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STUDY OF ADAPTATION IN NORMOTENSIVE AND HYPERTENSIVE RATS IN THE SOUTH ARAL REGION

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Relevance: The Aral Sea was once the world's fourth largest inland body of water in terms of surface area. A lake basin, fed by two rivers, the Amu Darya and the Syr Darya, it supported a diverse ecosystem and an economically valuable fishery. Intensive agricultural activity related to cotton production with high water demands during the Soviet era caused excessive water diversion for irrigation purposes from the rivers.[5] As a result, since the early 1970s, the shores of the sea have been steadily receding.
Key words: Aral Sea region, anthropometric, ecological factors
Актуальность:Аральское море когда-то было четвертым по величине внутренним водоемом в мире по площади. Бассейн озера, питаемый двумя реками, Амударьей и Сырдарьей, поддерживает разнообразную экосистему и экономически ценное рыболовство. Интенсивная сельскохозяйственная деятельность, связанная с производством хлопка и высокими потребностями в воде в советское время, привела к чрезмерному забору воды из рек для орошения.[5] В результате с начала 1970-х годов берега моря неуклонно отступают.

Ключевые слова:Приаралье, антропометрические, экологические факторы.

It is known that in the Southern Aral Sea region the environment is very polluted, the air contains aerosols of sulfate and chloride salts of magnesium, sodium and calcium, and drinking water contains high concentrations of substances that cause various diseases. The conditions of the Southern Aral Sea region are characterized by high temperatures - 38^0-45^0C, significant dry air and intense solar radiation - 2341-2846 kJ h.m2. Normotensive (WKY) and hypertensive (SHR) rats were brought into these conditions from the Institute of Physiology. Pavlova I.P. RAS of St. Petersburg. We studied changes in body weight over the course of days over the entire period of the experiment.[1,5]

Table 1 shows data on changes in the body weight of rats over time by days of stay in the conditions of the Southern Aral Sea region. In normotensive rats, weight loss was insignificant in the first 20 days (from 1 to 4%). By the end of the first and second months, the weight of the rats decreased by an average of 40 g and was 11% lower than the initial one.[2,3] The weight decreased most significantly in the period 90-120 days. On average it was 320±8.6 g and 314±8.7 g, which is 14-15% lower than the original one. After day 120, weight indicators stabilized somewhat and the rats began to gain weight under the same housing and feeding regime. On day 150 the average weight was 330±7.9 g (10.8% lower than the initial value), on day 180 335±9.0 g (9.5%) and on day 210 335±9.5 g (4 %).

Table 1

Changes in body weight in normotensive and hypertensive rats over the course of days of stay in the Southern Aral Sea region (M±m, n=63).

Rat lines	Weight of rats, g.											
	Original	Days										
		10	15	20	25	30	60	90	120	150	180	210

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WKY	370 ±9,7	367± 9,1	365± 9,5	357± 9,9	342± 9,6	330± 9,9	330± 8,7	320± 8,6	314± 8,7	330± 7,9	335± 9,0	355± 9,5
SHR	310 ±8,9	305± 8,9	299± 8,6	287± 9,4	275± 8,5	269± 8,7	260± 9,3	250± 9,9	220± 9,7	230± 9,4	240± 9,3	260± 8,9

In hypertensive rats, the dynamics of weight changes were somewhat different. The data is shown in Table 9 and Fig. 13. For the first time in 20 days, the weight decreased from 310±8.9 g to 287±9.4 g, that is, by 70%. At the end of the 30th day, the rats weighed on average 269±8.7 g (13% less than the original), at the end of the 60th day - 260±9.3g, 90th day - 250±9.9g (19%). The greatest weight loss was observed by day 120 – by 29% (220±9.7 g). In the following days, especially after mid-September and until the end of it, changes in weight stabilized somewhat and the weight began to increase. On day 150 it was 230±9.4 g (lower than the initial value by 26%), on day 180 - 240±9.3 g and on day 210 - 260±8.9 g (16%).

As can be seen from the above material, the state of physiological functions of hypertensive rats had a higher degree of tension than that of normotensive rats. This is also evidenced by the data on the survival of animals of both lines under conditions of a long stay in Southern Piaralya (Table 2).

Table 2

Survival of normotensive and hypertensive rats in the conditions of the Southern Aral Sea region.

Rat lines	Delivery date	Потери по месяцам					
		May	June	July	August	September	October
		Average monthly air temperatures in the shade, ^{0}C					
		29-31	36,1	37,4	34,5	27,0	23,0
WKY	30.04	-	2	2	-	-	-
SHR	30.04	2	2	3	1	-	-

Hypertensive rats died already in May, when the air temperature in the shade was in the range of 29-31^{0}C. When the air temperature increased to 36.1-37.4^{0}C in June and July, the mortality rate of hypertensive patients was higher and remained in August at an air temperature of 34.5^{0}C. Hypertensive rats, when they were in open areas, differed in behavior, as they stopped moving, unlike normotensive ones. The rats died not during their stay on the sites, but in the next few hours already in the vivarium.

According to (Schmidt-Nielsen, 1992), the influence of high temperature, for example, marsupial rats survive when exposed to 43^{0}C for 20 minutes, while laboratory rats die at 39^{0}C.

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