

LDN has been used to treat many problems including:

- Pain and Inflammation
- Hashimoto's Thyroiditis
- Chronic Fatigue & Fibromyalgia
- Autism Spectrum Disorder
- Allergies & Asthma
- Chronic Pruritus
- Mood Disorders
- Lyme Disease
- Multiple Sclerosis
- Crohn's and Ulcerative Colitis
- Diabetic Neuropathy / Small Fiber Neuropathy
- Complex Regional Pain Syndrome (CRPS)
- Autoimmune Disorders

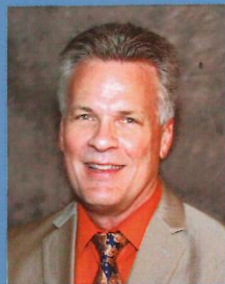
In summary, the research involving LDN and proposed uses is expanding. LDN is low cost, has low side effects, and no known abuse potential. Many peer-reviewed articles about the benefits of LDN can be found on PubMed <https://www.ncbi.nlm.nih.gov/pubmed>. Additional information can be found at [ldnresearchtrust.org](http://ldnresearchtrust.org) and [ldnscience.org](http://ldnscience.org).



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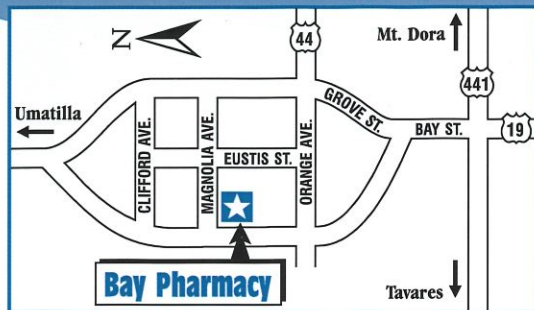
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Anti-inflammatory  
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How a drug developed to treat addiction evolved into a potential breakthrough for managing symptoms of many chronic conditions, when used in a much lower dose.

## Low Dose Naltrexone: A Paradox

Naltrexone is a medication approved as a treatment for opioid addiction and alcoholism. In 1985, while working at addiction clinics in New York, Harvard-educated internist Bernard Bihari, MD, discovered many novel benefits of using low doses of naltrexone (about 4.5 mg., or 1/10th of the typical dose of 50 mg. that is used to treat addiction). Ongoing research has shown that Low Dose Naltrexone (LDN) has potential benefits for patients with chronic pain, autoimmune diseases, and central nervous system disorders.

### The Science Behind LDN:

Naltrexone is a mu-opioid antagonist that is a mixture of two distinct shapes known as isomers. Research suggests that the L isomer binds to opioid receptors, while the D isomer binds to immune cells.

As an opioid antagonist, naltrexone binds to and blocks opioid receptors on cells. Because the opioid receptors are blocked only intermittently by Low Dose Naltrexone, the receptor sites rebound with increased and persistent production of endorphins (endogenous opioids best known for relieving pain and enhancing our sense of well-being). These natural opioids are also powerful regulators of the immune system.

Increased endorphin release:

- May lessen pain
- Downregulates inflammatory cytokines, while increasing T cells and Natural Killer Cells.
- Stimulates mucosal and tissue healing.
- Directly inhibits tumor growth.
- Reduces death of oligodendrocytes that produce myelin in the brain, thereby increasing the production of myelin (a protective covering for nerves).

LDN also blocks some non-opioid receptors (e.g., Toll-like receptor 4; TLR4). This is thought to be how LDN produces its anti-inflammatory effects. LDN has demonstrated the ability to reduce the severity of symptoms in certain inflammatory conditions such as fibromyalgia, Crohn's disease, multiple sclerosis and complex regional pain syndrome (CRPS).

### Side Effects:

LDN is well tolerated in most patients and side effects are usually transient. However, care should be taken to slowly titrate/increase the dose to avoid side effects.

#### Common Side Effects:

- Sleep disturbances/Vivid dreams
- Gastrointestinal upset, nausea
- Mild headache
- Mild agitation

#### Uncommon Side Effects:

- Flu-like symptoms
- Rash
- High temperature
- Dizziness
- Increased fatigue or spasticity

### Dosing:

There are many dosing protocols in the literature. It is best to work with your prescriber and our pharmacists on how best to dose for your particular condition.

The following may require dosage adjustments:

- Thyroid sensitivity in Hashimoto's patients may require a supervised decrease in the dose of thyroid medication.
- Agitation/extrapyramidal symptoms in patients with Parkinson's disease may require supervised adjustment of dopamine dose.

**Caution:** LDN should not be taken by patients who are also taking opioids such as morphine, oxycodone, or hydrocodone. It is possible that even a low dose of naltrexone could cause blockade of opioid receptors and reduce the effectiveness of opioid analgesics or induce withdrawal symptoms.

### Forms:

LDN is not commercially available but can be compounded in various dosage forms by prescription:

- Liquid - allows for slow titration to optimal dose.
- Capsules - in appropriate dose.
- Sublingual drops - for patients with swallowing difficulties or GI side effects from the liquid or capsules. SL drops facilitate more rapid absorption through the oral mucosa.
- Topical Cream - can be helpful when administering to children.

#### References:

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# LDN