Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

GEC Student Award for Excellence Finalist: Interaction of Non-Thermal Dielectric Barrier Discharge Plasma with DNA inside Cells SAMEER KALGHATGI, CRYSTAL KELLY, GREGORY FRIDMAN, JANE CLIFFORD-AZIZKHAN, ALEXANDER FRIDMAN, GARY FRIEDMAN, Drexel University — Direct non-thermal plasma is now being widely considered for various medical applications, viz; cancer treatment, coagulation, wound healing. However, the understanding of the interaction between non-thermal plasma and cells is lacking. Here we study the possibility that effects of the plasma treatment can penetrate though cellular membranes without destroying them. One of the most important of such effects to investigate would be DNA double strand breaks (DSB's) since these are some of the important events in a cell's life cycle. We measured DNA DSB's in mammalian cells using immunofluorescence and western blots. Hydrogen peroxide treatment was used as a positive control since it is known to induce massive DNA double strand breaks. The results indicate that short (5 seconds) direct plasma treatment at low power (0.2 W/cm^2) does produce DNA DSB's in mammalian cells. This means that somehow plasma penetrates inside the cells. Several questions arise about what is the mechanism of penetration and do the cells repair the DNA DSB's. We show that the cells do repair the DNA DSB's produced by short exposure of low power plasma. Although the detailed mechanisms are being investigated we confirmed that reactive oxygen species mediate interaction between plasma and DNA.

Sameer Kalghatgi
Drexel University

Date submitted: 08 Jul 2008 Electronic form version 1.4