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Histological examination of the Loeventhal gland after experimental administration of Metizol

The Loeventhal gland is the upper piece of the parotid gland in rodents. This part is not too easy to recognize. It produces secretions composed of proteins, lipids and mucoproteins. Secretions of this gland together with secretion of the lacrimal gland are released at the conjunctiva sac, but there are no noticeable changes in the eye after this gland has been removed.

We showed a coactivity of the Loeventhal gland with almost all the endocrine glands particularly sexual ones (2, 5, 10). The thyroid gland may play a part in the activity of the Loeventhal gland, as the influence of hormones of the thyroid gland on the morphology and activity of the submandibular gland (4, 7, 8, 9).

The level of the thyroid gland hormones influences the level of Metizol-thyreostatic, derivative thiourine. This activity consists of the inhibition of the initial stages of thyroid hormone synthesis (3). Apart from affecting the thyroid, Metizol indirectly or directly acts on other organs, causing different side effects, such as allergies – rash, erythema (1), and blood picture changes likeagranulocytosis, granulocytopenia (1).

We decided to experiment with histological observations of the Loeventhal gland of white Wistar rats administered Metizol (Polfa).

MATERIAL AND METHOD

The investigations were carried out on white Wistar rats (adult males, weighing ca 300 g each). The animals were divided into three groups (two experimental groups and a control one); experimental group I: the animals were given Metizol for 21 days; experi-

mental group II: the animals were given Metizol for 42 days; control group: the animals were given distilled water by means of intragastric bougie.

Metizol dissolved in distilled water was administered intragastrically at the dose of 1 mg/kg b.m. Twenty four hours following the last dose the animals were put to sleep by ether and the Loeventhal gland samples were taken for histological examination (stained with hematoxylin and eosin and Masson's method) and histochemical examination (stained by PAS's and Feulgen's methods).

The Loeventhal gland samples for the examination under optic microscope were fixed in Baker's fluid (1% $CaCl_2$ in 10% solution on neutralised formalin). 7 μm thick paraffin sections were histologically and histochemically evaluated.

The Loeventhal gland's samples stained with hematoxylin and eosin underwent morphometric measurement: 1) cell nuclei were measured by projection microscope (at 1000x magnification) to determine the smallest and the largest nucleus diameters. The surface section was then calculated using formulas πr^2 on the circle's surface and πab on the ellipse's surface). On fragments of each of the animals submandibular glands 100 nuclei were measured randomly, then the mean area of the section of cell nuclei of each group was then established.

Results of examinations were worked out statistically using Student's Test (6). The values of investigated parameters and surfaces of section of cells nuclei, standard deviation, coefficient variabilities, differences between groups, value of test-function "t" are shown in Table 1 and 2.

Table 1

Descriptions	n	Medium	SD	CV	Min	Max
control group	100	34.99	17.69	50.6	9.4	122.5
group I	100	26.45	12.50	47.2	11.8	63.6
group II	100	30.54	18.28	59.9	9.4	117.8

t-Student test for differences between means founding unequal variations.

Table 2

Compared pairs	df	t	P	Essential
control and gr. I	178	3.944978	0.000115	P<0.001
control and gr. II	198	1.748433	0.081939	No essential
gr. I and gr. II	175	1.846387	0.066525	No essential

RESULTS

CONTROL GROUP

Standard staining, with hematoxylin and eosin showed no deviation in the normal structure of the Loeventhal gland. There are visible different sizes clusters separated from connective tissue. The serous secreting cells are cone-shaped and contain the cell nuclei at the base. Some of the nuclei are large, polyploids and some cells are binuclear. Numerous capillary vessels wind thrash each cluster. The mean area of section of the cell nuclei of serous follicles is 34.99 μm^2.

