

Synthesis and characterization of linear-dendritic of PEG and citric acid as a nanocarrier for tamoxifen

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Background and Aims: Linear-dendritic copolymers containing PEG were attracted recently the most attention in various fields particularly in pharmaceutical research for delivery of both hydrophobic and hydrophilic drugs. Encapsulation of drugs into nanocarriers make them soluble in water and in some of the organic solvents, whereas they cannot be solved in them solely. The controlled release of drugs from linear-dendritic copolymers/guest molecule complexes under in vitro conditions have also been investigated. In this study the Linear-dendritic copolymers of PEG and citric acid was studied for encapsulation of tamoxifen. **Background and Aims:** The diacyl halide poly(ethyleneglycol) was prepared with thionylchloride and ClOC-PEG-COCl obtained as the light yellow precipitate. To prepare G1, a solution of citric acid in dry DMF was added to a solution of ClOC-PEG-COCl in dry dichlorometan. The product precipitated in diethylether. G2 was prepared in the same manner except G1 was added instead of ClOC-PEG-COCl. Preparation of the G2/Tamoxifen complex was carried out by mixing a solution of G2 with a solution of tamoxifen. The mixture was stirred for 30 minutes and precipitated in diethylether.

Results: Synthesis of PEGCOOH, ClOC-PEG-COCl, G1, and G2 was confirmed by FTIR and HNMR spectrum. Thermal behavior of dendritic copolymers with different generations were also investigated by DSC. Molecular weight of resultant dendrimers was determined by GPC. Particle size analysis was determined to be less than 249 nm. Tamoxifen was analyzed by UV spectroscopy at $\lambda_{max}=273$ nm ($R^2=0.995$). The extent of drug loading efficiency was about 91.2%. The release profile of nanocarrier was studied and it was found that Linear-dendritic copolymers can be considered as a sustained release carrier for tamoxifen.

Conclusions: The Linear-dendritic copolymers of PEG and citric acid was synthesized and characterized. The results showed that obtained nanocarrier can be used for controlled delivery of tamoxifen.

Keywords: Dendrimer; PEG; Citric acid; Tamoxifen