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Self-emulsifying drug delivery systems for increased availability of Resveratrol and enhanced anti-oxidant activity

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Resveratrol (3,5,4'-trihydroxystilbene) has attracted considerable interest for its beneficial potentials for human health. However, its *in vivo* biological effects appear strongly limited by its low bioavailability. To overcome this problem, current strategies are turned towards the design of nano-sized formulations like nanoparticles, liposomes or self-emulsifying drug delivery systems (SEDDS), potentially allowing for an increase in its efficacy in human health by enhancing its stability, solubility or capacity to cross cellular membrane. In this context, we have developed SEDDS consisting in ternary combinations of oils, surfactants, and co-surfactants, and able to form nanoemulsions upon aqueous dispersion. Tested on bovine aortic endothelial cells, these SEDDS were able to significantly increase the membrane and intracellular concentrations of resveratrol. In addition, resveratrol nanoemulsions significantly improved the cell protection from H₂O₂-induced injury in comparison with a resveratrol ethanol solution. In the same way, in a human immortalized chondrocytic cell line (T/C28a2), resveratrol SEDDS were able to increase cellular tolerance towards resveratrol, to increase resveratrol cellular uptake, and to improve protection against oxidative stress-mediated death. Finally, the capability of SEDDS to enhance resveratrol permeation across rat intestine was tested on Ussing chambers. The absorptive fluxes of resveratrol from the nanoemulsions were significantly increased compared to an ethanol solution. Simultaneously, the presystemic metabolism pattern was modified, suggesting that SEDDS could modulate this important limiting factor to resveratrol systemic absorption. In conclusion, nanoemulsions prepared from SEDDS dispersion could be promising formulations for enhancing cellular uptake and oral delivery of resveratrol.

Biography

Christine Charrueau has completed her PhD from Paris-Sud University in France, and Postdoctoral studies from North Carolina University, Chapel Hill, USA. She is currently an Assistant Professor in the Laboratory of Pharmaceutics, Faculty of Pharmacy, University Paris Descartes, France, and she is a member of the UTCBS Research Unit (Unité de Technologies Chimiques et Biologiques pour la Santé - UMR CNRS 8258 -- Inserm U 1022). She has published more than 30 papers in reputed journals.

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