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WHAT IS **NAD+?**

Nicotinamide adenine dinucleotide (NAD) is a universal and essential coenzyme found in all humans, providing the body with the energy it requires, womb to tomb. This includes eating, sleeping, learning, talking, breathing, digesting...the list is endless.[1]

NAD+ acts as a "vehicle" for energy production, which becomes NAD and improves mitochondrial oxidative phosphorylation. Roughly 90% of the energy requirements of the human body are met by mitochondrial oxidative phosphorylation to produce large amounts of energy for the body in the form of adenosine triphosphate (ATP). Additionally, NAD+ is crucial for the function of sirtuins, which are proteins important for maintaining healthy metabolism, cell survival, DNA repair, inflammation and circadian rhythm.[2,3]

The Risks of NAD Deficiency

NAD levels decline drastically with age, and consequently humans show accelerated signs of aging when NAD+ levels are deficient. Therefore, NAD+ is recognized for its anti-aging implications, as it rejuvenates existing stem cell pools, improves age-related sleep deterioration and digestive disorders and repairs DNA.[4] However, intracellular NAD homeostasis is a dynamic process, a balance between the production and degradation of NAD.[5,6,7,8] So, when NAD energy deficiency occurs, nearly all reactions in the body power down. For example, the brain uses 10 times more NAD than any other organ, yet it has a limited supply and must therefore be continually renewed.[9] When cells are exposed to a NAD deficient environment, their structure changes or unplanned cell death occurs, risking mitochondrial dysfunction and cellular impairment.[10] Additionally, a primary relationship exists between carcinogenesis, oncogene expression and decreased NAD concentration, which is why replenishing NAD in such cases is important to defend against signs of aging and tumor growth.[11]

Virtually all our mitochondrial DNA comes from our mothers. Approximately 10% of all babies are born with a maternally inherited NAD energy deficiency, which can lead to metabolic deficiency and low moods. In infancy particularly, these babies have no way to explain how they are feeling, and as a result some will be diagnosed with depression, only to be prescribed an antidepressant prior to their first birthday.[12] In 1994, the FDA reported that a staggering 3,000 fluoxetine prescriptions were written for children under the age of one year for depression and behavioral issues.[13]

For adults, NAD deficiency often spans a wide range of symptoms, yet this root cause may be overlooked completely, leading to mislabeling or misdiagnosis. To provide perspective, if NAD deficiency lasts for an extended period, permanent brain damage develops.[14] However, practitioners providing care for NAD energy-deficient individuals should be cautious not to abide by "professional stereotypes" such as labeling patients as depressive, alcoholic, eating disordered, hyperactive, drug-dependent and chronically fatigued. In reality, these

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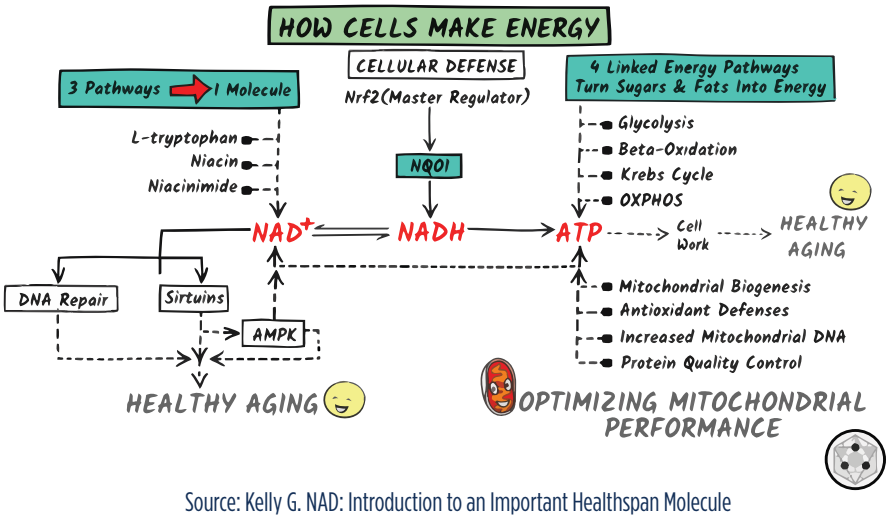
Physicians Preference Pharmacy is a Houston-based, PCAB-accredited compounding pharmacy serving physicians and patients since 2001. We are licensed to work with and ship to doctors and patients in all 50 states. Our standards are more stringent than those of the United States Pharmacopeia (USP). Physicians Preference Pharmacy ranks first in Houston for the number of samples sent for potency testing and in the top 8% of pharmacies nationwide.

people may simply lack the metabolic energy to continue. **They lack NAD.**

Why Treat With NAD+?

