

大気圧プラズマの iPS 細胞分化に与える影響

Effects of non-thermal atmospheric pressure plasma on iPS cell differentiation

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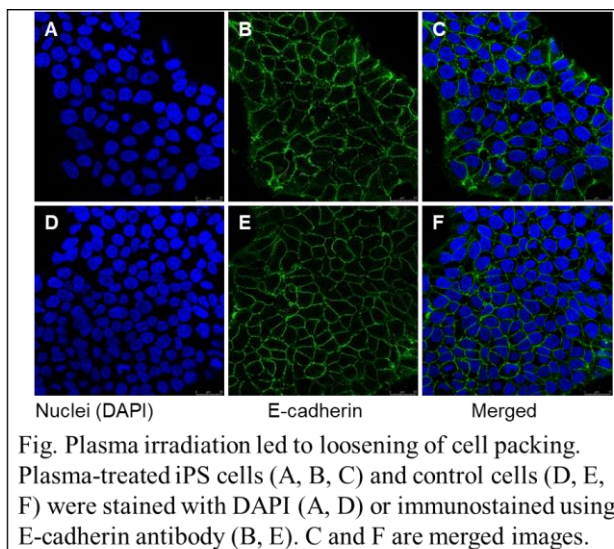
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Non-thermal atmospheric pressure plasma generates active species such as radicals, ions, and electrons. Plasma irradiation has been used for biological applications, including the selective killing of cells and enhancement of plant growth.

Human induced pluripotent stem cells (hiPSCs) can differentiate into any types of cells while infinitely proliferate in vitro. Because of these distinct abilities, their application in regenerative medicine, drug discovery, and

human developmental biology has been heavily investigated. Given plasma affects a broad range of biological events, it may also enhance differentiation or proliferation of hiPSCs. In this research, hiPSCs were treated with dielectric barrier discharge (DBD) air plasma (9 kV, 12.5 kHz) to gain insights into plasma applications. Plasma was generated in the atmosphere at room temperature, and different strength and duration of plasma have been tested. Our preliminary results suggest that the differentiation pattern of the irradiated cells seems different depending on the plasma irradiation condition used. At the same time, plasma seemed not to damage chromatin DNA. Immunohistochemical staining using E-cadherin antibody suggests that plasma irradiation influence cell-cell attachment (Fig). Detailed mechanisms behind plasma effects will be revealed by RNA expression analyses. Detailed mechanisms behind plasma effects will be revealed by RNA expression analyses.



References. Kumagai et al. (2016) Jap. J. Appl. Phys. 55, 01AF01; Kobayashi et al. (2016) Appl. Phys. Express 9, 127001; Kime et al. (2019) Stem Cell Rep. 13, 485.

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