

NAD+

What is NAD+?

Nicotinamide adenine dinucleotide (NAD+) is a helper molecule that exists inside each of your cells and supports many aspects of healthy aging. However, the amount of NAD+ in your body naturally falls with age. Low NAD+ levels have been linked to health concerns like aging and chronic illnesses, such as diabetes, heart disease, Alzheimer's disease and vision loss. Interestingly, animal research has found that raising NAD+ levels may help reverse signs of aging and lower the risk of many chronic diseases.

NAD+ acts as fuel for many key biological processes, such as:

- Converting food into energy
- Repairing damaged DNA
- Fortifying cells' defense systems
- Setting your body's internal clock or circadian rhythm

Ways to Boost NAD+ Levels

- Supplements: Nicotinamide riboside (NR) or nicotinamide mononucleotide (NMN). **If your body has enough of these substances, it will make its own NAD+**
- Diet: Foods rich in tryptophan, vitamin B3 (niacin), or precursors of NAD+ (e.g., fish, dairy, and whole grains).
- Exercise: Regular physical activity boosts NAD+ levels naturally.
- Fasting and Caloric Restriction: Promotes NAD+ synthesis by activating sirtuins.

Oral NAD+ supplements are ineffective

1. Poor Bioavailability

- NAD+ is a relatively large and polar molecule that struggles to cross cellular membranes, including the intestinal lining.
- When consumed orally, NAD+ is rapidly degraded by digestive enzymes and stomach acid, reducing the amount that reaches the bloodstream.

2. Enzymatic Degradation in the Bloodstream

- Even if some NAD+ survives digestion, it is further broken down into its components (nicotinamide and adenosine) by enzymes like **pyrophosphatases** in the bloodstream.
- The body must then rebuild NAD+ from these components, a less efficient process compared to direct supplementation via injections or IV.

3. Poor Cellular Uptake

- NAD⁺ cannot freely cross cell membranes to enter cells where it is needed.
 - Cellular NAD⁺ levels depend on the availability of precursors like **nicotinamide mononucleotide (NMN)** or **nicotinamide riboside (NR)**, which are better absorbed and converted into NAD⁺ inside cells.
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Potential Benefits

1. Supports Cellular Energy Production

- NAD⁺ is essential for converting nutrients into ATP through cellular respiration.
- It fuels critical metabolic pathways in the mitochondria, the powerhouse of the cell.

2. Enhances DNA Repair

- NAD⁺ activates poly-ADP-ribose polymerases (PARPs), enzymes involved in repairing DNA damage.
- Improved DNA repair may reduce mutations and potentially lower the risk of cancer and age-related diseases.

3. Boosts Mitochondrial Health

- Sirtuins (a family of NAD⁺-dependent proteins) regulate mitochondrial function and biogenesis.
- Enhanced mitochondrial health improves cellular energy and resilience, combating fatigue and age-related mitochondrial decline.

6. Anti-Aging Effects

- NAD⁺ levels decline with age, contributing to reduced cellular function and resilience.
- Restoring NAD⁺ has been associated with improved markers of aging, such as better skin elasticity and enhanced metabolic health.

5. Improves Metabolic Health

- NAD⁺ is involved in glucose and lipid metabolism.
- Increased NAD⁺ levels may improve insulin sensitivity, reduce obesity, and support metabolic flexibility.

6. Supports Neurological Function

- NAD⁺ may protect neurons by reducing oxidative stress and inflammation.
- It has shown potential in mitigating neurodegenerative conditions such as Alzheimer's, Parkinson's, and Huntington's diseases.

7. Reduces Inflammation

- NAD+ regulates inflammatory pathways through sirtuins, which can suppress chronic inflammation associated with aging and metabolic disorders.

8. Enhances Immune Function

- NAD+ supports the function of immune cells, potentially enhancing the body's defense against infections.
- It plays a role in modulating the inflammatory response during infections or chronic diseases.

9. Potential in Cardiovascular Health

- NAD+ may protect endothelial cells and improve vascular function.
- It may reduce oxidative stress in the cardiovascular system and lower the risk of heart disease.

10. Promotes Muscle Function and Recovery

- NAD+ is crucial for muscle regeneration and repair.
- It may improve endurance, strength, and recovery in aging populations.

11. Potential Cancer Support

- While NAD+ can support healthy cell function, its role in cancer is complex.
- Enhancing NAD+ may improve the function of healthy cells while selectively targeting cancer cells through certain therapies.

