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Curcumin-loaded nanoparticles used for breast cancer treatment

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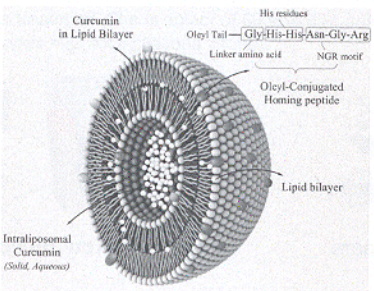
To contrive against the obstacles in physicochemical properties of curcumin, various carriers and delivery systems have been introduced in the past two decades. Among a multitude of potential vehicles, the prospective effects of the liposomes and lipid-structures in improving the pharmacokinetic and dynamic of turmeric compounds have numerously been reported in recent studies. Besides, peptides that modulate cancer cell specific molecular pathways have a great potential as anticancer therapeutics. Among them, peptides that induce cell death via apoptosis have attracted ever-increasing attention. Tumor homing peptides and peptidomimetics containing RGD or NGR motifs have been exploited for targeting of therapeutics or diagnostics to cells with an overexpression of αvβ integrin family of adhesion receptors. On the other hands, studies have demonstrated that KLA peptides with a sequence of (KLAKLAK)2 can induce apoptosis in cancer cells. However, cell internalization is perceived as a major obstacle for development of such pharmaceutically useful peptides. Many efforts have been done to optimize ACP properties through two approaches: computational design and delivery systems. Among the carriers, gold nanoparticles offer a safe delivery platforms for anticancer agent development. Self-assembled structures were prepared from the oleyl-peptide at pH 3, 5.5, and 7. Curcumin was also dispersed in aqueous phase at neutral pH and was further separated from the colloidal particles and precipitates through filtration. According to the results, the more cytotoxicity and cellular uptake by T47D and MCF-7 breast cancer cells were observed for the smaller NPs in size an aspect ratio (AR) in which T47D cells was more sensitive than MCF-7 cells. The MTT results were confirmed by the morphological changes for the cancer cells exposed to NPs. Our finding suggested that the biological and pro-apoptotic effects of the mitochondrial targeting peptide were tuned by P-AuNPs upon their size and shape.



Biography

Ismaeil Haririan received the PharmD in Pharmacy by working on SAR (Structure-Activity Relationship) of drug molecules from State University of Tabriz (Iran) in 1986. He got his PhD in Pharmaceutics and Physical Pharmacy (1989-1994) from London School of Pharmacy (UK). Apart from some significant works on novel drug delivery systems and physic-mechanical studies on some pharmaceutical polymeric films, he turned his attention to biomaterials and nanotechnology. He co-operated with some other Tehran University Academic Staff to establish Biomaterials Research Center (BRC) in 2007. This allowed him to enter the new field of investigation of cancer gene therapy and drug targeting by applying pharmaceutical biodegradable polymer/non-polymer vectors. He is the Founder of Pharmaceutical Biomaterials as a new PhD field and Director of the Center for Research in Medical Biomaterials Research Center (MBRC) as well as the Director of Department of Pharmaceutical Biomaterials at TUMS.

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