

# Morphology Of The Excretory Ducts Of The Parotid Salivary Gland In Rats During The Transition To Definitive Feeding And At Puberty

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**Abstract:** This study presents the morphological characteristics of the excretory ducts of the parotid salivary gland in rats during the transition to definitive feeding and the onset of puberty. Light microscopy and morphometry were used to study the structure of the epithelial layer, wall thickness, and lumen diameter of the ducts. The data obtained indicate age-related morphofunctional changes associated with the adaptation of the salivary glands to various physiological conditions. This study expands our understanding of the development of exocrine glands during ontogenesis and their structural adaptation to changes in diet.

**Keywords:** Morphology, rats, parotid gland, excretory ducts, definitive nutrition, sexual maturity.

**Introduction:** The salivary glands play a vital role in digestion, providing moisturizing and primary processing of food, as well as protecting the oral cavity. In mammals, the parotid glands are the largest of the three paired salivary glands and are largely responsible for the secretion of the protein components of saliva. Their functional activity and morphological structure vary depending on age, diet, and hormonal status.

The period of weaning, known as the transition to definitive feeding, is accompanied by significant changes in the functioning of the digestive system, including the exocrine glands. The subsequent stage of puberty also influences the morphofunctional characteristics of the organs.

The aim of this study is to investigate the morphological

characteristics of the parotid salivary gland ducts in rats during the transition to definitive feeding and at puberty. A comparative analysis allows us to identify structural adaptations that occur in response to changes in diet and age-related physiological changes.

## METHODS

The study was conducted on white laboratory rats raised in standard vivarium conditions with free access to food and water. Two age groups were identified:

- **The period of transition to definitive feeding** is for rats at the age of 30 days;
- **Sexual maturity period** - rats at the age of 50 days.

After euthanasia, the animals' parotid salivary glands were collected. The samples were fixed in 10% neutral

formalin, followed by standard histological processing and paraffin embedding. Sections (5–7  $\mu\text{m}$  thick) were stained with hematoxylin and eosin.

Microscopic examination of the specimens was performed using a light microscope at a magnification of  $\times 100$ – $\times 400$ . Morphometric analysis included measurement of the excretory duct lumen diameter, epithelial layer thickness, and duct wall thickness. Statistical data processing was performed using Student software, with a significance level of  $p < 0.05$ .

## RESULTS

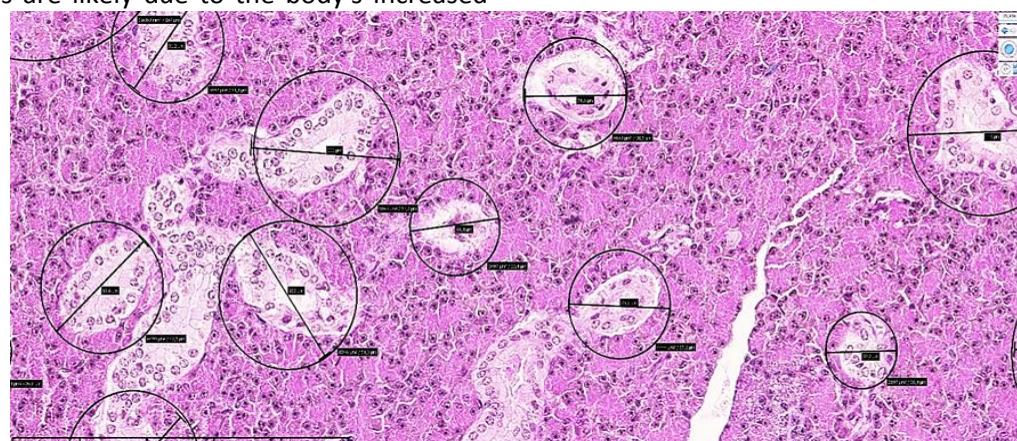
**Table 1**  
**Morphometric indices of the average diameter of the excretory ducts of the parotid salivary gland in rats at different periods of postnatal development**

| Parameters of the parotid salivary glands  | The period of transition to definitive nutrition | Sexual maturity period |
|--|--|------------------------|
|  | $M \pm m$  | $M \pm m$              |
| <b>Average diameter of the excretory ducts of the parotid salivary gland (in <math>\mu\text{m}</math>)</b> | $49.1 \pm 0.02$                                  | $61.4 \pm 0.02$        |

An increase in the average diameter of the parotid salivary gland ducts in rats at puberty compared to the period of transition to definitive feeding indicates significant age-related morphofunctional changes. These changes are likely due to the body's increased

Morphometric analysis revealed that the average diameter of the excretory ducts of the parotid salivary gland in rats changes significantly depending on age.

In animals during the transition to definitive feeding (30), the average diameter was  $49.1 \pm 0.02 \mu\text{m}$ , while at sexual maturity (50), this figure increased to  $61.4 \pm 0.02 \mu\text{m}$ . Thus, a significant increase in the diameter of the excretory ducts is observed during ontogenesis, which may reflect the functional adaptation of the glands to the increased secretory load.



**Fig. 1. Diameter and area of the parotid salivary gland ducts in control rats during the transition to definitive feeding. Stained with Hematoxylin and Eosin. Size: 10 $\times$ 10.**

need for salivary secretion associated with the transition to solid food and an increase in overall metabolic rate.

As the volume of secretory output increases, the load on the ductal system increases, which can contribute to the dilation of the excretory ducts. Furthermore, hormonal changes accompanying puberty can also affect the growth and development of glandular structures, including the ductal system.

The obtained data are consistent with the literature on age-related morphofunctional restructuring of exocrine glands in mammalian ontogenesis and confirm the high plasticity of the salivary glands in rats.

### **CONCLUSIONS**

Morphometric analysis revealed an increase in the average diameter of the excretory ducts of the parotid salivary gland in rats during the period from the transition to definitive feeding until the onset of puberty.

The detected changes reflect the age-related morphofunctional adaptation of the glands to new physiological conditions and increased functional load.

The obtained results can be used for further studies of the age-related morphology of exocrine glands and the development of models of the functional maturity of salivary glands in laboratory animals.

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