

Development and optimization of nanoparticle based formulation(s) of naturally occurring small molecule(s) to glorify therapeutic efficacy

Abstract

Cancer is one of the leading reasons of morbidity worldwide. Incidences of cancer are increasing day by day. Chemotherapy offers a classical strategy to fight with cancer. However, they pose with burdensome non-specific toxic effects. Again, many nature-derived small molecules display promise to kill cancer cells. On the contrary, they somewhat underperform during in vivo studies due to poor biopharmaceutical features. Mangiferin, a naturally-occurring polyphenol shows promising activity against cancer cells. Conversely, its usefulness is apprehended by poor pharmacokinetic attributes. Nanocarrier-based delivery systems may potentially overcome the limiting concerns. Present study formulates mangiferin into polymer-based nanoparticulate systems and evaluates anticancer efficacy in biological systems. PLGA nanoparticles loaded with mangiferin displayed attractive promise against breast cancer through multiple preclinical assays. Surface modification of PLGA nanoparticles via galactose conjugation exhibited promising activity against hepatocellular carcinoma, with only little concerns over toxicity. Therefore, polymeric nanoparticles carrying mangiferin emerge as promising tools against breast cancer and liver cancer.

Keywords: Apoptosis; cancer; mangiferin; nature-derived small molecule; polymeric nanoparticles