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**Interaction of cold plasmas with biological cells: What we have learned so far**

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In the last two decades, non-equilibrium, low temperature, atmospheric pressure plasmas have gained acceptance as an attractive technological solution in industrial applications such as the surface modification of polymers and the cleaning of flue gases. As more reliable “cold” plasma sources are developed, new and interesting applications continue to emerge. Amongst the more recent applications, the use of atmospheric pressure cold plasmas in the biomedical field is presently experiencing a heightened interest from the plasma science research community. This is due to promising possibilities to use these plasmas in medical research such as wound healing, tissue engineering, surface modification of biocompatible materials, and the sterilization of reusable heat-sensitive medical instruments. However, before any of these exciting possibilities become reality, an in-depth understanding of the effects of plasma on the cellular and sub-cellular levels has to be achieved. In this paper, a review of the knowledge that has been gained during the last few years will be presented. First an overview of research efforts on the inactivation of bacterial cells will be presented. This includes the evaluation of the inactivation kinetics and the roles played by the various plasma agents (such as UV photons and free radicals) in the inactivation process. In the second part of this talk, plasma sub-lethal effects on both prokaryotic and eukaryotic cells will be discussed. Finally, the prospects of the use of “cold” plasmas in the biomedical field are outlined.