**The use of polycrystalline calcium carbonate particles to create an ophthalmic dosage form.**

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The eye is one of the most sensitive organs, the internal parts of which are protected from external influences by various barriers (blood-aqueous barrier, blood-retinal barrier, etc.). Because of this, ocular drug delivery is difficult, and the bioavailability of drugs after ocular administration can be less than 5%, which is often insufficient for treatment [1]. In this regard, the creation of delivery systems for ophthalmic drugs with improved bioavailability and prolonged release of encapsulated substances is a promising area of modern research [2]. One of the promising ocular delivery systems is a polymorph of calcium carbonate – vaterite. Polycrystalline vaterite microparticles have low toxicity, high porosity, and the ability to provide continuous, sustained release of biologically active substances [3].

In this work, micro- and nanoparticles of calcium carbonate with a diameter of 5.7 ± 0.6 μm and 144 ± 28 nm, which were loaded with fluorescein-5-isothiocyanate (FITC-BSA)-labeled bovine serum albumin, were synthesized by bulk crystallization. When microparticles were incubated at pH 6.0 and 7.0, a prolonged release of FITC-BSA was observed over 24 hours, with more intense release occurring at pH 6.0, which is due to the sensitivity of calcium carbonate to low pH values. Using the analysis of intraocular fluid using fluorescence spectroscopy, it was shown that after instilling a suspension of particles of both types into the eyes of rabbits, their penetration into the anterior chamber of the eye does not occur.

By freezing induced loading enalaprilat, a drug that lowers intraocular pressure (IOP), is included in the particles. The weight percentage of loading was 3.9%. It was demonstrated that 2 hours after instillation of enalaprilat solution into the eyes of rabbits, IOP decreased by 0.6 ± 0.2 mm Hg, and enalaprilat in the composition of vaterite particles - by 2.5 ± 0.2 mm Hg.

Thus, as a result of the work, it was shown that despite the fact that the calcium carbonate particles themselves do not penetrate into the eye, the delivery of enalaprilat in their composition makes it possible to achieve a prolonged effect of reducing IOP.

**References.**

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