

Investigating nanoformulations for the oral delivery of resveratrol to inhibit first-pass metabolism and enhance drug bioavailability

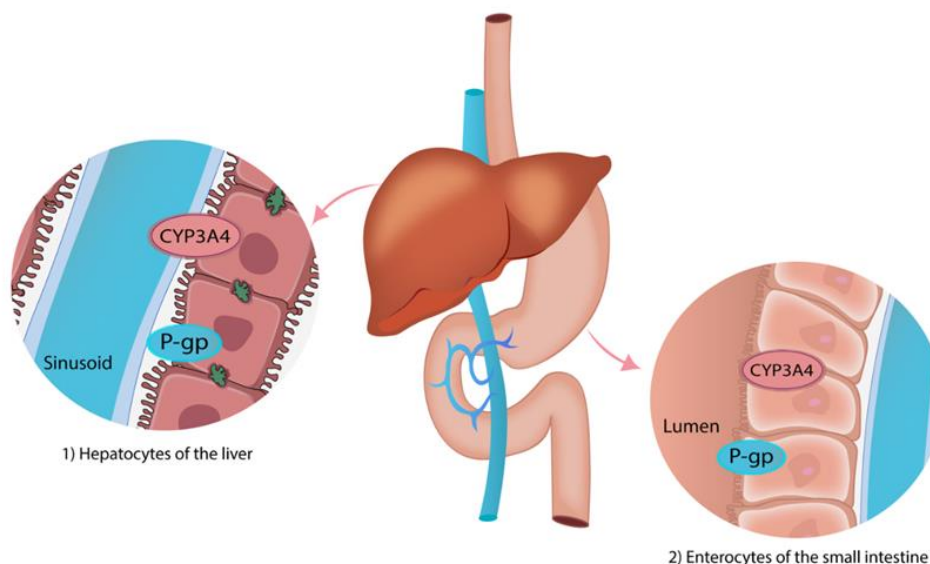


Fig. S1. Schematic diagram showing the role of CYP450 3A4 and P-gp in first pass metabolism and how orally administered drugs enter the bloodstream.

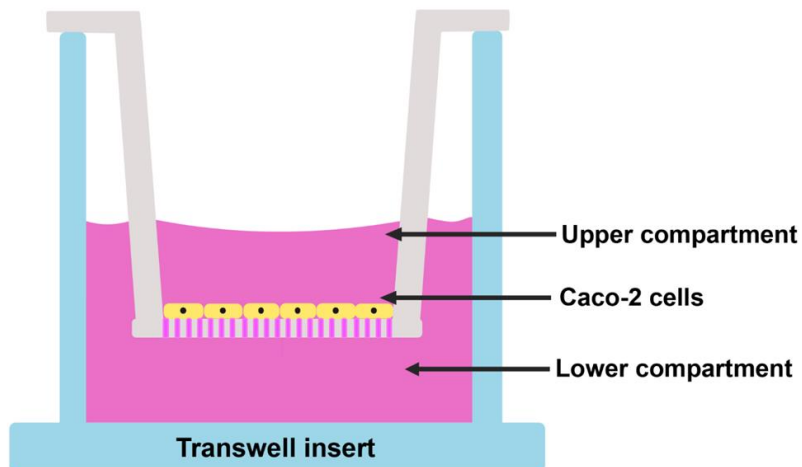


Fig. S2. Schematic of tight junction formation in a monolayer of Caco-2 cells in transwell inserts.

