N.O.Schevchenko [1]
K.V.Somova [2]
V.V.Volina [1]
V.Yu.Prokopiuk [1]
O.S.Prokopiuk [1]

[1] Institute for Problems of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine, Kharkiv
[2] V.N.Karazin Kharkiv National University

Key words:
placental cryoextract, placental cells, placental fragments, alfafetoprotein, human chorionic gonadotropin.

Received: 13.04.2016
Accepted: 27.05.2016

UDC 615.361.013.85.014.41:57.089.2

DYNAMICS OF ACTIVITY AND DURATION OF FUNCTIONING OF CRYOPRESERVED CRYOEXTRACT, PLACENTAL CELLS AND FRAGMENTS IN THE ORGANISM OF EXPERIMENTAL ANIMALS

ABSTRACT. . Background. Due to the fact that the regenerative medicine has been actively developing, an actual task is to study the features of functioning of biological objects in a patient's body. **Objective.** The aim was to study the dynamics of human chorionic gonadotropin, alphafetoprotein secretion and biodegradation in an organism of experimental animals of cryopreserved cryoextract, suspension of cells and fragments of human placenta. **Methods.** After administering the cryopreserved extract, fragments and suspension of placental cells to experimental animals we determined the content of alpha-fetoprotein and human chorionic gonadotropin at days 1-3, 7, 14, 21, 28 and 60; the site of cryopreserved placental fragment transplantation was histologically examined. **Results.** After application of cryopreserved placental cryoextract, the test compounds were identified in the highest concentration on the first day, the period of complete elimination from the blood of animals was limited by a week. After application of cryopreserved placental cells and fragments a slow increase of the alpha-fetoprotein and human chorionic gonadotropin concentrations were observed. Maximal concentration was detected during the first week, a gradual decrease was observed to the 28th day in case of cells and 60 days – placental fragments. The results of histological study of implanted placental fragment and surrounding tissues showed preserved typical for placental villous structure; they has been determined in a body of experimental animals for a long time (up to 60 days) and. **Conclusion.** The acellular object (placental cryoextract) was demonstrated to cause a pronounced and maximum effect in the first day after administration, their impact on a body was limited by a week. The introduction of placental cellular and tissue structures results in a more gradual release of the studied substances, the duration of their identification is 4-9 times longer. Our findings are crucial in selecting the cryopreserved biological objects of placental origin depending on the disintegration degree when administering them in the certain clinical situation.

✉ **cryo@online.kharkov.ua**

Citation:
Schevchenko NO, Somova KV, Volina VV, Prokopiuk VYu, Prokopiuk OS. [Dynamics of activity and duration of functioning of cryopreserved cryoextract, placental cells and fragments in the organism of experimental animals]. Morphologia. 2016;10(2):93-8. Ukrainian.

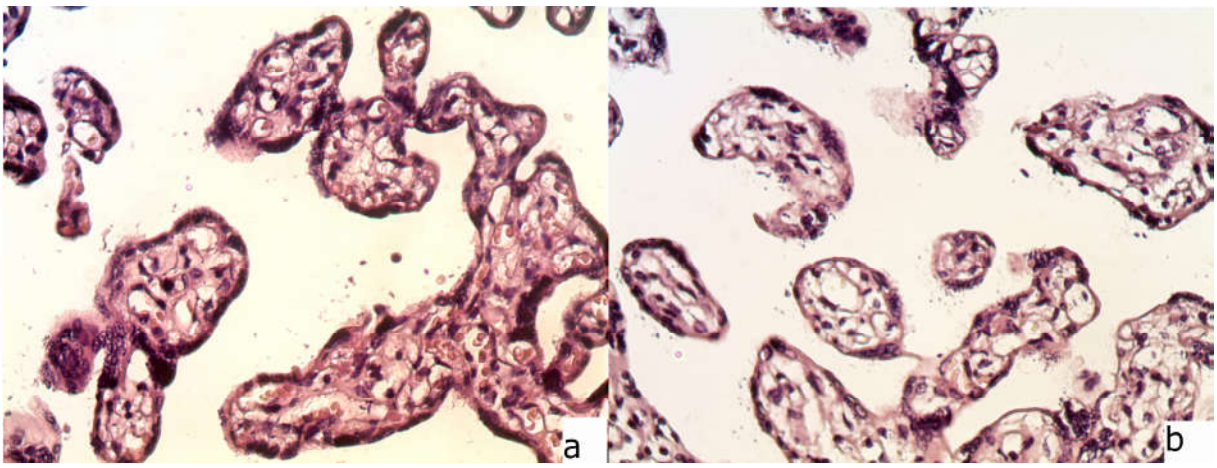

Fig. 2. Fragment of human placenta: a – native tissue; b – cryopreserved tissue. Hematoxylin&Eosin staining, ×400.

