greater intensity than the male thyroid. This can be deduced from the greater weight of the female than of male thyroid gland and, in particular, by the lower TT_4 and FT_4 levels after simultaneous injection of progesterone and TTH into females. These results indicate that stimulation of the female thyroid gland additionally to progesterone by exogenous TTH leads to its exhaustion.

The considerable functional stress on the thyroid gland caused by estrogens and intensified by progesterone may be one cause of the hyperplasia of the thyroid gland more often observed in women than in men.

LITERATURE CITED

1. B. V. Aleshin and N. G. Tsarikovskaya, Uspekhi Sovrem. Biol., 59, No. 2, 284 (1965).
2. E. A. Loskutova, Probl. Éndokrinol., No. 5, 65 (1974).
3. Y. Takashi, K. Isao, F. Hitoshi, et al., Proc. Soc. Exp. Biol. Med., 143, 948 (1973).
4. B. E. P. Murphy, Nature, 201, 679 (1964).
5. F. Clark and H. Brown, Brit. Med. J., 1, 713 (1970).
6. S. A. D'Angelo and J. S. Fischer, Endocrinology, 84, 117 (1969).

EFFECT OF NEONATAL ANDROGENIZATION ON HYPOTHALAMIC BIOGENIC MONOAMINES AND PITUITARY FUNCTION IN RATS

N. D. Nosenko, O. N. Zryakov, and A. G. Reznikov

UDC 612.65.62-06:612.616.38:[612.433+612.826.4

Injection of testosterone propionate into female Wistar rats on the 2nd-4th day after birth did not change the serotonin concentration but sharply reduced the noradrenalin and dopamine concentrations in the hypothalamus of the animals at the age of 3.5 months. This was accompanied by an increase in the prolactin content in the adenohypophysis despite preservation of normal somatotropic activity. The results of this investigation point to a role of catecholamines in the pathogenesis of anovulatory sterility and give greater precision to modern views on the regulation of pituitary gonadotropic function.

KEY WORDS: neonatal androgenization; anovulatory sterility; hypothalamus; pituitary; biogenic monoamines.

Administration of androgens to newborn female rats disturbs the normal process of sexual differentiation of the brain and induces anovulatory sterility. The development of the anovulatory syndrome is linked with depression of the hypothalamic centers regulating secretion of gonadotropins [1,3,5].

This paper gives experimental proof of the participation of biogenic monoamines in the pathogenesis of anovulatory sterility.

EXPERIMENTAL METHOD

Female Wistar rats on the 2nd-4th day after birth received a subcutaneous injection of 150 μg testosterone propionate (TP). The animals were killed at the age of 3.5 months. Intact sexually mature females

Laboratory of Neurohormonal Regulation of Reproduction and Laboratory of Biosynthesis of Protein Hormones, Kiev Research Institute of Endocrinology and Metabolism. (Presented by Academician of the Academy of Medical Sciences of the USSR N. A. Yudaev.)

Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 82, No. 9, pp. 1112-1114, September, 1976. Original article submitted January 29, 1976.

TABLE 1. Content of LTH and STH in Adenohypophysis of Neonatally Androgenized Female Rats at the Age of 3.5 months (M±m)

Hormone	Animals	Number of animals	Hormone content	
			In μg per adenohypophysis	In μg/mg adenohypophysis
LTH	Control	12	607,0±52,4	39,2±2,1
	Experimental	10	1153,6±56,2	70,0±3,0
	P		<0,001	<0,001
STH	Control	12	966,0±89,4	69,0±7,5
	Experimental	10	1087,0±95,4	70,9±6,4
	P		>0,25	>0,5

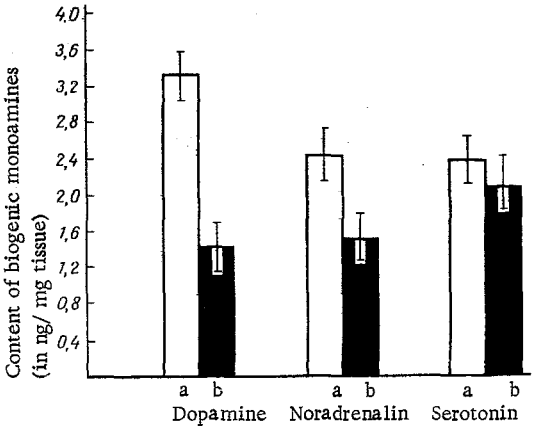

Fig. 1. Content of biogenic monoamines in hypothalamus of neonatally androgenized female rats at the age of 3.5 months (M±m): a) control (12 rats); b) experiment (10 rats).

with a regular 4-day cycle, killed in the stage of estrus, were used as the control. The state of the sex cycle was established from the cytological picture of vaginal smears. The concentrations of dopamine, noradrenalin, and serotonin in the hypothalamus were determined spectrofluorometrically [4]. The levels of prolactin (LTH) and somatotropic hormone (STH) in the adenohypophysis were determined by electrophoresis in polyacrylamide gel, using sodium dodecylsulfate [2].

