Electronic Supplementary Material (ESI) for Food & Function.

Supplementary Materials:

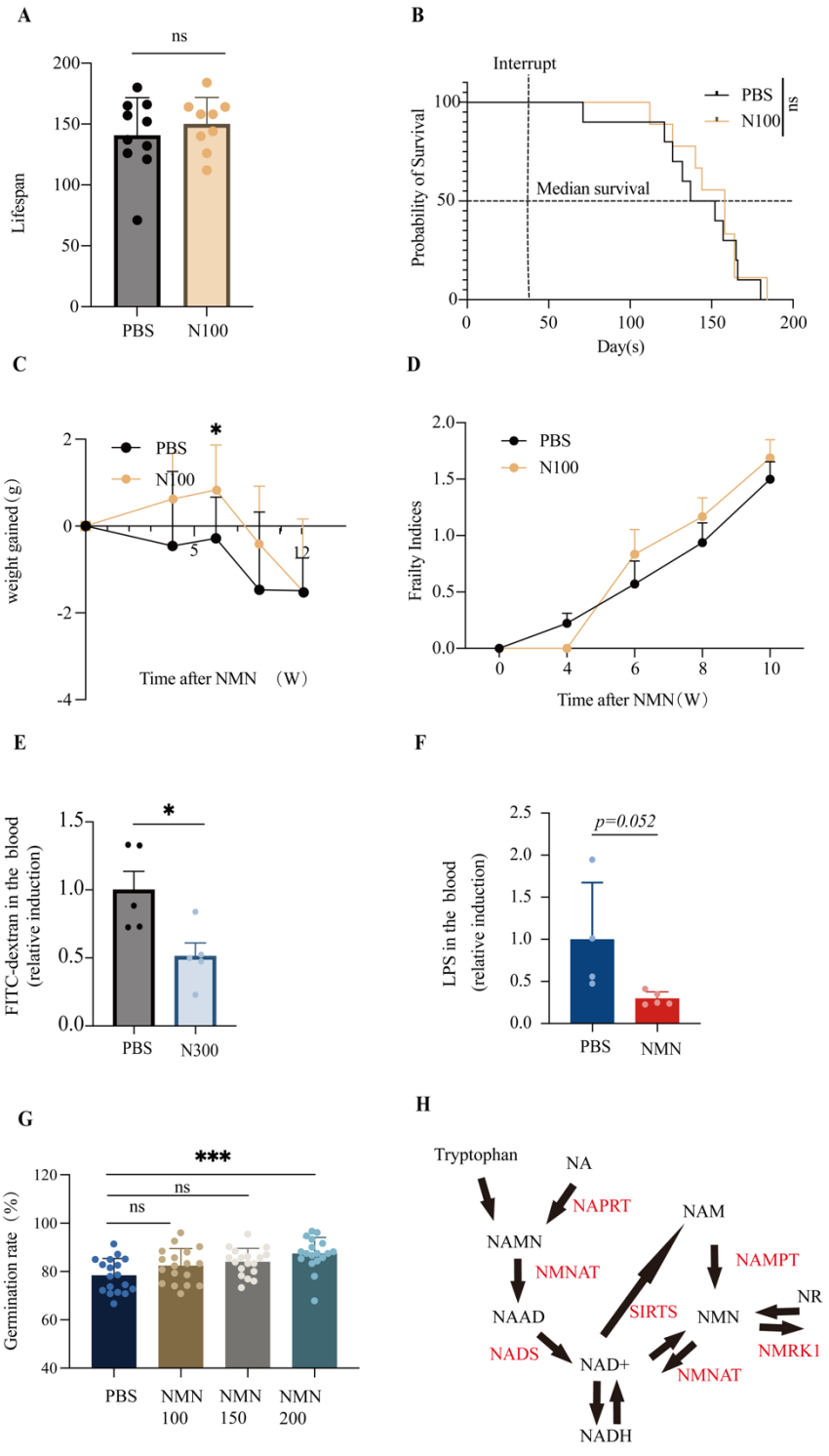


Fig S1:

