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Cold atmospheric plasma- a new biomedical tool

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Cold atmospheric plasma (CAP) is a novel biomedical tool for various applications ranging from hygiene, cosmetics, to medicine. It has promising role in skin disinfection, blood coagulation, wound healing and in cancer treatment. CAP has bactericidal and fungicidal effects due to reactive species, ultra-violet radiation, electrons, ions etc. It can be used for hospital and personal hygiene. Plasma, designed for medical purpose is case-sensitive, thus the dose and the plasma properties to eradicate bacteria from cell surfaces are different from the properties used to stop proliferation of skin cancer. The devices to generate plasma for medical purposes are so designed that these will be fully compatible with the international safety regulations (specially in case of reactive species, UV emission and electrical charge). However, the highest efficacy of the plasma treatment is reached by considering the combination of different plasma components (charged particles, reactive oxygen and nitrogen species, heat, electric field and photons), the way of application (direct or indirect), distances from the target cells, the different reactions phenomena in and around the target cells (cell membrane and intracellular biochemistry) along with the defense mechanisms in and around the target cells. Our group has developed a number of different CAP devices using microwave technology (eg: MicroPlaSterβ, NanoPlaSter), ventury flow and surface micro discharge (SMD) technology (eg: HandPlaSter, FlatPlaSter, CylindricalPlaSter, PersonalPlaSter), and many devices are in pipeline. The strength, weakness, opportunity, and threat (SWOT) analysis shows that the CAP as biomedicine is less costly, simple, easy to handle and case sensitive, though more studies on the mechanism of interaction of plasma and cells are required. However, CAP shows us a newfangled hope for the development of molecular medicine with immense market potentiality.

Biography

Mitra received her Ph.D from Kalyani University, India. She worked on new antibiotic sources from actinobactria. In August 2011, she joined Max-Planck Institute as postdoc fellow. Her current research interest is “the application of cold atmospheric plasma as biomedicine”.

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