

DOI: <https://doi.org/10.56936/18290825-2023.17.f-58>**PLASMA BIOMEDICINE: MODERN STATE-OF-ART AND PERSPECTIVES IN REGENERATIVE MEDICINE****MARTUSEVICH A.K.^{1,2*}, FEDOTOVA A.S.¹, SUROVEGINA A.V.^{1,2}, NAZAROV V.V.¹**¹Laboratory of Medical Biophysics Privolzhsky Research Medical University, Nizhny Novgorod, Russia²Nizhny Novgorod State Agrotechnological University, Nizhny Novgorod, Russia*Received 31.07.2023; Accepted for printing 08.10.2023***ABSTRACT**

The purpose of the review was a comprehensive analysis of the biological effects and applications of cold plasma.

First of all, physical principles of cold atmospheric plasma, including generation of reactive oxygen and nitrogen species as intermediates, were discussed. The analysis of the specialized literature on plasma medicine as an innovative interdisciplinary direction allowed us to show the physical mechanisms of biological effects of cold plasma associated with the modulation of free radical processes in the biological objects. That is why correction of oxidative stress and other disorders of redox balance was determined as direct target of the effect of studied factor.

Among the most significant aspects of the biological action of cold plasma, antibacterial and pro-regenerative activity, as well as modulation of apoptosis, should be cited. On this basis, the factor in question determines its application in oncology, surgery, dermatology and other fields of medicine.

One of the most important effects of cold plasma was its antibacterial and antifungal activity, which is useful for wound healing, sterilization etc. Special attention was paid to possibilities of cold plasma therapy in combustiology. Molecular, tissue and systemic mechanisms of sanogenic effects of cold plasma was demonstrated and analyzed.

Results of own studied in this field was observed. Further discovery of the biological effects of cold plasma can significantly expand the range of its medical applications.

KEYWORDS: *cold plasma, biological effects, reactive oxygen species, oxidative stress.***INTRODUCTION**

Plasma medicine is the direction of using low-temperature atmospheric pressure plasma to generate controlled amounts of specific chemically active substances that are transported to interact with biological targets, including cells and tissues [Laroussi M, 2020]. Plasma medicine is an interdisciplinary research field combining plasma physics, biochemical and biological sciences and clinical medicine [von Woedtke T et al., 2019]. This

area was formed in the mid-1990s on the basis of a number of experiments that showed that low-temperature plasma has effective bactericidal properties [Laroussi M, 1996; Herrmann H et al., 1999; Laroussi M et al., 2000]. The antibacterial activity of cold plasma has been the subject of research for several years and has been shown in experiments both in vitro and in vivo [Kelly-Wintenberg K et al., 1998; Laroussi M et al., 2000].

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