Film dosimetry application in Photodynamic Therapy: A practical method to test beam uniformity from microlens

PDT is a relatively new modality of cancer treatment utilizing a photosensitizer and light. The biological efficacy of PDT depends on photosensitizer type and its uptake, oxygen, light delivery from a laser. Photodynamic therapy with Photofrin® has been approved by the USFDA for treatment of advanced esophageal and early lung cancer.

Film dosimetry has been utilized in the quality assurance of radiation therapy process for a long time. The hypothesis of this work was to show that we can use the same concept used in radiation therapy quality assurance for analyses of beam profile from the laser unit. This study was aimed at investigating the feasibility and accuracy of an *in vivo* quality assurance program used in our PDT Center.

Light from different laser systems was delivery on the film (CEA- TVS) for several exposition times. The films were processed and analyzed using the RIT113 Radiation therapy Film dosimetry system. The cross section from our experimental laser shown that the irradiance from the beam emerging from the fiber was not uniform, but tends to be peaked around its central axis. "Hot spots" were not observed to bare eyes. These result correlates well with C3H/HeN animal checked, implanted with radiation-induced fibrosarcoma (RIF-1) cells. The cross section from our PDT clinical laser (PDL1-Coherent) shows much better uniformity.

This study showed had errors in setup and aligning of the dye laser, and/or defect fiber from the companies can result on bad PDT response. More studies to improve our PDT QA program are warranted.