Demonstration of the High Efficiency of an Air Plasma Jet Combining Electric Field and RONS in the Treatment of Chronic Wounds

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Abstract-

A Cold Atmospheric Air Plasma Jet (CAAPJ) for the treatment of skin injuries in medicine and veterinary medicine is presented with experimental evidence that point to the electric field inside the plasmas jet could be a determinant therapeutic mechanism. The device is characterized by producing a cold atmospheric air plasma jet compatible with living tissues at a low heat transfer rate with a temperature on the skin surface below 40 . It has a practical design to be used by physicians and veterinaries during daily practice, with a special focus on the treatment of skin injuries and unhealed ulcers. Plasma diagnostics, including currents-voltage signals, UV-VIS spectroscopy, IR images of the skin, and electric field measurements in the air cold plasma jet are presented. The last is made for the first time in this type of plasma, and them can justify the induction of local electric currents on the wound surface to accelerate healing by highlighting the possible synergy with Reactive Oxygen and Nitrogen Species (RONS) as a decontaminant agent for bacteria (including resistant), fungi and viruses without damaging healthy tissue. A remarkable clinical case study example is reported.

Index Terms- Plasma Medicine, Cold Air Atmospheric Plasma Jet, Wound Healing, Ulcers, Tissue Regeneration

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