12. May Aid in Addiction Recovery

- Preliminary research suggests NAD+ therapy may alleviate withdrawal symptoms in substance addiction.

Potential Side Effects and Precautions

Common Side Effects

1. Injection Site Reactions:

- Redness, swelling, or tenderness at the injection site.
- Rarely, bruising or irritation.

2. Nausea:

- A frequent side effect, particularly with higher doses or rapid administration.
- Slower infusion rates can often mitigate this.

3. Flushing or Warmth:

- Some individuals experience a sensation of warmth or flushing during the injection.

4. Fatigue:

- Paradoxically, some people feel fatigue or drowsiness shortly after administration.
- This effect is typically transient.

5. Headaches:

- Likely due to vasodilation or rapid metabolic shifts.
- Slower injection rates can reduce the risk.

6. Lightheadedness or Dizziness:

- May occur, especially if administered too quickly or in individuals prone to low blood pressure.

7. Digestive Disturbances:

- Nausea can sometimes lead to vomiting.
- Less commonly, diarrhea or abdominal discomfort.

Rare Side Effects

1. Palpitations or Irregular Heartbeat:

- Rapid or irregular heartbeat has been reported in a few cases.
- May be related to changes in mitochondrial energy output.

2. Anxiety or Restlessness:

- Some individuals report transient feelings of anxiety or restlessness during the infusion.

3. Muscle Cramps or Stiffness:

- Rare cases of muscle discomfort, possibly linked to electrolyte imbalances.

4. Drop in Blood Pressure (Hypotension):

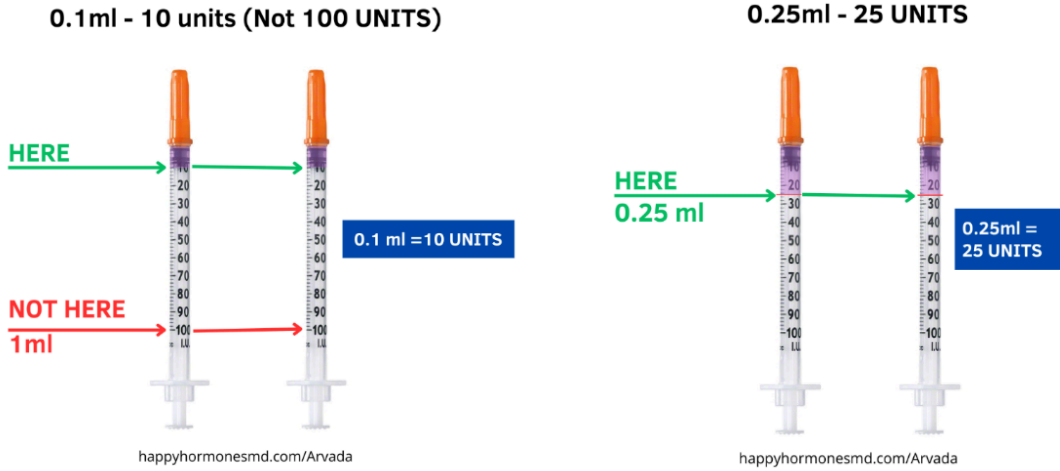
- Rapid administration can lead to temporary decreases in blood pressure.
- Symptoms include dizziness, fainting, or a feeling of weakness.

5. Chest Pressure

Dosage Guidelines

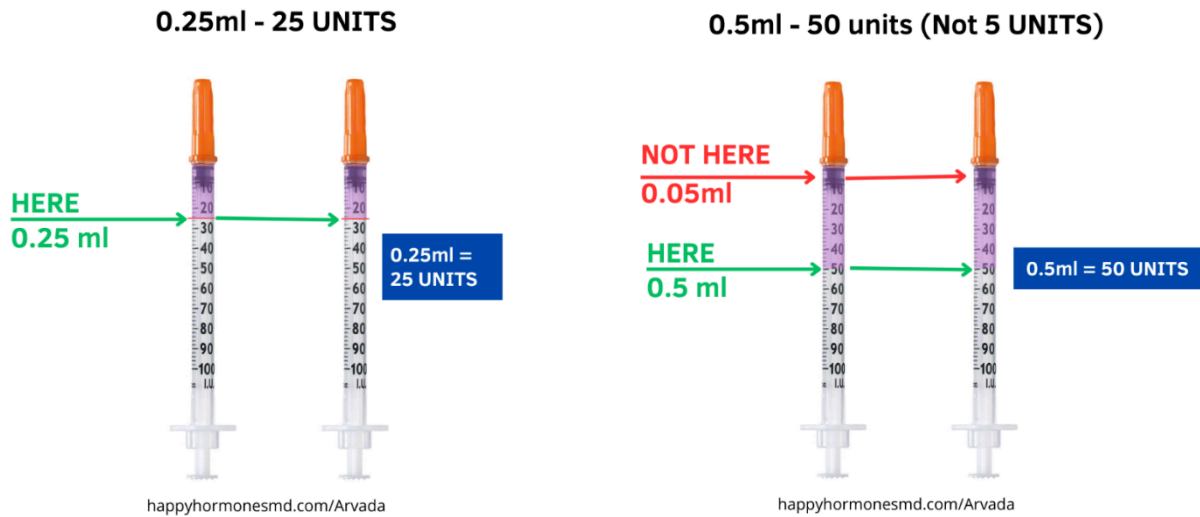
Low dose: Typically used for general wellness, boosting cellular energy, and longevity.

