
Development and application of skin equivalents for the investigation of atmospheric pressure plasma

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Investigation of the biomedical effects of atmospheric pressure plasma is mostly based on the animal experiments before clinical applications. However, it is difficult to use animals for systemic studies due to ethical problems. As a desirable replacement of animal experiments, tissue-engineered skin equivalents have recently been introduced as a model system. In the present study, the applicability of tissue-engineered skin equivalents for the investigation of the biomedical effects of nonthermal plasma was evaluated. Epidermal and a full-thickness skin equivalents with dermal fibroblasts and keratinocytes were developed, and the transportation of reactive species from plasma through this equivalent was studied using UV absorption spectroscopy. The biological changes at the plasma-treated sites were investigated by histological analysis. The possibility to use this tissue-engineered technology as models for wound healing, melanoma, or hair follicle studies were examined. This novel tissue-engineered technology would enable diverse systemic approaches for the study of the interactions between plasma and skin.

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