

Cat Anatomy and the Five Senses

Student Notes - Answer Key

Internal Cat Anatomy

Anatomy is the science of the structure of animals.

Physiology is the science that deals with the functions of the living organism and its parts.

Five Senses

Sense of Sight: Cats have **exceptional** eyesight. Most cats can see kinds of light, such as **ultraviolet**, that are **invisible** to humans. As far as scientists have been able to tell, cats are more or less **colorblind**.

Tapetum lucidum, or “**eyeshine**”, the glowing of cat’s eyes in the dark. A layer of iridescent cells at the back of the eyeball reflects the light, which adds to the cat’s ability to see at night.

A cat’s eyes appear as large, round globes or orbs, with a transparent covering known as the **cornea**. Around the cornea is a ring of white, shiny tissue called the **sclera**. The **nictitating membrane**, or third eyelid, is located in the lower part of the cat’s eye. This eyelid serves as protection for the eye. Cats have partial vision through the third eyelid, and often use it as protection when fighting or when traveling through dense underbrush. When the nictitating membrane is clearly visible, it is usually a sign that the cat does not feel well.

In the center of the eye is the **pupil**. When exposed to bright light, the pupils **contract** and in darkness they open **very wide** to allow in as much light as possible.

Behind the pupil is the **lens**, which focuses images on the back of the eyeball. It is composed of strong, crystal-like fibrous tissue. Light rays passing through the lens are **bent** to rest on a very sensitive area on the back of the eye, the **retina**. The nerves in the retina receive light and change it into nerve impulses or signals. Impulses are transmitted to the brain by way of the **optic nerve**. The brain interprets these impulses and lets the cat “see.”

Sense of Hearing: Cats are exceedingly **sensitive** to sound; their range of hearing extends **well above** and below the range of human hearing. Cats, like all four-legged animals, have cupped ears which serve as receptors and conductors of sound. When listening, the cat will move its head this way and that, turning its ears **in the direction of the sound**. The sound travels down through the **outer ear canal**, which is fitted with small knobs or protuberances. The outer ear tapers and narrows near the cat’s skull, then turns downward and inward, ending in a delicate membrane known as the **eardrum**.

Beyond the eardrum are three small, delicate bones: the **hammer, anvil and stirrup**. The names describe the shapes of the bones that function to transmit sound waves into a section of the inner ear known as the **cochlea**. The cochlea, a snail shaped canal, contains the auditory nerve which changes sound waves into nerve impulses (nerve signals) and relays sound messages to the brain.

Near the cochlea are three horseshoe-shaped tubes known as the **semicircular canals**. They contain fluid and fine hairs called cilia that function to maintain the cat's excellent sense of balance.

Connecting the middle ear to the throat is the **Eustachian tube**. Its main purpose is to equalize pressures. Without this safety device, the eardrum would be **ruptured** when subjected to great pressure. When pressure is exerted on its ears, a cat swallows and sticks out its tongue.

Sense of Smell: The cat's **olfactory nerves**, those concerned with its sense of smell, are not as sensitive as those of some other animals, but are quite adequate. Cats can scent people, animals and other objects at a considerable distance, but they do not rely on this sense while hunting as much as other animals do. Fastidious about odors, they dislike many of the same smells that humans do. They will try to cover up **disagreeable** smells.

Most cats have a particular fondness for **catnip**, a member of the mint family. It is believed they are excited by the smell. Some authorities believe that the odor of catnip stimulates the cat sexually. Some cats are not affected by catnip, some become just quietly excited, while others roll, purr and growl in ecstasies of delight. The occasional cat may become disagreeable.

Sense of Taste: The cat's tongue is **long** and **flat**, with almost parallel sides. It tapers slightly in front and somewhat more in the back of the mouth. The upper surface of the tongue is covered with rasplike **papillae** which enable the cat to scrape every piece of meat off a bone or to lick its coat clean. The tongue is covered with **taste buds**, particularly at the tip and at the back of the throat. These taste buds react to chemical stimuli to produce sensations of **acidity, sweetness, bitterness and saltiness**.

Sense of Touch (Hair and Skin): The least important sense in a cat is the sense of **touch**. Both the skin and the hair play a role in that sense.

First of all, the hair or fur serves as **insulation** against heat and cold. Hair also protects the cat against insect bites, stings, thorns and other dangers and annoyances. The cat raises its hair, particularly the hair along its neck and spine, as a **protective** device when frightened or threatened. With its hackles raised, the cat assumes a wary and defiant position. Back arched, tail hairs bristling, muscles tensed, it turns itself broadside. In this attitude, the cat appears larger and more ferocious to its attacker.

Cats shed their hair according to climatic conditions and their state of health. Hair is shed naturally **year-round**, especially in the spring and fall. Excessive shedding is a warning signal of possible disease, poor diet, parasites, or overheating. Therefore, it is important to pay attention to the condition of your cat's hair.

The cat's skin is made up of an outer layer, the **epidermis**, and an inner layer, the **dermis**. The epidermis consists of four sub-layers, with the innermost providing for the regeneration of skin cells.

Skin functions to **protect the body from the external environment**. Skin protects against **injuries** and prevents **excess loss of water, electrolytes and large molecules**. The skin has many glands. Sweat glands are located only on the **foot pads**. Sweating is only a small portion of **thermoregulation** (keeping the body at a correct operating temperature). The cat cools itself primarily by **panting**. Cats also have glands in their skin that are connected with the hair follicles, known as **sebaceous glands**. They secrete an oily substance known as **sebum** that solidifies when exposed to the air.