2 ABSTRACT

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Title of Thesis: Preparation of oxim reactivators loaded PLGA nanoparticles

In theoretical part the main attention is paid to polymeric nanoparticles (NP) for brain targeting. The drug properties and methods of preparation of the nanoparticles with hydrophilic drugs are presented. The part is devoted to physico-chemical properties that affect the permeability of these substances across biological barriers to the target site. The polymers used for NP preparation for brain targeting are focused. The experimental part deals with the nanoparticle formulation. Nanoparticles were prepared by double emulsion method. The method of preparation was chosen based on the drug solubility. In the W/O/W system oil phase was formed by linear copolymers of poly(lactic-*co*-glycolic) acid (PLGA) and its derivatives branched on polyacrylic acid (A2) or tripentaerythritol (T3). Poloxamer 407 and dimethyldidodecylammonium bromide (DDAB) were chosen for NP stabilization. The effect of the polymers on particle size was studied. The effect the polymers used, and the formulation factors on the size, polydispersity and stability of NP were studied. The concentration of the polymers in the internal phase and their molar weight played a major role. Promising results were obtained by nanoparticles prepared by the double emulsion method from a 1% PLGA 5:5 solution, stabilized with a 1% solution of poloxamer 407. Nanoparticles prepared from a branched polymer A2, stabilized by a 0.01% DDAB solution, also had surprisingly good results.

Key words: brain targeting, HI-6, oxime reactivators, polymeric nanoparticles, PLGA, zeta potential.