Insights in Analytical Electrochemistry

Abstract

Innovative method of nanotechnology to increase the storage time of RBCs due by stabilizing the molecular structure of proteins and lipids of erythrocyte membranes

Andrey Nikolaevych Belousov

Kharkov Medical Academy of Postgraduate Education, Ukraine.

Abstract:

Objectives: Red blood cells (RBCs) into bags containing anticoagulant citrate, nutrient phosphate and dextrose (CPD); RBCs into bags containing anticoagulant citrate, nutrient phosphate, dextrose and adenine (CPDA-1).

Methods: As membrane protective used saline which had previously been treated with magnetite nanoparticles (ICNB) by the Belousov's method. The physiological solution that was treated with nanoparticles was added to the preserved RBCs according to the developed method. Sample of control was the addition of intact saline. IR Spectrophotometer-29 (LOMO), working in NSC Kharkov Institute of Physics and Technology of the National Academy of Sciences of Ukraine, was used for registration of absorption spectra of an aqueous solution of erythrocytes in the IR range.

Results: The method of infrared spectroscopy made it possible to track the dynamics of changes in all important types of bonds in molecules of erythrocyte membranes at the stages of their storage at positive temperature. The results clearly showed that the presented method of application of nanotechnology significantly increases the storage time of RBCs in different versions of preservatives due to mechanisms to reduce violations of the molecular structure of proteins and lipids in the erythrocyte membranes. In the future, with used nanotechnologies is planned to continue to study the features of metabolic processes of preserved RBCs at storage stages at positive temperature.

Conclusions: Nevertheless, today it is obvious that the presented method of application of nanotechnology is not only safe for use in

practice in the Blood Service, Transfusiology and Hematology, but also is the most promising innovation project.

Biography:

Andrey Nikolaevych Belousov is DM, Professor. Author a new medicine products – nanotechnology preparations based on magnetite nanoparticles (Fe3O4) of the size 6-12 nm: the preoral form - Micromage-B (officially registration in Ukraine); Magnet-controlled sorbent brand of MCS-B (officially registration in Ukraine and was allowed for medical practice); NanoBiocorrector for intravenous application – ICNB (intracorporal nanosorbent). Author a new program (PHUAS) for estimation degree the severity of the patient. The published more 230 scientific works. At now Andrey Belousov - the Head

of Laboratory Applied Nanotechnologies in Ukraine, Professor of Department Anesthesiology, Intensive Care, Transfusiology and Hematology Kharkov Medical Academy of Postgraduate Education.

Publication of speakers:

- Belousov A.N., (2014). Inhibition of Eryptosis by Means of Magnetite Nanoparticles (MCS-B) International Journal of Advance in Medical Science (AMS) Volume 2, p. 19-23.
- Belousov A.N., (2014). Application of Biocompatible Standardized Magnetite Nanoparticles (ICNB) In MRI Investigation of Malignant Tumour. Journal Nanomaterials & Molecular Nanotechnology, Manuscript number: JNMN-14-25, p.17-21.
- Belousov A.N., (2014). The Role of Magnetite Nanoparticles (ICNB) in Discovery New Factor Which Influence on Permeability of Erythrocytes and Eryptosis. Journal Nanoscience and Nanotechnology Research. 2(1), p. 8-11 DOI: 10.12691/nnr-2-1-2
- Belousov A.N., (2009). Spectrum of Application Magnetite Nanopaticles in Medicine. Nanotech 2009. Vol. 2 Chapter 3, pp.154 – 157. - ISBN: 978-1-4398-1783-4.
- Belousov A.N., (2011). The use of magnetite nanoparticles in applied medicine. Nanocon 2011. Brno, Czech Republic, EU, 2011, 9. P.21-23.
- Belousov A.N., (2013). Ultrastructure of hepatic cells in rabbits after injection of nanoparticles MCS-B. Journal Nanotechnology 2013: Bio Sensors, Instruments, Medical, Environment and Energy (Volume 3) Chapter 4: Cancer Nanotechnology & Nano Medical Sciences ISBN: 978-1-4665-6276-9. P. 258 – 260

Webinar on Material Chemistry and research; Oct 27, 2020

Citation: Suppose the title is "Innovative method of nanotechnology to increase the storage time of RBCs due by stabilizing the molecular structure of proteins and lipids of erythrocyte membranes" and speaker name is Andrey Nikolaevych Belousov , Webinar on Material science and Chemistry. So the citation will be