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RESEARCH ARTICLE

AGE-RELATED CHANGES IN STOMACH STRUCTURE DURING PALM OIL FEEDING DURING POSTNATAL ONTOGENESIS

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Abstract: The morphofunctional state of the stomach under the influence of drugs has been studied by world scientists as an urgent problem, and a number of scientific studies have been conducted to solve this problem over the past decade. Among them, a group of scientists studied the histopathological changes that occurred in the gastric mucosa of white male rats under the influence of "various drugs".

The results of a number of scientific studies show that as a result of gastrointestinal dysfunction, morphofunctional changes in the layers of the stomach walls of various etiologies occur.

Key words: Morphological, stomach, palm oil, mucus, submucosa, developmental dynamics, morpho-functional, postnatal ontogenesis.

INTRODUCTION

Nowadays, proper nutrition and the formation of a culture of nutrition are among the priority problems of today, as a means of improving the living standards of the world's population, maintaining their health, ensuring their nutritional needs, and preventing various somatic diseases.

In our country, comprehensive measures are being implemented to develop the medical field, in particular, to reduce the incidence of diseases of the functional and organic activity of the digestive organs and their complications, as well as to improve and prevent disease treatment methods, and certain results are being achieved.

Based on our scientific research, comparative morphological and morphometric analysis of the structure of the mucous, submucosal, muscular and serous layers of the stomach wall layers of rats fed palm oil, comparative analysis of the density of the mucous glands, and evaluation and comparison of their morpho-functional changes under experimental conditions using laboratory analyses allow us to develop statistical analysis indicators of the stomach wall layers [4,5,8,10,11,13,15,19].

Research objective

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To study the weight and dynamics of the stomach, the length and width of the stomach, the development and formation of tissue structures in postnatal ontogenesis and under the influence of palm oil in experimental postnatal ontogenesis.

METHODS

For the study, the stomachs of 150 white male rats, weighing from 48 to 220 grams, of 2 groups, of different ages: 21, 60, 90, 120, 150, 180 days, were taken. The experimental animals were kept under normal laboratory diet conditions. These rats were divided into two groups. The control group continued to be fed a daily constant diet. The diet of the second experimental group of white rats was restructured so that it consisted of red palm oil. For 30 days, 1.7 g/kg of Palm Oil Premium Carotino [1,2,3,9,12,14] was additionally administered intragastrically via oral gavage after the special diet given to the rats in the laboratory during daytime feeding.

The general morphology of the structural structures of the stomach of experimental animals was studied by histological sections of the stomach prepared on a microtome, stained with hematoxylin eosin and Van Gizon. To measure the macroscopic dimensions of the stomach, the organometry method was used to study the anatomical dimensions of the stomach of Ivan Pavlov's rats. After the stomach was removed from the abdominal cavity, its length, height, width and weight were measured. Organometry of organs, since it is possible to conduct statistical analysis, complements morphological data, increases the level of reliability, and demonstrates objectivity. This method is of great importance in assessing the concepts of the normal state and pathological changes of organs. A caliper was used to measure these dimensions of the stomach. The shape of the stomach was determined visually.

RESULTS AND DISCUSSION

The following data were obtained regarding the components of the anatomical structure of the stomach wall of rats.

Topographically and anatomically, the upper posterior wall of the stomach of the studied white rats touches the jejunum and ileum loops on the right side, and the left adrenal gland and left kidney on the left. The upper anterior wall of the stomach covers the upper 2/3 of the left adrenal gland and the edge of the left kidney. The left half of the stomach is round, located mainly under the diaphragm, and touches the spleen on the left.

The right half of the stomach of rats narrows and continues into the duodenum. The duodenum lies anterior to the right half of the stomach, under the visceral surface of the liver and extends to the right border of the hilum of the liver.

