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Influence of Uniform and Non-Uniform Regimes of Nanosecond-Pulsed Dielectric Barrier Discharges on Intracellular Biochemical Processes in 10T1/2 Cells ABRAHAM LIN, NATALIE SHAINSKY, DAYNNA PARK, THERESA FREEMAN, DANIL DOBRYNIN, ALEXANDER FRIDMAN, VANDANA MILLER, GREGORY FRIDMAN, Drexel University, JEFFERSON UNIVERSITY COLLABORATION — Before investigating plasma effects on differentiation, plasma regime limiting cell death must first be determined. We report the effects of dose on cell viability and compare with dose rates. Results allow for the safe operation of plasma in a regime where nanosecond pulsed DBD on mesenchymal stem cells (MSCs) promote differentiation with limited cell death. After optimizing plasma parameters, discharge energy and uniformity effects on differentiation in MSCs can be studied. We also report the effects of direct and indirect treatment on cellular behavior. C3H-10T1/2 MSCs were treated in 12well plates and stained with two fluorescent markers: MitoSOX Red, which detects O2- and propidium iodide, which is a live/dead stain. Dose vs dose rate effects were investigated, and direct vs indirect treatments were performed with nano-pulses at varying doses while keeping power and electric field the same. We show dependence of cell death with dose and not dose rate. Additionally, we demonstrated that direct treatment elicits greater ROS generation compared to that of indirect. A correlation of cell death and ROS generation with treatment dose is required to find optimal operating parameters for nano-plasma treatment of stem cells.

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