COENZYME · CELLULAR ENERGY · SIRTUIN · LONGEVITY

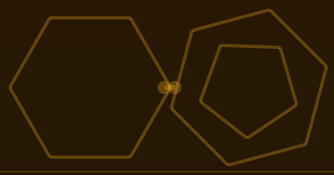
NAD+

Energy · Longevity · DNA Repair · Metabolism

Nicotinamide adenine dinucleotide —

the universal cellular currency that

powers life itself.

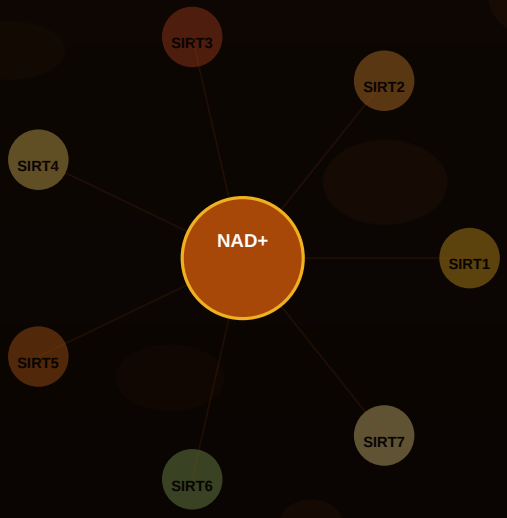


500+
Enzyme Reactions

7
Sirtuin Targets

50%
Decline by 60yrs

IV/SC/Sub
Routes



What is NAD+?

Nicotinamide adenine dinucleotide — the coenzyme at the heart of all cellular life

NAD+ (nicotinamide adenine dinucleotide) is a dinucleotide coenzyme found in every living cell, present in two forms — NAD+ (oxidised) and NADH (reduced) — that shuttle electrons in hundreds of critical metabolic reactions.

As the primary electron carrier in cellular respiration, NAD+ is essential for ATP production via glycolysis and the citric acid cycle. Without adequate NAD+, mitochondria cannot generate the energy cells need to function.

Beyond energy metabolism, NAD+ is the obligate substrate for sirtuins (SIRT1-7), PARP enzymes involved in DNA repair, and CD38/CD157 signalling — making NAD+ levels the rate-limiting factor for cellular longevity pathways.

NAD+ levels decline approximately 50% between ages 40-60 due to increased CD38 activity, reduced biosynthesis, and mitochondrial dysfunction — directly contributing to the hallmarks of ageing.

MOLECULAR IDENTITY

Nicotinamide Adenine Dinucleotide (NAD+)

MW: 663.43 g/mol | C21H27N7O14P2 | Found in all living cells

The NAD+/NADH ratio is one of the primary metabolic sensors in the cell — signalling energy status to sirtuins and AMPK.

When NAD+ is abundant, SIRT1 deacetylates PGC-1alpha to drive mitochondrial biogenesis, SIRT3 maintains mitochondrial function, and SIRT6 enhances DNA repair — a trifecta of longevity signalling.

IV NAD+ infusion, subcutaneous injection, and high-dose oral supplementation with NAD+ precursors (NMN, NR) represent different strategies to restore declining cellular NAD+ levels.

IV NAD+ produces rapid, dramatic increases in blood and tissue NAD+ levels — often producing noticeable effects on energy, cognition, and mood within the infusion session itself.

SIRT1	Nuclear — gene reg.
SIRT3	Mitochondria
SIRT6	DNA repair
SIRT5	Urea / TCA cycle

Key Benefits

Clinical and mechanistic evidence for NAD+ restoration therapy

Cellular Energy Restoration

NAD+ is the rate-limiting substrate for mitochondrial ATP production. Restoring NAD+ levels in aged or metabolically compromised cells reliably increases energy output, exercise capacity, and cognitive sharpness.

DNA Damage Repair

PARP1-3 enzymes consume NAD+ to repair DNA strand breaks — the molecular damage that accumulates with age, radiation, and oxidative stress. Adequate NAD+ is essential for maintaining genomic integrity.

Sirtuin Longevity Activation

All seven sirtuins require NAD+ as an obligate cofactor. Restoring NAD+ activates SIRT1 (metabolic regulation), SIRT3 (mitochondrial health), and SIRT6 (DNA repair and inflammation suppression) simultaneously.

Neurological Recovery

High-dose IV NAD+ is used clinically in addiction recovery programmes, producing rapid reduction in withdrawal symptoms and cravings. Research also supports neuroprotective effects in TBI, Parkinson's, and Alzheimer's models.

Metabolic Health

NAD+ normalises the SIRT1-mediated deacetylation of key metabolic enzymes, improving insulin sensitivity, fatty acid oxidation, and mitochondrial biogenesis — with clinical improvements in type 2 diabetes markers.

