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## **Delivering of Resveratrol with Solid Lipid Nanoparticles Improved Mitochondria Activity**

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Skin is main target for UV-oxidative stress and their antioxidant defenses can be quickly overcome. The consequences are reflected at the molecular and cellular level. Here, most important organelle included in survival pathway are mitochondria. Recently significant activation of mitochondria-mediated signaling cascades by resveratrol (RSV) has been discovered [1].

RSV is a naturally occurring polyphenolic phytoalexin, which has many beneficial biological effects but on the other hand possess some limitations. Few of these are: poor water solubility, high metabolic rate and frequent dosage –dependent effect in the cellular environment [2]. One of recent progresses that can satisfy all these obstacles of RSV is design of nanosized drug delivery system [3].

The protective effects of RSV in solution or loaded into SLN (SLN-RSV) on radiated keratinocytes were studied comparing with the effects on non-radiated cells.

Cosequences of damaged effect of UV-radiation was slightly changed cell morphology, as some fragments of actin fibers appeared and mitochondria activity was weakened and they were dispersed over whole cytoplasm. However, only SLN with incorporated RSV at 100  $\mu$ M preserved normal cell morphology and improved mitochondria activity, while the other samples (RSV at 10 or 100  $\mu$ M and also SLN-RSV at 10  $\mu$ M) showed any significant difference regarding radiated control cells. These effects are ascribed to the transfer of RSV by nanoparticles intracellularly – integrating among mitochondria, where RSV can best realize its “anti-stress” potential.

To conclude, the results clearly revealed the hypothesis that loading of RSV into SLN significantly improve bioavailability and diminish UV-related damage of keratinocytes, and thus providing better photoprotection of cells compared to the application of RSV in solution.

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