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Gene Transfection Method Using Atmospheric Pressure Dielectric-Barrier Discharge Plasmas SHOTA SASAKI, MAKOTO KANZAKI, TOSHIRO KANEKO, Department of Electronic Engineering, Tohoku University. — Gene transfection which is the process of deliberately introducing nucleic acids into cells is expected to play an important role in medical treatment because the process is necessary for gene therapy and creation of induced pluripotent stem (iPS) cells. However, the conventional transfection methods have some problems, so we focus attention on promising transfection methods by atmospheric pressure dielectric-barrier discharge (AP-DBD) plasmas. AP-DBD He plasmas are irradiated to the living cell covered with genes. Preliminarily, we use fluorescent dye YOYO-1 instead of the genes and use LIVE/DEAD Stain for cell viability test, and we analyze the transfection efficiency and cell viability under the various conditions. It is clarified that the transfection efficiency is strongly dependence on the plasma irradiation time and cell viability rates is high rates (>90 %) regardless of long plasma irradiation time. These results suggest that ROS (Reactive Oxygen Species) and electric field generated by the plasma affect the gene transfection. In addition to this (the plasma irradiation time) dependency, we now investigate the effect of the plasma irradiation under the various conditions.

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