



Curcumin

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Curcumin
Formulations

Accurate Education

Nutraceuticals: Curcumin

Curcumin, the active compound found in turmeric root, has potent anti-inflammatory and antioxidant properties making it very important in pain management. Curcumin has been widely studied regarding its use for pain and other conditions, with Moderate to High Confidence in the evidence supporting its use.

Therapeutic Benefits - Conditions with moderate to high quality evidence

- **Osteoarthritis:** Reduces pain and inflammation (High confidence RCTs).
- **Rheumatoid Arthritis:** Decreases disease activity (Moderate confidence RCTs).
- **Crohn's Disease/Ulcerative Colitis:** Improves remission rates (High confidence RCTs).
- **IBS & (Gut Health:** Supports gut barrier and reduces IBS symptoms (High confidence RCTs).
- **Metabolic Health:** Improves insulin sensitivity (~10–20%), lowers glucose, (High confidence RCTs).
- **Cardiovascular Health:** Lowers LDL and BP (~10–15%), (Moderate confidence RCTs).
- **Depression:** Improves mood (Moderate confidence RCTs).
- **Systemic Inflammation:** Lowers inflammatory markers (~10–20%), (High confidence RCTs).
- **Oxidative Stress:** Reduces ROS and boosts antioxidants (High confidence RCTs).

Dietary sources: Fresh turmeric root (has only 20–180 mg free curcumin /100 gm root and curry powder has only 10–50 mg /100 gm powder). These amounts are insufficient to provide significant therapeutic benefits. Furthermore, dietary free curcumin is very poorly absorbed from the intestinal tract so without the use of enhanced supplement formulations, turmeric/free curcumin offers very limited benefit.

Curcumin Supplements: There are different formulations that provide enhanced absorption:

- **Phytosomal curcumin** is *complexed* with [phosphatidylcholine](#), a compound that enhances absorption into cells, notably the best formulation for entering the brain and spinal cord so it's the best choice for conditions including cognitive dysfunction ("brain fog"), mood disorders and central sensitization.
- **Liposomal curcumin** is encapsulated to resist breakdown and improve uptake into cells.
- **Nano-formulations** are tiny particles of curcumin that significantly increase bioavailability and rapid absorption systemically, better than liposomal overall, but not as good as phytosomal formulations for penetration into the central nervous system (CNS), so it may be best for systemic inflammation.
- **Black Pepper (piperine) co-administration** increases curcumin bioavailability, but the resulting blood concentrations can be quite variable and may still be too low for optimal benefits compared to the above.

Dose: 500–2000 mg/day.

Synergies:

- **NSAIDs** – Curcumin enhances NSAIDs in osteoarthritis (500 mg/day (~30% better pain relief)
- **Gabapentin** – Curcumin may synergistically reduce central sensitization and oxidative stress
- **Nutraceuticals** – Curcumin may synergize with other anti-inflammatories and antioxidants including **Resveratrol**, **EGCG** (Matcha, green tea), **Quercetin**, **Alpha Lipoic acid** and **Omega-3** (EPA + DPA).
- **Adaptogens** – With **Ashwagandha**, curcumin enhances reduction of stress, anxiety and depression; With **Rhodiola**, curcumin synergizes for fatigue.

Safety: Curcumin is generally safe, with mild gastrointestinal upset at very high doses (>4 gm/day), but consult your doctor if taking blood thinners or diabetes medications.

“Iceberg” Drugs: Curcumin can be described as an “Iceberg” drug, as in “the tip of the iceberg,” where the perceivable or measurable benefits (i.e. pain relief, lower blood sugar) are outweighed by the benefits that are imperceivable or unmeasurable (i.e. reduced future pain or prevention of a condition).

In the case of curcumin, the unmeasurable benefits are potentially the strongest argument for supplementing with it, particularly when it comes to chronic pain. The following pain-related conditions are likely to benefit from supplementing with curcumin but may not be directly perceived:

Therapeutic Benefits - Suppression of the Driving Forces of Pain

Curcumin has been used in traditional Ayurvedic medicine India for centuries to reduce inflammation, protect tissues and support overall wellness. It is strongly recommended for its ability to reduce systemic inflammation and oxidative stress, key drivers of pain amplification and chronic disease.

Systemic Inflammation (SI) and Oxidative Stress (OS) contribute to chronic pain by creating a cycle of tissue damage and immune cell activation. By disrupting normal cellular physiology, SI and OS contribute to peripheral and central sensitization, neuroinflammation and opioid analgesic tolerance and they facilitate the transition of acute to chronic pain.

- **Systemic inflammation (SI)** is a widespread inflammatory response throughout the body, triggered by infection, injury, stress, and other conditions. It involves activation of the immune system with the release of pro-inflammatory molecules driving chronic pain and leading to other health issues. Symptoms can include increased pain, fatigue, cognitive problems, depression, decreased physical activity, and, in severe cases, organ dysfunction. While inflammation is a natural part of the healing process, chronic or excessive systemic inflammation contributes to the development of heart disease, diabetes, and autoimmune disorders.
- **Oxidative stress (OS)** is an imbalance of excessive “oxidants” (oxidizing or chemically active compounds, like free radicals, that are obtained from the diet and produced by the body) and insufficient “antioxidants” to neutralize oxidants. Antioxidants are also obtained from the diet and produced by the body. Oxidative stress and chronic systemic inflammation coexist because they mutually induce each other. Oxidative stress, caused by excessive free radicals and insufficient antioxidant defenses, damages nerves and other tissues which leads to persisting pain. Furthermore, this damage also triggers more inflammation, further exacerbating pain.
- **Neuroinflammation** is inflammation within the nervous system (brain, spinal cord and peripheral nerves), Systemic inflammation produces inflammatory molecules that cross the blood-brain barrier, activating immune cells in the brain thus contributing to the neuroinflammation that drives sensitization.
- **Peripheral and Central Sensitization** Sensitization refers to the increased nerve connections and associated hyper-responsiveness in nerves following intense or prolonged pain, tissue injury or nerve damage. This sensitization leads to greater intensity and spread of pain to non-injured areas.
- **Opioid Analgesic Tolerance (OAT)** is a multifactorial process that leads to reduced pain relief from the use of an opioid, commonly associated with prolonged use of opioids. Curcumin helps fight oxidative stress and reduce inflammation which helps suppress the progression of OAT.
- **Transition of Acute to Chronic Pain** The factors that contribute to the transition of acute to chronic pain are complex, but inflammation and oxidative stress are significant conditions that drive transitioning. Curcumin, with powerful antioxidant and anti-inflammatory properties may help reduce this transition.



Systemic Inflammation



Oxidative Stress



Neuroinflammation



Sensitization



Curcumin Patient Guide



Opioid Tolerance



Pain Transition