

Serotonin Syndrome



Serotonin Syndrome (also known as Serotonin Toxicity) occurs when there is a build-up of too much histamine or tyramine in the body. This is often the result of a drug or food interaction. It may occur when patients are taking **Isoniazid** or **Linezolid**, as these medications can inhibit the body's breakdown of histamine or tyramine. When patients consume items containing histamine or tyramine, it can result in a dangerous buildup of these amino acids. Depending on patient's response, symptoms can range from mild to severe.

Symptoms of Serotonin Syndrome

Serotonin syndrome is likely underdiagnosed because symptoms are nonspecific, diagnostic criteria vary, and some clinicians are simply unaware of its manifestations. In addition, mild symptoms may be ignored or not attributed to drug therapy.

Mild Symptoms	Moderate Symptoms	Severe Symptoms
Nervousness Insomnia Diarrhea Muscle tremors Dilated Pupils Flushing Headache	Hyperreflexia (increased reflexes) Sweating Agitation Clonus (rhythmic muscle spasms) Ocular clonus (side to side eye movements) Hypo- or hypertension	Temperature >101.3F Sustained clonus or rigidity Mental confusion Delirium Rhabdomyolysis (muscle tissue breakdown)

What to Avoid

The list of food and drinks containing tyramine or histamine is long, but common sources are noted in the chart below. High consumption of these items should be avoided during the patient's therapy on Isoniazid or Linezolid, and for 2 weeks after the patient discontinues them.

Tyramine or Histamine Containing Foods	
High Tyramine or Histamine Content	
Strong/Aged Cheeses:	blue cheese, cheddar, gorgonzola
Cured/Smoked meats:	sausage, salami
Frozen/Salted/Canned fish:	sardines, tuna, anchovies
Beer	(tap or home-brewed)
Overripe fruits	
Certain beans:	(fava beans or broad beans)
Some sauces/gravies:	ketchup, soy sauce, teriyaki sauce, bouillon-based sauces
Sauerkraut, kimchi, pickles or pickled vegetables	
Sourdough breads	
Fermented products:	miso soup, bean curd, tempeh
Moderate Tyramine or Histamine Content	
Other cheeses:	american, parmesan, farmer's, havarti, brie
Fermented dairy:	yogurt, sour cream buttermilk
Fruits/Vegetables:	raspberries, tomatoes, eggplant, spinach, avocados
Beverages:	wines, champagne, kombucha

NOTE: Chocolate is not listed above, however it contains small amounts of serotonin and dopamine, which means it can also contribute to Serotonin Syndrome.