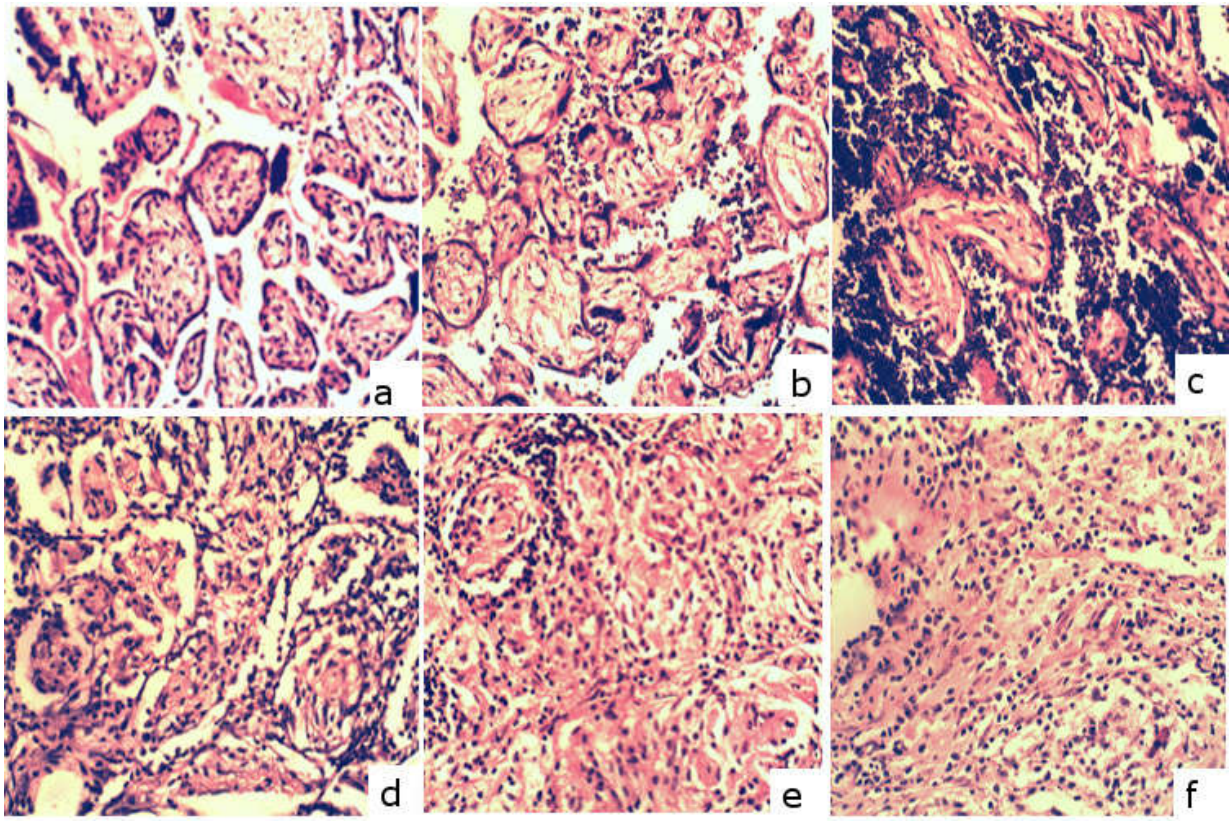

Fig. 3. Histological examination of the implantation site in cryopreserved fragments of placena: a – day 1, b – day 3, c – day 7, d – day 14, e – day 28, f – day 60. Hematoxylin&Eosin staining, ×200.

References

1. Regnault TRH, Galan HL, Parker TA, Anthony RV. Placental development in normal and compromised pregnancies – a review. Placenta. 2002;23 (Suppl A):119–29.

2. Pipino CL, Shangaris P, Resca E, Zia S, Deprest J, Sebire NJ, David AL, Guillot PV, De Coppi P. Placenta as a reservoir of stem cells: an underutilized resource? Br Med Bull. 2013;105:43–68. doi: 10.1093/bmb/lds033.

3. Goltsev AM, Yurchenko TN. Platsenta: kriokonservirovanie, klinicheskoe primenenie [Placenta: cryopreservation, structure, properties, perspectives for clinical application]. Kharkiv. 2013, 318 p. Russian.

4. Prokopyuk VYu, Prokopyuk OS, Musatova IB, Shevchenko NA, Roenko AA, Terehova EA, Volina VV. Safety of placental, umbilical cord and fetal membrane explants after cryopreservation. Cell and organ transplantology. 2015;3(1): 34-8.

5. Grischenko VI, Prokopyuk OS, Volkova NA, Perchik OA. [Effect of Various Low Temperature Storage Regimens on Placenta Cryoextract Hormone Content]. Problems of Cryobiology. 2004;4:8–11. Russian.

6. Thirumala S, Goebel WS, Woods EJ. Clinical grade adult stem cell banking. Organogenesis. 2009;5(3):143−54.

7. Han NR, Park CL, Kim NR, Kim HY, Yoou MS, Nam SY, Moon PD, Jeong HJ, Kim HM. Protective effect of porcine placenta in a menopausal ovariectomized mouse. Reproduction. 2015;150(3):173–81.

8. Hong JW, Lee WJ, Hahn SB, Kim BJ, Lew DH. The effect of human placenta extract in a wound healing model. Ann Plast Surg. 2010;65(1):96–100.

9. Siok May Chua L, O'Connell J, Kang S. An open label prospective pilot study to evaluate the efficacy of cryopreserved amniotic tissue grafts for chronic nonhealing ulcers. Wounds. 2014;26(5):30–8.

10. Pogozhykh D, Prokopyuk V, Pogozhykh O, Mueller T, Prokopyuk O. Influence of Factors of Cryopreservation and Hypothermic Storage on Survival and Functional Parameters of Multipotent Stromal Cells of Placental Origin. PLoS One. 2015;2(10):1–16.

11. Stefanov OV. [Preclinical studies of drugs: Guidelines]. Kyiv: Avitsena. 2001, 528 p. Ukrainian.

12. Merkulov GA. [The course of pathohistological techniques]. Leningrad: Medgiz; 1961. 343 p.