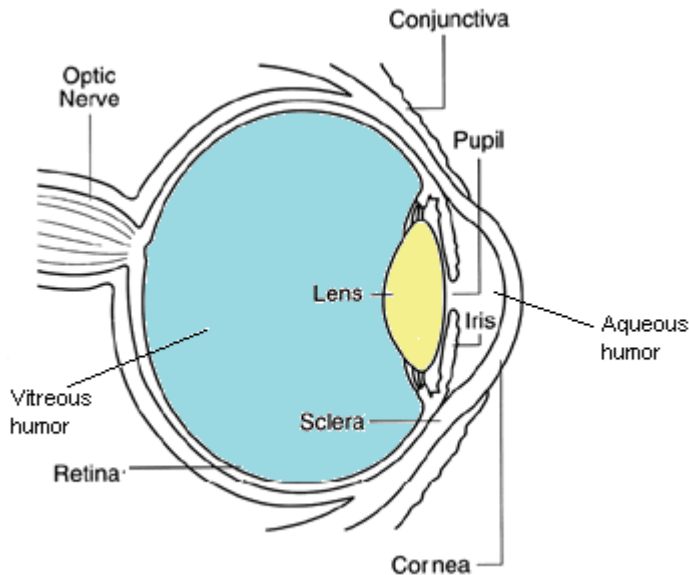


## 13.1D: Animal Functions. Class Notes

- The vertebrate eye is more complex, with a tough outer layer, the **sclera**, and a thin inner layer, the **choroid**.
- At the front of the eye, the sclera is transparent and forms the **cornea**, through which light can pass.
- The choroid at the front of the eye forms the **iris**, which gives eyes their color, and controls how much light enters the eye.
- The light is focused by the lens in the eye, which is made thicker or thinner by the ciliary muscles around it.
- [Eye anatomy](#)
- Light is detected by the **retina** at the back of the eye.
- The retina has 125 million **rods**, which see in black and white and are used at night, and 6 million **cones** which see in color.

## 13.1E: Animal Functions. Class Notes

- Most mammals see in black and white, primates are one of the few mammals with good color vision.



- [Humans Have Apes to Thank for Colorful World](#)

- The “blind spot” in each eye is the part where the nerves leave the eye in the optic nerve, which ends in the

brain.

- **The heart**
- The heart pumps blood through the body. Simple animals, such as sponges lack blood.
- Most invertebrates have an **open** circulatory system: the heart pumps blood into body cavities, so it is not confined all the time in blood vessels.
- [CIRCULATORY SYSTEMS](#)
- Vertebrates have a **closed** circulatory system: the blood is always in blood vessels. Blood enters the **atrium** of the heart from the veins, is pumped into the larger **ventricle** and then leaves the heart by the **arteries**.



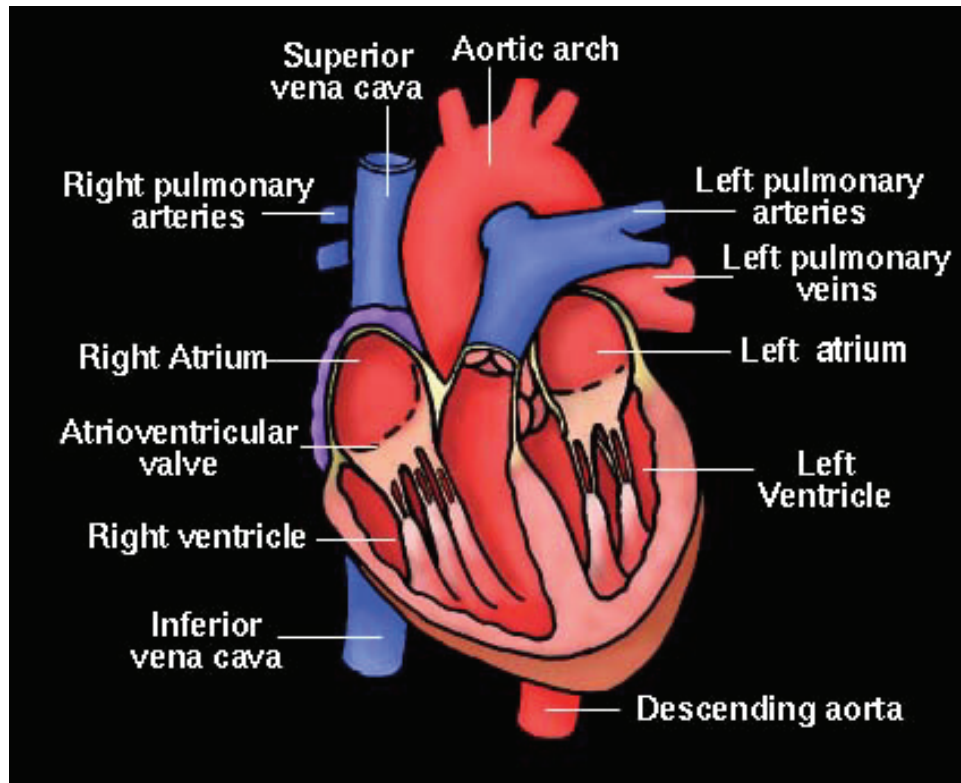
## 13.1F: Animal Functions. Class Notes

- Fish have one atrium and one ventricle in their heart.
- Amphibians and most reptiles have two atria and one ventricle.



