REACTIVITY OF THE REPRODUCTIVE SYSTEM IN MATURE INTACT RATS IN THE ARID ZONE

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Annotation

We have studied the reproductive system of mature white male rats with a weight of 180-220 g. living in the arid zone. Reproductive conditions in intact rats were studied using morphological, morphometric, histochemical, cytophotometric biochemical, as well as using enzyme immunoassay methods. At the same time, the reproductive system in index rats is in a state of moderate functioning to ensure the synthesis and secretion of testosterone.

Keywords: Arid zone, endocrine system, adenohypophysis, follicle-stimulating hormone, luteinizing hormone, testosterone.

Relevance. A number of scientific studies are being conducted all over the world to improve the assessment of endocrine system disorders between anabolic, catabolic and kinetic systems, under the influence of various extreme factors, as well as on the role of the endocrine system in ensuring general and specific reactivity of the body [1,2,5,6,9-13,15,24,25,28,29,33,34].

In the arid zone, high physical loads are characteristic of the modern athlete's body, and impose special requirements on the energy-supplying system of the body and how perfect the system of regulation of these processes will be formed [9, 19].

In the process of adaptation of the athlete's body to high training loads, the activation of the hypothalamic-pituitary-adrenocortical and sympatho-adrenal systems – the hormonal link of adaptation process management [4, 17]. Changes in hormonal status reflect the degree of training stress in athletes. The imbalance of hormones affects the functioning of various body systems [2, 21, 22,26].

An important role in the adaptation of athletes to a high level of physical activity is traditionally assigned to the "pituitary – adrenal cortex" system, while one should not forget about the influence of the reproductive system: the exceptionally significant role of which in the regulation of energy and productive metabolism in the body is beyond doubt [23,19]. At the same time, the normal level of reproductive hormones

is necessary for the functioning of all body systems, and in case of dysfunction: changes are polysystemic in nature [18,27].

We know that when exposed to extreme factors, the body primarily activates the sympathoadrenal system of the body [4,8,14,16,20,31,32,35]. At the same time, the deterministic excitation of the higher sympathetic centers and neuroendocrine systems, an increase in the concentration of catecholamines, leads to the realization of two interrelated phenomena: activation of the adenylate cyclase system, that is, energy conversion processes and sequential activation of the main processes of renewal of the lipid bilayer of membranes, i.e. lipid peroxidation, which provides dystrophic changes at the cellular level [28]. At the same time, reproductive and regenerative processes in the cell remain at a disadvantage. It is known that luteinizing hormone (LH), follicle stimulating hormone (FSH) and testosterone are responsible for this kind of process [30,36,37].

Therefore, without knowing the sequence of dynamic changes, the components of the endocrine system responsible for the cellular reproductive process during post-resuscitation disease, we cannot reveal the causes of changes at the cellular level, disorders of the reproductive state at the cellular level.

An analysis of the literature shows that studies of endocrine system dysfunctions in the arid zone with aerobic, mixed and anaerobic exercise have studied only some glands.

Certain measures are being taken in the world to create a healthcare system that provides a radical increase in the quality and effectiveness of medical care to the population, including early diagnosis, effective treatment, prevention and reduction of complications of various somatic diseases. Based on the identified tasks, it is advisable to conduct scientific research: experimental studies aimed at assessing disorders of the reproductive system during physical exertion; it is mandatory to study the reproductive state of intact rats living in the arid zone.

The purpose and objective of the study. To study the morphofunctional states of the reproductive system in sexually mature intact rats living in the arid zone. At the same time, the objectives of the study are to assess the functional state of β and d-basophil cells of the adenohypophysis, the content of follicle-stimulating hormone (FSH) luteinizing hormone (LH), testosterone in the blood of intact rats.

Object of research. In connection with the task, conducted a study on 20 mongrel white sexually mature male rats weighing 180-220 g. who have conducted a study of the reactivity of the reproductive system of those living in the arid zone.

Research methods. To achieve the goal and solve the problem, experimental, morphological, morphometric, histochemical, cytophotometric, enzyme immunoassay methods were used.

