



Hinze Medical Foods™ / NeuroResearch Centers, Inc.™

1150 88th Ave. West - Duluth, MN +1-218-626-2220 | www.HinzeMedicalFoods.com

Hypo-serotonergic™ conditions occur when serotonin concentrations are not enough, low, inadequate, depleted, deficient, or suboptimal on a modified normal diet.™

Hypo-dopaminergic™ conditions occur when dopamine concentrations are not enough, low, inadequate, depleted, deficient, or suboptimal on a modified normal diet.™

Hypo-glutathionemia™ conditions occur when glutathione concentrations are not enough, low, inadequate, depleted, deficient, or suboptimal on a modified normal diet.™

- Giving only *serotonin precursors* can deplete dopamine and glutathione.™
- Giving only *dopamine precursors* can deplete dopamine and glutathione.™
- Giving only *glutathione or glutathione precursors* can deplete serotonin and dopamine.™

The centrally acting monoamines (monoamines) are serotonin, dopamine, norepinephrine, and epinephrine.

For the management of **hypodopaminergic conditions** or states that may accompany

Fatigue

A **hypodopaminergic condition** or state often accompanies fatigue (see the right column).

After diagnosing fatigue, formulate a differential diagnosis to rule out accompanying issues, including a hypodopaminergic condition or state.

Use the hypo-serotonergic-hypodopaminergic condition protocol to identify the presence of a hypodopaminergic condition or state then consider using an empirical trial of the hypodopaminergic condition or state protocol (see below).

Management of the hypodopaminergic condition or state which may accompany fatigue requires establishing dopamine concentrations higher than are possible with modification of the normal diet.

Fatigue may be accompanied by symptoms arising from a hypo-serotonergic condition or a hypodopaminergic condition

"The biological basis of energy, motivation, and fatigue in association with depression remains unknown, but a wide variety of data link these symptoms to the 3 monoamine neurotransmitters serotonin, norepinephrine, and dopamine. Low amounts of all 3 may be associated with mood complaints, but reductions of norepinephrine and dopamine are particularly associated with symptoms of fatigue, low energy, and lack of motivation." Stahl, S. The Psychopharmacology of Energy and Fatigue, Clinical Neuroscience update, J. Clin Psychiatry 63:1, January 2002

"Perhaps the mechanism of how chemotherapy causes fatigue may be by inducing changes in sympathetic tone causing insufficient dopamine release."

Check, D. et al. Sympathomimetic Amine Therapy Markedly Improves Severe Fatigue That Diminishes Quality of Life in Patients with Cancer, Cancer Sci Res. 2020; 3(3); 1-3.

In addition to dopamine and serotonin, COVID-19 may alter the levels of other neurotransmitters, such as acetylcholine, which is the main cause of fatigue in myasthenia gravis. Rudroff, T. et al. Post-COVID-19 Fatigue: Potential Contributing Factors Brain Sci. 2020, 10(12), 1012; <https://doi.org/10.3390/brainsci10121012>

"Patients with striatal dopamine deficiencies show symptomatic mental fatigue, suggest that mental fatigue results from a failure to maintain adequate levels of dopaminergic transmission to the striatum and the ACC, resulting in impaired cognitive control." Lorist, M. et al. Impaired cognitive control and reduced cingulate activity during mental fatigue, Cognitive Brain Research Volume 24, Issue 2, July 2005, Pages 199-205

