

PFr09-09

Xenotransplantation—the prospect of using a bioflavonoid

Kolomiichuk S., Kogan B.* , Kogan B. M., Kolomiichuk S. G.

The Filatov Institute of Eye Diseases and Tissue Therapy of the National Academy of Medical Sciences of Ukraine, Odesa, Ukraine

Pig corneal keratoplasty solves the problem of donor material shortage. Optimization of donor cornea decellularization methods in order to improve the structural and functional properties of bioengineered samples reduces the likelihood of graft rejection due to antigenic incompatibility. In the graft zone during keratoplasty, homeostasis in tissue cells is disturbed, oxidative stress develops, and the likelihood of an inflammatory process and complications increases.

Purpose: To study the effectiveness of the use of quercetin with antioxidant and anti-inflammatory properties in xenokeratoplasty.

Materials and methods: Cell-free corneal stroma equivalents (CSE) were obtained from enucleated porcine eyes. Layered and intralamellar CSE keratoplasty was performed on one eye (experimental) of rabbits under general anesthesia. Quercetin solution was instilled into the experimental eye 4 times a day for 30 days. The second eye is the control, which was instilled with saline. After xenokeratoplasty, the clinical condition of the anterior eye section of rabbits was assessed. Animals received antimicrobial and anti-inflammatory therapy. 30 days after determining the biochemical parameters in the area of xenokeratoplasty and the integral indicator of clinical signs in the cornea of the rabbit eye, a correlation analysis was performed.

Results: Correlation analysis according to Spearman indicates the presence of a significant negative relationship between the degree of inflammatory reaction of the cornea in the area of lamellar and intralamellar keratoplasty of the CSE and the ratio GSH/ GSSG ($R = 0.76$ and $R = 0.72$, respectively, at $p < 0.01$), activity of glutathione peroxidase ($R = 0.74$ and $R = 0.70$ at $p < 0.01$) and glucose-6-phosphate dehydrogenase ($R = 0.68$ and $R = 0.63$ at $p < 0.05$), and also a positive relationship with the activity of non-sedimented acid phosphatase ($R = 0.57$ and $R = 0.51$ at $p <$

0.05). The use of quercetin instillations in the presence of a correlation relationship caused an improvement in the clinical signs of the state of the cornea and the normalization of biochemical parameters in the cornea during keratoplasty.

Conclusions: Correlation analysis data according to Spearman indicate a decrease in the risk of developing inflammatory complications with the use of quercetin, which is associated with the normalization of the thiol disulfide status and the stabilization of the membrane structures of epithelial lysosomes in the cornea during keratoplasty.