The results obtained and their discussion. In the study, β- and d-basophilic cells are scattered throughout the adenohypophysis. They are mainly defined around the vessels. β-basophilic adenocytes have a smaller size compared to d-basophilic adenocytes, in both basophilic in adenocytes, the glycoprotein is diffusely located, depending on functional activity. The cytoplasm volume in β-basophilic adenocytes is 592.1 ± 17.9 mm3, the cytoplasm volume of d-basophilic adenocytes is greater than that in β-basophilic adenocytes, which are within 812.0 ± 31.3 mm3. When determining the functional activity of β- and d – basophilic adenocytes, the cells are at the stage of different functional activity. At the same time, in β- and d-cells, the number of highly active cells is 10.6 ± 0.4% and 10.8 ± 0.4%. The glycoprotein in them is located mainly in the pericaryon region. The preparation is mainly dominated by cells of moderate functional activity, the glycoprotein in them is scattered throughout the cytoplasm, diffusely and loosely, their number is equal to 70,6 ± 0,4% and 70,4 ± 0,6%, and the number of cells of low functional activity, that is, with a densely located glycoprotein in the cytoplasm is determined within 18,8 ± 0,4% and 18,8 ± 0,4%. The glycoprotein content is determined in the range of 155,8 ± 3,3 units and 156,0 ± 3,1 units (Fig.1). Nuclei in β- and d-basophilic adenocytes are chromatic; chromatin in them is diffusely located throughout the nucleus, the volume of the nuclei is 127,2 ± 3,5 microns 3 and 126,9 ± 3,5 microns^3, the nucleoli in them are mainly located in the center of the nucleus, their volume is on average 0,88 ± 0,02 microns^3 and 0,87 ± 0,02 microns^3. The value of the nuclear-cytoplasmic ratio in β-basophilic adenocytes is equal to 0,215 ± 0,0009, and in d-basophilic adenocytes, the value of the nuclear-cytoplasmic ratio is less, compared with β-basophilic adenocytes and is equal to 0,156 ± 0,001.

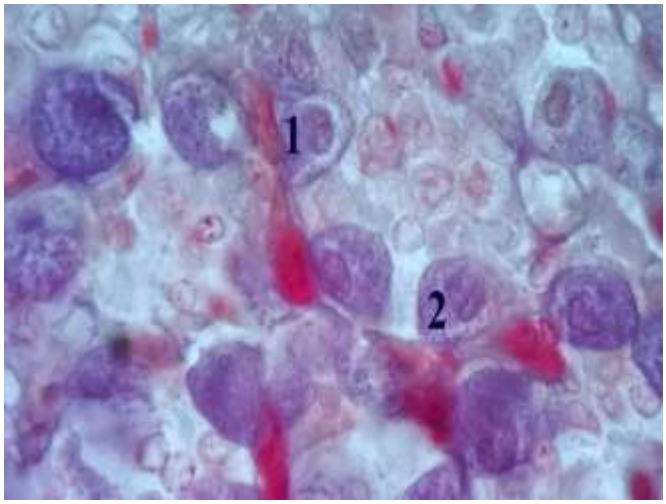

Fig.1. Basophilic cells of the adenohypophysis in intact rats with a densely located glycoprotein. PAF coloring with azan coloring according to Haidengine. Magnification: about 100x, about 15x. The numbers are: 1. d-basophilic adenocytes, 2. β-basophilic adenocytes.

The capillaries in the adenohypophysis have different sizes, they are slightly hyperemic. Their diameter is within 5,9 ± 0,05 microns. The FSH content in the blood was 0,13 ± 0,015 mlU/ml. LH 0,43± 0,01 mlU/ml. the testosterone content is 5,04± 0,03 nmol/l. If we interpret the data with the data (Karabaeva A.G.2021), then the reproductive system, that is, cells of moderate functional activity prevail in d- and β-basophil cells, normal amounts of follicle-stimulating hormone, luteinizing hormone and testosterone in the blood; moderate functioning of d-and β-basophil cells of the adenohypophysis is aimed at the synthesis and secretion of testosterone for ensuring adaptive processes in the arid zone.

Based on the data obtained , the following conclusions can be drawn: The reproductive system in intact rats is in a state of moderate functioning, aimed at ensuring the synthesis and secretion of testosterone.

