大気圧プラズマが iPS 細胞分化に与える影響の解析

Analysis of effects caused by non-thermal atmospheric pressure plasma on iPS cell differentiation

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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*. 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. Our results suggest that differentiation toward mesoderm is preferred at one plasma irradiation condition used. At the same time, plasma did not affect survival of DNA-repair-deficient cells indicating that the treatment do not damage chromatin DNA at the condition used (Fig). Immunohistochemical staining using E-cadherin antibody suggests that plasma irradiation influence cell-cell attachment. Detailed mechanisms behind plasma effects will be revealed by RNA expression analyses.

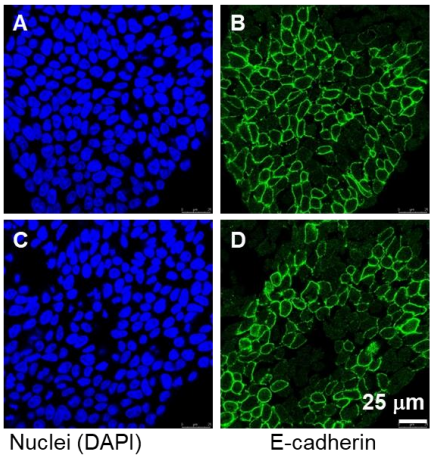

Fig. Plasma irradiation did not affect cell survival of DNA-repair-deficient iPS cells. Plasma-treated cells (A, B) and control cells (C, D) were stained with DAPI (A, C) or immunostained using E-cadherin antibody (B, D).

References: Kumagai et al. (2020), Electron. Comm. Jpn. 103, 43; 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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