



Nutraceuticals for  
Driving Forces of Pain  
Part 1

**Accurate Clinic**  
2401 Veterans Memorial Blvd. Suite 16  
Kenner, LA 70062 - 4799  
Phone: 504.472.6130 Fax: 504.472.6128  
[www.AccurateClinic.com](http://www.AccurateClinic.com)

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Part 2

## Accurate Education

### Nutraceuticals: *Sulforaphane for Chronic Pain*

Melatonin is a natural hormone the brain makes every night to help sleep. It is usually thought of as a sleep aid—but research has found that it does much more than help one fall asleep: it also helps reduce pain and inflammation and it protects nerves from damage. Melatonin is one of the most important nutraceuticals used in the “6 Domains Approach to the Management of Chronic Pain.”

#### (1) DIETARY SOURCES

*Melatonin is found naturally in various foods, though in relatively small amounts:*

**Important:** Dietary sources alone cannot provide therapeutic doses needed for pain conditions. Supplementation is typically required, as therapeutic doses range from 3-10 mg or higher.

#### (2) CONDITIONS THAT MAY BENEFIT MOST FROM MELATONIN (*Level of Evidence*):

- **Fibromyalgia** (*Strong*) – Melatonin can reduce pain, improve sleep, and boost quality of life, especially when combined with antidepressants [fluoxetine (Prozac) and amitriptyline (Elavil)].
- **Migraine and cluster headaches** (*Strong*) – Reduces the frequency and intensity of headaches.
- **Irritable bowel syndrome** (*Moderate*) – Pain reduction and overall symptoms.
- **Central Sensitization** (*Moderate*) – Acts on spinal cord receptors to reduce pain amplification

#### (3) HOW MELATONIN REDUCES PAIN:

##### 1. Melatonin reduces pain signals (Primary Effect):

Melatonin attaches to receptors (MT1 and MT2) in the brain and spinal cord that process pain signals. These receptors turn down the intensity of pain impulses before they reach conscious awareness. Melatonin also activates the body's natural pain-suppression pathways and works with the opioid, GABA, and serotonin systems.

##### 2. Melatonin treats the underlying pain conditions. (Secondary Effect):

Melatonin reduces inflammation and oxidative stress at the site of tissue damage, protecting nerves from ongoing injury. It suppresses pain-related genes and improves cellular energy production.

**The balance:** Melatonin has a stronger effect on pain processing than on the underlying condition itself - it helps reduce the severity of pain, while also protecting against further tissue damage.

#### (4) SUMMARY OF BENEFITS

1. It synergizes with opioids to make them more effective
2. It suppresses pain signals in the brain and spinal cord
3. It reduces inflammation by suppressing inflammatory compounds
4. It is a powerful antioxidant that protects nerves from damage
5. It helps break the vicious cycle of poor sleep that pain worse, which makes sleep worse.
6. It reduces anxiety which can make pain feel more intense
7. It is an “iceberg drug” Some benefits it provides are noticeable - important others are not:

## (5) THE 6-DOMAIN APPROACH:

*Chronic pain involves multiple biological processes. Here's how melatonin addresses each:*

- **Systemic Inflammation** – (*HIGH* Impact)  
Melatonin is a potent anti-inflammatory. It blocks the master switch for inflammation (NF-κB) and reduces inflammatory chemicals (TNF-α, IL-1β, and IL-6).
- **Neuroinflammation** – (*HIGH* Impact)  
Melatonin suppresses overactive immune cells in the nervous system (microglia) and reduces inflammation in the spinal cord, helping to quiet amplified pain signals.
- **Oxidative Stress** – (*VERY HIGH* Impact - Primary Mechanism)  
Melatonin is one of nature's most powerful antioxidants. It directly neutralizes harmful molecules (free radicals) that damage nerves and it activates the master antioxidant switch (Nrf2).
- **Mitochondrial Dysfunction** – (*HIGH* Impact)  
Melatonin protects cells' energy-producing structures (mitochondria) and activates a pathway (SIRT1-PGC-1α) which keeps cellular mitochondria healthy.
- **Peripheral Sensitization** – (*MODERATE* Impact)  
By reducing inflammation and oxidative stress at nerve endings, melatonin helps prevent peripheral nerves from becoming overly sensitive to pain.
- **Central Sensitization** – (*MODERATE* Impact)  
Melatonin acts directly on receptors (MT2) in the spinal cord that reduce the "wind-up" phenomenon where the nervous system amplifies pain signals over time.

## (6) DOSING FOR CHRONIC PAIN:

- 3-10 mg at bedtime, start with a lower dose (3-5 mg) and increase if needed
- 30-60 minutes before one wants to fall asleep
- *Take it* at the same time every night for best results
- *Keep the bedroom dark*—darkness helps melatonin work better

## (7) POSSIBLE SIDE EFFECTS (*usually mild*):

- Melatonin has an excellent safety record
- Feeling drowsy the next day (~2% of people)
- Headache (rare)
- Vivid dreams
- Mild stomach upset

## (8) WHAT TO EXPECT:

- *First 1-2 weeks:* One may notice improved sleep fairly quickly. This alone can help reduce pain.
- *Weeks 2-4:* Pain benefits often become more noticeable
- *Long-term:* Continued use helps protect nerves and prevent pain from worsening over time.

***Be patient — Pain benefits may take 2-4 weeks or more to notice***

