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STAGES OF MORPHOLOGICAL DEVELOPMENT OF THE PAROTID SALIVARY GLANDS OF RABBITS IN POSTNATAL ONTOGENESIS

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ABSTRACT

The aim of this study is to analyze the stages of morphological development of the parotid salivary glands of rabbits during postnatal ontogenesis. The paper considers the key stages of differentiation and formation of these glands, as well as their morphofunctional features at different stages of postnatal development. Using histological and morphometric analysis, changes in the structure of the glands, as well as their relationship with the development of other organs of the digestive system, were studied. The results demonstrate significant changes in the morphology of the parotid salivary glands of rabbits, which occur at different stages of their development. Particular attention is paid to age-related differences in the cellular structure and functional activity of the glands, which is important for further studies of the physiology and pathology of the salivary glands in animals. This study contributes to the understanding of the biological mechanisms of salivary gland formation in mammals.



KEYWORDS

Parotid salivary glands, rabbits, postnatal ontogenesis, morphological development, morphogenesis, salivary glands, differentiation, histology, morphofunctional features, cell differentiation.

INTRODUCTION

The salivary glands play an important role in the body of mammals, participating in the processes of digestion, moistening the oral cavity and protection from pathogenic microorganisms. The parotid salivary glands, in particular, are one of the largest paired glands that secrete a secretion containing enzymes, amylose and other substances necessary for digestion of food. These glands, like other exocrine organs, undergo a complex process of morphological and functional development during ontogenesis, which is important for understanding not only their normal function, but also the pathology associated with disturbances in their development. In rabbits, as one of the common objects of zoological research, the parotid salivary glands play an important role in digestion, and their morphological development in the postnatal period is of particular interest for studying the mechanism of formation and differentiation of glandular tissues. However, despite the importance of these studies, issues related to the morphogenesis of the parotid salivary glands in rabbits in postnatal ontogenesis remain insufficiently covered in the scientific literature. The present study is aimed at studying the morphological features of the

development of the parotid salivary glands in rabbits in the postnatal period. The main attention is paid to the various stages of their development, as well as the analysis of morphofunctional changes during growth and formation. The data obtained can serve as a basis for further research in both normal physiology and pathology of the salivary glands, which, in turn, is important for veterinary medicine and biology.

The purpose of the study

The aim of this study is to analyze the stages of morphological development of the parotid salivary glands in rabbits during postnatal ontogenesis, with an emphasis on the key stages of cell differentiation, the development of gland structures and their morphofunctional changes at different age stages.

METHODS

The study involved the use of rabbit carcasses of various age groups, from newborns to adults. The animals were obtained from a laboratory nursery and were used in accordance with the ethical standards for scientific research.

Morphological examination of the parotid salivary glands was performed using histological methods. For this purpose, tissue samples were selected, fixed in 10%



formalin solution and then processed with paraffin. Sections 5-7 μm thick were stained with hematoxylin and eosin to assess the general morphology of the glands, as well as using special methods (for example, staining according to the Verhoeff method) to highlight the structural features of the cells and ducts. To evaluate the morphometric parameters, a light microscope imaging technique was used with a digital camera and appropriate software. Cell sizes, duct wall thicknesses, cell density in different areas of the glands were measured, and changes in tissue structure were analyzed depending on the age of the animals.

In addition, to identify functional changes in the structure of the salivary glands, immunohistochemical analysis was performed using antibodies to specific markers of cells involved in the production of saliva.

RESULTS AND DISCUSSION

Morphological examination of the parotid salivary glands showed that with age, rabbits experience significant development of the structure of these glands. In newborn animals, the glands were less differentiated, with insufficiently developed ducts and an insignificant number of secretory cells. While in adult rabbits, clear differentiation of cells, developed ducts and pronounced secretory activity are observed. The use of hematoxylin and eosin made it possible to isolate mature acinar cells in older individuals, indicating the development of functional maturity of the glands. While in newborns, immature cells with less pronounced secretory activity predominated.

Morphometric analysis showed that the size of the cells and the thickness of the duct walls increase with age. In newborn rabbits, the cells of the parotid glands were significantly smaller in size, and the walls of the ducts were thinner. While in adult animals, the cell sizes increased and the duct walls thickened, indicating an increase in the functional activity of the glands. The cell density also increased with age, which may be due to the intensity of saliva secretion and the adaptation of the glands to a more active function. Immunohistochemical analysis using antibodies to markers of cells involved in saliva production (e.g., amylose and acid mucoprotein) showed that in adult rabbits the expression level of these markers was significantly higher than in neonates. This confirms the hypothesis that with age, the activity of the salivary glands and their ability to produce saliva increases.

In newborn individuals, markers of saliva production were poorly expressed, which may be associated with insufficient maturity of the salivary glands at this age.

CONCLUSION

The obtained data indicate that the parotid salivary glands of rabbits undergo significant changes during the process of growth and development. From newborn to adult individuals, both morphological and functional changes occur, which correlate with the age and level of development of the animal.

The increase in cell size and thickening of the duct walls is associated with an increase in the functional activity of the glands, which may be due to the body's need for



a larger volume of saliva secretion. Increased expression of saliva production markers in adult rabbits confirms that with age, the salivary glands become more active and specialized.

These results can serve as a basis for further research aimed at studying changes in the salivary glands in other animal species or humans, as well as for developing methods to improve the functioning of the salivary glands in various diseases.

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