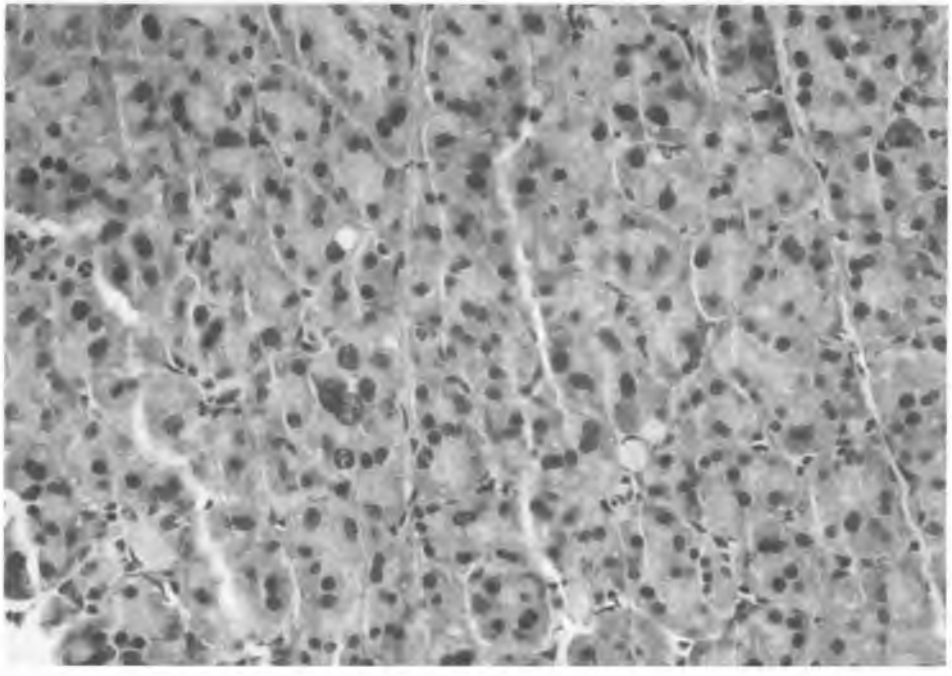

Fig. 1. The Loeventhal gland of the rat, experimental group I. Hematoxylin and eosin staining. Magn. 400x

EXPERIMENTAL GROUP I (21 DAYS' METIZOL ADMINISTRATION)

Shows a greater quantity of cells with enlarged nucleus, however in some cells the nuclei decrease and colour more strongly. The mean area of the section of cell nuclei of serous follicles is 26.45 μm^2.

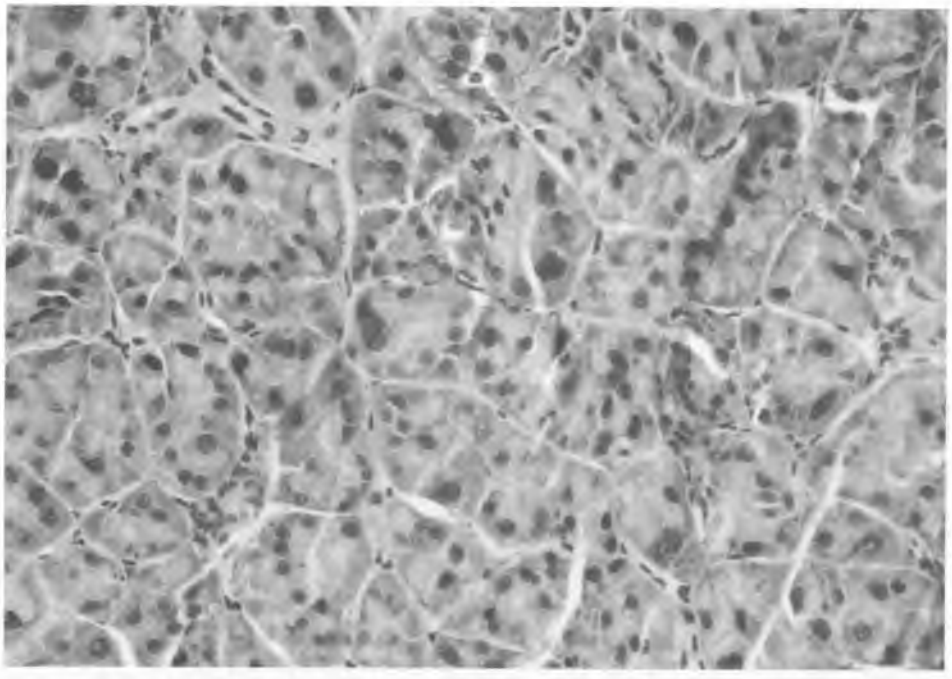

Fig. 2. The Loeventhal gland of the rat, experimental group II. Hematoxylin and eosin staining. Magn. 400x

