

Joint seminar with NERS



Friday
December 2, 2016
4:00 pm
Room G906 Cooley

Prof. Vandana Miller

Drexel University

Plasma Onco-Immunotherapy: From Laboratory to the Clinic

Non-thermal plasmas are currently being developed as an alternative therapy for cancer. Local application of plasma to tumors *in vivo* has led to reduced tumor size and increased life expectancy of treated animals. Currently, most studies have focused on the direct influence of plasma on tumors, but not all tumors are accessible for plasma application. Therefore, a different approach is required for deep tissue treatment and systemic elimination of cancer in patients. The body's immune system plays a vital role in the control of cancer. New approaches being explored include increasing the immunogenicity of tumor cells by inducing immunogenic cancer cell death (ICD). We have demonstrated that non-thermal plasma is a good candidate for cancer therapy via immunomodulation by direct effects on immune cells and indirectly, via induction of ICD of cancerous cells.

The role of plasma augmentation of the immune system, based on our *in vitro* and *in vivo* studies, will be discussed as a potential modality for clinical application in cancers. Nanosecond pulsed dielectric barrier discharge (nspDBD) was used to treat multiple cancerous cell lines *in vitro* and mice *in vivo*. Taken together, our data shows that plasma elicits ICD locally, in the treatment area, which leads to beneficial host immune responses both locally and systemically. The clinical potential of plasma cancer immunotherapy will be discussed.

About the Speaker: Dr. Vandana Miller is the Director of the Plasma Medicine Laboratory at the AJ Drexel Plasma Institute of Drexel University in Philadelphia. At DPI, she spearheads all biological projects including anti-microbial applications of plasma, plasma-assisted transdermal drug delivery, treatment of skin diseases and tissue regeneration with non-equilibrium plasma. The institute has approvals and industry and clinical partners to study DBD Plasma-assisted treatment of acne and skin restructuring for cosmetic aesthetics. Another area of research in her laboratory is use of plasma activated water in agriculture, addressing microbial contamination of food and for enhanced growth of plants. She has initiated a major shift in the philosophy of using plasmas for treatment of cancer whereby instead of direct ablative therapy of tumors, plasma is being used to trigger immune responses within the subject's body.