Cardiovascular & Muscle

SIRT3 activation maintains mitochondrial function in cardiac and skeletal muscle, reducing oxidative damage and preserving contractile function. Clinical data supports improved muscle strength and reduced fatigue.

IV NAD+ vs. NMN (oral) vs. NR (oral) vs. Niacin

Research & Dosing

Eight decades of biochemistry from Nobel Prize to clinical longevity practice

1930s

Nobel Prize Discovery

Otto Warburg and Arthur Harden characterised NAD+ as the essential 'co-ferment' of cellular respiration, earning multiple Nobel Prizes. The coenzyme was identified as universal to all aerobic life.

1958

DNA Repair Role

The first evidence that NAD+ consumption drives DNA repair was described, setting the stage for understanding PARP biology and establishing NAD+ as fundamental to genomic maintenance.

2000

Sirtuin Connection

Guarente lab demonstrated sirtuins are NAD+-dependent deacetylases, directly linking NAD+ levels to caloric restriction and lifespan extension — sparking the modern NAD+ longevity research field.

2013

Declining Levels & Ageing

Landmark studies from the Guarente and Sinclair labs confirmed age-related NAD+ decline is causally linked to mitochondrial dysfunction, with NAD+ precursor supplementation reversing ageing markers in mice.

2018

Human Clinical Trials

Phase I/II trials confirmed safety and efficacy of IV NAD+ infusions, NMN, and NR supplementation in raising blood NAD+ levels in humans — with measurable improvements in metabolic and physical performance markers.

2023

Ongoing Clinical Evidence

Expanding human data now supports NAD+ therapy for metabolic disease, neurodegeneration, cardiovascular disease, and healthy longevity — with IV protocols established in longevity medicine clinics worldwide.

Dosing Guide

IV NAD+	250-1000 mg per session
IV frequency	1-3x/week loading
IV maintenance	Monthly
SC NAD+	100-300 mg/day
NMN oral	250-1000 mg/day
NR oral	300-600 mg/day
Onset (IV)	During infusion
Duration	3-7 days effect

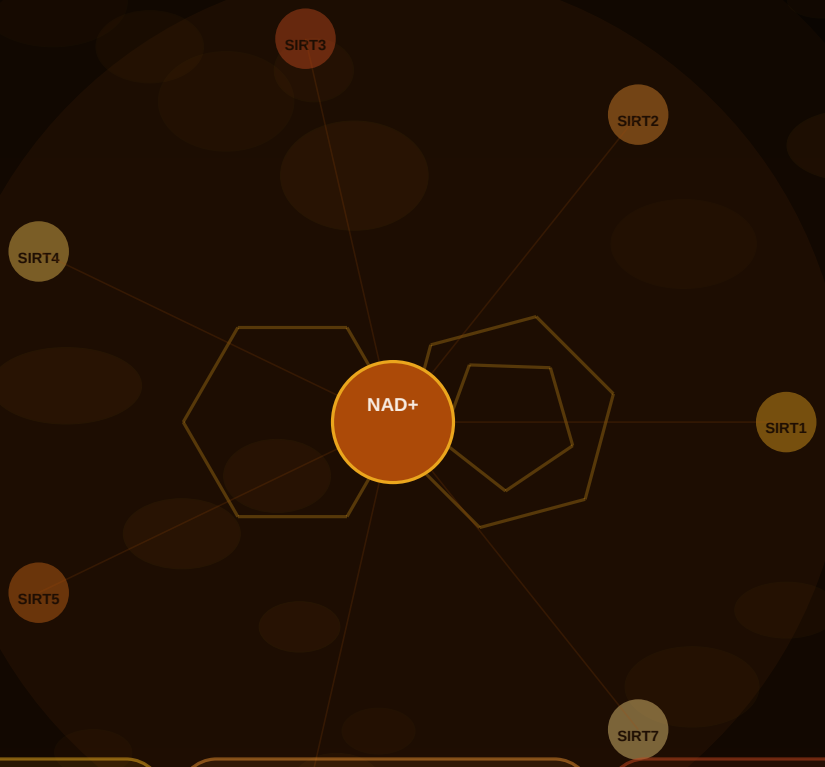
Synergistic Compounds

Resveratrol · Quercetin · SLU-PP-332 · Berber

For research use only. IV NAD+ is an investigational therapy. Always use under physician supervision. Consult a licensed provider for therapeutic protocols.

Recharge Your Cells.

NAD+ does not trick your biology — it fuels it. By restoring the coenzyme that 500 enzymes depend upon, NAD+ therapy addresses ageing, disease, and metabolic decline at the most fundamental level possible: the currency of cellular energy itself.



ENERGISE

ATP production
Restore mitochondrial

REPAIR

DNA damage repair
Activate PARP-mediated

EXTEND

signalling maximised
Sirtuin longevity

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NAD+

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