100-250mg (0.1 - 0.25ml or 10-25 units) 1-2 times a week, then once a month maintenance.



Higher dose: Common in cases of fatigue, cognitive decline, or recovery from addiction or chronic illness.

250-500 mg (0.25 – 0.5ml or 25-50 units) 1-2 times a week, then once a month maintenance.



Cost

Research Peptide - Please see document titled *“Research Peptide Information”* in the Education Folder under Records in the patient portal.

NAD+ 1000mg vial (1000mg/ml): \$218.50 (includes shipping and bacteriostatic water). One vial = 2-10 doses.

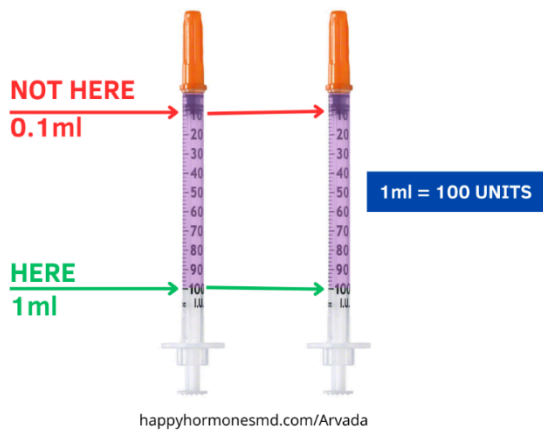
Reconstitution Instructions

IMPORTANT:

- Follow the instructions below regarding the amount of bacteriostatic water to use when reconstituting the peptide. **DO NOT** follow the instructions that come with the peptide.
- Do **NOT** throw away the vial of bacteriostatic water!!! It is a multiuse vial and can be used for your next order!

Inject **1ml** of bacteriostatic water into the vial (**1ml = 100 units**).

1 ml - 100 units (Not 10 UNITS)



- See the **document** titled *“Reconstituting Medications in Powder Form”* in the Education Folder in the patient portal.
- See the following Instructional **videos** in the Education Folder in the patient portal:
 - *“Reconstituting Powdered Medications”*
 - *“Injection Video – Introduction”*
 - *“Injection Video – Drawing Up the Medication”*

- *“Injection Video – Administering the Medication”*
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Storage and Stability

- Vials are shipped as **lyophilized powder**, requiring no refrigeration during shipping.
 - In Lyophilized Form:
 - Stable for up to 3 years in the freezer and 2 years in the refrigerator.
 - Protect from light.
 - Once Reconstituted:
 - Stable for 6 weeks.
 - Must be refrigerated and kept away from light.
 - Avoid placing vials in the refrigerator door to prevent degradation from frequent temperature changes.
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Important Disclosures

- These statements have not been evaluated by the US Food and Drug Administration (FDA).
 - Not intended to diagnose, treat, cure, or prevent any disease.
 - Compounded drugs and research peptides are not FDA-approved but are produced under strict quality control measures.
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Quality Assurance

- All peptides are subjected to third-party testing with publicly available Certificates of Analysis (COA).
- Testing includes:
 - RP-HPLC (Reversed-Phase High-Performance Liquid Chromatography)
 - Mass Spectrometry (MS)
 - Sterility Testing
 - Additional tests meeting or exceeding U.S. Pharmacopeia (USP) and USP-National Formulary (NF) regulations.
- The manufacturer ensures quality, safety, and efficacy, complying with regulatory standards.