

EFFECT OF ADAPTATION TO HEAT ON THE NONSPECIFIC RESISTANCE OF THE BODY

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Adaptation to cold (hardening) is known to increase the resistance of the body to the action of various unfavorable factors [4, 5]. The effect of adaptation to a high temperature on the resistance of the body has been inadequately studied. There are reports that habituation of the organism to heat increases its resistance to overheating and to anoxia [1-3]. This problem is one of practical importance, for persons engaged in certain occupations must spend several hours daily exposed to the action of high temperatures.

The object of the present investigation was to study the effect of adaptation to overheating on the resistance of the body to various unfavorable agents.

TABLE 1. Effect of Acclimatization to Heat on the Lowering of the Rectal Temperature of Albino Mice during Cooling

Duration acclima- tization of mice (in weeks)	Amount of lowering of rectal temperature (in degrees) $M \pm m$					
	during brief cooling			during prolonged cooling		
	control	expt.	P	control	expt.	P
3	$1,4 \pm 0,15$	$2,0 \pm 0,15$	$<0,01$	$14,4 \pm 0,72$	$14,0 \pm 0,86$	$>0,5$
6	$2,0 \pm 0,31$	$1,7 \pm 0,21$	$>0,2$	$10,6 \pm 0,88$	$11,7 \pm 0,67$	$>0,2$

TABLE 2. Effect of Acclimatization to Heat on the Duration of Postrotational Nystagmus of the Trunk in Albino Mice

Duration of acclimatiza- tion of mice (in weeks)	Duration of nystagmus (in sec) ($M \pm m$)		
	control	expt.	P
3	$32 \pm 4,1$	$34 \pm 4,2$	$>0,5$
6	$66 \pm 8,1$	$79 \pm 9,2$	$>0,2$

METHOD

Albino mice kept in the laboratory at 20° were acclimatized to heat in a warm room where the air temperature was 32°. The duration of acclimatization varied: one group of mice was placed in the warm room for 2 h daily for 3 weeks; the other for 6 h daily for 6 weeks. At the end of the period in the warm room, the rectal temperature of the mice was raised by 0.3-2.4° (on the average by 1.1°). Two days after the end of acclimatization the reaction of the experimental and control mice to various unfavorable factors was studied.

The tests used to determine the nonspecific resistance of the animals were as follows: 1) the degree of lowering of the rectal temperature

TABLE 3. Effect of Acclimatization to Heat on the Length of Survival of Albino Mice during the Swimming Test and Exposure to Asphyxia

Duration of acclimatization of mice (in weeks)	Length of survival of mice (M±m)					
	during swimming test (in min)			during asphyxia test (in sec)		
	control	expt.	P	control	expt.	P
3	348 ± 25,7	290 ± 18,3	> 0,05	651 ± 30,3	645 ± 48,4	> 0,5
6	139 ± 21,5	184 ± 30,0	> 0,2	978 ± 75,2	902 ± 42,5	> 0,2

during cooling of the animals for 5 min in a metal vessel surrounded by ice, and when kept for 2 h in a refrigerator at 10-12°; 2) the duration of nystagmus of the trunk in mice suspended by the tail after rotation in a centrifuge (head first) at a speed of 800 rpm for 20 sec (in the experiments with the longer period of acclimatization instead of the time of postrotational nystagmus, the time taken by the animals to recover their ability to walk in a straight line after rotation was recorded); 3) the duration of swimming of the mice (before death) in warm (28°) water; and 4) the period of survival of the mice exposed to asphyxia in a standard, hermetically closed vessel. Altogether 430 experiments were carried out.

RESULTS

The experimental results are given in Tables 1-3.

The results given in Tables 1, 2, and 3, show that acclimatization to heat had practically no effect on the nonspecific resistance of the albino mice. Only in one series of experiments (in which mice acclimatized for short periods were cooled for a short time) was the degree of lowering of the rectal temperature greater in the experimental animals than in the controls (i.e., it could be assumed that the resistance of the acclimatized mice to cooling was lowered). It is interesting to note that, according to V. Ya. Rusin's findings [5], acclimatization to cold lowered the resistance of albino mice to hyperthermia with respect to some criteria, but raised it with respect to others.

It may be concluded from the results described above that the acclimatization of mice to heat does not affect their resistance to the action of low temperatures, of angular acceleration, or of severe physical exertion and asphyxia.

LITERATURE CITED

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