

## **Devitalized xenogenic vascular grafts: 2 years after transplantation**

Byzov D.V., Chizh N.A., Mikhaylova I.P., Pushkova Ye.N., Sandomirsky B.P.

*Institute for Problems of Cryobiology & Cryomedicine of the National Academy of Sciences of Ukraine, Kharkov, 23 Pereyaslavskaya Str.*

*e-mail: altei@ukr.net*

There is progressive need in small diameter ( $\leq 6\text{mm}$ ) vascular prostheses caused by increased number of peripheral arteries` pathology worldwide. Commonly used autological vessels are considerably limited and have some serious short-comings. The perspective approach is using biological prostheses based on xenogenic arteries. However the technologies of their treatment to reduce immunogenicity and prevent early occlusion have been uneffective till now.

**The research aim.** We used two physical factors: low temperatures and electron beam irradiation to create non-immunogenic biological vascular prostheses.

**Materials and methods.** The research objects were porcine intrathoracic arteries. Isolated vessels were deeply frozen and after thawing they were subjected to ionizing irradiation in the experimental doses. We estimated morphological structure and biomechanical properties of treated vessels. Immunogenicity and biocompatibility of devitalized arteries were studied in vivo at subcutaneous xenoimplantation. Experimental xenoprosthetic repair have been also done to rabbits with using devitalized arteries as vascular grafts.

**Results.** Studying devitalization method led to complete deendothelization and significant destruction of smooth muscle cells. However the connective tissue structure of devitalized arteries wall was mainly preserved. Combined influence of freezing and ionizing irradiation increased strength parameters of treated arteries. Xenoimplantation demonstrated the absence of significant rejections. Performed experimental vascular surgeries have shown high-grade patency of treated arteries for 24 months at least, there were no signs of occlusion and inflammatory response.

**Conclusion.** The proposed treatment allows to design integrally functioning biological vascular grafts based on xenogenic arteries. Positive results of experimental transplantation testify that devitalized arteries are promising to be studied in clinic.