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Physical and biological aspects of cold plasma jet interaction with tissue ALEXEY SHASHURIN, George Washington University, M.N. SHNEIDER, A. DOGARIU, R.B. MILES, Princeton University, M.A. STEPP, M. KEIDAR, George Washington University — Parameters of helium atmospheric plasma jet are measured by means of microwave scattering, fast photographing and measuring of jet currents. Streamer ("plasma bullet") propagating along with gas flow is generated immediately after the breakdown of the interelectrode gap. It is observed that post-streamer afterglow plasma column remains on the way of streamer passing. Lifetime of this afterglow plasma column is longer (about 3-5 μs) than that for the streamer (about 1 μs). The effects induced in living cells due to treatment with cold atmospheric plasma jet are studied by means of time-lapse microscopy and flow cytometry. We show that treatment of cells with plasma jet affects the cells on sub-cellular level, namely decreases expression of cell surface integrins. This change in integrin expression might be the original cause for the effects observed on cellular level, such as reduced cell migration rate and cell detachment. The living tissue response on treatment with plasma jet may be probably caused by post-streamer plasma column and excited species (due to their longer lifetime) rather than by "plasma bullets". We would like to acknowledge the technical assistance of Dr. Y. Raitses, through the PPPL Offsite University Research Program supported by the Office of Fusion Energy Sciences.

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