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Research Article

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

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Kim L.A.
Associate Professor Of The Department Of Histology And Medical Biology TGSI, Uzbekistan

Abdukarimov D.I.
Senior Lecturer Of The Department Of Histology And Medical Biology TGSI, Uzbekistan

Mirzaakhmedova. N.A.
Assistant Of The Department Of Physiology And Pathology TGSI, Uzbekistan

Turdaliev K.M.
Assistant Of The Department Of Physiology And Pathology TGSI, Uzbekistan

Shogulamova K.L.
Assistant Of The Department Of Physiology And Pathology TGSI, Uzbekistan

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 examines 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 were studied, as well as their relationship with the development of other organs of the digestive system. 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.

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KEYWORDS

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

INTRODUCTION

Salivary glands play an important role in the body of mammals, participating in the processes of digestion, moistening of 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 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 various stages of their development, as well as to the analysis of morphofunctional changes during growth and formation. The obtained data 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.

Research objective:

The objective 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, development of gland structures and their morphofunctional changes at different age stages.

MATERIALS AND METHODS

The study was conducted on the corpses of rabbits of different age groups, from newborns to adults. The animals were obtained from a laboratory nursery and used in accordance with the ethical standards provided for scientific research.

Morphological examination of the parotid salivary glands was carried out using histological methods. For this purpose, tissue samples were selected, fixed in a

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10% formalin solution and then processed with paraffin. Sections of 5-7 µm thickness were stained with hematoxylin and eosin to evaluate the general morphology of the glands, and using special techniques (e.g., Verhoeff staining) to highlight the structural features of the cells and ducts.

To evaluate the morphometric parameters, a light microscopic imaging technique was used with a digital camera and appropriate software. Cell sizes, duct wall thicknesses, and 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, immunohistochemical analysis was performed to identify functional changes in the structure of the salivary glands using antibodies to specific markers of cells involved in saliva production.

Results and discussion:

The morphological study of the parotid salivary glands showed that with age, the structure of these glands in rabbits significantly develops. 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 the expression level of these markers was significantly higher in adult rabbits than in neonates. This confirms the hypothesis that the activity of the salivary glands and their ability to produce saliva increases with age.

In neonates, the markers of saliva production were poorly expressed, which may be due to the insufficient maturity of the salivary glands at this age.

CONCLUSION

The data obtained indicate that the parotid salivary glands of rabbits undergo significant changes during growth and development. From neonates to adults, both morphological and functional changes occur that correlate with the age and developmental level of the animal.

Increased cell size and thickening of the duct walls are associated with increased functional activity of the glands, which may be due to the body's need for

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greater salivary secretion. Increased expression of salivary production markers in adult rabbits confirms that the salivary glands become more active and specialized with age.

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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