

Национальная академия наук Беларуси  
Институт биофизики и клеточной инженерии  
НАН Беларуси

Международная научная конференция

**СОВРЕМЕННЫЕ ПРОБЛЕМЫ  
КЛЕТОЧНОЙ ИНЖЕНЕРИИ,  
ИММУНОЛОГИИ И АЛЛЕРГОЛОГИИ**

20-21 мая 2021 г.

Тезисы докладов

Минск 2021

УДК 576.5+577.2+615.3

**Редакционная коллегия**

канд.мед.наук, доц. Гончаров А.Е., канд.биол.наук Скоробогатова А.С.,  
канд.биол.наук Полешко А.Г., канд.хим.наук Мартынова М.А.,  
канд.биол.наук Пинчук С.В., канд.биол.наук Бушмакина И.М.,  
канд.биол.наук Позняк Т.А.

**Организатор:**

Государственное научное учреждение «Институт биофизики и клеточной инженерии  
Национальной академии наук Беларуси»

**Финансовая поддержка:**

Национальная академия наук Беларуси

Современные проблемы клеточной инженерии, иммунологии и аллергологии :  
Междунар. науч. конф., 20-21 мая 2021 г., Минск, Беларусь : сб. тезисов / редкол. :  
А.Е. Гончаров [и др.]. – Минск, 2021. – 62 с.

В сборник включены материалы Международной научной конференции «Современные проблемы клеточной инженерии, иммунологии и аллергологии».

Издание представляет интерес для специалистов в области клеточной инженерии, иммунологии, аллергологии, вирусологии и клеточной биологии.

## CHEMILUMINESCENCE ANALYSIS OF DRUG RESISTANCE OF THE RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR

**Batyuk L.V.<sup>1</sup>, Muraveinik O.A.<sup>2</sup>, Kizilova N.N.<sup>3</sup>**

<sup>1</sup>*Kharkiv National Medical University, Kharkiv, Ukraine*

<sup>2</sup>*Kharkiv City Clinical Hospital No 7, Kharkiv, Ukraine*

<sup>3</sup>*PoreLab, Department of Chemistry, Norwegian University of Science and Technology, Trondheim, Norway*

*e-mail: lv.batyuk@knu.edu.ua*

Intravenous administration of a recombinant tissue plasminogen activator alteplase (rtPA) alteplase at a dose of 0.9 mg/kg (maximum 90 mg; 10% bolus and subsequent infusion within 60 minutes) in the first 4.5 hours after the onset of ischemic stroke (IS) is currently the "gold standard" of reperfusion therapy, having received the highest level of evidence (class I, level A) as in European (Guidelines for Management of Ischemic Stroke of the European Stroke Organization (ESO), 2008/2009), and North American [1] guidelines for the management of patients with acute IS. M.G. Lansberg et al. [2] identify the following factors associated with the side effects of rtPA administration, namely, extracerebral hemorrhagic complications, myocardial damage (during thrombolysis in the early stages after myocardial infarction), allergic reactions (angioedema, anaphylactic reactions) [3-4].

The aim of this work was to study the biochemiluminescence of blood serum and whole blood in patients who were prescribed rtPA (at a dose of 0.9 mg/kg, the maximum dose was 90 mg) during the first 3 hours after the onset of neurological symptoms (onset of IS). The level of spontaneous chemiluminescence (SCL) of blood serum and whole blood of practically healthy people (control group n = 10) and patients after therapy as well as the intensity of induced (ICL) and luminol-enhanced chemiluminescence (LCL) were recorded. All patients were divided into 2 age groups: 31–40 years old (n = 10); 41 - 50 years old (n = 12). Chemiluminescent analysis of biological substrates was carried out on a domestic stationary chemiluminometer. The conducted studies have established a significant increase in the level of SCL and the intensity of ICL and LCL in the blood serum of patients of all age categories in comparison with the control group. In particular, the amplitude of the rapid burst of blood serum, reflecting the content of the primary products of lipid peroxidation in it, lipid hydroperoxides, was reduced by 1.3 times compared with the control in the 41-50-year-old group. The maximum luminescence amplitude after the addition of a standard dose of lipid peroxidation initiators - H<sub>2</sub>O<sub>2</sub> and FeCl<sub>3</sub> (ICL), which characterizes the intensity of the LPO process, on average for all age categories decreased by 1.20 and 1.14 times, respectively. Analysis of the results obtained shows that in patients with IS on the background of rtPA therapy, there is a decrease in the level of PO products, a decrease in the increase in lipid hydroperoxides in the blood, which indicates a decrease in the severity of neurological deficit.

### Literature

1. Kidwell C.S. et al. Evolving Paradigms in Neuroimaging of the Ischemic Penumbra. *Stroke*. 2004; 35: 2662–5.
2. Marler J.R., Tilley B.C., Lu M. et al. Early stroke treatment associated with better outcome: the NINDS rt-PA stroke study. *Neurol*. 2000; 55: 1649–55.
3. Moazami N., Smedira N.G., McCarthy P.M. et al. Safety and efficacy of intraarterial thrombolysis for perioperative stroke after cardiac operation. *Ann Thorac Surg*. 2001; 72: 1933–7.
4. Batyuk L., Kizilova N., Muraveinik O. Proceedings of the 2017 IEEE 7<sup>th</sup> International Conference on Nanomaterials: Applications & Properties (NAP-2018). 2018; 1–8.