EXPERIMENTAL GROUP II (42 DAYS' METIZOL ADMINISTRATION)

Similarly as in group I this group shows a greater quantity of cells with large nucleus. However, in many cells the nucleus decreases. The mean surface of the area of section of cell nuclei of serous follicles is 30.54 μm^2. In some cells there are little, irregular follicles, which are the result of the proliferation of cells (visible mitotic changes in nuclei).

DISCUSSION

Metizol – a derivative from thiourine is a standard drug in hyperthyroidisms, where there is a decreased level of hormones of thyroid (3). It is known that thyroid as an endocrine gland has connections with other glands: with pituitary gland, suprarenal glands, and salivary glands (7). Metizol, as one can suppose, also influences the action and morphology of the Loeventhal gland.

21 days' administration of Metizol at the dose 1 mg/kg b.m./24 h resulted in the statistically important change and size of the mean area of the section of cell nuclei (about 8.54 μm^2). Admittedly a large number of cells with large nucleus has increased but simul-

taneously a large quantity of nucleus has inactivated. From this relationship it appears that Metizol inhibits the production of thyroid hormones and inhibits cell division. After 42 days Metizol administration the mean area of section of cell nuclei decreases (about 4.45 μm^2 in comparison with control group), but to a lesser degree than in group I. Also follicles appeared which is the result of the cell proliferation. It seems that the gland becomes similar to the gland of the control group.

CONCLUSIONS

1. 21 days' administration of Metizol causes a decrease in the mean area of the section of cell nuclei, which may be the evidence of decreased activity of this organ.

2. 42 days' administration of Metizol causes a decrease in the mean area of section of cell nuclei as well, but to a lesser degree than after 21 day administration of Metizol. In addition new follicles appear, which is the expression of the cell's proliferation (a protective mechanism of an organism).

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SUMMARY

The Loeventhal gland of the white Wistar rats was examined. The animals were given Metizol for 21 days and 42 days at the dose of 1 mg/kg b.m./24 h. The Loeventhal gland's samples were taken for histological and histochemical examination. Then they there stained with hematoxylin and eosin, Masson's, PAS's, and Feulgen's method. The mean area of section of cell nuclei was measured. Results of examination were counted statistically. The following changes were noticed: after 21 days of administration of Metizol in the Loeventhal gland the mean area of the section ofcells nuclei was decreased; after 42 days of administration of Metizol the mean area of the section of cell nuclei was decreased as well, but to a lesser degree than in group 1. New follicles appeared which can be the expression of cell mitotic activity.

Badania histologiczne gruczołu Loeventhala po doświadczalnym podawaniu Metizolu

Badano gruczoł Loeventhala szczurów rasy Wistar, którym podawano Metizol przez 21 dni i 42 dni w dawce 1 mg/kgm.c./24 godz. Stosowano barwienia H+E, met. PAS, met. Feulgena, met. Massona. Mierzono powierzchnię przekroju jąder komórkowych i do uzyskanych danych stosowano obliczenia statystyczne. Zaobserwowano następujące zmiany. Po 21 dniach podawania Metizolu w gruczole Loeventhala zmniejszyła się powierzchnia przekroju jąder komórkowych. Po 42 dniach podawania Metizolu powierzchnia przekroju jąder komórkowych również uległa zmniejszeniu, ale w mniejszym stopniu niż w grupie 1. Pojawiły się pęcherzyki proliferacyjne, które są wyrazem aktywności mitotycznej.