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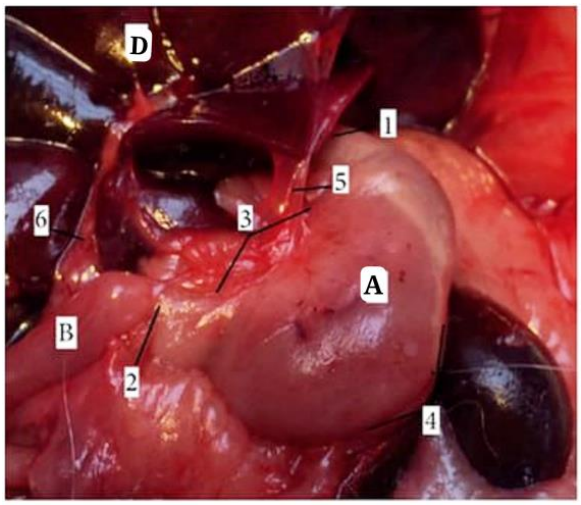

Figure 1. Stomach structure of rats.
A- stomach (facies parietalis), B- duodenum, D-facies visceralis hepatis. 1-pars cardiaca, 2-pars pylorica, 3-curvatura ventriculi minor, 4-curvatura ventriculi major, 5-lig. hepatogastricum, 6-ductus hepaticus communis

The stomach of rats is a crescent-shaped sac, weighing from 3.9 to 9.5 grams. The stomach tissue of rats is approximately 2.2% of the total body weight.

The dynamics of changes in the structure of the stomach with age during postnatal ontogenesis were obtained as follows.

The body weight of 21-day-old male rats ranged from 48 to 55 grams, with an average of 51.5±0.14 grams, and the stomach weight ranged from 1.06 to 1.21 grams, with an average of 1.13±0.5 grams. It was found that the shape of the rat stomach at this age gradually approaches a hook-shaped shape from a tubular one. The length of the stomach is from 1.8 cm to 2.0 cm, with an average of 1.9±0.2 cm, and the width is from 0.4 cm to 0.8 cm, with an average of 0.6±0.4 cm.

The body weight of 60-day-old male rats ranged from 70 to 82 grams, with an average of 75.6±2.08 grams, and the stomach weight ranged from 1.54 to 1.80 grams, with an average of 1.67±1.8 grams. It was found that the shape of the rat stomach at this age gradually changes from a hook-shaped to a stocking-shaped shape. The length of the stomach is 2.4 to 2.8 cm, with an average of 2.6±0.5 cm, and the width is 0.7 to 1.4 cm, with an average of 1.05±0.2 cm.

The body weight of 90-day-old male rats ranged from 100 to 120 grams, with an average of 110.2±3.08 grams, and the stomach weight ranged from 2.2 to 2.6 grams, with an average of 2.4±0.6 grams. It was found that the shape of the rat stomach at this age gradually changes from a stocking-shaped to a crescent-shaped shape. The length of the stomach is 3.0 to 3.5 cm, with an average of 3.25±0.3 cm, and the width is 1.2 to 1.8 cm, with an average of 1.5±0.1 cm.

The body weight of 120-day-old male rats ranged from 130 to 150 grams, with an average of 141.6±2.23 grams, and the stomach weight ranged from 2.9 to 3.3 grams, with an average of 3.1±0.8 grams. It was found that the shape of the rat stomach at this age gradually approaches the shape of a horseshoe from a crescent. The length of the stomach is 3.5 to 3.8 cm, with an

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average of 3.65±0.2 cm, and the width is 1.5 to 2.2 cm, with an average of 1.85±0.7 cm.

The body weight of 150-day-old male rats ranged from 165 to 186 grams, with an average of 175.5±4.34 grams, and the stomach weight ranged from 3.6 to 4.1 grams, with an average of 3.85±2.6 grams. It was found that the shape of the rat stomach at this age gradually changes from crescent-shaped to sac-shaped. The length of the stomach is 4.0 to 4.2 cm, with an average of 4.1±0.2 cm, and the width is 2.0 to 2.6 cm, with an average of 2.3±0.8 cm.

