MICROWAVE PLASMA FOR WOUND TREATMENT

I. Tsonev[1], T. Bogdanov[2], E. Benova[3]

[1]*Faculty of Physics, Sofia University, 5 James Bourchier Blvd., Sofia, 1164, Bulgaria*

[2]*Medical University–Sofia, 15 Academician Ivan Evstratiev Geshov Blvd., Sofia, 1431, Bulgaria*

[3]*DLTIS, Sofia University, 27 Kosta Loulchev Str., Sofia, 1111, Bulgaria*

Over 40% of combat-related deaths are attributable to uncontrolled bleeding, the majority of those from noncompressible profuse hemorrhage [1]. Other patients, for example diabetics, have problems with activating healing processes in wounds, which could escalate to losing a limb, quite common in patients suffering from severe forms of diabetes. Plasma treating has proven to have positive effect on activating healing processes and enhancing wound healing. Low temperature plasma jet discharge contains active agents, microwave radiation and UV radiation which sterilize and activate the healing agents in the wound.

The purpose of this research is to accelerate blood coagulation and tissue regeneration of open wounds. For this purpose, we are investigating the effect of a microwave plasma torch sustained by travelling electromagnetic wave with the usage of different gasses and gas mixtures. Till this moment this type of plasma source has not been investigated regarding bio-medical purposes.

Low temperature plasma torch at atmospheric pressure sustained by solid state microwave generator coupled to a wave launching structure surfatron type is used. This plasma source allows varying of the: geometrical parameters (length, diameter, cross section), main plasma parameters (wave power, gas temperature, concentration of charged particles and reactive species, UV and microwave radiation), gas and gas mixture parameters (flow velocity, gas mixture ratio). The fact that we are able to vary these parameters allows us to sustain low temperature plasma torch (gas temperature up to 30 – 37 ^{o}C) for in vivo treatment of live ICR mice models.

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