References:

1. Volkov A.V., Moroz V.V., Yezhova K.N., Zarzhetsky Yu.V. The role of sex steroids in the recovery period after clinical death (experimental study). General resuscitation.- 2010. 4(1):- p.1-18
2. Gogotova V.L., Smirnov I.E., Kucherenko A.G., etc. Features of the hormonal status of swimmers aged 13-17 years, depending on their qualifications. // Medical Bulletin of the North Caucasus. – 2010. – No. 3. – pp. 107-108.
3. Danilova N.N., Krylova A.L. Physiology of higher nervous activity. Rostov-on-Don: Phoenix, 2002. – 479 p.
4. Dzhalolov D.A., Karabaev A.G., Karabaev Zh.A. Mutual relations of the reactivity of the autonomic nervous system, indicators of endogenous intoxication, and basophilic cells of the adenohypophysis of white rats. //Journal Bulletin of modern research.- 2018.-№4.2 (19). - Pp.47-49.
5. Dzhumaniyazov Sh. A., Karabaev A. G., Kim D. V. Study of the development and formation of the neurosecretory function of the hypothalamic-pituitary neurosecretory system in fetuses and offspring of animals poisoned with chlorpyrifos during pregnancy. // Journal Bulletin of the doctor.-2022,- № 3 (106),-2022,- Pp. 46-51.
6. Zarechnova N.N., Slynko T.N. The effect of mountain hypoxia on the organs of the endocrine system with insufficiency of adrenal and pancreatic hormones // Bulletin of New Medical Technologies. Electronic edition-2018. No. 4.-pp.3-10.
7. Isaev A.P., Aminov A.S., Ehrlich V.V. et al. Integrative system of bioelements, proteins, immunological resistance, enzymatic and hormonal activity of athletes in conditions of development of local-regional muscular endurance. // Theory and practice of physical culture. – 2014. – No. 1. – pp. 73-79.
8. Karabaev A. G. The relationship between the reactivity of the autonomic nervous system and the morphofunctional activity of basophilic cells of the adenohypophysis in the post-resuscitation period //Science and Peace. – 2020. – №. 3-1. – Pp. 55-61.

9. Karabaev A. G., Vladislavna K. D. Changes In the Reproductive System During Clinical Death //Central Asian Journal of Medical and Natural Science. – 2022. – Vol. 3. – No. 5. – Pp. 194-198.
10. Karabaev A.G. Relationship of reactivity of the autonomic nervous system and morphofunctional activity of basophilic cells of the adenohypophysis in the post-resuscitation period// Journal Science and the World.-2020.- №3(1).- C55-61.
11. Karabaev A.G. Morphofunctional changes in the hypothalamic-pituitary neurosecretory system in the process of dying and reviving the body (experimental study) Abstract. Tashkent 1988.20 p .
12. Karabaev A.G., Zhuraeva G., Karabaev J.A., Zhabbarov R.J. One of the mechanisms of violation of the hypothalamic-pituitary system during post-resuscitation disease. Journal of Problems of Biology and Medicine. -2013.-No.1(72) - pp.44-46.
13. Karabaev A.G., Isroilov R.I. Morphofunctional changes in basophilic cells of the adenohypophysis in post-resuscitation disease. – 2020. Artigo | IMSEAR | ID: sea-210175
14. Karabaev Aminjon Gadaevich Karabaeva Marzhona Aminzhonovna, Khudoyarova Dildora Rakhimovna. Vegetative reactivity of pregnant women with severe iron deficiency anemia // Journal.A new day in medicine.- 2021.- №3(35).- Pp.95-100.
15. Karabaev Aminjon Gadaevich Pathogenetic bases of violation of morphofunctional activity of the hypothalamus arcuate nucleus in the post-resuscitation period // Journal Novy day in medicine. -2021,- No.3,- pp. 137-142.
16. Karabaev Zh., Karabaev A. G. Shtkir pancreatitni davolashda avtanom nerve tizimimi reactivligida dynamik uzgarishlar //Gospodarka i Innowacje. – 2022. – Vol. 28. – pp. 76-80.
17. Karaulova L.K., Krasnoperova N.A., Rasulov M.M. Physiology: study guide for students. higher. studies. institutions. – M.: Publishing center "Academy", 2009. – 384 p.
18. Melnichenko G.A. Physiology of the thyroid gland, examination of patients with its diseases. In the book: Endocrinology by Williams. Diseases of the thyroid gland. Translated from English. ed. acad. RAS and RAMS I.I. Dedova, member-cor. RAMS G.A. Melnichenko. – M.: Publishing Group "GEOTAR-Media", 2010. – pp. 19-103.
19. Msersov, F.Z. The main patterns of individual adaptation. Physiology of adaptive processes / F.Z. Meerson. - M., Medicine, 1986. - 635 p.
20. Nurimov P. B., Karabaev A. G. The relationship of the reactivity of the hypothalamic–pituitary-neurosecretory system, the autonomous nervous system, the prooxidant and antioxidant system in intact rats in the arid zone //Central Asian Journal of Medical and Natural Science. – 2022. – Vol. 3. – No. 5. – pp. 234-238.
21. Pavlov S.E., Kuznetsova T.N. Adaptation and stress in sports. – M.: Fundamental Medicine, 2007. – pp. 198-215.
22. Fomin N.A. Adaptation: general biological and psychophysiological foundations. M.: Theory and practice of physical culture, 2003. – 382 p.
23. Tsikunib A.D., Jivakh B., Kaitmesova S.R., etc. Features of adaptation to physical exertion of submaximal power in conditions of iodine deficiency. // Theory and practice of Physics . culture. – 2013. – No. 8. – pp. 27-29.
24. Yuldasheva F. I., Ismatova M. Sh. Physiological regulation of innate and acquired immunity.// International journal of discourse on innovation, integration and education.- 2020.-Volume 1.-No.5.-C363-366

