Research in Pharmaceutical Sciences, 2012;7(5)
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Conjugating PLGA nanoparticles with HSA for delivery to cancerous tissue

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Background and Aims: Poly-lactide-co-glycolide (PLGA) is an approved polymer that is numerous used in pharmaceutical science. Preparation of PLGA nanoparticles containing docetaxel would be used in cancer nanotechnology. Beside the advantages of nanoparticles one of the problems is that they would be omitted from the blood circulation by MPS, so coating the surfaces of nanoparticles with Human Serum Albumin (HSA) can increase time of circulation that reach the drug to the target issue.
Methods: PLGA nanoparticles were prepared by modified emulsification evaporation method. Organic and aqueous phases for production of nanoparticles were prepared. In the study organic phase were added to aqueous phase with probe sonicator (misonix, USA). Then samples were placed on the stirrer through overnight. The resulting PLGA nanoparticles were exposed to activating agent several hours for producing activated nanoparticles. The activated nanoparticles were exposed HSA for conjugation. Then samples were purified and lyophilized.
Results: PLGA-HSA conjugated was proved with FTIR. Size of PLGA nanopareticles before and after conjugation with HSA was 243, 253 respectively, it means that layer of HSA (mean size ≈7 nm) coated on the PLGA nanoparticles. PLGA nanoparticles have a hydrophobic surface but HSA has a hydrophilic property; by conjugating surface of PLGA nanoparticles with HSA, surface of conjugated has a hydrophilic property and can escape from the MPS system.
Conclusions: Tumoric tissue is one of the most inflammable tissues of the body, so by loading docetaxel in the PLGA-HSA conjugated, hydrophilic layer of HSA causes longtime circulation of PLGA-HSA conjugated in the body and deliver docetaxel in the cancerous issue.

Keywords: Nanoparticle; PLGA; HSA; Cancer