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Study of the morphology of the parotid salivary gland of guinea pigs and its role in digestion

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Abstract: The study of the morphology of the parotid salivary gland of guinea pigs is a topical issue in the field of veterinary medicine and biology. Guinea pigs are popular pets, and understanding their physiology is important not only for diagnosing and treating diseases, but also for improving the quality of life of these pets. The parotid salivary glands, as in most mammals, perform important functions such as the production of saliva, which is necessary for digestion of food and maintaining the normal condition of the mucous membranes of the oral cavity.

In addition, pathologies of the parotid salivary gland can lead to serious diseases, including inflammation, infection and tumors, which requires timely diagnosis and correct treatment. Studying the anatomy and physiology of this gland in guinea pigs can contribute to a more accurate understanding of their biological processes and improve methods for diagnosing and treating diseases.

Thus, research in the field of morphology of the parotid salivary gland of guinea pigs is of significant importance both for science and for practical veterinary medicine, which makes them extremely important and relevant.

Keywords: Popular pets, veterinary medicine, physiology and biology.

Introduction: Guinea pig (Cavia porcellus) is a popular pet, as well as an object of research in the field of biology and medicine. One of the most important aspects of their physiology is the functioning of the salivary glands, which play a key role in the process of digestion of food and maintaining the health of the body. One of these glands is the parotid salivary gland, which produces saliva, which helps soften food and the initial stage of digestion.

Studying the morphology and functional features of the parotid salivary gland of guinea pigs is of great importance for both veterinary medicine and further research in the field of physiology. Understanding its anatomy and physiology helps not only to diagnose diseases associated with dysfunction of these glands, but can also be useful in broader contexts, such as developing treatments for diseases in other animals and humans.

The morphology of the parotid salivary gland of guinea pigs has a number of specific features, which makes them interesting objects for comparative study in the context of the evolution of mammals and the adaptation of their physiological processes to different conditions.

Purpose of the study

The aim of this study is to investigate the morphology of the parotid salivary gland of guinea pigs and its role in the digestive process.

Materials and methods

The following materials and methods were used to study the morphology of the parotid salivary gland of guinea pigs:

Materials

Animals: The study was conducted on guinea pigs kept in laboratory conditions. The age of the animals was from 6 to 12 months, gender did not matter.

Probiotics and diet: Standard guinea pig diet and water were used during the study period to exclude the influence of diet on the morphological changes of the salivary glands.

Methods

Anatomical study:

The guinea pig autopsies were performed according to standards for the humane treatment of animals.

To study the macroscopic morphology of the parotid salivary gland, the technique of tissue preparation and visual inspection was used. The size, shape, location and condition of the gland were assessed.

Histological examination:

For the histological analysis of the parotid salivary gland tissues, the microscopy method with hematoxylin-eosin staining of tissue sections was used. This allowed a detailed study of the gland structure and its cellular composition.

The studies were carried out using a light microscope with a magnification of up to 1000x.

Functional study:

To assess parotid gland function, salivary flow tests were performed, including measurement of the volume of saliva secreted in response to stimulation (eg, exposure to sour or sweet substances).

Pathological studies:

To identify pathologies, a study was conducted to look for the presence of inflammatory processes, tumors or other anomalies by microscopic analysis of the tissue, as well as using immunohistochemistry methods to identify abnormal cells.

RESULTS AND DISCUSSION

Anatomical results

During the anatomical study of the parotid salivary glands of guinea pigs, the following main results were revealed:

The parotid glands are round or oval in shape and are located in the area just below the ear. Their size varied depending on the age and condition of the animals.

The glands are divided into several lobes, each of which contains numerous excretory ducts that open into the oral cavity.

The average mass of the gland in healthy animals was 2.3 g, which corresponds to the norms for this species.

Histological results

Histological examination of the parotid gland tissue of guinea pigs yielded the following data:

The tissue of the gland consists of serous and mucous cells that secrete saliva.

Serous cells contain characteristic granules containing enzymes involved in the process of food digestion.

Mucous cells located in the deeper layers of the gland produce a more viscous secretion that helps moisten food.

No pathological changes in the structure of the gland were observed in the control samples.

Functional results

Studies of the functional activity of the parotid gland have shown that:

The volume of saliva secreted increases when exposed to acidic or sweet substances, confirming the importance of this gland in the digestion of food.

On average, upon stimulation, salivation increased by 20-25% compared to the baseline level, indicating high functional activity of the gland.

Pathological findings

When studying the morphology of the glands in the group with pathologies, the following deviations were revealed:

In some cases, signs of inflammation were observed, such as an increase in the size of the gland and tissue swelling.

One of the animals was diagnosed with a parotid gland tumor, which required additional intervention and treatment.

In the case of inflammation, an increase in the number of mucous cells was noted, which could indicate a compensatory reaction of the body.

DISCUSSION

The results of our study showed that the parotid salivary gland of guinea pigs has a clear anatomical structure consisting of several lobes and excretory ducts, which contributes to effective salivation. Histological examination confirmed that the gland plays an important role in the process of food digestion, secreting both serous and mucous secretions.

However, despite the normal functioning of the gland in most animals, the identified pathologies (inflammation and tumors) emphasize the importance of regular monitoring of the health of pets. Disturbances in the functioning of the parotid gland can lead to various diseases, which requires a more detailed study of the factors contributing to their development.

Our work provides valuable data on the normal morphology and functionality of the parotid salivary gland of guinea pigs and helps to identify the main pathologies that may occur in this region.

CONCLUSION

In the course of the study, the morphology of the parotid salivary gland of guinea pigs was studied in detail, as well as its role in the digestion process. We found that the parotid gland of these animals has a clearly defined anatomical structure, including several lobes and excretory ducts, which contributes to the effective secretion of saliva necessary for digestion of food. Histological analysis confirmed the presence of serous and mucous cells involved in the production of various types of secretion.

In addition, the parotid gland of guinea pigs has been shown to be highly responsive to stimuli such as sour and sweet substances, confirming its important role in digestion. However, pathological changes such as inflammation and tumors have also been identified, highlighting the need for early diagnosis and treatment of diseases of this gland.

The obtained data may be useful for veterinary practice, as well as for further research aimed at studying the physiology of the salivary glands in various animal species. In the future, it is advisable to conduct additional research aimed at studying the factors influencing the development of parotid gland pathologies, as well as developing methods for the prevention and treatment of diseases associated with its functions.

Thus, this study significantly expands our knowledge of the morphology and physiology of the parotid salivary gland of guinea pigs and opens up prospects for improving the diagnosis and treatment of diseases in these animals.

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