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Anatomic-Physiological Eatures of Dogs

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Annotation: The nucleus is the most important part of the cell, participating in all its vital processes. The bones of puppies and young dogs are very elastic due to the large amount of moisture and organic substances – collagen fibers. With age, bones, losing water and organic components, become more fragile and brittle.

Keywords: proteins, fats, carbohydrates, mineral salts, cell cytoplasm.

Relevance of the topic. Anatomy is one of the most ancient sciences; it studies the structure of the body, individual organs, and the systems they form. When assessing a dog's appearance, cynologists must constantly use anatomical concepts, albeit at a rather superficial level.

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When assessing a dog's exterior, cynologists must constantly use anatomical concepts, albeit at a fairly superficial level.

A dog's body is composed of a number of organ systems, some of which give the body its shape—its exterior—while others, located within the body, make up its interior. All organs are intimately interconnected—the life and function of some are directly dependent on the others. Organs are constructed from various “materials”: tissues that provide the functions (work) of each organ and are collections of cells of the most varied shapes, fibers and intercellular substance.

Cells are the smallest structural units in the body; their shape and structure correspond to their function. Cells range in size from thousandths of a millimeter (10–100 μm). A cell is composed of the following main parts: the cytoplasm, the cell nucleus, and the cell membrane.

The nucleus is the most important part of the cell, participating in all its vital processes. Cell reproduction, the consolidation and hereditary transmission of historically established structural and functional characteristics specific to each dog breed, depend on it. The cytoplasm of cells is rich in organic and inorganic elements (proteins, fats, carbohydrates, mineral salts). It contains

certain structures—cell organelles, ensuring its life - growth, development, movement, sensation, self-reproduction, as well as the formation of special substances, which can be produced according to the function they perform in the body and organ (secretion of mucus, hormones, etc.) It is the basis of the body and the carrier of soft tissues, a complex of complex levers for diverse movements.. The skeleton is a rigid structure consisting of more than 280 individual bones, connected to each other immobile or by joints with ligaments. Muscles and tendons are attached to the skeleton, which set individual sections of it in motion, allowing the animal to move in space.

This chapter provides an overview of the basic factors that affect biological response to chemicals, reviews the anatomical and physiological considerations in animals species selections, and describes several examples of species variations in biological response and the reasons for those variations. Biological and biochemical factors modify toxicity and must be considered in the selection of species to be used for toxicity studies. Metabolism, kinetics, the presence of chemicals in tissues, and biotransformation must be studied increasingly for a better understanding of species differences. The variables that affect the target cell, the presence of target organelles within the cell, the ratio of strong versus weak binding sites within cells, the location of receptor sites, the presence of other chemicals as promoters, and the structure and properties of target enzymes are necessary details. This knowledge is needed and will assist in evaluating why one species is more or less sensitive to a specific chemical group.

The vagus is a mixed nerve carrying somatic and visceral afferents and efferents. The majority of vagal nerve fibers are visceral afferents and have a wide distribution throughout the central nervous system (CNS) either monosynaptically or via the nucleus of the solitary tract. Besides activation of well-defined reflexes, vagal stimulation produces evoked potentials recorded from the cerebral cortex, the hippocampus, the thalamus, and the cerebellum. Activation of vagal afferents can depress monosynaptic reflexes, decrease the activity of spinothalamic neurons, and increase pain threshold. Depending on the stimulation parameters, vagal afferent stimulation in experimental animals can produce electroencephalo-graphic (EEG) synchronization or desynchronization and has been shown to affect sleep states. The desynchronization of the EEG appears to depend on activation of afferent fibers that have conduction velocities of $\leq$ 15 m/s. Vagal afferent stimulation can also influence the activity of interictal cortical spikes produced by topical strychnine application, and either attenuate or stop seizures produced by pentylenetetrazol, 3-mercaptoproprionic acid, maximal electroshock, and topical alumina gel. The mechanisms for the antiepileptic effects of vagal stimulation are not fully understood but probably relate to effects on the reticular activating system. The vagus provides an easily accessible, peripheral route to modulate CNS function.

The bones of puppies and young dogs are very elastic due to the large amount of moisture and organic substances – collagen fibers. With age, bones lose water and organic components, becoming more fragile and brittle.

The first bones to appear in a dog embryo are the spinal column and ribs (2-3 weeks of pregnancy), then the limbs, and finally, the head bones. During the prenatal period, all bones contain red bone marrow, which performs hematopoietic and protective functions, In adult dogs, yellow bone marrow, which is degenerated fatty tissue, is located in the diaphyses of tubular bones.

The purpose of the study: to study the morphometric characteristics of the forelimb bones in dogs during the stages of postnatal ontogenesis.

Research materials and methods. Scientific research work was carried out in the laboratory of the Department of Animal Anatomy, Histology and Pathological Anatomy of SamDVMCHBU**.** The dogs were slaughtered, bled, and the leg bones were separated from the body and weighed on an analytical balance. The linear dimensions and weights of the bones were obtained according to generally accepted morphometric methods..

The numerical data of morphometric indicators obtained as a result of the study were processed using variation statistics methods using Microsoft Excel computer software.

To determine the dynamics of changes in morphometric dimensions with age, the growth coefficient was calculated. The growth coefficient was calculated by dividing the bone indices of adult chickens by the corresponding indices of young chickens, and the entire examined postnatal ontogenesis period was calculated using the formula developed by K.B. Svechin $K = \frac{V_t}{V_0}$ determined by the formula:

K – is the growth coefficient;;

V_0 – is the initial bone mass.

Research results. The absolute value of the width of the humerus increased from 0.23±0.01 cm to 0.27±0.01 cm (K=1.17) from the first day of postnatal development to 16 days of age, and to 0.38±0.01 cm (K=1.4; p<0.03) by 35 days of age, and this trend was maintained at subsequent ages studied. At 570 days, it increased to 0.78±0.02 cm, and its growth coefficient increased by 3.39 times from day one to day 570 of postnatal ontogenesis.

It was observed that the absolute value of the humerus thickness showed dynamics proportional to the absolute values of the bone width during the period from the first day of postnatal ontogenesis to the 570th day. It was found that the growth coefficient increased by 3.42 times during the period from the first day of postnatal ontogenesis to the 570th day.

Conclusion:

It was observed that the absolute values of the linear dimensions of the ulna bones increased rapidly from the first day of postnatal ontogenesis to the 16th day, and this trend continued until the physiological maturity of dogs.

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