ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové
Department of Pharmaceutical Technology
Supervisor: PharmDr. Ondřej Holas, Ph.D.
Consultant: Dmytro Iefremenko, M.Sc.
Student: Denisa Prošková
Title of Thesis: Polymeric paticles for targeted drug delivery into mononuclear fagocytic system

Polymeric nanoparticles (NPs) can act as drug nanocarriers. They are frequently used to enhance distribution to a target tissues in which they specifically act. The mononuclear phagocytic system (MPS) represents a target to which NPs could be specifically distributed. It has been found that cells of this system are involved in the development of a number of diseases. Optimal parameters of NPs suitable for MPS targeting are size ranging between 100 nm and 300 nm and negative surface charge.

In this work the polymeric nanoparticles with encapsulated cholic acid were prepared by nanoprecipitation method using five selected types of non-ionic surfactants in concentration of 0,1%, 0,5%, 1% and 2%. PLGA was the polymer used for their preparation because of its high biocompatibility and biodegradability. Encapsulation efficiency, size and zeta-potential were selected as critical parameters chosen for prepared nanoparticles. The obtained data were used to characterize the effect of non-ionic surfactants on the properties of the prepared nanoparticles and to verify their suitability for distribution into MPS.

It was found that different concentrations of the surfactants did not have significant effect on the size of prepared nanoparticles, however, zeta-potential and encapsulation efficiency were affected by a surfactant type. Polyvinyl alcohol showed the most pronounced effect on nanoparticles parameters. Nanoparticles were significantly larger with relatively high encapsulation efficiency in comparison to other prepared nanoparticles. This could be explained by its high molecular weight and undefined critical micellar concentration.