



**National Academy of Sciences of Ukraine
Institute for Problems of Cryobiology and
Cryomedicine of NAS of Ukraine
UNESCO Chair in Cryobiology**

IMET2000

Abstract book

**46th Annual international Conference of
Young Scientists**

**"COLD IN BIOLOGY AND MEDICINE:
CURRENT PROBLEMS IN CRYOBIOLOGY,
TRANSPLANTOLOGY, AND
BIOTECHNOLOGY"**

May 25th, 2022



UDC 57.086.13

The conference is supported by the The Council of Young Scientists jointly with the Administration of the Institute for Problems of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine.

Contacts:

The Institute for Problems of Cryobiology and Cryomedicine of the NAS of Ukraine
23, Pereyaslavskaya str., Kharkiv, Ukraine 61015
<http://coldbiomed.cryo.org.ua>

The Young Scientists Council
e-mail: yscouncil.ipcc@gmail.com
coldbiomed@gmail.com

46th Annual International Conference of Young Scientists "Cold in biology and medicine: current problems in cryobiology, transplantology, and biotechnology", Kharkiv, May, 25 2022 / The Institute for Problems of Cryobiology and Cryomedicine of the NAS of Ukraine – Kharkiv, 2022. – 41 p.

The abstract book contains materials of scientific works on topical studies of the effects of low temperatures on various biological objects, the problems of modern cryobiology and cryomedicine.

Materials are given in the author's edition.

© The Institute for Problems of Cryobiology and Cryomedicine of the NAS of Ukraine, 2022

Characteristic of migration in the culture of newborn and fetal rat neural cells

S.O. Vsevolodska¹, O.M. Sukach^{1,2}, O.V. Ochenashko¹

¹*Institute for Problems of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine*

²*H.S. Skovoroda Kharkiv National Pedagogical University, Kharkiv, Ukraine*

The use of neural stem/progenitor cells (NSPCs) holds great promise for the treatment of central nervous system disorders. At the same time, for effective recovery and regeneration, NSPCs must be capable of targeted migration to diseased or damaged tissues. There is currently limited understanding the ways and mechanisms underlying migration of both transplanted and endogenous NSPCs.

The aim of work was to study the features of migration in the culture of newborn and fetal rat neural cells (NCs).

Cells were isolated from newborn and fetal (E15-16) rat brains. Neural cells were seeded at the concentration of 2×10^6 cells/well in 24-well plates and cultured in a CO₂ incubator in DMEM/F12 in the presence and absence of serum. The formation of NCs aggregates was stimulated by pipetting. The formed aggregates were reseeded.

Most of the cell aggregates (fetal and newborns) of both initial cultures and after reseeding attached to the substrate. After that, their cells proliferated, differentiated and migrated in all directions. Two days after the replacement of the medium with serum-free medium, in the initial NCs cultures of both fetal and newborn rats, the formation of cell chains was observed, which is typical for migrating NSPCs and neuroblasts of the neurogenic zones of the postnatal brain of mammals. The chains consisted of neuroblast-like (with two short processes), or round, undifferentiated cells. There were no guiding structures along which the cells lined up. During cultivation, the length of chains and their number increased. Chains were observed in cultures for 2 months after formation, after which they disintegrated. The shape of the chains was rectilinear, arcuate, sinusoidal. The chains could cross. A parallel arrangement of several chains was observed.

After cryopreservation, the ability of NCs cultures to form chains was preserved. However, unlike the initial cells, the formation of chains by cryopreserved cells occurred 5 days after the medium was replaced with serum-free medium.

The studies performed have shown that heterogeneous suspensions of fetal and newborn rat brain NCs contain a significant amount of cryoresistant stem/progenitor cells capable of proliferating, differentiating, and migrating. The ability of newborn and fetal rat NSPCs to a chain migration indicates their ability during transplantation to colonize damaged areas of brain tissue, crossing the intact tissue. This gives grounds to assume a high therapeutic efficiency of the studied cells.

Organizers:

**The Institute for Problems of Cryobiology and Cryomedicine
of the National Academy of Sciences of Ukraine**

UNESCO Chair in Cryobiology

Contacts:

**The Young Scientists Council of The Institute for Problems
of Cryobiology and Cryomedicine of the NAS of Ukraine**

yscouncil.ipcc@gmail.com

coldbiomed@gmail.com

<http://coldbiomed.cryo.org.ua>

23, Pereyaslavskaya str., Kharkov, Ukraine 61015