

Seminar

Institute for Plasma Research

Title : Cold atmospheric plasma in treatment of gingivobuccal squamous cell carcinoma and breast carcinoma: A proof of concept study

Speaker: Dr. Kshama J Pansare

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Date : 24th December 2018 (Monday)

Time : 10.30 AM

Venue : Committee Room 3, (New Building), IPR

Abstract :

Cold atmospheric pressure plasma (CAP) or non thermal plasma (NTP) is a partially ionized gas utilized in the field of plasma medicine mainly due to its ambient temperature and ability to generate reactive species which regulate biological processes. Excessive ROS levels cause DNA double strand breaks, resulting in cell cycle arrest, senescence and apoptosis in tumors. In the current study, we investigated the effect of CAP on gingivobuccal squamous cell carcinoma, breast carcinoma and non cancerous cell lines using MTT assay and Raman spectroscopy. We observed a time dependent decrease in the cell viability on treatment with plasma jet. Comparative study with the current treatment modality of radiation indicated that plasma has a potent effect on tumor cell lines. Minimal inhibitory effect on cell viability was observed on treatment with only Helium gas, affirming the effect is induced by plasma. Further, PC-LDA based classification of Raman spectra showed overlapping groups of radiation and plasma treated cells ascertaining similar mechanism of cell death. The outcome of the in vitro assays led us to initiate in vivo studies using Hamster cheek pouch model of oral cancer. Tumor is being induced in hamsters using DMBA which closely resembles premalignant lesions and carcinomas of human. Alternatively, tumor cells would be injected subcutaneously in mice to generate tumor xenografts. On formation of tumors, direct plasma treatment would be initiated to observe regression of tumor over a period of time. Further, the tumor would be subjected to immunohistochemical analysis to establish the mechanism of cell death on treatment with plasma jet.