EXPERIMENTAL RESULTS AND DISCUSSION

Throughout the period of observation the vagina of the androgenized female rats failed to open. Histological examination of such animals showed intensive cornification of the vaginal epithelium, with polycystosis and absence of corpora lutea in the ovaries [3].

The content (total and relative) of LTH in the adenyhypophysis was sharply increased. The STH content was not significantly altered (Table 1).

Early androgenization caused a sharp decrease in the concentrations of dopamine (from 3.35±0.31 to 1.46±0.37 ng/mg tissue) and noradrenalin (from 2.46±0.13 to 1.53±0.15 ng/mg tissue) in the hypothalamus (Fig. 1). The serotonin concentration remained unchanged (2.13±0.16 and 2.44±0.16 ng/mg tissue in the experimental and control animals respectively). The results confirmed those of earlier experiments in which androgenization on the 2nd-4th day of postnatal development caused more severe injury to hypothalamo-hypophyseal regulation of the reproductive system (a decrease in the level of LH-releasing activity of the hypothalamus, and of luteinizing and follicle-stimulating hormones in the pituitary, etc.) than androgenization on the 5th day [3]. Hyyppa and Rinne [6], who investigated the noradrenalin and serotonin content in the hypothalamus of rats with a prematurely opened vagina and persistent estrus after injection of TP on the 5th day of life,

found no changes whatsover. Neonatal androgenization increases pituitary lactotropic activity [7,8].

The fact that the STH level in the adenohypophysis of neonatally androgenized rats is unchanged is evidence of the selective action of TP on the regulation of secretion of gonadotropic hormones. The change in gonadotropic activity can evidently be explained by a decrease in the tonic inhibitory influence of the hypothalamic catecholamines of LTH secretion and of the stimulating effect on secretion of lutenizing hormone.

LITERATURE CITED

1. V. N. Babichev, Probel. Éndokrinol., No. 3, 120 (1969).
2. F. P. Martynenko and T. O. Sakhno, Ukr. Biokhim. Zh., No. 1, 122 (1975).
3. A. G. Reznikov, in: The Mechanism of Action of Hormones [in Russian], Kiev (1975), p. 88.
4. J. B. Ansell and M. F. Beeson, Analyt. Biochem., 23, 196 (1968).
5. C. A. Barraclough and R. A. Gorski, Endocrinology, 68, 68 (1961).
6. M. Hyyppa and U. K. Rinne, Acta Endocrinol. (Copenhagen), 66, 317 (1971).
7. R. S. Mallampati and D. C. Johnson, J. Endocrinol., 59, 209 (1973).
8. R. S. Mallampati and D. C. Johnson, Neuroendocrinology, 9, 255 (1974).

EFFECT OF INJURY TO THE MATERNAL LIVER ON REACTIVE CHANGES IN THE LIVER OF THE YOUNG

N. I. Tsirel'nikov

UDC 616.36-056.716-07:616.36-018.1-053.31

The liver of young rats aged 30 days was studied spectrocytophotometrically (content of glycogen, amino acids, RNA, and DNA) and morphometrically (size of the nuclei and nucleoli, mitotic index) 48 h after intragastric administration of CCl_4. Toxic hepatitis had been produced in the mothers of these rats before pregnancy. The results indicate that previous hepatitis in the mother not only affected the morphological nature and histochemical properities of the liver of the progeny, but also led to considerable changes in the response of the hepatocytes to administration of the poison, for the harmful effect of the hepatotoxin was increased.

KEY WORDS: injury to the liver by CCl_4; toxic hepatitis; hepatocytes; changes in liver of the progeny.

Diseases of the liver, especially infectious hepatitis, occupy an important place among the causes of intrauterine pathology of the fetus and may be the cause of delay in the general development of the child and its predisposition to various diseases [5]. Diseases of the liver are possible in the postnatal period in a child whose mother had hepatitis shortly before or during the preceding pregnancy [6]. Experiments have shown [2,3] that degenerative changes characterized by extensive vacuolation of the cytoplasm of the hepatocytes, signs of balloon degeneration, increasing processes of destruction of the cell nuclei, and so on, arise in young rats whose mothers had been poisoned with α-methylstyrene. Triple administration of CCl_4 to rats causes physical underdevelopment and delay in sexual maturation of young rats, in which the first pregnancy is late to occur and runs a pathological course [4].

In the investigation described below the morphological and histochemical reaction of the liver of young rats aged 30 days to administration of a hepatotoxin was studied. Before pregnancy toxic hepatitis had been produced in the mothers of these young rats (three injections of CCl_4, each of 0.3 ml/100 g body weight, as a

Group for Fetoplacental Pathology, Institute of Clinical and Experimental Medicine, Siberian Branch, Academy of Medical Sciences of the USSR. Central Research Laboratory, Novosibirsk Medical Institute.

(Presented by Academician of the Academy of Medical Sciences of the USSR V. P. Kaznacheev.) Translated from Buylleten' Éksperimental'noi Biologii i Meditsiny, Vol. 82, No. 9, pp. 1114–1116, September, 1976. Original article submitted February 16, 1976.