

EFFECT OF VITAMIN A CONTENT OF THE DIET ON HAIR STRUCTURE

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Experiments on albino rats receiving various doses of vitamin A in addition to a synthetic diet showed that with a dose of 8-23 μg /day per animal the length of the growing zone of the hair was maximal.

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In connection with the need for establishment of normal levels of vitamin A intake [1, 2, 4, 5], the present investigation was carried out in order to study quantitative changes in hair morphology in animals receiving different doses of vitamin A, having regard to the importance of this vitamin for the morphogenesis of epidermal structures [3, 6-10].

EXPERIMENTAL METHOD AND RESULTS

After albino rats had been kept for 3 months on a synthetic diet together with different doses of vitamin A (3, 8, 13, 23, and 83 μg) [1, 4], the length of the growing root zone of a whisker was measured by means of a hand lens. The results of statistical analysis of data obtained in two experiments are given in Table 1.

When the daily dose of vitamin A, which was known to be deficient and led to the onset of hypovitaminosis A (3 μg), was increased to 8 μg a statistically significant increase in length of the growing zone of the hair was observed. A further increase in the daily dose of vitamin A to 13 μg did not always give a significant decrease in length of the growing zone of the hair. With a still greater increase in daily dose of vitamin A (to 23 μg), a statistically significant increase in length of the growing zone ($P < 0.001$) was found by comparison with the dose of 13 μg . However, compared with the dose of 8 μg , the increase in length of the growing zone was not statistically significant. The first statistically significant increase in length of the growing zone of the hair resulting from an increase in the daily dose of vitamin A to 8 μg was therefore the maximal increase in this index (i.e., the length of the growing zone of the hair) obtained with a minimal physiological dose of vitamin A, namely 8 μg . The subsequent decrease in length of the growing zone of the hair with a daily dose of 13 μg and the secondary increase with a daily dose of 23 μg were not

TABLE 1. Changes in Length of Growing Zone of Hair with Different Doses of Vitamin A

Daily dose of vitamin A (in μg /rat)	Conventional designation of length of root zone for corresponding dose of vitamin A	Expt. 1			Expt. 2		
		n	$M \pm m(\mu)$	P	n	$M \pm m(\mu)$	P
3	M_3	5	1134 ± 84	$M_3 - M_8 < 0.01$	10	1176 ± 14	$M_3 - M_8 < 0.001$
8	M_8	5	1512 ± 84	$M_8 - M_{13} > 0.2$	8	1582 ± 56	$M_8 - M_{13} < 0.01$
13	M_{13}	9	1428 ± 42	$M_{13} - M_{23} < 0.001$	10	1372 ± 42	$M_{13} - M_{23} < 0.001$
				$M_8 - M_{23} > 0.1$			$M_8 - M_{23} = 0$
23	M_{23}	5	1666 ± 28	$M_{23} - M_{83} < 0.1$	9	1582 ± 14	$M_{23} - M_{83} < 0.02$
83	M_{83}	7	1442 ± 112		10	1428 ± 56	

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significant and were evidently the result of individual variations in animals whose optimal daily doses of vitamin A ranged from 8 to 23 μ g. Finally, with the largest increase in daily dose of vitamin A (to 83 μ g), apparently corresponding to the saturation limits of the rat with vitamin A, a more definite and statistically significant decrease in length of the growing zone of the hair took place compared with that found with a daily dose of 23 μ g.

The length of the growing root zone of the hair in rats can therefore be used as an intravital morphological index of the vitamin A level in the body. In other animals and in man, the hair structure also presumably changes in relation to the vitamin A level in the body.

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