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Cold atmospheric plasma and its effects on primary
human skin fibroblasts

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Since the discovery of the bactericidal action of cold atmospheric plasma (CAP) researchers also wanted to know its effects on human cells. As there are a huge number of the different used plasma devices the results have a wide range.

Several studies on wound healing and other diseases were started and had already first results [1]. But to learn more about mechanisms which are involved and influenced, experiments have to be done in cell cultures.

As most of the laboratories are working with cancer cell lines in their cell cultures it was consequential to test the effect of CAP on them. And of course there are again certain distinctions in the behaviour of for example brain tumour cells and ovarian cancer cells. There were some publications in which it is described that CAP can selectively kill cancer cells [2, 3]. Controls were cell lines that are declared as “normal”. But in this context “normal” means only “not cancer cells”. This cell lines are also immortalised for the convenient use in cell cultures and remain an artificial model that cannot be transferred 1:1 to real organisms.

In cooperation with the department of Dermatology we were able to establish a primary culture model of human dermal fibroblast of ex vivo skin samples. This is a first step to discover the effects of CAP on cells that were not immortalised or modified otherwise. First results of the CAP treatment of ex vivo human dermal fibroblasts in the bactericidal range of CAP are presented.

Cell viability and apoptosis were substance of investigation as well as cell cycle distribution and cell migration.

1. Isbary, G., et al., *Successful and Safe Use of 2 Min Cold Atmospheric Argon Plasma in Chronic Wounds: Results of A Randomized Controlled Trial*. British Journal of Dermatology, 2012. **167**(2): p. 404-10.
2. Keidar, M., et al., *Cold plasma selectivity and the possibility of a paradigm shift in cancer therapy*. Br J Cancer, 2011. **105**(9): p. 1295-301.
3. Iseki, S., et al., *Selective killing of ovarian cancer cells through induction of apoptosis by nonequilibrium atmospheric pressure plasma*. Applied Physics Letters, 2012. **100**(11).