

16th International Conference on

Clinical and Experimental Ophthalmology

September 18-20, 2017 | Zurich, Switzerland



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The study of interaction of terahertz radiation with the cornea in experiment *in vivo*

Studying the possibilities of applying terahertz radiation (THzR) in diagnostics and treatment of the anterior eye segment pathology determines the actuality of the research of THzR influence on cornea in normal and pathological conditions.

Purpose: The analysis of THzR impact on cornea of animal eyes in experiment *in vivo*.

Materials & Methods: 10 eyes of 5 Californian rabbits were studied. During the experiment, we exposed one eye of each rabbit to a Terahertz photometer (Institute of Photonics and Optical Informatics), the second eye as control group. The sensitive innervation of cornea was checked after 5 minutes of THz exposure with 25-68 nW power and 0.015-320 RUs intensity, Ø spots – 1.5-5.0mm. Analgesic effect was checked starting from 1 min after the onset by applying mechanical irritation at the main area of cornea with von Frey hair (algesimeter). To evaluate the THz impact on epithelization rate of corneal erosion, the notch of 2.5mm had been made with a scarify superficially in the center of cornea. Photo registration of the corneal epithelization was performed immediately and after the exposure for 1.5 days. The corneas were stained with fluorescein solution.

Results: The corneal sensitivity pre-and post THzR exposure was sustained and didn't change. The corneal epithelization in the experimental group with low-power (26 nW) more intensive during the first 3-4 hours. The total epithelization time (24 hours) the same in both groups. The accelerated epithelization is related, our opinion, to the therapeutic effect of THzR-26 nW on the anterior epithelium of cornea.

Conclusion: The most representative was the experiment of applying low-power (26.0 nW) THzR. The radiation of 0.1-2.6 THz is well safe for rabbit eyes: it doesn't change cornea innervation, doesn't have analgesic effect and causes acceleration of epithelization of scarified corneas in the first few hours, without changing the total epithelization time.

Biography

Alexander G Zabolotniy is Head of the Scientific Department Interindustry Scientific-Technical complex of Eye microsurgery named after Sv. Fedorov, the Krasnodar branch and Professor of the Department of eye diseases of the Kuban State Medical University. His scientific activity include: Innovative treatment of AMD, glaucoma; organization and quality of ophthalmic medical care; high-tech methods of diagnosis. Field of innovative scientific interests – the study of possibility of applying THzR in diagnostics and treatment of ophthalmopathology in the anterior eye segment.

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