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Low temperature plasma for controlling iPS cell differentiation[1]
MIME KOBAYASHI, Nara Institute of Science and Technology, KIICHIRO TOMODA, MICHIO ASAHI, Osaka Medical College, SHINYA KUMAGAI, Meijo University — Cold (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. Different strength and duration of plasma have been tested. After optimizing irradiation conditions, the effects of the plasma on survival, proliferation, and differentiation of the irradiated cells will be examined. Refs. Kumagai et al. (2016) Jap. J. Appl. Phys. 55, 01AF01; Kobayashi et al. (2016) Appl. Phys. Express 9, 127001; Kime et al. (2016) Proc. Natl. Acad. Sci. USA 113, 12478

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