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Risk assessment of a cold argon plasma jet in respect to its mutagenicity

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Highlights

Non-thermal physical plasma is an emerging tool in biomedical application.
We investigated the potential genotoxicity of non-thermal plasma.
The micronucleus assay, the HRPT1 assay, and a clonogenicity assay were used.
The assays indicated the absence of genotoxic events for the investigated plasma source.

Abstract

Cold atmospheric pressure plasmas represent a favorable option for the treatment of heat sensitive materials and human or animal tissue. Beneficial effects have been documented in a variety of medical conditions, e.g., in the treatment of chronic wounds. It is assumed that the main mechanism of the plasma's efficacy is mediated by a stimulating dissipation of energy via radiation and/or chemical energy. Although no evidence on undesired side effects of a plasma treatment has yet been presented, skepticism towards the safety of the exposure to plasma is present. However, only little data regarding the mutagenic potential of this new treatment option is available. Accordingly, we investigated the mutagenic potential of an argon plasma jet (*kinpen*) using different testing systems in accordance with ISO norms and multiple cell lines: a HPRT1 mutation assay, a micronucleus formation assay, and a colony formation assay. Moderate plasma treatment up to 180 s did not increase genotoxicity in any assay or cell type investigated. We conclude that treatment with the argon plasma jet *kinpen* did not display a mutagenic potential under the test conditions