A: The average life span (days) of *Zmpste24*$^{-/-}$ mice (n =9 OR 10). B: Survival curves for *Zmpste24*$^{-/-}$ mice (n =9 OR 10) with median lifespan (days) inset. C: The weight gained of *Zmpste24*$^{-/-}$ mice (n≥7). D: Frailty Indices were performed once every two weeks until natural death (n≥7). * $p < 0.05$, ** $p < 0.01$and *** $p < 0.001$ represent significant differences between the PBS group and the N100 group. E: Intestinal permeability was evaluated by the levels of *Zmpste24*$^{-/-}$ mice serum the fluoresce-in isothiocyanate (FITC)-dextran (n=5). F: Intestinal permeability was evaluated by the levels of *C57BL/6* mice serum Lipopolysaccharides (LPS). (n>=4). G: The germination rate of organoids derive from the PBS, NMN100, NMN150 and NMN200 group (n = 3), count 6 views per hole. H: NAD biosynthesis pathway. NA: nicotinic acid; NAMN: nicotinic acid mononucleotide; NAAD: nicotinic acid adenine dinucleotide; NMN: nicotinamide mononucleotide; NR: nicotinamide riboside; NADS: NAD Synthetase; NAPRT: Nicotinic Acid Phospho rybosyl transferase; NMNAT: Nicotinamide Mononucleotide Adenylyltransferase; NMRK1: Nicotinamide Riboside Kinases; NAM: nicotinamide.

* $p < 0.05$, ** $p < 0.01$and *** $p < 0.001$ represent significant differences between the PBS group and the N300 group, between the PBS group and the NMN group between the PBS, the NMN100, NMN150, NMN200 group.

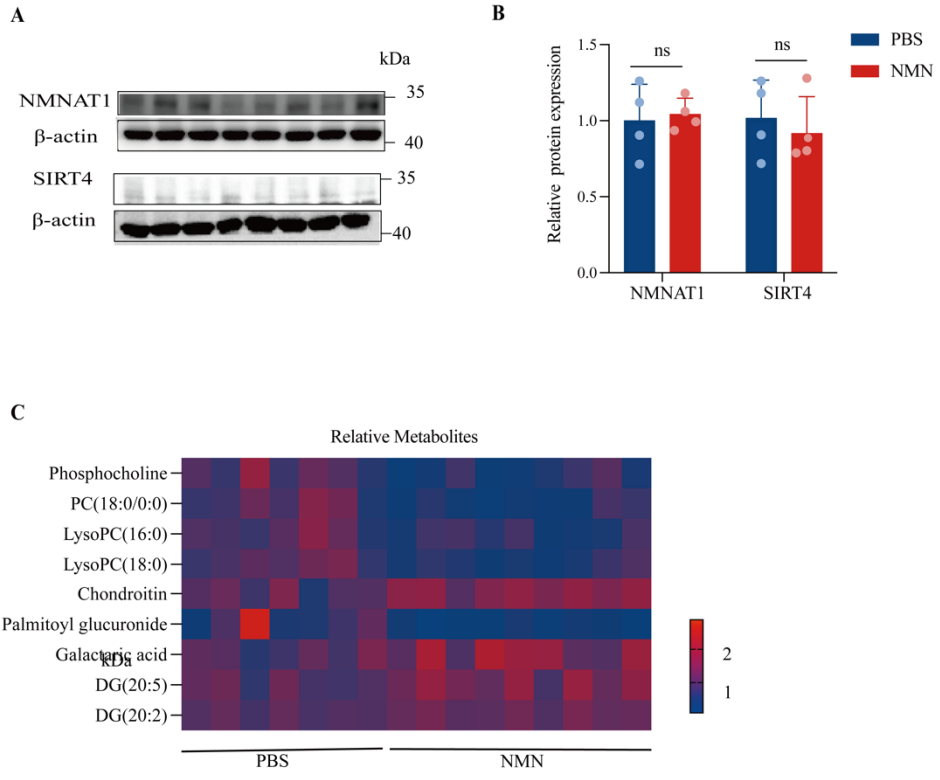


Fig S2:

A: Western blots for NMNAT1 and SIRT1 with β-actin as an internal control (n=4).
B: The protein level of NMNAT1 and SIRT1 quantification analyzed using ImageJ.