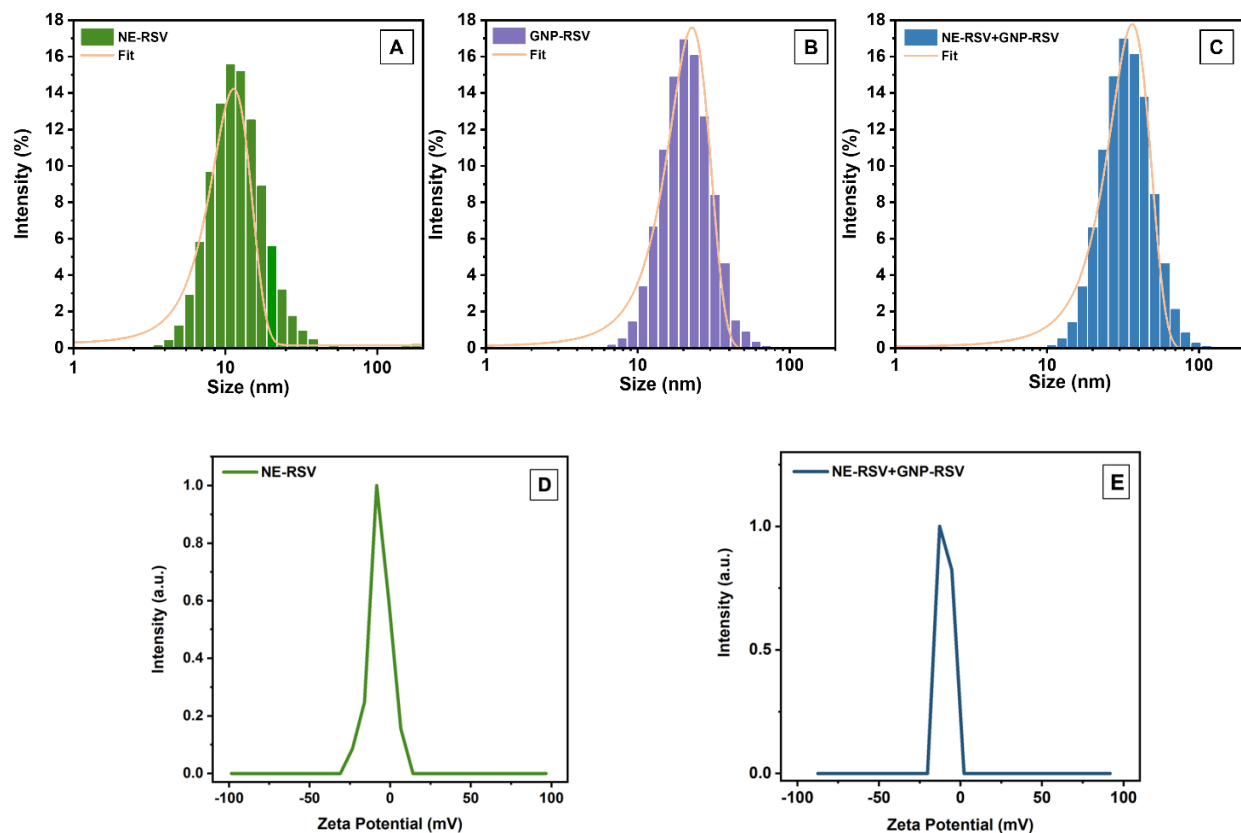


Fig. S3. Size distribution graphs of NE-RSV (A), GNP-RSV (B) and NE-RSV+GNP-RSV (C) as measured by dynamic light scattering (DLS). Images (D) and (E) show the zeta potential of NE-RSV and NE-RSV+GNP-RSV formulations, respectively

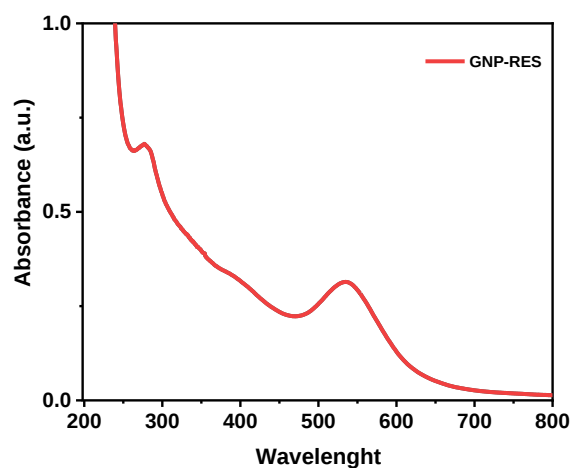


Fig. S4. UV-Vis spectrum after washing with Amicon® tubes, showing peaks at 532 nm (GNPs) and 277 nm (RSV), confirming GNP-RSV formation.

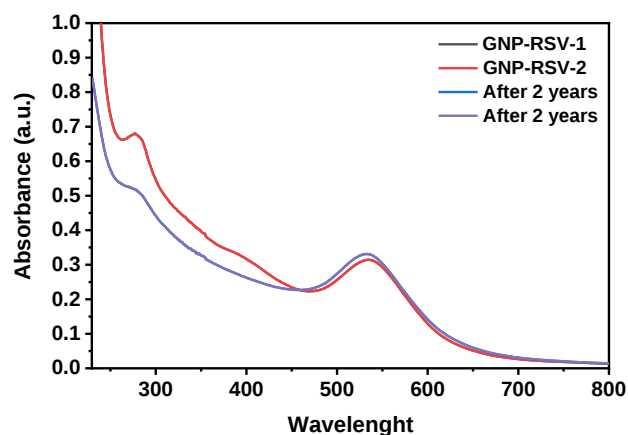


Fig. S5. UV-Vis absorption spectra of resveratrol-loaded gold nanoparticles (GNP-RSV) immediately after synthesis and after two years of storage at 4°C. The characteristic Surface Plasmon Resonance (SPR) peak (530-535) remain stable with minimal shift or peak broadening, indicating excellent long-term colloidal stability and preservation of the nanoformulation without aggregation or degradation of the conjugated resveratrol.

Table S1. Results of DLS measurement of NE-RSV average droplet size after storage at 4, 25, 45 °C.

NE-RSV +GNP-RSV		4 °C		25 °C		45 °C	
Time (Week)		Size (nm)	PDI	Size (nm)	PDI	Size (nm)	PDI
0		8.8 ± 0.3	0.01	9.0 ± 0.3	0.01	9.5 ± 0.7	0.05
2		10.1 ± 1.1	0.11	10.3 ± 2.5	0.60	12.0 ± 2.1	0.36
4		10.5 ± 0.5	0.02	11.1 ± 0.3	0.01	12.3 ± 1.4	0.15
8		Unstable		Unstable		9.8 ± 0.7	0.05

Table S2. Results of DLS measurement of NE-RSV+GNP-RSV average particle size after storage at 4, 25, 45 °C.

NE-RSV +GNP-RSV		4 °C		25 °C		45 °C	
Time (Week)		Size (nm)	PDI	Size (nm)	PDI	Size (nm)	PDI
0		40.0 ± 0.3	0.00	38.1 ± 0.3	0.00	43.0 ± 0.7	0.01
2		42.1 ± 1.1	0.03	39.3 ± 2.5	0.16	45.0 ± 2.1	0.1
4		43.1 ± 0.5	0.00	41.1 ± 0.3	0.00	51.3 ± 1.4	0.04
8		111.7 ± 10.5	0.98	Unstable		Unstable	