Design and synthesis of non-toxic nanocontainers loaded with selective inhibitors contributing to the pathogenesis of cancer.

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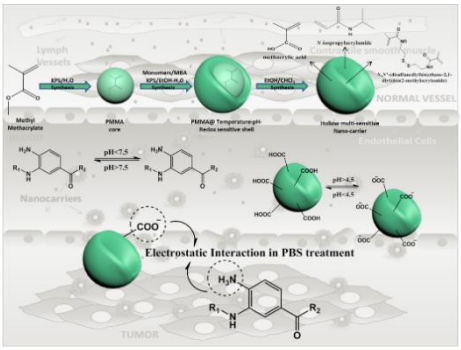
Within the most recent decade, progress in the design of controlled drug delivery systems has resulted in tremendous development in the treatment of numerous diseases. In this study was used soap-free radical emulsion polymerization to form core-shell composite nano-carrier with an inner cavity, based on a variety of monomers with specific sensitivities. The size of this structure allows nano-carriers to overwhelmed various biological barriers and accomplish passive targeting through the enhanced permeability and retention (EPR) effect, which facilitates the delivery of drugs exactly to the intended targets without provoking unfavorable reactions in cancer therapy. The synthetic route contains two steps. In the first step a non-toxic spherical core is synthesized and in the second step the shell is formed by a combination of random polymerized sensitive monomers. Each monomer exhibits a unique sensitivity such as pH, thermo and redox once. Taking advantage of this behavior, we synthesized a multi-sensitive nano-container (mNC) able to respond to external stimulus causing drug release in a controlled manner. Loading and release studies of 3, 4-diaminobenzoic acid derivatives (AP-62, AP-24 and AP-59) and also of furanoditerpenoid taepeenin D derivatives (YM-21-170, YM-21-172 and YM-21-173) were carried out and the cytotoxicity of nanocontainer-drug system was investigated using the MTT assay. Hence, hemolytic activity of the NCs was performed in erythrocytes and whole blood cells evaluating its biocompatibility. Finally labeling methods for this drug delivery system are an indispensable need to provide the radiolabeled analog nanodimensional structures that represent an ideal tool for investigations of pharmacological profiles. In the clinic have already been used nanodimensional drug delivery systems, as carriers for sensitive chemotherapeutics or even for highly toxic substances. The ability to maintain highest therapeutic efficacy remains an important goal for the development of such a drug delivery system.



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