The 27th Iranian Conference on Organic Chemistry
Urmia University
21-23 Aug
2019

Chemotherapy of breast cancer cells using novel pH-responsive chitosan-based nanomicelle

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Keywords:Chitosan, Methotrexate, Nanomicelles, Targeted Drug Delivery, Cancer Chemotherapy

Conventional chemotherapy suffers lack of bioavailability, selectivity and multidrug resistance (MDR). Nano-sized drug delivery systems (DDS) is developing aimed to solve several limitations of conventional drug delivery systems. These systems have been offered for targeting tumor tissue due to their long circulation time and improved drug solubility, retention (EPR) effect, and enhanced permeability. So, the aim of this research was the development and design of novel targeted nanocarriers for cancer chemotherapy.[1-3] For this reason, *N*-phthaloyl-chitosan was first modified with 4-cyano, 4-[(phenylcarbothioyl) sulfanyl] pentatonic acid to prepare the macro initiator. Then, the macro initiator was copolymerized with DMAEMAQ and IA monomer via RAFT polymerization method to create CS-g-P(DMAEMA-co-IA). In the next step, fluorescein dye was entrapped into the core of nanomicelles during the synthesis with the dialysis method. Afterward, methotrexate anticancer drug (MTX) as an anionically charged drug was coupled to the cationic segment of nanomicelles. Additionally, owing to the folate-mediated endocytosis reaction of MTX, these developed nanocarriers can be potent for effective cell-uptake to provide the benefits of active targeting of NPs (Fig1).

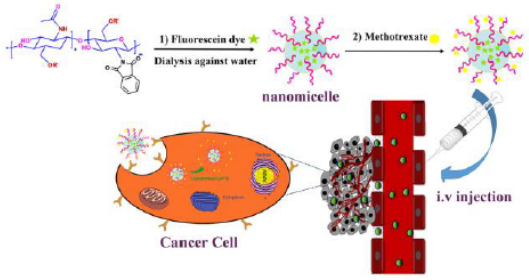

Fig. 1 Cell uptake mechanism for passive delivery of methotrexate (MTX) to the cancerous tissue.

References

1) Abbasian, M.; Mahmoodzadeh, F. *J. Elastom. Plast*, **2017**, *49*, 173.
2) Ghorbani, M.; Hamishehkar, H. *Mater. Sci. Eng. C*, **2017**. *81*, 561.
3) Sofla, S. F. I.; Abbasian, M.; Mirzaei, M. *Int. J. Polym. Mater. Po.*, **2019**, *68*, 297.