

RESEARCH MONOGRAPH . COMPOUND PROFILE

NMN

(Nicotinamide Mononucleotide)

A direct precursor of NAD⁺ and the molecule directly downstream of NAMPT, the rate-limiting enzyme of NAD⁺ salvage; popularized by David Sinclair for longevity applications.

DOCUMENT	KDC-MN-102
ISSUED	2026-05-09
REVISION	1.0
AUTHOR	Kodi ac bio l abs Research
COMPOUND CLASS	NAD ⁺ precursor

RESEARCH USE ONLY

ABSTRACT

NMN (β -nicotinamide mononucleotide; CAS 1094-61-7; molecular formula $C_{11}H_{15}N_2O_8P$; molecular weight 334.22) is the immediate precursor of NAD^+ in the salvage biosynthesis pathway, generated by phosphorylation of nicotinamide riboside by NRK kinases or by NAMPT-mediated condensation of nicotinamide with PRPP. NMN was popularized by David Sinclair's group at Harvard as a longevity supplement for raising NAD^+ levels, which decline with age. The compound is converted to NAD^+ through NMNAT enzymes after cell uptake (presumed via Slc12a8 transporter or via dephosphorylation to NR with separate uptake). Animal studies show NMN supplementation reverses several age-related phenotypes (vascular, metabolic, neurological) by restoring NAD^+ levels. Human clinical trials have shown plasma NAD^+ elevation but clinical endpoint changes are modest. The compound is sold as a dietary supplement; FDA classified NMN as a drug investigation in 2022, complicating supplement market availability. Doses are typically 250 to 1000 mg per day.

1. Compound Identification

NMN (Nicotinamide Mononucleotide) is described as nad⁺ precursor. A direct precursor of NAD⁺ and the molecule directly downstream of NAMPT, the rate-limiting enzyme of NAD⁺ salvage; popularized by David Sinclair for longevity applications.

1.1 Class summary

NAD⁺ precursor

1.2 Subtitle

A direct precursor of NAD⁺ and the molecule directly downstream of NAMPT, the rate-limiting enzyme of NAD⁺ salvage; popularized by David Sinclair for longevity applications.

2. Abstract

NMN (β -nicotinamide mononucleotide; CAS 1094-61-7; molecular formula $C_{11}H_{15}N_2O_8P$; molecular weight 334.22) is the immediate precursor of NAD⁺ in the salvage biosynthesis pathway, generated by phosphorylation of nicotinamide riboside by NRK kinases or by NAMPT-mediated condensation of nicotinamide with PRPP. NMN was popularized by David Sinclair's group at Harvard as a longevity supplement for raising NAD⁺ levels, which decline with age. The compound is converted to NAD⁺ through NMNAT enzymes after cell uptake (presumed via Slc12a8 transporter or via dephosphorylation to NR with separate uptake). Animal studies show NMN supplementation reverses several age-related phenotypes (vascular, metabolic, neurological) by restoring NAD⁺ levels. Human clinical trials have shown plasma NAD⁺ elevation but clinical endpoint changes are modest. The compound is sold as a dietary supplement; FDA classified NMN as a drug investigation in 2022, complicating supplement market availability. Doses are typically 250 to 1000 mg per day.

3. Mechanism of Action

Direct NAD⁺ precursor; converted to NAD⁺ via NMNAT after cellular uptake.

The mechanistic profile described above represents the consensus position from peer-reviewed literature where available; for compounds with sparse formal characterization, this section reflects vendor-grade reports and structurally-related class pharmacology and should be interpreted with appropriate caution.

4. Pharmacokinetics and Routes of Administration

Pharmacokinetic data are summarized within the abstract for compounds with formal Phase 1 records. Compounds without published human pharmacokinetic studies are noted as such; investigators should treat the absence of data as a research limitation.

5. Reported Research Dose Ranges

250 to 1000 mg per day.

Doses are scaled from clinical use where the compound is approved as a medicine, from Phase 2/3 trials where development advanced, or from rodent dose-response data scaled by allometric assumptions where the compound has no human clinical record. Investigators should treat dose ranges from research-chemical-grade vendors as starting points for their own pharmacokinetic and tolerability characterization rather than validated dosing recommendations.

6. Sourcing and Quality Verification

Investigators should obtain analytical confirmation of identity (mass spectrometry; for peptides, additionally amino acid analysis or N-terminal sequencing) and purity (HPLC area-percent, ideally greater than 95 percent) on every lot. Vendor certificates of analysis vary in quality; third-party analytical confirmation through independent laboratories (e.g., Janoshik Analytical, Anabolic Lab) is the gold standard for research-grade peptides and small molecules.

For compounds with established pharmaceutical-grade marketing in any jurisdiction, sourcing from the marketed product (where legal and accessible) provides the highest quality assurance.

7. Reconstitution and Handling

Peptides should be reconstituted in bacteriostatic water or sterile water for injection in the volume appropriate to the desired concentration; lyophilized peptides should be allowed to come to room temperature before reconstitution to minimize precipitation. Reconstituted peptides should be stored refrigerated and used within the timeframe specified by the manufacturer (typically 14 to 30 days for bacteriostatic water reconstitutions, shorter for sterile water).

Small molecules: storage conditions vary by compound; consult the certificate of analysis for the specific product. Most are stable at room temperature in dry, dark conditions; oxidation-sensitive compounds (e.g., catecholamine precursors) require cool storage and protection from light.

8. Stack Interaction Considerations

Investigators combining this compound with other research substances should consider receptor-level interactions (additive effects at shared targets), enzyme-level interactions (CYP-mediated drug-drug interactions where applicable), and pharmacodynamic interactions (additive sedation, additive serotonergic activity, additive hemodynamic effects).

The stack interaction section in published monographs of well-characterized compounds is necessarily incomplete for any specific combination; investigators should treat novel combinations with elevated caution and titrate gradually.

9. References

1. Yoshino J, et al. NAD intermediates: the biology and therapeutic potential of NMN and NR. Cell Metab 2018.

This monograph is provided for research use only. Not for medical, diagnostic, or therapeutic purposes. Not for human consumption. Compound class generalizations are noted where compound-specific data are sparse; investigators should weight the evidence accordingly.