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THE "IDEAL" DAILY LYSINE INTAKE

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The food and nutrition board of the National Research Council National Academy of Sciences has not set recommended dietary allowances (RDA) for amino acids. However, they have published (1) estimated human amino acid requirements (12 mg per kilogram of body weight per day of lysine).

Relationship of reported daily lysine consumption (food frequency questionnaire) and reported total clinical findings (Cornell Medical Index Health Questionnaire) in a presumably healthy male and female sample

	Sample size	Clinical findings (affirmative CMI responses) range	mean & S.D.	Daily intake of lysine (mg) range	mean & S.D.
1) entire sample	859	0–125	15.5±12.4	1100-17596	6940±2723
2) CMI <50	842	0– 49	14.5±9.9	1100-17596	6935±2720
3) CMI <40	819	0– 39	13.7±8.8	1100-17596	6930±2718
4) CMI <30	762	0– 29	12.2±7.1	1100-17596	6932±2736
5) CMI <20	620	0– 19	9.6±4.9	1100-17596	7044±2771
6) CMI <10	318	0– 9	5.6±2.3	2700-17596	7310±2761
7) CMI < 5	103	0– 4	2.7±1.2	2731-13689	7533±2560
8) CMI < 4	69	0– 3	2.1±0.9	3300-13689	7617±2608
9) CMI < 3	42	0– 2	1.5±0.7	4025-13689	7708±2537
10) CMI 2	15	0– 1	0.7±0.5	4025-13527	8108±2590
11) CMI 0	5	0	0.0±0.0	7000-13527	9411±2458

Table 2: Statistical significance of the relationship of lysine and reported clinical findings (CMI)

	n	*t*	*P*
1) entire sample versus	858		
2) CMI < 10	318	2.050	< 0.050 *
3) CMI < 5	103	2.205	< 0.050 *
4) CMI < 4	69	2.069	< 0.050 *
5) CMI < 3	42	1.909	> 0.050
6) CMI < 2	15	1.648	> 0.050
7) CMI 0	5	1.991	< 0.050 *

** statistically significant difference of the means.*

Earlier studies (2–7) have attempted to develop an "ideal" daily consumption of vitamins A, B_1, C, niacin, refined and unrefined carbohydrates on the hypothesis that relatively symptomless and signfree persons are healthier than those with clinical symptoms and signs. Therefore, the consumptions of such groups might well provide a basis for designating the "ideal" daily lysine consumption. Table 1 shows (line 1) the daily lysine consumption for a group of 859 doctors and their wives. These tabular figures were derived from United States Department of Agriculture food table calculations (Handbook No. 8). The clinical rating (CMI score) was spread from 0 to 125 with a mean and one standard deviation of 15.5±12.4. The reported daily lysine intake for the group ranged from 1100 to 17596 mg. with a mean and standard deviation of 6940±2723. This is approximately eightfold the amount designated by the Food and Nutrition Board.

Since the lysine intake of the entire group exceeded the recommendations, it would generally be regarded as "ideal" or "optimal". However, proceeding through the eleven lines of table 1, the daily lysine intake slowly rises as the number of allowable clinical symptoms and signs (CMI score) is reduced. Table 2 indicates that there are statistically significant differences ($P < 0.05$) in the daily lysine intake when one compares the consumption of the entire sample to those with progressively fewer clinical findings.

This association suggests that the healthier the sample, the greater the lysine intake. Under the conditions of this experiment, the "ideal" allowance may well be tenfold that suggested by the Food and Nutrition Board. However, the true lysine intake of this group is likely less than the calculated figure we reported since considerable protein destruction occurs as foods are heated (8). More severe heat damage to proteins results when moist heat is used. When reducing sugars are present, true destruction of amino acids has been repeatedly corroborated with a possible loss of 50 per cent of the lysine, arginine, tryptophane, and histidine content (8). Apropos, it was reported in 1966 that the stockpile of survival biscuits and crackers developed by the Office of Civil Defense was significantly deficient in essential amino acid content (8). Two-thirds of the lysine was missing when chemically analyzed. However, the lysine content from food table calculation was very acceptable.

Allowing for lysine losses during food processing, those with the fewest clinical findings in this study still consumed possibly three or four times as much lysine as is thought to be adequate. Statistically significant increases in consumption of isoleucine, leucine valine, threonine and phenylalanine have also been found in the progressively healthier samples (results in preparation). Further studies are in hand on other amino acids.

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