2023
May 01 - 02
Zurich, Switzerland

InterSci

CONFERENCE PROCEEDINGS

XVIII International
scientific and practical conference
Developing an understanding of the
specificities and functions of scientific language

Proceedings of the XVIII International Scientific and Practical Conference

Developing an understanding of the specificities and functions of scientific language

Zurich, Switzerland
May 01 – 02, 2023

UDC 001

Proceedings of the XVIII International Scientific and Practical Conference «Developing an understanding of the specificities and functions of scientific language», May 01 – 02, 2023 Zurich, Switzerland by the «InterSci». 64 p.

ISBN – 9-789-46485-075-8

The collection of proceedings of international scientific and practical conference is an electronic publication for a wide audience of interested scientists. Students, postgraduates, doctors and candidates of sciences, scientific and pedagogical workers, specialists of various profiles and directions and other interested persons of the international scientific community submit their materials for publication. The published theses reflect the authors' vision of the development of modern science and educational trends.

E-mail: *info@intersci.eu*

Homepage: *https://intersci.eu*

TABLE OF CONTENTS

Modern possibilities of using autologous platelet-rich plasma (PRP) for the correction of age-related skin changes

Chornenka Alona
Department of Dermatovenereology and
Cosmetology with a course in Dermatovenereology and Aesthetic Medicine FPE.
Zaporizhia State Medical and Pharmaceutical University. Assistant.

Makurina Galyna
Department of Dermatovenereology and Cosmetology with a course in Dermatovenereology and Aesthetic Medicine FPE. Zaporizhia State Medical and Pharmaceutical University.
Doctor of Medicine, Professor, Head of the Department

Siusiuka Volodymyr
Department of Obstetrics and Gynecology.
Zaporizhia State Medical and Pharmaceutical University.
Doctor of Medicine, Associate Professor.

Shevchenko Anna
Department of Obstetrics and Gynecology.
Zaporizhia State Medical and Pharmaceutical University.
Candidate of Medical Sciences. Assistant.

Human life expectancy is constantly increasing, so the search for methods that improve the quality and social adaptation of patients continues. Aging is a set of body changes that affect general homeostasis. Age-related skin changes are one of the visible aspects of chronological aging combined with the influence of modifying factors (ultraviolet radiation, environmental pollution, stress, smoking, diet, cosmetic products, etc.) [1, 2].

One of invasive aesthetic correction methods of age-related skin changes is the use of platelet-enriched plasma. Autologous platelet-rich plasma (PRP) is a processed liquid fraction of patient's own peripheral blood with a concentration of platelets higher than the initial (before centrifugation) level [3].

Platelets are small (2-5 μm) anucleated metabolically active cell fragments that are formed from megakaryocytes in the bone marrow. The normal level in peripheral blood is 150 - 400*10^9/l and the lifespan of platelets is limited and reaches 5-7 days [4]., This cell inside is divided into zones: peripheral, sol-gel and organelle zone, membrane systems. There are three types of granules - α-granules, dense granules and lysosomes in the zone of platelet's organelles. α-granules (50-80 units per 1 platelet) contain integral membrane proteins, cytokines, blood coagulation factors, growth factors, etc.; dense granules (3-8 pieces per 1 platelet) mix ATP, APD, serotonin, histamine, and lysosomes (up to 3 pieces per 1 platelet) - cathepsins, collagenase, acid phosphatase, etc. [5, 6]. The effectiveness of PRP is due to the presence of growth factors in α-granules of a platelet, which are released upon its activation. For example,

vascular endothelial growth factor (VEGF), transforming growth factor β (TGF-β), platelet-derived growth factor (PDGF), fibroblast growth factor (FGF), epidermal growth factor (EGF), hepatocyte growth factor (HGF), insulin-like growth factors 1 and 2 (IGF-1 and IGF-2), as well as matrix metalloproteinases 2 and 9 (MMP - 2, 9) and cytokines (IL-8) [7].

Many methods of preparation of PRP are used today. They vary depending on the tube manufacturer, sampling systems, activation and clinical indications for the procedure. However, most methods are based on collection of peripheral venous blood in the presence of an anticoagulant followed by immediate centrifugation and separation into 3 layers of whole blood – erythrocytes, the intermediate leukocyte layer, and plasma with platelets [8, 9].

There are several classifications of platelet concentrates. In 2009, Ehrenfest D. and his colleagues divided platelet concentrate preparations into 4 groups depending on the content of leukocytes and fibrin: pure platelet-rich plasma (P-PRP), leukocyte- and platelet-rich plasma (L-PRP), pure platelet-rich fibrin (P -PRF) and fibrin enriched with leukocytes and platelets (L-PRF) [9]. However, the above-mentioned classification turned out to be incomplete, so DEPA was developed to maximize the quality assessment of the PRP drug. It is based on 4 components: the dose of injected platelets, the efficiency of production, the purity of the obtained PRP and the activation process. Activation is possible in the form of exogenous calcium chloride or thrombin (to obtain a gel) [10]. Subsequently, for greater standardization of the method of obtaining PRP-drug, Frautschi R.S. with colleagues presented FIT PAAW selection criteria, where F - the Force of centrifugation; I – the Iteration or sequence of centrifugation; T - the Time of centrifugation; P - Platelet concentration (baseline of patients whole blood and final PRP product); A - Anticoagulant use; A - the utilization of an Activator including the type and amount; W - the composition of white blood cells [11].

