COMPOUND GUIDE

NAD+ — Nicotinamide Adenine Dinucleotide

Coenzyme · Multiple routes (SubQ, IV, oral NMN/NR) · Injectable form not FDA-approved

Quick Start

NAD+ IS NOT A PEPTIDE

NAD+ (nicotinamide adenine dinucleotide) is a coenzyme, not a peptide. It is grouped with research peptides in many injectable research contexts due to its availability as a lyophilised injectable powder. It is the same molecule regardless of formulation; "buffered NAD+" simply contains a pH stabiliser that reduces injection-site stinging.

WHAT IT IS

NAD+ is an essential coenzyme found in every cell. It is the primary electron carrier in cellular respiration (ATP production), a substrate for PARP DNA repair enzymes, and a regulator of sirtuin (SIRT1-7) longevity pathways. Cellular NAD+ levels decline with age, which is one rationale for NAD+ supplementation research.

ROUTES OF ADMINISTRATION

Research studies use multiple routes: **SubQ injection** (50–100 mg 2–3× per week), **IV infusion** (250–1,000 mg per session, clinic-administered), **IM injection**, **intranasal**, oral precursors (**NMN or NR** — the strongest published human RCT base), and pre-mixed injection pens. Oral NR and NMN are the most evidence-supported delivery routes for systemic NAD+ elevation.

REGULATORY STATUS

Injectable NAD+: not FDA-approved. Oral NR (Nicotinamide Riboside): classified as GRAS/NDI supplement in the US. Oral NMN: the FDA excluded NMN from the dietary supplement definition in 2022–2023. No WADA ban on NAD+ itself. For injectable research purposes only.

Dosing by Route

ROUTE	DOSE	FREQUENCY	NOTES
SubQ (injectable)	50–100 mg	2–3× per week	Most accessible injectable route; some injection-site stinging common
IV Infusion	250–1,000 mg	Weekly or biweekly	Clinic-administered; fastest delivery; common nausea side effect at high doses
Oral NR	300–1,000 mg	Once or twice daily	Strongest human RCT base; GRAS supplement; converts to NAD+ in cells
Oral NMN	250–600 mg	Once daily	600 mg shows largest NAD+ rise (Yi 2022 dose-response RCT); excluded from supplements 2022–23

BUFFERED VS UNBUFFERED NAD+

Buffered NAD+ contains a pH stabiliser (e.g. sodium bicarbonate) that reduces the injection-site stinging experienced with unbuffered NAD+. The molecule and biological effects are identical. If stinging is significant with unbuffered, buffered formulations are worth exploring.

Supplies & Reconstitution (SubQ)

Reconstitution & Dosing

LA LAB does not stock this as a standalone product, so vial-specific reconstitution and dosing figures are not provided here. This page is a research reference only. For compounds we carry, see our guides.

Reconstitution Steps

01 Warm the vial
Allow lyophilised NAD+ vial to reach room temperature before reconstitution.

02 Swab stoppers
Alcohol swab both vial tops. Air-dry before inserting needle.

03 Draw BAC water
Draw the required BAC water volume. Draw the 3.0 mL with a 1 mL syringe, or use a 10 mL syringe for efficiency.

04 **Inject along the wall**
Run BAC water slowly along the inside glass wall. NAD+ dissolves quickly — do not jet directly onto powder.

05 **Swirl gently**
Swirl until clear. NAD+ solution is typically clear to light yellow. Do not shake.

06 **Refrigerate**
Store reconstituted at 2–8°C for up to 30 days. NAD+ is sensitive to heat and oxidation; keep capped and in the dark.

Mechanism of Action

ATP PRODUCTION

NAD+ and NADH cycle as electron carriers in the mitochondrial electron transport chain. NAD+ accepts electrons from glycolysis and the TCA cycle, then donates them to Complex I, driving ATP synthesis via oxidative phosphorylation.

DNA REPAIR (PARP)

PARP-1 (poly-ADP ribose polymerase) uses NAD+ as a substrate to add poly-ADP ribose chains to DNA repair proteins at strand-break sites. Low NAD+ impairs this DNA damage response.

SIRTUINS (SIRT1-7)

NAD+-dependent deacylases that regulate gene expression, metabolism, and stress response. SIRT1 deacetylates PGC-1α (mitochondrial biogenesis), FOXO transcription factors, and NF-κB. Sirtuin activity requires NAD+.

CD38 CONSUMPTION

CD38, an enzyme expressed on immune cells, is the primary consumer of NAD+ in aged tissue. CD38 levels increase with age and chronic inflammation, contributing to the age-associated decline in tissue NAD+.

Key Human Studies (Oral Precursors)

STUDY	COMPOUND	DESIGN	KEY FINDING
Martens 2018	NR (Niagen)	RCT; 12 adults; 6 weeks	Whole blood NAD+ elevated 60% vs baseline; well tolerated
Conze 2019	NR	RCT; dose-response	Dose-dependent NAD+ elevation; up to 2.7× at 1,000 mg/day
Dollerup 2018	NR	RCT; 40 obese adults; 12 weeks	NAD+ elevated; no significant metabolic effect at this dose
Yi 2022	NMN	RCT; dose-response (100/300/600 mg)	600 mg/day produced largest NAD+ rise; dose-response relationship confirmed
Brakedal 2022	NR	RCT; Parkinson's disease; 12 weeks	Significantly elevated brain NAD+ on MRS; tolerated in neurodegenerative disease context

Storage

STATE	TEMPERATURE	DURATION	NOTES
Lyophilised (powder)	−20°C (freezer) or 2–8°C	Up to 24 months frozen; 6 months refrigerated	Sensitive to oxidation and heat; protect from air exposure
Reconstituted (liquid)	2–8°C (refrigerator)	Up to 30 days	Keep capped tightly; minimise air headspace; protect from light
Short-term (travel)	<25°C	Up to 48 hours	NAD+ is more heat-sensitive than typical peptides; minimise time at room temperature