

Supplementary Materials

The Combination of Niacinamide, Vitamin C, and PDRN Mitigates Melanogenesis by Modulating Nicotinamide Nucleotide Transhydrogenase

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Table S1. List of primers used for quantitative real-time polymerase chain reaction.

Gene (Host)		Primer
<i>Actb</i> (Mouse)	Forward	5'-CCG TAA AGA CCT CTA TGC CAA C-3'
	Reverse	5'-GCA GTA ATC TCC TTC TGC ATC C-3'
<i>MC1R</i> (Mouse)	Forward	5'-CAA GCA GCG GCA GAA AAA GT-3'
	Reverse	5'-TGG GAC TCA GAT ACG CCTGA-3'
<i>MITF</i> (Mouse)	Forward	5'-GAG AAC TGC AGC CAG GAA CT-3'
	Reverse	5'-GCC GCA TTT AGA AAG CGA GA-3'
<i>TYRP1</i> (Mouse)	Forward	5'-AGG GTG GAC CAA TCA GGA GA-3'
	Reverse	5'-CCG CAT CAG TGA AAG TGT GC-3'
<i>TYRP2</i> (Mouse)	Forward	5'-CCT GAA TGG GAC CAA TGC CT-3'
	Reverse	5'-GAA AAG CCA GCA ACC CCA AG-3'
<i>RAB32</i> (Mouse)	Forward	5'-GAC AGG AAC GGT TTG GCA AC-3'
	Reverse	5'-GGG TAA AGT CAC AGG GCC TC-3'
<i>RAB27A</i> (Mouse)	Forward	5'-GTG GGG CCA GAC GGA AAA TA-3'
	Reverse	5'-GTC CTC GCT GTG CTC TAT CC-3'
<i>Actb</i> (Human)	Forward	5'-CTC GCC TTT GCC GAT CC-3'
	Reverse	5'-TCT CCA TGT CGT CCC AGT TG-3'
<i>MC1R</i> (Human)	Forward	5'-ACT TCT CAC CAG CAG TCG TG-3'
	Reverse	5'-CAT TGG AGC AGA CGG AGT GT-3'
<i>MITF</i> (Human)	Forward	5'-AGA GAA GGT GCA CGT AAG CG-3'
	Reverse	5'-ATC TGC ATA CAG GAC GCT CG-3'
<i>TYRP1</i> (Human)	Forward	5'-GTG CCA CTG TTG AGG CTT TG-3'
	Reverse	5'-ATG GGG ATA CTG AGG GCT GT-3'
<i>TYRP2</i> (Human)	Forward	5'-AAA GCC TGA CTT AAC GGG GG-3'
	Reverse	5'-GGA TTT TGC AGC CCA AGC AA-3'
<i>RAB32</i> (Human)	Forward	5'-TCC AAA TGG CAG CCC TAT CC-3'
	Reverse	5'-CAT CCG GCA AAG CCA TGT TC-3'
<i>RAB27A</i> (Human)	Forward	5'-AGT TGA TGG AGC GAA CTG CT-3'
	Reverse	5'-CCC TAC ACC AGA GTC TCC CA-3'