NAD+ is particularly useful for patients who suffer from fatigue, brain fog and general lack of energy or motivation. To accept when and why we choose to replenish bodily NAD stores using compounded NAD+, we must first understand the precursors of NAD. Precursors of NAD biosynthetic pathways involve L-tryptophan, niacinamide and niacin (vitamin B3).[15]



Source: Kelly G. NAD: Introduction to an Important Healthspan Molecule
https://neurohacker.com/nad-introduction-to-an-important-healthspan-molecule

As seen from this diagram, providing L-tryptophan, niacin or niacinamide should ultimately result in higher NAD levels in patients and therefore the benefits of optimized NAD levels. Dr. Abram Hoffer, a distinguished researcher of NAD, reports that his patients who would ordinarily take three to six months to show an adequate response to vitamin B3 responded to NAD+ in days and weeks.[16]

In addition to a quicker treatment response, choosing to treat with NAD+ versus one of its precursors *depends on where the metabolic breakdown is occurring*. Conditions such as obesity, diabetes, alcoholism and high fat diets can compromise suitable absorption of the vitamins necessary to generate and maintain a continuous pool of NAD,[17] so dosing niacin in this case may not be helpful. Additionally, when metabolic conditions are being addressed, in many cases lifestyle and dietary changes alone are not enough to replenish NAD levels. *Note: Frequently, medications cannot be fully absorbed by the body until mitochondrial function is optimized. Therefore, patients should be instructed to discontinue the medication until their mitochondrial function is fixed. The patient can then be rechallenged with the same medication, generally with better results.*

Which Dosage Form Is Most Effective?

A common question regarding NAD+ therapy is, "Which dosage form is most effective?" NAD+ is not orally bioavailable, which is why it must be given either intranasally or intravenously to be absorbed. Oral treatment related to boosting NAD levels in the body is achieved only by dosing the NAD precursors previously mentioned. Overall, dosing NAD precursors is not thought to be as effective as NAD+, and it takes longer for patients to see and feel results.

NAD+ is frequently given via intravenous (IV) administration, as the body benefits from widespread absorption of NAD+. The full body effects of NAD+ are beneficial as they assist the mitochondria throughout the body to function more efficiently. However, an NAD+ IV may take four or more hours to complete, and the effects associated with these infusions are not always desirable. During an NAD+ infusion, the patient may experience feelings of cramping, overall pressure, muscle fatigue and nausea, which is why the IV infusion is spread out over many hours. Typical NAD+ IV regimens require multiple trips to the doctor's office, usually for several weeks in a row. While IV NAD+ can be an effective option, supplementation with either intranasal NAD+ or its oral precursors (i.e., nicotinamide) following IV therapy will most likely still be required.

NAD+ nasal spray compounded by Physicians Preference Pharmacy provides a unique solution to NAD+ treatment. Treatment with our nasal spray typically requires one to two sprays twice daily, taking less than a total of one minute out of the patient's day. No trips to the doctor's office are required, and patients do not need to live near a clinic offering NAD+ to receive therapy. Administration of intranasal NAD+ provides the desired contact with brain tissue as well as immediate absorption of NAD+ into other tissues. NAD+ provides an immediate result, generally by providing a boost in energy and helping to combat symptoms of fatigue, anxiety, depression and brain fog. With continued treatment of NAD+, we expect improvement in mitochondrial function and metabolism, slowed aging and reduced inflammation.

DOSING INFORMATION:

NAD+ (30mg/spray) intranasal spray

Use 1-2 sprays in one nostril twice daily (alternating nostrils)

8ml bottle

Many of the chronic ailments we see today are rooted in energy metabolic deficiency, aka NAD deficiency and mitochondrial insufficiency. Treatment with NAD+ nasal spray provides an effective and flexible option for NAD therapy, as well as adjunct therapy for those receiving it IV, or anyone who is not a candidate for IV NAD+ therapy from the start. Contact us today to learn more about our NAD+ nasal spray!

DID YOU KNOW?

During a woman's life she will:

- Talk for up to 10 years
- Breathe 41 million times
- Drive in a car for one year
- Sleep for 22 years
- Fall in love twice, have sex more than 3,000 times and kiss for two weeks
- Grow 100 feet of fingernails, 38 million inches of hair and 78 inches of nose hair
- Discard over 40 pounds of dead skin
- Spend 5 years eating and drinking
- Renew her skeleton 11 times
- Renew the inner lining of her stomach 32,448 times

To do all these things successfully and to reach an average age of 78 years, her body will need to make and use 950 tons of NAD+. WHY? Because these all require energy.

Are you getting enough NAD+?

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