reduced the total fatty acids of the animals.

Summary. From these experiments it is apparent that *trans* isomers of the "essential" fatty acids are converted to inactive forms of polyunsaturated acids which are, however, detectable spectrophotometrically. Conversely, the detection of polyunsaturated acid in a tissue does not imply that these substances are biologically active. However, this factor is not likely to affect studies of animals fed natural diets.

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The Effect of Acclimatization on the Propulsive Motility of the Small Intestine During Anoxia.* (18400)

EDWARD J. VAN LIERE, J. CLIFFORD STICKNEY, AND DAVID W. NORTHUP.

From the Department of Physiology, School of Medicine, West Virginia University, Morgantown

Only a relatively few objective criteria have been established for adaptation to oxygen want. Perhaps the two most widely recognized are the increases in the number of red blood cells and in the amount of hemoglobin. It is desirable to establish other criteria and it is always appropriate to study adaptation in different species of animals. In the present study albino rats were used.

We have shown(1) that the propulsive motility of the small intestine of rats is decreased by effective degrees of hypoxia. Actually a pressure of only 382 mm of Hg (simulated altitude of 18,000 ft.) is capable of producing a significant decrease of motility. If rats became acclimatized to a low oxygen tension, and then were exposed to altitude, the propulsive motility should not be affected to the same degree as it would in unacclimatized animals.

Methods. Seventeen albino rats (Wistar-strain) were acclimatized by placing them in a low-pressure chamber for three and one-half hours each day at a pressure of 303 mm Hg (simulated altitude of 24,000 ft.); 8 rats were exposed for 26 and 9 for 62 days. The temperature of the room in which the low-pressure chamber was located varied from 70° to 75° F. Forty-eight hours after the last acclimatization period the rats were paired with normal unacclimatized rats, which were similar in weight and age. They had been fasted for 24 hours. Each member of a pair of these rats was given 2 cc of a mixture of 10% powdered charcoal suspension in 10% gum acacia in water by stomach tube. After allowing 10 minutes for some of the material to enter the small intestine, both rats were placed in the low-pressure chamber at a pressure of 254 mm Hg (simulated altitude of 28,000 ft.) At the end of 30 minutes they were taken out of the chamber and decapitated. The small intestine was removed, slit open and the distance the charcoal had traversed measured.

In order to ascertain whether acclimatization alone affects normal propulsive motility of the small intestine 11 rats were acclimatized using the same general procedure as previously outlined. They were exposed to a low oxygen tension for four hours each day for 41 days. They were then paired with unacclimatized rats and the propulsive motility of the small intestine determined (at ground level) in the usual manner. No significant difference was found.

Results. The results are given in Table I. The latter shows that the propulsive motility of the small intestine of the acclimatized rats was less affected by hypoxia than the unacclimatized. The results were statistically significant at the 0.1% level (Fisher's t test). It was found, moreover, that those animals which had been exposed to hypoxia for 3.6 hours each day for 26 days were as well

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TABLE I. Effect of Anoxia on Rats Acclimatized to Altitude of 24,000 Ft. (3.6 hr each day for 62 days).

Unacclimatized				Acclimatized			
Body wt, g	Length of intestine, cm	Length traversed cm	%	Body wt, g	Length of intestine, cm	Length traversed cm	%
330	125	41	33	440	110	42	38
340	111	31	28	390	123	44	36
330	122	42	34	370	112	68	61
320	110	47	43	360	116	80	69
310	109	44	40	310	117	69	59
310	115	47	41	340	111	62	56
300	119	57	48	290	116	79	68
290	111	46	41	280	117	64	55
290	114	41	36	220	111	75	68
Avg 313.3	115.1	44.0*	38.2†	333.3	114.8	64.8*	56.7†

* $t = 4.07942$; $P = <.001$.
† $t = 4.15579$; $P = <.001$.

acclimatized—as far as the response of the intestine to hypoxia was concerned—as those which had been exposed for the same number of hours each day for 62 days.

Discussion. That the propulsive motility of the small intestine of acclimatized rats was less affected by hypoxia than that of the unacclimatized animals was not unexpected. We have shown previously (2) that gastric emptying in the dog, which is known to be delayed by oxygen want, will return to normal at altitude following effective acclimatization. It appears, then, that in the acclimated rat the propulsive motility of the small intestine tends also to regain its normal activity under conditions of low oxygen tension. Dogs, incidentally, could not be used in this current study, for we have shown that the propulsive motility of the small intestine of the adult dog is unaffected even by severe degrees of hypoxia(3). It is worthwhile to study the effects of acclimatization to altitude on separate organs since some of them respond more readily to adaptation than others. Data obtained, furthermore, from such studies throw light on the complicated processes known to be associated with the adaptation of an organism to altitude.

Summary. The propulsive motility of the small intestine of rats, which had been acclimatized to hypoxia, was significantly less affected at altitude than were unacclimatized animals. This was interpreted to mean that the effect of hypoxia on the propulsive motility of the small intestine could be used as another criterion for acclimatization.

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