

17th International Conference on

Clinical and Experimental Ophthalmology

October 01-03, 2018 | Moscow, Russia

Morphophysiological study of possible ways of delivery of neuromodulators from the retina to the sclera to confirm the hypothesis of the theory of changes in the retinal defocus

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Background: Today, more and more importance is attached to the research of the ways of extravascular, including interstitial transport of substances, providing the whole complex of metabolic and drainage functions in various anatomical structures of various tissues and organs, including in the eye. On the possible presence of this mechanism, one of the hypotheses in the theory of peripheral retinal defocus is also based, while unconfirmed by clinical studies.

Objective: To detect the transport mechanism, possibly produced by the retina of neurotransmitters, affecting the scleral collagen formation, as well as the physiological ways of their delivery from the vitreous chamber to the sclera. The use of this approach makes it possible to investigate the mechanisms of metabolic processes that can explain the general patterns of transport of metabolites, including the remodulation of scleral collagen in norm and in myopia.

Methods: A method of investigation was used to evaluate the functional activity of interstitial transport paths by introducing color markers and processing the photographs of the obtained frozen slices using the multifractal parameterization method using a special program. The ways of distribution and elimination of color markers of different specific gravity introduced into the vitreous chamber of the rabbit eye with the blood flow and absent in the eye and in models of retinal and choroidal blood flow disturbances were investigated and also the method of investigation from the introduction of magneto-contrast substances into the vitreous chamber of the rabbit's eye and the visualization of their *in vivo* removal by the means of magnetic resonance imaging.

Results: The data obtained show that for transportation in the eyeball of substances with different molecular weights there are separate ways of their removal from the vitreous chamber. In the peripheral parts of the retina, substances with a lower molecular weight are excreted in the ora serrata region. In the central parts of the retina, substances with a greater molecular mass along the axons of the ganglion cells within the optic nerve migrate. Transport of dyes through the retina and choroid from the vitreous chamber was not detected.

Recent Publications

1. Rodionov O V, Granadchikov V A and Shumkin A M (2008) Influence of disturbance of retinal and choroidal circulation on interstitial transport of chorioretinovitreal interface. Modern technologies of treatment of vitreoretinal pathology. Moscow, 2008.
2. Granadchikov V A, Rodionov O V, Kantukova G A and Bulatov R T (2004) The use of nuclear magnetic resonance tomography in the study of circulation of intraocular liquids in an experiment. Bulletin of the University of Orenburg 234-235.

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