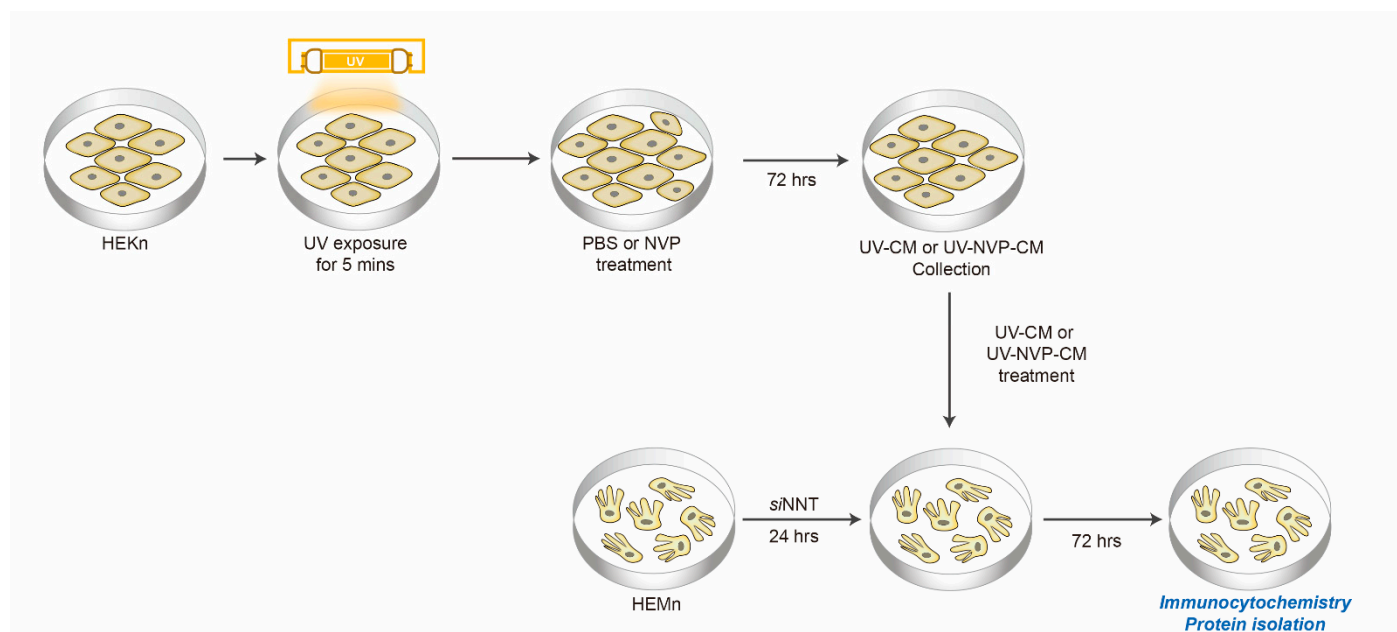


Figure S1. Schematic diagram of the in vitro experiment in this study. Human keratinocytes were exposed to UV irradiation for 5 mins, and then NVP-mix was added. The supernatants from these cell cultures were collected (CMs). Then, melanocytes or NNT-silenced melanocytes were treated with CM. CM, conditioned medium; HEK_n; human primary epidermal keratinocyte; HEM_n; human primary melanocyte; hrs, hours; mins, minutes; NVP, niacinamide + vitamin C + polydeoxyribonucleotide; PBS, phosphate-buffered saline; siNNT, silencing with nicotinamide nucleotide transhydrogenase; UV, ultraviolet.

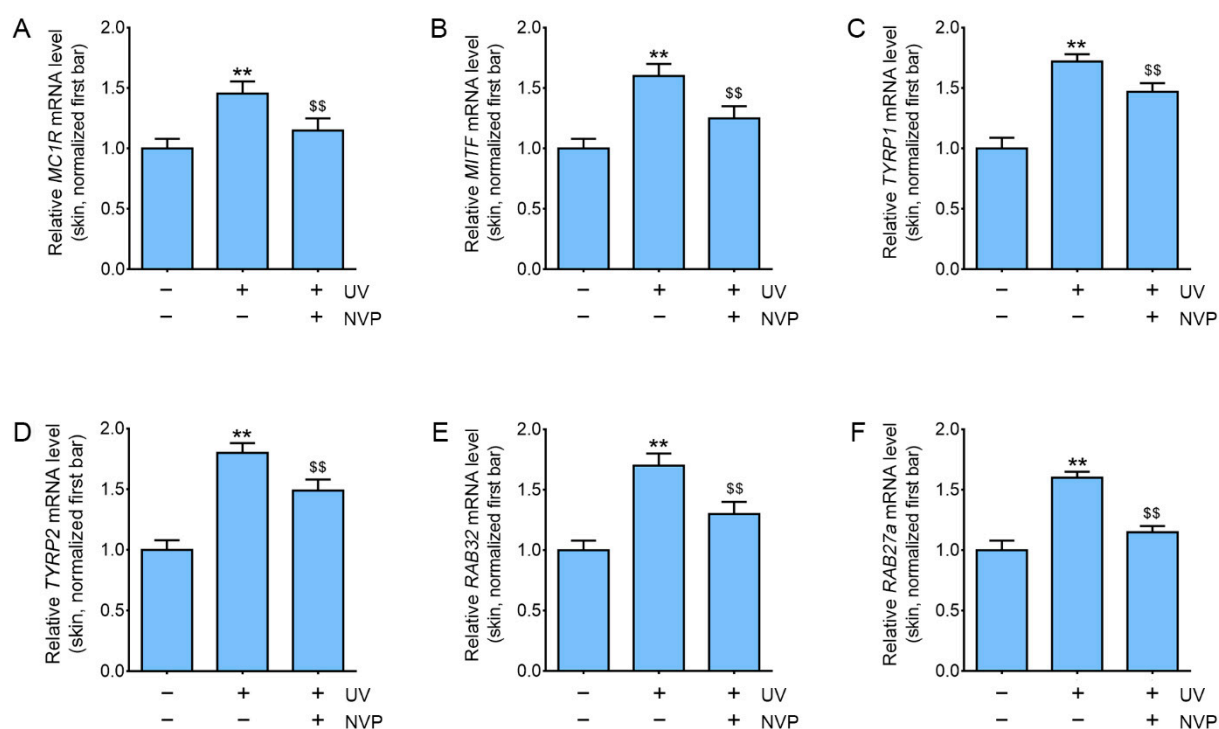


Figure S2. Regulation of the expression of MC1R, MITF, TYRP1, TYRP2, RAB32, and RAB27A after NVP-mix treatment of UV-irradiated animal skin. (A–F) The mRNA expression levels of MC1R (A), MITF (B), TYRP1 (C), TYRP2 (D), RAB32 (E), and RAB27A (F) determined by quantitative real-time polymerase chain reaction in UV-irradiated animal skin. The mRNA levels were normalized to that of Actb and are expressed relative to the corresponding level in the control group. Data are presented as the mean \pm standard deviation; **, $p < 0.01$ second bar vs. first bar; \$, $p < 0.05$, \$\$, $p < 0.01$ vs. second bar (Mann–Whitney U test). MC1R, melanocortin 1 receptor; MITF, microphthalmia-associated transcription factor; RAB27A, Ras-related protein Rab27A; RAB32, Ras-related protein Rab32; TYRP1, tyrosinase-related protein 1; TYRP2, tyrosinase-related protein 2; NVP, niacinamide + vitamin C + polydeoxyribonucleotide; UV, ultraviolet.