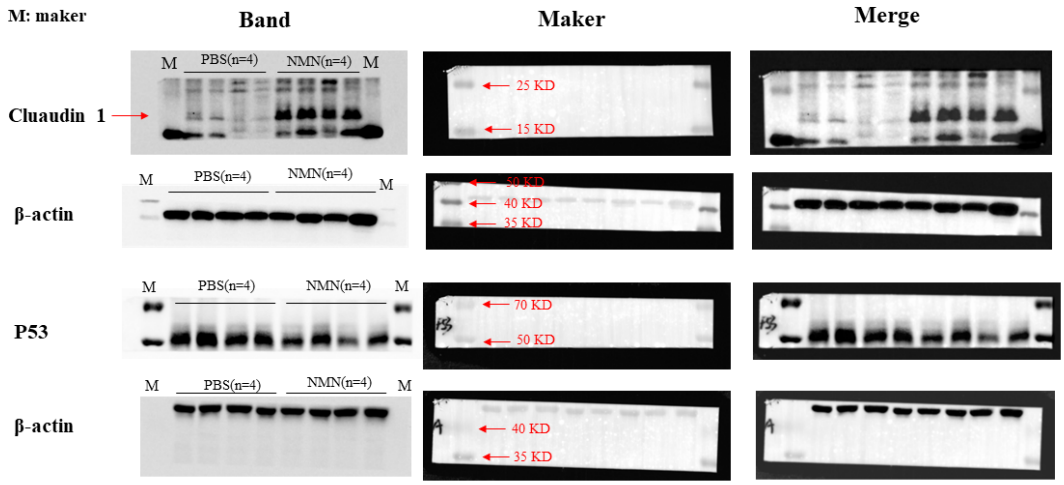
C: Metabolites based on the significant enrichment of the KEGG pathways ($p < 0.05$). $^{*}p <$ 0.05, $^{**}p < 0.01$and $^{***}p < 0.001$ represent significant differences between the PBS group and the NMN group.

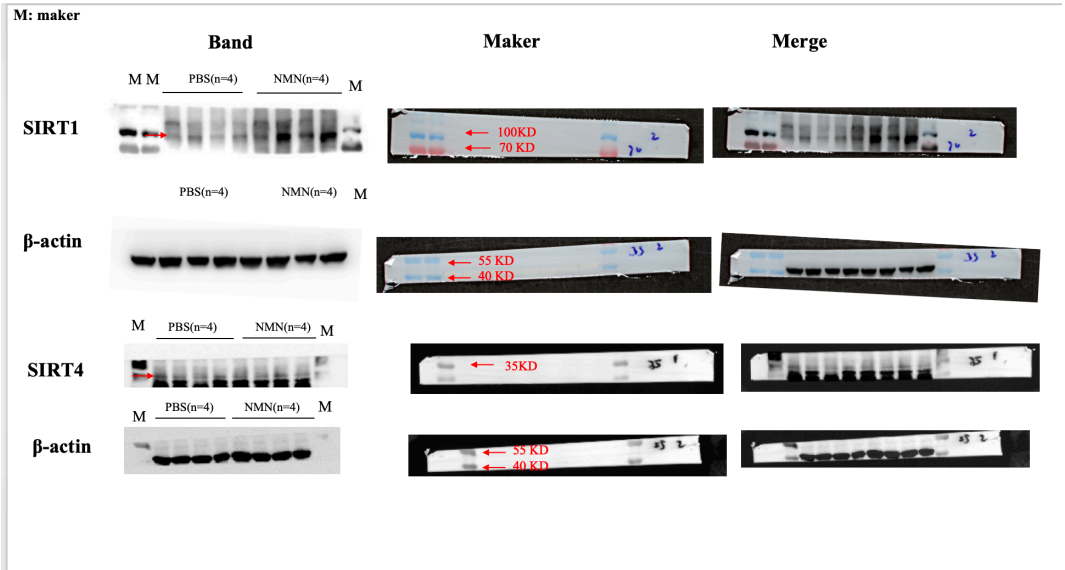
TABLE 1. Sequences of oligonucleotide primers		
Target gene	**Species**	**primer sequence**
Actin forward	mus	GAGACCTTCAACACCCCAGC
Actin reverse	mus	GGAGAGCATAGCCCTCGTAGAT
SIRT1 forward	mus	CTCCACCAGCATTGGGAACT
SIRT1 reverse	mus	GGAAGATGAAGTCAACCAACAGT
SIRT2 forward	mus	CTCTGACCCTCTGGAGACCC
SIRT2 reverse	mus	ACAATCTGCCACAGCGTCAT
SIRT3 forward	mus	TGCCTGCAAGGTTCCTACTC
SIRT3 reverse	mus	AGTCGGGGCACTGATTTCTG
SIRT4 forward	mus	ATTCCCGCTGTGGAGAGTTG
SIRT4 reverse	mus	TTCAGAGTTGGAGCGGCATT
SIRT5 forward	mus	CTTTTTGCAGCCTGCCTGG
SIRT5 reverse	mus	GCAGGAGGCTTTCGTCTACA

