

## The Whey to Weight Loss

Our present understanding of the physiology of appetite is still incomplete. However, we are aware that there are various endogenous brain messenger substances (neuro-transmitters, neuro-hormones) that effect, among other things, mood, memory, relaxation, focus, and appetite. A better appreciation of the relationship of these brain messenger chemicals to their nutritional building blocks, particularly the amino acids, may well be an important factor in endeavors to modulate appetite and thereby facilitate clinical efforts to attain and maintain optimal lean body mass.

One such brain messenger is serotonin, which is known to affect mood, promoting a relaxed feeling, that Julia Ross, M.D., perhaps best describes as “lightness”, to support deep sleep and melatonin production, and to affect appetite, especially for carbohydrates.

The amino acid “building block” to serotonin is tryptophan. It is therefore important to appreciate that the ratio of tryptophan to large neutral amino acids determines tryptophan availability to the brain. These large neutral amino acids, LNNA, are tyrosine, phenylalanine, and the branched chain amino acids, BCAA, namely leucine, isoleucine, and valine, all of which compete with tryptophan to crossing the protective blood brain barrier to enter the brain.<sup>1</sup>

Furthermore, it is important to be aware that insulin, which is released as the result of ingesting carbohydrates, is, as any serious body builder knows, anabolic, meaning growth promoting. Insulin facilitates the removal of proteins, *specifically the aromatic and branched chain amino acids*, from the bloodstream to be largely directed to muscle tissue. This function of insulin helps remove these *competitors* to tryptophan’s crossing the blood brain barrier.

A recent paper reported in the American Journal of Clinical Nutrition <sup>2</sup>, both the plasma tryptophan *concentrations*, and *ratios* of tryptophan to large neutral amino acids, were low at all times during *and* after successful weight loss programs that nonetheless maintained lean body mass. The authors also noted that the obese participants are often insulin resistant as well. Such diminished insulin activity may be an aggravating factor in continued low plasma *ratios* of large neutral amino acids to tryptophan levels. Plasma concentrations of tryptophan as such were also reported to be low in dieting patients before, during, and after successful weight loss. According to the authors, Breum et al., these two observations, and their potential concomitant effects on mood and appetite, may well be part of the reasons for relapse after diet induced weight loss!

These data strongly support the notion that obese persons may do well to be supplementing tryptophan. As both low levels of tryptophan and its availability to the brain vis-à-vis tryptophan/LNAA ratios tend to lead to below optimal serotonin levels, which is subsequently conducive to carbohydrate cravings, poor sleep, low self esteem and mood, and impulsive behavior, such a notion is not without logical argument.

Unfortunately, the FDA continues what many convincingly argue feel is its unjustified prohibition of tryptophan as a dietary supplement. Perhaps not unrelated is the soaring prescription of multi-billion dollar per year selective serotonin reuptake inhibitors AKA SSRIs, perhaps the most familiar being Prozac. Perhaps the lack of “natural” competition from tryptophan is part of this “success” story!

An alternative, and perhaps even superior, approach may be to utilize high quality whey protein blends. Such whey protein blends have both an unusually rich supply of tryptophan and a higher ratio of tryptophan to BCAAs as compared to other proteins such as soy protein or casein. The simultaneous ingestion of as little of 10 gm of carbohydrate initiates the release of insulin, with its potential salubrious effect on tryptophan uptake by the brain and the brain's neurophysiology.

As whey protein also affords high levels of complete, highly biologically available, and complete amino acids, with minimal additional calories from carbohydrates and fats, it may be in itself one of the more ideal food choices to include in weight loss and lean body mass maintenance nutrition strategies. Based on the above understandings, it may well be best to ingest whey proteins without competition from other protein sources, and to not slow down the assimilation of the amino acids with simultaneous ingestion of large amounts of fiber or fats, if our desire is to generate a more immediate effect on mood, sleep, behavior, and appetite.

1.) Pearson, D, Shaw S., Fat and Happy? Tryptophan Concentrations Reduced in Obesity, *Life Extension News*, Vol. 7 No. 1, Feb 2004

2.) Breum et al. twenty-four-plasma tryptophan concentrations and ratios are below normal in obese subjects and are not normalized by substantial weight reduction. *Am J Clin Nutr* 77:1112-8 (2203)