It is best to use sodium citrate as an anticoagulant for the preparation of preparation, because there is an increase in a number of platelets without their morphological changes and cell proliferation [12].

Today, plasma therapy is used mostly in aesthetic dermatology to correct age-related changes in the skin (remodeling of the extracellular matrix, collagen synthesis is observed), for alopecia, scars, and acne. Post-procedural reactions such as burning sensation, erythema, swelling, petechiae and ecchymoses are temporary [13, 14]. In addition to the above, there are data on the use of plasma therapy in reproductive medicine [15], orthopedics and traumatology [16, 17], etc.

PRP therapy is a promising, safe method in aesthetic dermatology and other medical areas, however, today there is no single method of standardization of platelet concentrate preparations. We hope that later these aspects will help to expand the indications for use and improve the results.

References

1. Boismal F., Serror K., Dobos G., Zuelgaray E., Bensussan A., Michel L. Skin aging: Pathophysiology and innovative therapies. Med Sci (Paris). 2020; 36(12):1163-1172.

2. Krutmann J., Schikowski T., Morita A., Berneburg M. Environmentally-Induced (Extrinsic) Skin Aging: Exposomal Factors and Underlying Mechanisms. J Invest Dermatol. 2021;141(4S):1096-1103.

3. Everts P., Onishi K., Jayaram P., Lana J.F., Mautner K. Platelet-Rich Plasma: New Performance Understandings and Therapeutic Considerations in 2020. Int J Mol Sci. 2020; 21(20):7794.

4. Holinstat M. Normal platelet function. Cancer Metastasis Rev. 2017; 36(2):195-198.

5. Gremmel T., Frelinger A.L. 3rd, Michelson A.D. Platelet Physiology. Semin Thromb Hemost. 2016; 42(3):191-204.

6. Yun S.H., Sim E.H., Goh R.Y., Park J.I., Han J.Y. Platelet Activation: The Mechanisms and Potential Biomarkers. Biomed Res Int. 2016; 2016:9060143.

7. Xu J., Gou L., Zhang P., Li H., Qiu S. Platelet-rich plasma and regenerative dentistry. Aust Dent J. 2020; 65(2):131-142. DOI: 10.1111/adj.12754.

8. Akbarzadeh S., McKenzie M.B., Rahman M.M., Cleland H. Allogeneic Platelet-Rich Plasma: Is It Safe and Effective for Wound Repair? Eur Surg Res. 2021; 62(1):1-9.

9. Bos-Mikich A., de Oliveira R., Frantz N. Platelet-rich plasma therapy and reproductive medicine. J Assist Reprod Genet. 2018; 35(5):753-756.

10. Magalon J., Chateau A.L., Bertrand B., Louis M.L., Silvestre A., Giraudo L., Veran J., Sabatier F. DEPA classification: a proposal for standardising PRP use and a retrospective application of available devices. BMJ Open Sport Exerc Med. 2016; 2(1): e000060.

11. Frautschi R.S., Hashem A.M., Halasa B., Cakmakoglu C., Zins J.E. Current Evidence for Clinical Efficacy of Platelet Rich Plasma in Aesthetic Surgery: A Systematic Review. Aesthet Surg J. 2017; 37(3):353-362.

12. do Amaral R.J., da Silva N.P., Haddad N.F., Lopes L.S., Ferreira F.D., Filho R.B., Cappelletti P.A., de Mello W., Cordeiro-Spinetti E., Balduino A. Platelet-Rich Plasma Obtained with Different Anticoagulants and Their Effect on Platelet Numbers and Mesenchymal Stromal Cells Behavior In Vitro. Stem Cells Int. 2016; 2016:7414036.

13. Lin M.Y., Lin C.S., Hu S., Chung W.H. Progress in the Use of Platelet-rich Plasma in Aesthetic and Medical Dermatology. J Clin Aesthet Dermatol. 2020; 13(8):28-35.

14. Emer J. Platelet-Rich Plasma (PRP): Current Applications in Dermatology. Skin Therapy Lett. 2019; 24(5):1-6.

15. Cakiroglu Y., Saltik A., Yuceturk A., Karaosmanoglu O., Kopuk S.Y., Scott R.T., Tiras B., Seli E. Effects of intraovarian injection of autologous platelet rich plasma on ovarian reserve and IVF outcome parameters in women with primary ovarian insufficiency. Aging (Albany NY). 2020; 12(11):10211-10222.

16. Özyalvaç O.N., Tüzüner T., Gürpinar T., Obut A., Acar B., Akman Y.E. Radiological and functional outcomes of ultrasound-guided PRP injections in intrasubstance meniscal degenerations. J Orthop Surg (Hong Kong). 2019; 27(2):2309499019852779.

17. Liang Y., Li J., Wang Y., He J., Chen L., Chu J., Wu H. Platelet Rich Plasma in the Repair of Articular Cartilage Injury: A Narrative Review. Cartilage. 2022; 13(3).