25. Yakimov I. A., Loginova E. S. Analysis of changes in the level of thyroid hormones in certain types of death//Journal: Almanac of modern science and education. - 2017.No. 6.-pp.91-92
26. Yarmukhamedova S.H., Ismatova M.S.The physiological state of the right ventricle in patients with arterial hypertension.//Materials of the XXIII Congress of the Physiological Society named after IP Pavlova with international participation.-2017C.162-164.
27. Bhasin, S. Testosterone therapy in men with hypogonadism / S. Bhasin, J.P. Brito, G.R. Cunningham et al. // An Endocrine Society clinical practice guideline. J. Clin. Endocrinol. Metab.– 2018. - Vol. 103 – P.1715–1744.
28. Gadaevich K. A. et al. Morphofunctional activity of neurosecreter cells in the arcuatic nucleus of hypothlamus during the period post-reanimation disease //European Journal of Molecular & Clinical Medicine. – 2021. – T. 8. – №. 3. – C. 948-953.
29. Gadaevich K. A. et al. Reactivity of the supraoptic, arcuate nucleus of the hypothalamus and the B-and D-basophilic cells of the adenohypophysis in the early postreanimation period //European Journal of Molecular & Clinical Medicine. – 2021. – T. 8. – №. 3. – C. 954-957.
30. Hernández-Hernández, J.M. Kisspeptin Stimulatestion of Luteinizing Hormone (LH) during Postpartum Anestrus Continuous and Restricted Suckling / J.M. Hernández-Hernández Becerril-érez et al. // Animals (Basel). – 2021. – Vol.11 – P.1-8.
31. Karabaev A.G. et al. Reactivity of the supraoptic, arcuate nucleus of the hypothalamus and the B-and D-basophilic cells of the adenohypophysis in the early postreanimation period //European Journal of Molecular & Clinical Medicine. – 2021. – T. 8. – №. 3. – C. 954-957.
32. Karabaev A.G. Relationship between the reactivity of the autonomic nervous system and the morphofunctional activity of basophilic cells of the adenohypophysis in the post-resuscitation period. // Science and World International scientific journal- 2020. 3 (79). P.55-62.
33. Karabaev Aminjon Gadaeviv, Isroilov Rajabboy Israilovich, Violation in the Post Resuscitation Disease Period: Recent Evidance, American Journal of Medicine and Medical Sciences, Vol. 9 №. 9, 2019, pp. 347-350. doi: 10.5923/j.ajmms.20190909.08.
34. Karabayev A. G., R. I. Isroilov. Morphofunctional Changes in Basophilic Cells of the denohypophysis during Post-resuscitation Disease // Journal of Advances in Medicine and Medical Research- 2020. 32 (8).p.130-135.
35. Karabayev Aminjon Gadaevich karabayeva Marjona Avinjonovya, Xudozrova Dildora Raximovya. Study of vegetative reactivity of pregnant women with normoblastic normoch rom ic h ematopoiesis. /Polish science journal. -2021.-№8.-C.36-55.
36. Mirone, V. European Association of Urology Position Statement on the role of the urologist in the management of male hypogonadism and testosterone therapy / V. Mirone, F. Debruyne, G. Dohle et al. // Eur. Urol. – 2017. - Vol. 72 – P.164–167.
37. Mulhall, J.P. Evaluation and management of testosterone deficiency / J.P. Mulhall, L.W. Trost, R.E. Brannigan // AUA guideline. J. Urol. – 2018. - Vol. 200 – P.423–432.