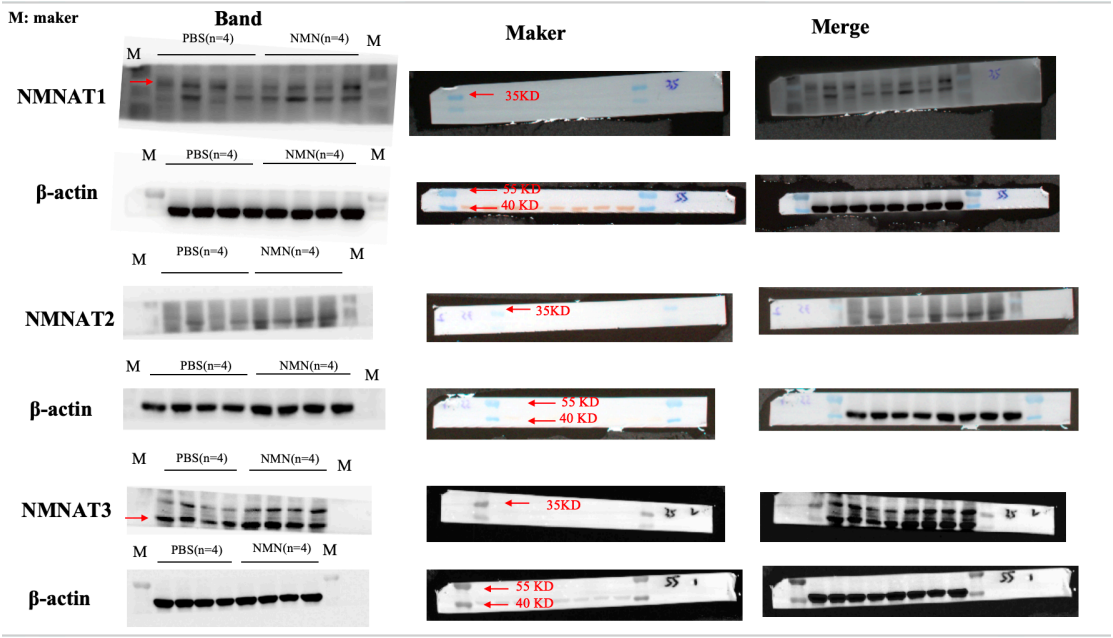
SIRT6 forward	mus	AAGTCTCACTGTGTCCCTTGTC
SIRT6 reverse	mus	TCACGAGCGGGTGTGATTG
SIRT7 forward	mus	GGGTCCTAATGGAGTATGGACA
SIRT7 reverse	mus	CTCATGCAAACGGGTGATGC
IL10 forward	mus	CTTACTGACTGGCATGAGGATCA
IL10 reverse	mus	GCAGCTCTAGGAGCATGTGG
TNFα forward	mus	CCTGTAGCCCACGTCGTAG
TNFα reverse	mus	GGGAGTAGACAAGGTACAACCC
IL6 forward	mus	TGCAAGAGACTTCCATCCAGT
IL6 reverse	mus	GTGAAGTAGGGAAGGCCG
Lgr5 forward	mus	GCGATTTCTTTGAGGCTTTG
Lgr5 reverse	mus	ATCCGAAAGATTGGCATCAC
β-catenin forward	mus	AATCAGCTGGCCTGGTTTGA
β-catenin reverse	mus	CTGTGGCAAAAACATCAACGTG
Axin2 forward	mus	ATGAGTAGCGCCGTGTTAGTG
Axin2 reverse	mus	GGGCATAGGTTTGGTGGACT
Wnt5a forward	mus	CACGCTATACCAACTCCTCTGC
Wnt5a reverse	mus	AATATTCCAATGGGCTTCTTCATGGC
Wnt6 forward	mus	CGGAGACGATGTGGACTT
Wnt6 reverse	mus	GGAACCCGAAAGCCCATG
NMNAT1 forward	mus	GAAATTGCTGTGTGGGGCAG

NMNAT1 reverse	mus	CCACGATTTGCGTGATGTCC
NMNAT2 forward	mus	GATGTTCGAGAGAGCCAGGG
NMNAT2 reverse	mus	AAGGCCCTGTTTTCCGTAGG
NMNAT3 forward	mus	AAGACACCATCAGCCTCTGC
NMNAT3 reverse	mus	CCAAGCCGAACTTCTCCACT

Raw western blot bands in Fig 2G,Supplementary Fig.S2, A







Raw western blot bands in Fig 3 B