

Nano-Formulation of Natural Products as Complementary or Alternative Choices for Common Chemical Therapeutics

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ABSTRACT: The growing concerns over the side effects, resistance, and limited efficacy of many conventional chemical therapeutics have led to increased interest in natural products as safer and more sustainable alternatives. However, challenges such as poor solubility, low bioavailability, and rapid metabolism limit the clinical application of many natural compounds. Nano-formulation technologies offer promising solutions by enhancing the pharmacokinetic profiles, stability, and targeted delivery of bioactive natural molecules. This lecture explores the current advancements in nano-formulation strategies, including encapsulating drugs within nanoparticles (NPs), utilizing different carrier materials, and employing stimuli-responsive nanoparticles for controlled drug release, and to optimize the therapeutic potential of natural products. Integrating nanotechnology with phytotherapy provides a viable complementary or alternative approach to conventional drugs, particularly in treating chronic diseases, infections, and cancer. The lecture concludes with a discussion on safety, regulatory considerations, and the future direction for translating these nano-formulations into clinical practice.