THE MOST POWERFUL NUTRIENTS

PERSPECTIVE:
• The nutrients 5-HTP, L-dopa, and L-cysteine are the “rate limiting step” in the synthesis of serotonin, dopamine, and glutathione, respectively. They are required when an optimal diet does not meet the needs of normal function.
• Metabolism of 5-HTP, L-dopa, and L-cysteine to serotonin, dopamine, and glutathione, respectively, are unregulated (without biochemical feedback regulation).
• Theoretically, if adequate enzymes are available, administering unlimited amounts of 5-HTP, L-dopa, and L-cysteine will produce unlimited serotonin, dopamine, and glutathione in the system.

A relative nutritional deficiency occurs when an optimal diet does not meet the needs of the system. Whenever there is not enough (low, inadequate, depleted, deficient, or suboptimal) serotonin, dopamine, or glutathione on an optimal diet, a relative nutritional deficiency of 5-HTP, L-dopa, or L-cysteine always exists.

Administering only one precursor from the list 5-HTP, L-dopa, and L-cysteine will induce depletion of the other two systems. Caregiver-induced depletion on an optimal diet represents a relative nutritional deficiency involving the depleted system.

The super amino acids, 5-HTP, L-dopa, and L-cysteine can produce as much serotonin, dopamine, and glutathione as needed for normal function when a related relative nutritional deficiency interferes with function.

Administering nutrient precursors of serotonin or dopamine on an optimal diet can cause depletion of dopamine or serotonin, respectively through competitive inhibition.

Administering glutathione (or any of the other thiols) on an optimal diet can deplete serotonin and dopamine through conjugation, inducing a relative nutritional deficiency of their precursors. Administering serotonin or dopamine precursors (or any of the other thiols) on an optimal diet can deplete glutathione (and the other thiols) through conjugation, inducing a relative nutritional deficiency of glutathione precursors.

The Food and Drug Administration (FDA) has not evaluated these statements. These nutrients are not intended to diagnose, treat, cure, or prevent any disease.
NUTRIENT-INDUCED Relative Nutritional Deficiencies

Study the illustration below. If only one precursor of serotonin, dopamine, or the thiols is administered, depletion of other nutrients will occur.*

For example, the practice of giving substances containing the naturally occurring aromatic amino acid L-dopa (dopamine precursor) is associated with depletion of serotonin, L-tyrosine, L-tryptophan, and all seven thiols. Whenever depletion occurs on an optimal diet, a relative nutritional deficiency is always present. *

Administration of serotonin, dopamine, and thiols amino acid precursors need to be in proper balance. Nutrient-induced depletion can cause relapse of disease-like relative nutritional deficiency symptoms, side effects, and new onset of disease-like symptoms.

Serotonin precursors can deplete dopamine. Dopamine precursors can deplete serotonin. This occurs by competitive inhibition during synthesis, metabolism, and transport discussed at the bottom of this page.

Thiols deplete serotonin and dopamine. Serotonin and dopamine precursors deplete thiols. The mechanism of action is conjugation by glutathione (the most prevalent thiol in the body) with serotonin, dopamine, and their precursors.25 *

SYNTHESIS; The same enzyme (AADC) catalyzes synthesis of serotonin and dopamine. Loading the precursors of one lead to decreased synthesis of the other with associated depletion of the non-dominant enzyme.12 *

METABOLISM; MAO catalyses metabolism of both serotonin and catecholamines. MAO activity is not static. Loading the precursors of one system increases MAO activity leading to depletion of the non-dominant system.12 *

TRANSPORT; Serotonin and catecholamine synthesis, metabolism, intercellular, extracellular monoamine and amino acid levels are primarily a function of the OCT transporters. Loading the precursors of one system, through competitive inhibition crowds out the non-dominant system leading to depletion.12 *

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The same enzyme aromatic amino acid decarboxylase (AADC) catalyzes the metabolism of 5-HTP to serotonin and L-dopa to dopamine.

