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The effect of cold atmospheric plasma in dermatology and rejuvenation

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Plasma electro-surgical devices have long been used for coagulation, cutting tissue, drying, and burning. Notwithstanding all the advantages, these technologies cause tissue warming, and their effects are mostly thermal. Recently, significant progress made in atmospheric pressure plasma science and engineering (CAP), by which the temperature of the CAP is controlled and works at temperatures below 40 ° C. In the past decade, an innovative new field has emerged from the combination of plasma physics, life science, and clinical medicine, which is known as plasma medicine (Heinlin J Isbary G Stolz W Morfill G Landthaler M et. al., 2011; Isbary et al., 2011). Thanks to these modern systems and plasma-medicine, the use of plasma in the human body is made possible. The purpose of this field is to employ the effects of cold plasma by managing the interaction between plasma elements with particular structural elements and features of living cells. Recent advances in comprehending the phenomena of the physical plasma, along with the development of new plasma sources, have opened a new way to cold atmospheric plasma healing, particularly in skin infections. The active components of the plasma such as molecules, atoms, ions, electrons and photons, reactive species, UV, and heat enable, control and catalyzes the reactions and complicated biochemical methods. Thermal and non-thermal (cold) plasma is now extensively used in medicine. It has very high potential in dermatology, for example, in wound healing, disinfection, sterilization, the treatment of various skin infections, or tissue recovery, and ultimately skin rejuvenation. This review is a general overview of the potential of plasma therapy in medicine, including recent research on skin diseases and interactions of plasma and living tissue (Choi et al., 2017). Thanks to both better understanding of plasma phenomena and the development of new plasma sources in the past few years, plasma medicine has become an innovative research field with a high potential for healing. While thermal plasma is used in various medical fields (for example, to burn and sterilize medical devices), current research focuses mainly on the use of non-thermal plasmas. Experiments show that Cold-Air Plasma (CAPs) allows efficient, non-contact and painless disinfection, even in microscopic openings, without damaging healthy tissues. CAP can affect the biochemical processes. In the skin, new horizons open for wound healing, tissue regeneration, treatment for skin infections, and possibly other illnesses. The first clinical trial demonstrates the efficacy and tolerability of plasma in the treatment of chronically infected wounds (Gentile, 2018; Heinlin et al., n.d.). An important task is the introduction of plasma into clinical medicine and simultaneously examining the mechanisms of plasma action at the cellular level.

Biography

Kobra Hajizadeh has completed his PhD at the age of 23 years from IAU-South Tehran Branch University,Tehran, Iran. She is the Director of Plasma Research Center, Kharazmi University, Tehran, Iran. He has published more than 15 papers in reputed journals and has been serving as an editorial board member of repute.

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