FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 13.12.2012, 16^{15} Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

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Cold Atmospheric Plasmas in Medical Therapy

Cold atmospheric plasmas (CAPs) - partly ionized gases, which consist of neutral gas, charged particles, excited atoms and molecules and reactive species - are of considerable interest in medicine and health care due to (i) their ability to inactivate bacteria, fungi and viruses without harming eukaryotic cells and tissue. (ii) their variability: CAPs and their produced chemistry can be specifically designed for different therapeutic applications. These properties open up a broad application spectrum in medical therapy and hygiene. The first part of this presentation will therefore focus on results obtained from the first worldwide clinical phase II studies on chronic infected wounds, on wound healing of acute wounds and on the case report dealing with the Hailey-Hailey disease using a microwave driven cold atmospheric argon plasma device (MicroPlaSter): The used CAP device demonstrated that a 5 min (and in subsequent studies 2 min) therapy regimen led to a highly significant higher germ reduction in CAP treated chronic wounds compared to the controls. Furthermore, the influence of CAP on wound healing was investigated in patients with acute wounds from mesh grafts. The results showed improved epithelisation with lower fibrin layers and blood crusts, resulting in faster wound healing. A rapid clinical improvement was also reported in a patient with Hailey-Hailey disease resistant to topical disinfectants and corticoids. Based on these encouraging results, the second part of this presentation will focus on in vitro and ex vivo results of the clinical phase I study performed with a smaller, low-cost, hand-held and battery-operated CAP device possessing the Surface Micro Discharge (SMD) Technology which uses the surrounding air for plasma production: Besides the technological characterization of the SMD device, containing electrical safety, UV and toxic gas emission measurements, the efficacy of the SMD device against different bacteria, viruses and fungi was demonstrated. Furthermore biological safety tests were carried out to demonstrate the safe usage of CAP on human skin and mucosa. These tests included toxicity and mutagenicity tests, cell viability tests, histology analysis and detection for DNA double strand breaks. The results of this study are summarized in a medical proposal to get approval for a clinical phase II study on infected wounds with the SMD technology. Further medical trials on fungi-related (tinea) and virus-related (herpes, warts) diseases are planned.

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