

# Serotonin Syndrome

Serotonin Syndrome (*also called serotonin toxicity or serotonin toxidrome*) is not an idiosyncratic drug reaction; it is a predictable consequence of an excess of serotonergic activity at both peripheral and central nervous system receptors. This drug utilization review identified Idaho Medicaid participants receiving both tramadol as well as an antidepressant over the same time period. Additional drugs that are known to cause serotonin syndrome are listed below. Patients experiencing serotonin syndrome need to discontinue at least one of the medications; e.g., use a different analgesic agent than tramadol.

## Medications Known to Cause Serotonin Syndrome

- **Antibiotic**
  - linezolid (Zyvox<sup>®</sup>)
- **Antidepressants - SSRIs (Selective Serotonin Reuptake Inhibitors)**
  - citalopram (Celexa<sup>®</sup>)
  - escitalopram (Lexapro<sup>®</sup>)
  - fluoxetine (Prozac<sup>®</sup>)
  - fluvoxamine (Luvox<sup>®</sup>)
  - paroxetine (Paxil<sup>®</sup>)
  - sertraline (Zoloft<sup>®</sup>)
- **Antidepressants - SNRIs (Serotonin and Norepinephrine Reuptake Inhibitors)**
  - desvenlafaxine (Pristiq<sup>®</sup>)
  - duloxetine (Cymbalta<sup>®</sup>)
  - mirtazapine (Remeron<sup>®</sup>)
  - trazodone
  - venlafaxine (Effexor<sup>®</sup>)
- **Cough/Cold Medication**
  - dextromethorphan
- **Herbal Supplements**
  - ginseng
  - St. John's Wort
- **MAO Inhibitors**
  - e.g., selegiline, rasagiline
- **Synthetic Opioid - Besides being a centrally acting synthetic opioid, this medication also inhibits the uptake of both serotonin and norepinephrine.**
  - tramadol (Ultram<sup>®</sup>)
  - tramadol/acetaminophen (Ultracet<sup>®</sup>)
  - tramadol extended release (Ultram<sup>®</sup> ER, Ryzolt<sup>®</sup>)
- **Tricyclic Antidepressants**
  - e.g., amitriptyline, nortriptyline
- **Triptans**
  - almotriptan (Axert<sup>®</sup>)
  - eletriptan (Replax<sup>®</sup>)
  - frovatriptan (Frova<sup>®</sup>)
  - rizatriptan (Maxalt<sup>®</sup>)
  - sumatriptan (Imitrex<sup>®</sup>)
  - zolmitriptan (Zomig<sup>®</sup>)



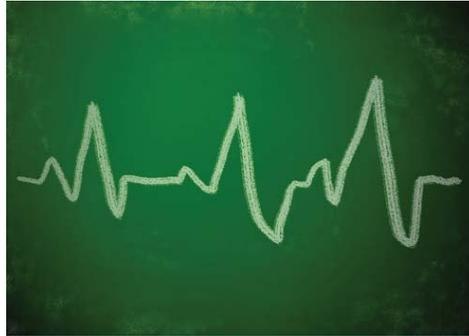
## Signs and Symptoms of Serotonin Syndrome

### Autonomic Instability



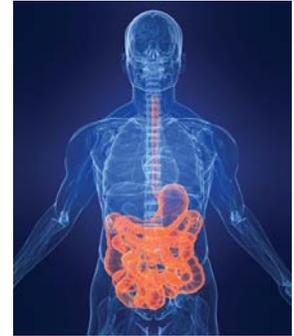
- Sweating (not due to activity)
- Goosebumps
- Shivering
- Fever

### Cardiovascular



- Rapid Heart Beat
- Irregular Heart Beat

### Gastrointestinal Symptoms



- Nausea
- Diarrhea
- Vomiting

### Mental Status Changes



- Agitation or Restlessness
- Confusion
- Hallucinations

### Neuromuscular Aberrations



- Loss of Muscle Coordination
- Twitching Muscles
- Muscle Rigidity
- Overactive Reflexes
- Tremor

### Others



- Seizures
- Dilated Pupils
- Headache

*Note: Triptans are on the list of medications known to cause serotonin syndrome, so using triptans to treat a headache due to serotonin syndrome will make it worse!!*