PPPS 2019



Contribution ID: 858

Type: Poster

3P54 - Effects of Nanosecond Pulsed Electric Fields Application and Combination of Anticancer Drug on Cancer Cell

Wednesday 26 June 2019 13:30 (1h 30m)

In recently years, malignant neoplasm (cancer) occupies the extremely high percentage of cause of death; the percentage is ranked the first place in Japan and the second place in the United States. Currently, three major cancer therapy are radiation therapy, chemotherapy, and surgical therapy and these therapies have several disadvantages as large invasiveness and critical side effects. It has been reported that nanosecond pulsed electric fields (nsPEFs) application induced apoptosis on cancer cells; many studies apply it to a cancer therapy have been started.

In this study, we considered the effect of nsPEFs application on tumor cells and combinational effect of anticancer drug administration by experiment. 14ns- and 2ns-PEFs were applied to mouse melanoma cells: B16-F10 in the cuvette, and the cell surviving ratio was measured by crystal violet assay. The 2ns-PEFs application did not affect the cell surviving ratio of B16-F10. The 14ns-PEFs application decreased the cell surviving ratio of B16-F10 and the ratio reduced with increase in number of pulses. More apoptotic cells with pulse application were observed than cells in control sample with apoptosis–necrosis test using flow cytometry. In combinational treatment, the surviving ratio of cells of the combinational treatment of nsPEFs application and anticancer drug (Adriamycin) administration was significantly smaller than unilateral treatment. The surviving ratio of cells administered just after pulse application was significantly smaller than cells administered at 24 hours before nsPEFs application. It is thought that administration of Adriamycin has larger effect for affected cells by nsPEFs application.

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Session Classification: Poster - Industrial/Commercial/Medical Applications and Plasma and Pulse Power Diagnostics

Track Classification: 6.5 Medical and Biological Applications