The body weight of 180-day-old male rats ranged from 200 to 220 grams, with an average of 211.6±3.54 grams, and the stomach weight ranged from 4.4 to 4.8 grams, with an average of 4.6±1.75 mg. The shape of the rat stomach at this age was found to be crescent-shaped. The length of the stomach ranged from 4.2 to 4.6 cm, with an average of 4.4±0.5 cm, and the width ranged from 2.2 to 2.7 cm, with an average of 2.45±0.1 cm.

Table 1

Age-related changes in gastric anatomical parameters of rats in the control group

Age of rats (in days)	Body weight of rats, g	Body weight of rats, g	Stomach length cm	Stomach width cm
21	51,5±0,14	1,13±0,5	1,9±0,2	0,6±0,4
60	75,6±2,08	1,67±1,8	2,6±0,5	1,05±0,2
90	110,2±3,08	2,4±0,6	3,25±0,3	1,5±0,1
120	141,6±2,23	3,1±0,8	3,65±0,2	1,85±0,7
150	175,5±4,34	3,85±2,6	4,1±0,2	2,3±0,8
180	211,6±3,54	4,6±1,8	4,4±0,5	2,45±0,1

The relative weight of the body and stomach of rats at 21, 60, 90, 120, 150, 180 days of age changes depending on age. The anatomical dimensions of the stomach have a high growth rate from 21 days to 180 days. Gradually, due to the faster growth of the length of the stomach, the shape of the stomach changes from a tubular shape to a crescent-shaped sac (see Table 1).

The following data were obtained on the dynamics of changes in the structure of the stomach with age when feeding with palm oil during postnatal ontogenesis.

The body weight of 21-day-old rats ranged from 73 to 80 grams, with an average of 76.5±1.2 grams, and the stomach weight ranged from 1.20 to 1.37 grams, with an average of 1.28±0.6 grams. It was found that the shape of the rat stomach at this age

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gradually changes from a tubular to a hook-shaped shape. The length of the stomach is from 1.9 cm to 2.2 cm, with an average of 2.1±0.3 cm, and the width is from 0.46 cm to 0.9 cm, with an average of 0.67±0.46 cm.

Table 2

Age-related changes in gastric anatomical parameters of rats in the control group

Age of rats (in days)	Body weight of rats, g	Body weight of rats, g	Stomach length cm	Stomach width cm
21	76,5±1,2	1,28±0,6	2,1±0,3	0,67±0,5
60	107,3±2,5	1,95±2,1	2,9±0,6	1,2±0,2
90	146,2±1,7	2,80±0,7	3,65±0,3	1,8±0,1
120	178,1±1,4	3,65±0,9	4,1±0,2	2,25±0,8
150	215,5±1,1*	4,60±3,1*	4,55±0,2*	2,75±0,9*
180	255,4±1,6	5,40±2,1	4,9±0,6	2,85±0,1

Note:* - r<0.05 is significant compared to the control group

The body weight of 60-day-old rats ranged from 100 to 112 grams, with an average of 107.3±2.5 grams, and the stomach weight ranged from 1.8 to 2.1 grams, with an average of 1.95±2.1 grams. It was found that the shape of the rat stomach at this age gradually approaches the shape of a sock from a hook. The length of the stomach is from 2.7 to 3.1 cm, with an average of 2.9±0.6 cm, and the width is from 0.8 to 1.6 cm, with an average of 1.2±0.2 cm.

The body weight of 90-day-old rats ranged from 135 to 155 grams, with an average of 146.2±1.7 grams, and the stomach weight ranged from 2.6 to 3.0 grams, with an average of 2.8±0.7 grams. It was found that the shape of the rat stomach at this age gradually changes from a stocking-shaped to a crescent-shaped shape. The length of the stomach is 3.4 to 3.9 cm, with an average of 3.65±0.3 cm, and the width is 1.43 to 2.1 cm, with an average of 1.8±0.1 cm.