Administer only L-dopa, synthesis of serotonin by AADC can be compromised. Serotonin depletion represents a nutrient induced serotonin-related relative nutritional deficiency.

Administer only 5-HTP, synthesis of dopamine by AADC can be compromised. Dopamine depletion represents a nutrient induced dopamine-related relative nutritional deficiency.
This approach: When depleted serotonin or dopamine occur on an optimal diet, insufficient synthesis is always present. Increasing synthesis requires nutrients; drugs do not increase synthesis.

PERSPECTIVE: Competitive inhibition

Metabolism of serotonin and dopamine is by the same enzyme, monoamine oxidase (MAO). The activity of this enzyme is not static. Increasing concentrations of serotonin or dopamine increase the metabolic activity of the MAO.

Administering only L-dopa can increase MAO metabolism of serotonin. Without increasing, precursor and cofactor intake, serotonin depletion can occur, which induces serotonin related relative nutritional deficiency.

Administering only 5-HTP can increase MAO metabolism of dopamine. Without increasing, precursor and cofactor intake, dopamine depletion can occur, which induces dopamine related relative nutritional deficiency.
Competitive inhibition

Synthesis

Metabolism

Transport

The bidirectional Organic Cation Transporters Type-2 (OCT-2) transports serotonin, dopamine, and their precursors in and out of cells. Precursor metabolism to serotonin and dopamine require transport into cells. Transport of the newly synthesized serotonin and dopamine out of the cell allows them to perform their numerous functions.

Raising dopamine concentrations by loading L-dopa can compromise the transport of serotonin and its precursors. L-dopa loading can compromise and deplete serotonin, causing nutrient-induced serotonin related relative nutritional deficiency.™

Raising serotonin concentrations by loading 5-HTP can compromise the transport of dopamine and its precursors. 5-HTP loading can compromise and deplete dopamine, causing nutrient-induced dopamine related relative nutritional deficiency.™
The naturally occurring aromatic amino acids L-tyrosine and L-dopa are the precursors of dopamine. The naturally occurring aromatic amino acids L-tryptophan and 5-HTP are the precursors of serotonin. L-cysteine is the immediate precursor of glutathione.*

The metabolism of L-tryptophan and L-tyrosine to 5-HTP and L-dopa respectively are rate limited. With regards to serotonin and dopamine precursors, an optimal diet occurs when L-tryptophan and L-tyrosine metabolize to 5-HTP and L-dopa, respectively are saturated. As concentrations of both increase, arrival occurs at a point where serotonin and dopamine concentrations no longer increase as L-tryptophan and L-tyrosine intake increases. The intermediate amino acids 5-HTP and L-dopa are not rate limited. When adequate amounts of the activated vitamin B6 enzyme AADC (EC 4.1.1.28) exist, administration of theoretically unlimited amounts of 5-HTP and L-dopa can induce unlimited amounts of serotonin and dopamine respectively. When systemic serotonin and catecholamine (dopamine, norepinephrine, and epinephrine) concentrations required for optimal function is greater than can be supplied by L-tryptophan and L-tyrosine intake, a 5-HTP, L-dopa or vitamin B6 relative nutritional deficiency™ always exists.

Serotonin, dopamine, and glutathione do not cross the blood-brain barrier, their immediate precursors 5-HTP, L-dopa, and L-cysteine, respectively freely cross the blood-brain barrier, then are freely metabolized to serotonin, dopamine, and glutathione, in the brain.

Association of relative nutritional deficiencies™ with many states occurs. For example, a provisional diagnosis of depression is made by meeting the criteria of the DSM-5. Next the differential diagnosis is formulated. The following is a limited illustrative differential diagnosis example:*  

Differential diagnosis of the provisional diagnosis of depression:  
1. Major affective disorder (depression)  
2. Rule out depression-like hypothyroid symptoms  
3. Rule out depression-like anemia symptoms  
4. Rule out depression-like relative nutritional deficiency symptoms™*  
5. Other

(continued on next page)