

Plasma Biomedicine: A brief review on the relation between bacteria, cells, liposomes, tissues, biological liquids, endoscopic surgery etc., and high voltage driven electrical discharges in gases

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Atmospheric pressure cold plasmas of electrical discharges are out of thermodynamic equilibrium, leading thus to the production of copious reactive species, at a wide range of energy, under low temperature conditions. Such plasmas may be engineered, and they are associated with a variety of tunable parameters. Thus, electrons, positive and negative ions (atomic or molecular), oxygen- and nitrogen-based free radicals, ozone, UV-visible photons, electronically, rotationally and vibrationally excited neutrals (at metastable or not states), electrohydrodynamic forces etc. are formed, providing a quite controllable, active, gaseous, dry medium. On the other hand, temperature-sensitive biological systems (like cells, bacteria, tissues etc.) are involved in targeted applications, including biomaterials and medicine, and their treatment demands novel methods for tailored modifications, both in vitro and in vivo. The highly promising results obtained over the last two decades on the interface of cold plasma and biological-medical areas, led to the new interdisciplinary domain of "Plasma Biomedicine". A brief review of this emerging field is herein attempted.