The body weight of 120-day-old rats ranged from 168 to 188 grams, with an average of 178.1±1.4 grams, and the stomach weight ranged from 3.4 to 3.9 grams, with an average of 3.7±0.9 grams. It was found that the shape of the rat stomach at this age gradually approaches the shape of a horseshoe from a crescent. The length of the stomach is from 3.9 to 4.3 cm, with an average of 4.1±0.2 cm, and the width is from 1.8 to 2.7 cm, with an average of 2.25±0.8 cm.

The body weight of 150-day-old rats ranged from 205 to 226 grams, with an average of 215.5±1.1 grams, and the stomach weight ranged from 4.3 to 4.9 grams, with an average of 4.6±3.1 grams. It was found that the shape of the rat stomach at this age gradually changes from crescent-shaped to

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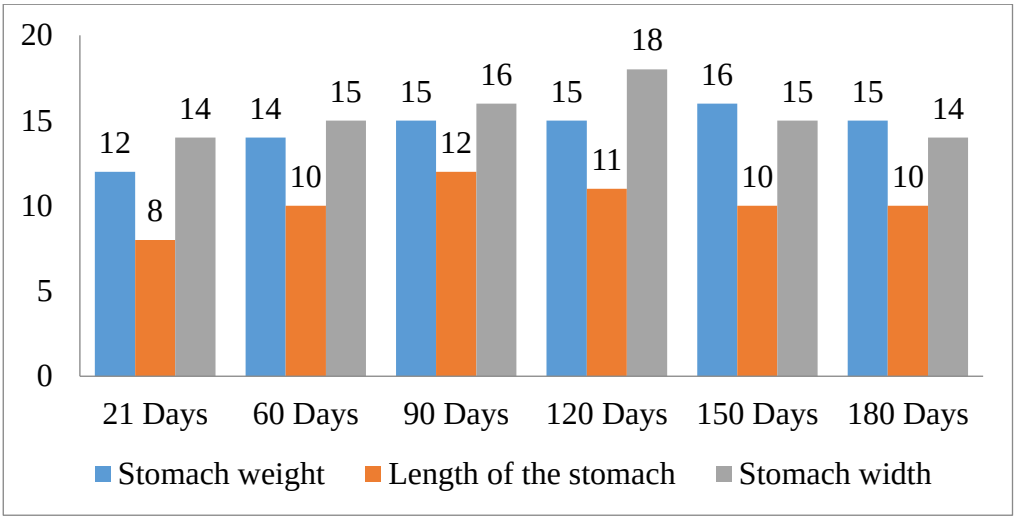
sac-shaped. The length of the stomach is 4.4 to 4.7 cm, with an average of 4.55±0.2 cm, and the width is 2.4 to 3.1 cm, with an average of 3.75±0.9 cm.

The body weight of 180-day-old rats ranged from 244 to 264 grams, with an average of 255±1.6 grams, and the stomach weight ranged from 5.2 to 5.6 grams, with an average of 5.4±2.1 grams. The shape of the stomach of rats at this age was found to be crescent-shaped. The length of the stomach ranged from 4.7 to 5.1 cm, with an average of 4.9±0.6 cm, and the width ranged from 2.6 to 3.1 cm, with an average of 2.85±0.1 cm.

Percentage increase in the anatomical parameters of the stomach of the experimental group of rats compared to the control group of different ages



CONCLUSION

Thus, it was found that the body weight, stomach length, width, and stomach weight of white male rats were greater in the experimental group than in the control group. The results of our studies showed that when comparing 21-day-old male rats of the experimental group, the stomach weight was 12% larger, the length was 8% larger, and the width was 14% larger; when comparing 60-day-old rats, the stomach weight was 14% larger, the length was 10% larger, and the width was 15% larger; when comparing 90-day-old rats, the stomach weight was 15% larger, the length was 12% larger, and the width was 16% larger; when comparing 120-day-old rats, the stomach weight was 15% larger, the length was 11% larger, and the width was 18% larger; when comparing 150-day-old rats, the stomach weight was 16% larger, the length was 10% larger, and the width was 15% larger; when comparing 180-day-old rats, the stomach weight was 15% larger, the length was 10% larger, and the width was 14%.

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