

Smart Polymeric Nanoparticles Loaded with Vincristine Sulfate for Applications in Breast Cancer Drug Delivery in MDA-MB 231 and MCF7 Cell Lines

Authors : Reynaldo Esquivel, Pedro Hernandez, Aaron Martinez-Higareda, Sergio Tena-Cano, Enrique Alvarez-Ramos, Armando Lucero-Acuna

Abstract : Stimuli-responsive nanomaterials play an essential role in loading, transporting and well-distribution of anti-cancer compounds in the cellular surroundings. The outstanding properties as the Lower Critical Solution Temperature (LCST), hydrolytic cleavage and protonation/deprotonation cycle, govern the release and delivery mechanisms of payloads. In this contribution, we experimentally determine the load efficiency and release of antineoplastic Vincristine Sulfate into PNIPAM-Interpenetrated-Chitosan (PIntC) nanoparticles. Structural analysis was performed by Fourier Transform Infrared Spectroscopy (FT-IR) and Proton Nuclear Magnetic Resonance (1HNMR). ζ -Potential (ζ) and Hydrodynamic diameter (DH) measurements were monitored by Electrophoretic Mobility (EM) and Dynamic Light scattering (DLS) respectively. Mathematical analysis of the release pharmacokinetics reveals a three-phase model above LCST, while a monophasic of Vincristine release model was observed at 32 °C. Cytotoxic essays reveal a noticeable enhancement of Vincristine effectiveness at low drug concentration on HeLa cervix cancer and MDA-MB-231 breast cancer.

Keywords : nanoparticles, vincristine, drug delivery, PNIPAM

Conference Title : ICBN 2018 : International Conference on Biotechnology and Nanotechnology

Conference Location : New York, United States

Conference Dates : October 08-09, 2018