TREATMENT OF SKIN INFECTIONS WITH DC OPERATED AFTERGLOW AIR PLASMA JET*

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We have developed a non-thermal plasma jet, which is generated with a dc voltage from ambient air[1]. By flowing air through the channel of a microhollow cathode discharge geometry at rates of 7-15 Ltr/min, a 10-20-mm long afterglow plasma plume is observed. The temperature in this expelled afterglow plasma reaches values that are close to room temperature at a distance of 5 mm from the discharge origin. Emission spectra show that atomic oxygen, hydroxyl ions and various nitrogen compounds are generated in the discharge and are driven out with the gas flow. These radicals are considered highly effective in the decontamination and sterilization of surfaces. We have investigated the effectiveness of this microplasma jet against notoriously difficult to treat yeast infections. In an *in vitro* study, complete eradication of *candida kefyr* (a model for *candida albicans* – the most common yeast infection) could be achieved with an exposure of 90 seconds at distances of 10 mm and more. Other pathogens that were tested, also respond well. The safety of the treatment was studied by an *in vivo* skin model. The exposure of healthy skin to the plasma jet, when using the same treatment parameters as for the *in vitro* studies, and even a treatment with a ten times higher dose, did not result in any damage. Possible interaction mechanisms were investigated. Treatment parameters, such as the penetration depth of radicals into skin, were studied with skin substitutes.

1. Juergen F. Kolb, Abdel-Aleam H. Mohamed, Robert O. Price, R. James Swanson, Angela Bowman, Robert L. Chiavarini, Michael Stacey, Karl H. Schoenbach, "Cold atmospheric pressure air plasma jet for medical applications," Appl. Phys. Lett. 92 (2008) 241501.

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