Abstract No.95

Polymeric Nano Curcumin, the Novel Nano Structures for Increasing the Aqueous Solubility of Polyphenol Curcumin as an Anti-cancer Agent

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Recently, nano-particles have been used as vehicles for drug delivery in order to improve bioavailability and water solubility of hydrophobic drugs. In this work-, the novel polymeric nano structures composed of PEGylated fatty acid units were used as a vehicle for enhancing water solubility and drug delivery of hydrophobic plant-based anti-tumor extract called curcumin. However, application of this compound as an anti-cancer drug is limited because of its low level of uptake and tissue distribution, low activity, rapid metabolism and products' inactivity. Being biodegradable and non-toxic and possessing neutral charge are advantages of this nano-polymer in comparison with traditional nano-particles. Different weight/weight ratios of polymer/curcumin were tested before settling an appropriate proportion. Briefly, curcumin was dissolved in various amounts of liquid nano polymer and checked for absorbance spectrum by UV spectrophotometry. The appropriate mixture of nano-polymer and curcumin was evaluated for excitation/emission value compared to curcumin dissolved in PBS and 1% methanol as control samples. Our findings showed that nano-polymer significantly augments the water solubility of curcumin. Cellular uptake analysis of polymeric nano curcumin was traced using fluorescence microscopy which is based on native fluorescent property of curcumin in various cancer cell lines including fibrosarcoma (wehi), bladder (5637), glioblastoma (U87MG), hepatoma (HuH-7 and HepG2) and melanoma (SK-mel3). The results revealed that bioavailability of curcumin increased via nano-polymer structures in all of cancer cell lines compared with free curcumin. Furthermore, cell proliferation assay gave rise to induction of death in cancer cells following polymeric nano curcumin treatment in a time and dose dependent manner whereas there is no cytotoxicity correlated with nano-polymer. Taken together, the data demonstrated this novel nano-polymer could be used as a safe carrier for drug delivery.

Keywords: Curcumin, Nano Polymer Drug Delivery, Cancer.

Abstract No.96

Cyclic Peptide Alkaloids as Putative Model Inhibitors For Early Stage of Human Serum Albumin Glycation

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Glycation of protein such as human serum albumin (HSA) could be considered as a causative factor for different diabetic complication. In this study, with interest in natural compounds, docking methods was used for identifying HSA glycation(GHSA) inhibitors. The availability of co-crystallographic structure of aspirin (in vitro inhibitor of HSA-glycation) makes a good chance for investigating the inhibitory ability of four plants: Cucurbita, Ziziphus, Urtica and Fumaria (as Iranian's anti-diabetic folk medical plants) compounds by docking methods. At first stage, 161 structures data sets of these plants were retrieved from data bank of chemical dictionary, after running docking calculation by using AutoDock 4.2, results shows thatmucroninneD, daechuineS3 and frangufoline have a best binding energy and geometrical position via residues of Lys 195 and Arg257 for GHSA site. At the second stage, by considering this lysine as a primary site in interaction of glucose with HSA, the MD simulation and docking methods was employed for analyze the competitive affinity of glucose and one of the abovementioned compounds for the free lysine. The results show the higher affinity and stability of frangufoline interaction with free lysine than glucose. According to results, these putative model inhibitors which were defined as cyclic peptide alkaloids could prevent the reaction between glucose and free amino groups of this glycation site by hydrophobic hindrance.

Keywords: Inhibition, Frangufoline, Human Serum Albumin, Glycation, Docking, Ziziphus.