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DELIVERY OF DOCETAXEL TO BREAST CANCER CELLS EMPLOYING WATER SOLUBLE CARBON NANOTUBOLS: ENHANCED ANTI-NEOPLASTIC ACTIVITY AND IMPROVED PHARMACOKINETIC PROFILE

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In the present research, the aim was to synthesize aspartic acid tagged water soluble hydroxylated CNTs (CNTnols) and to deliver docetaxel to cancer cells with enhanced safety and efficacy. Various characterization studies like FT-IR and NMR spectroscopy were performed after synthesizing docetaxel conjugated aspartic acid derivatized CNTnols. Particle size analysis, zeta potential, PDI and FE-SEM were also used for characterization of the nanoconjugate. Release kinetics, cytotoxicity assay, cellular uptake studies and pharmacokinetics and other methods were used for evaluation of conjugate. From cell viability studies, it was found that there was 4.05 times decrease in IC50 values after conjugation showing the targeted action. Cellular uptake studies are in support with cytotoxic studies proving the enhancement in cellular uptake of docetaxel. Through pharmacokinetic studies it was observed that the half-life and bioavailability was increased by 6 and 4.3 times when compared to pure drug. It was found that the synthesised nanoconjugate was hemocompatible and offered low protein binding. All the findings are promising in nature and the nanoconjugate was considered as a novel carrier for delivery of anti-cancer drugs, especially belonging to bio pharmaceutics classification system (BCS) class IV.

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