THE TRYPTOPHAN LOAD TEST AS AN INDEX OF VITAMIN B-6 NUTRITION

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The amino acid tryptophan was first isolated as the chromogenic substance in tryptic digests of proteins (1). Since that time, naturally occurring L-tryptophan has been shown to be one of the indispensable amino acids having a number of important biological functions.

The nutritional requirement for tryptophan in the diet, as determined by measurements of nitrogen balance, is about 160 mg/day for women and about 250 mg/day for men (2,3). The actual daily intake of tryptophan in the typical high protein diet of developed countries is about 800 to 1000 mg/day. Thus, the typical diet provides several times the minimal requirement. Although studies have not been well documented, it can be expected that the requirement for tryptophan by individuals may vary somewhat depending upon age, race, other nutrients, state of health, and other factors.

Some of the known metabolic pathways of tryptophan are summarized in Fig. 1. The enzyme tryptophan pyrrolase (L-tryptophan-2, 3-dioxygenase) which gives rise to kynurenine (via formylkynurenine, not shown) is an inducible enzyme which can increase many-fold in response to its substrate or in response to induction by cortisol or conditions which may increase cortisol. Since the action of tryptophan oxygenase is to initiate the first step of the irreversible kynurenine pathway of tryptophan metabolism, if substantial tryptophan passes via this pathway, the available tryptophan for other functions may well be reduced to limiting levels.
Fig. 1. Metabolic chart showing some of the metabolites of tryptophan. The large arrows indicate the pathway for degradation of the majority of ingested tryptophan. B-6 indicates the sites of action of enzymes requiring PLP as a cofactor.