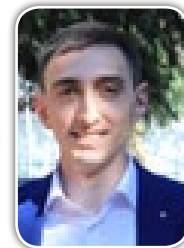


Pseudo-protein based biodegradable nanoparticles show promise as carriers for ocular drug delivery

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Abstract

In case of chronic eye diseases, such as age-related macular degeneration, glaucoma and diabetic retinopathy drug delivery remains a challenge, as these diseases are becoming increasingly prevalent in the aging population. Ocular barriers make it difficult to deliver effective drug concentrations to the posterior segment of an eye when non-invasive routes (topical or systemic administration) are taken. One way to achieve drug delivery that was investigated currently is topical administration of drug-loaded polymeric nanoparticles (NPs) that are able to penetrate ocular barriers. The purpose of this study was optimal preparation of NPs based on pseudo-proteins and evaluation of their ability to penetrate ocular tissues. Biodegradable NPs of various types were prepared by nanoprecipitation method. They were loaded with fluorescent probes (fluorescein diacetate and rhodamine 6G). Suspensions of NPs were given to cultivated cells as well as topically on eyes of C57BL/6 mice. Penetration of NPs into the eyes was checked by fluorescence analysis. After topical administration, penetration of NPs into the cornea of the eyes was clearly shown. Small amounts of NPs were also found in the lens, the retina and the sclera depending on the type of NPs. The results show that the new pseudo-protein-based NPs penetrate ocular tissues after topical administration and are internalized by the cells. This raises confidence that the NPs may be useful carriers of therapeutic agents for ocular delivery.

Biography

Temur Kantaria is currently a Research-Scientist at Agricultural University of Georgia. He got his PhD in Chemistry from Agricultural University of Georgia & Free University of Tbilisi in 2018. He has published 9 scientific papers and 29 conference papers. Temur Kantaria has his expertise in the preparation and characterization of nanoparticles on the basis of amino acid based biodegradable poly(ester urea)s (MS thesis, 2015, Georgian Technical University) and in the preparation, surface modification and characterization of new biodegradable nano- and microparticles on the basis of pseudo-proteins (PhD thesis, 2018).

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