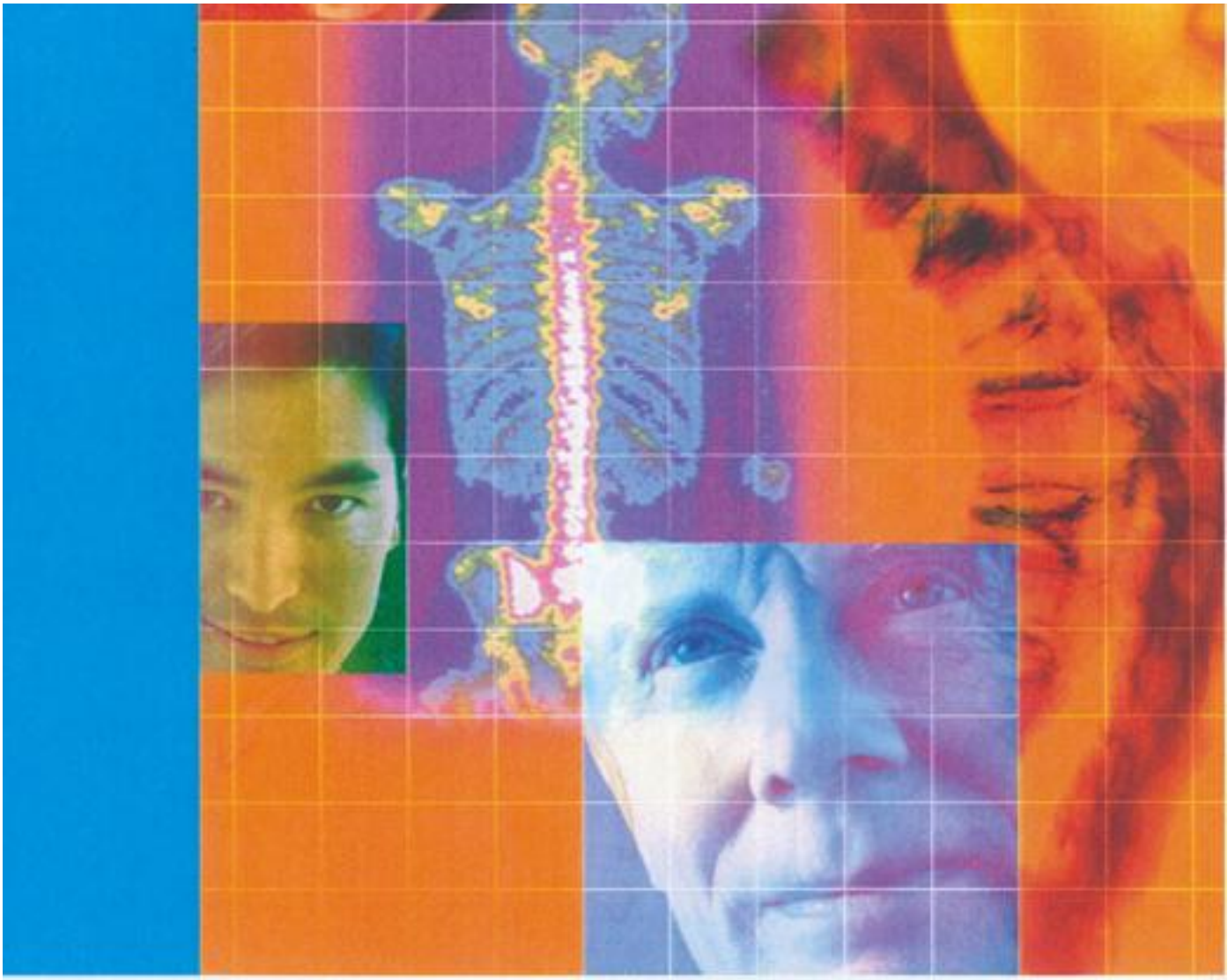

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## SSA20-08 • 11:55 AM

### RadiaPlexRx Gel Protects Cultured Skin Cells from Oxidative Free Radical Damage Induced by Hydrogen Peroxide and by Irradiation: A Pilot Study

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Purpose/Objective: Background: Most patients undergoing external beam radiation therapy are expected to develop acute skin reactions causing discomfort, erythema, itching, and pain. If it becomes severe, some patients become noncompliant in completing their prescribed treatments. Aggressive radiation damages normal skin, results in slower healing and may require treatment for the life of the patient. Tissue is easily injured and requires a combination of ingredients particularly developed for long-term use in sensitive skin treatment. Introduction: Hyaluronic acid, reported in the literature, may support skin cell integrity during radiation treatment. High molecular weight mannan polysaccharides have also been indicated in the literature to reduce acute radiation-induced skin reactions in preliminary studies. These two active compounds have been formulated into an application called RadiaPlexRx Gel (RPX gel) provided by MPM Medical Inc., Irving, Texas, to help maintain skin integrity between and after radiation treatments. The goal of this study was to determine if RPX gel could be used in vitro to assess protection of cells from oxidative/free radical damage induced via two external methods: glucose oxidase-driven hydrogen peroxide free radical damage and irradiation. Materials/Methods: Normal skin cells were grown in tissue culture suspension according to reported methods (Gracy et al. 2003). For each experiment, control groups of normal cells were left untreated or received various concentrations of the gel to determine possible toxicity. Experimental groups received predetermined methods of oxidative damage to cause a known percentage of cell death with and without RPX gel. Since hydrogen peroxide caused oxidative damage by initiating the apoptotic cascade, it resulted in cell death. Adding the enzyme, glucose oxidase, to the cell suspensions (1000 cells/well) provided for the constant generation of H2O2 in the cell cultures resulting in 62% cell death (i.e. 38% cell survival). In the hydrogen peroxide induced cell death experiment, several concentrations (100-400ug/ml) of the gel solubilized in 0.5% dimethylsulfoxide (DMSO) were added to cells before initiating oxidative damage. In the second experiment, groups of cells were irradiated by placing cells 102 cm from the source and exposing to 350mAm (125KVP) for 1/60 sec sufficient for 30% cell death (i.e.70% cell survival). Cell groups were pretreated with RPX gel concentrations (10 to 80 ug/ml) and exposed to the radiation damage. Results: RPX gel at a concentration of 200 to 400ug/ml provided significant protection against hydrogen peroxide generated free radical damage. Only 42% cell death (i.e. 58% survival) occurred with cells treated with RPX as compared to the untreated cells, which had a 62% cell death (i.e. 38% cell survival). RPX (from 10 to 80ug/ml) pretreated irradiated cells achieved 0% cell death as compared to 30% cell death with untreated irradiated cells. Conclusions: It appears that the in vitro skin cell model provided an objective method for evaluating the efficacy of the gel product. The RadiaPlexRx product showed no toxicity to cultured skin cells and protected skin cells from both hydrogen peroxide generated free radical damage and irradiation damage. (K.L.L.,J.L.P.: work for the company funding the research.)

## SSA20-09 • 12:05 PM

### Relative Biological Effectiveness (RBE) of Carbon Ion Beams for Apoptotic