- Mammals and birds have a four chambered heart: two atria and two ventricles.
- The right side of the heart pumps blood to the lungs in the pulmonary arteries. The left side pumps oxygenated blood to the body in the aorta. The vena cava returns deoxygenated blood from the body to the right atrium.

## 13.1G: Animal Functions. Class Notes



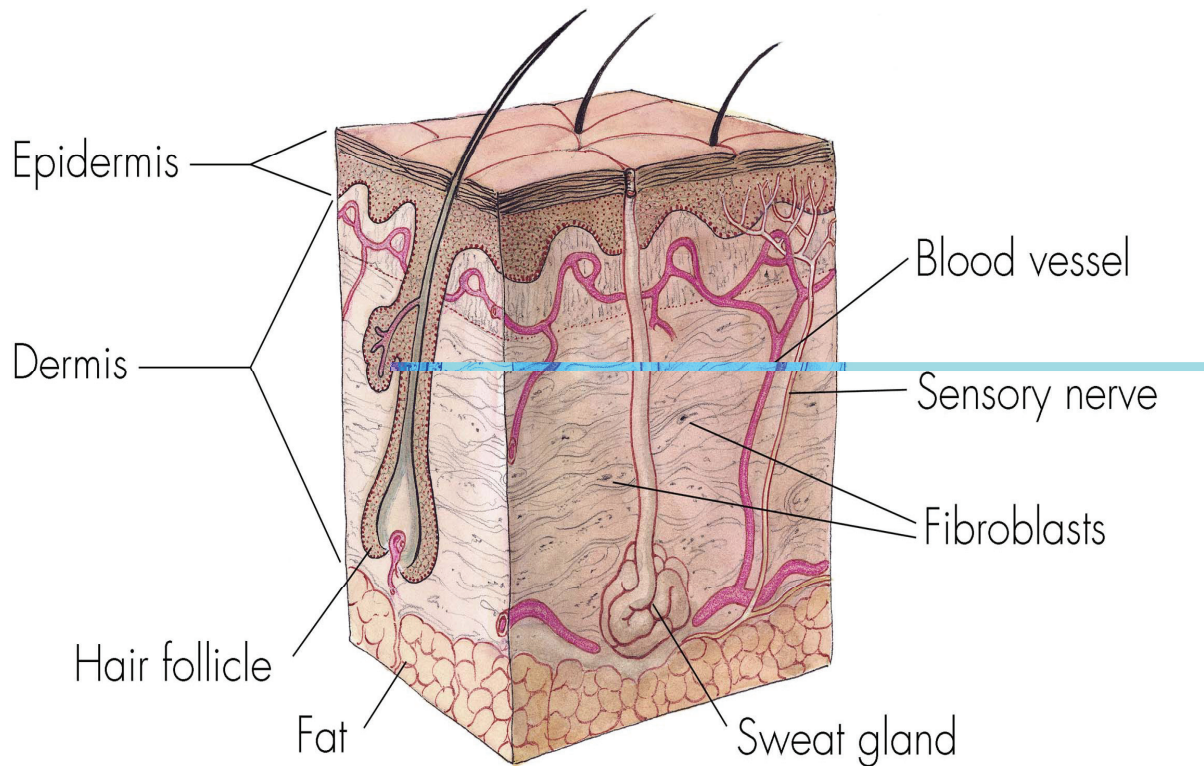
- **The endocrine system**
- The endocrine system is a group of glands that release **hormones**. Hormones are chemical messages that travel in the blood.
- Each hormone attaches to a **receptor** on a particular type of organ (for example the kidneys), and causes a response within that organ.
- Hormones are typically **steroids** (lipids) or **peptides** (amino acids).
- Many hormones are regulated by **negative feedback**, or feedback inhibition.
- [The endocrine system](#)
- **The exocrine system**

## 13.1H: Animal Functions. Class Notes

- The exocrine system is glands that secrete chemicals **outside** the cell, such as tears, sweat and digestive enzymes.
- Tears help to moisten the eye, and also contain proteins that keep the eye sterile.
- Sweat glands control temperature by the evaporation of sweat from the skin. Eccrine glands produce sweat onto the skin that is odorless, apocrine glands, such as in the armpit, release sweat into hair follicles. Bacteria can make the secretions from apocrine glands smell.
- [Sweating.net: Information on sweat glands](#)
- Antiperspirants reduce sweating, particularly from apocrine glands. Deodorants do not reduce sweating, but cover up the odor.
- Digestive enzymes, like amylase and pepsin, are found in the mouth, stomach and small intestine. They break large molecules down into smaller molecules.
- **Skin**
- The skin is the largest organ in the body.
- The **epidermis** is the outer layer of the skin, the **dermis** is deeper.



## 13.11: Animal Functions. Class Notes



- Skin controls body temperature through sweat glands.
- Skin contains receptors for temperature (hot and cold), pressure, touch and pain.
- Vitamin D is synthesized by the skin.
- Fibroblasts in the skin produce most of the dermis. They manufacture collagen and elastins that make the skin soft yet supple.
- Melanin protects the body from harmful ultra-violet light.