Purpose/Objective(s): Benign prostatic hyperplasia (BPH) is often treated with 5-alpha-reductase inhibitors (5-ARIs) such as finasteride and dutasteride. Studies in our laboratory have demonstrated that the use of dietary supplements may lead to radiosensitization of normal prostate cells. This study examines if the addition of these supplements can alter the survival and radiosensitivity of prostate cell lines in combination with 5-ARI treatment. 

Materials/Methods: Prostate tumor cell lines with differing androgen receptor (AR) status (PC3, DU145, LNCaP and VCaP) and normal prostate cell lines (RWPE-1 and PWR-1E) were studied. Two prostate-specific dietary supplements were used: Trinovin (10 ug/mL) and Prostate Rx (50 ug/mL or 6 ug/mL for normal cells). Treatments of finasteride and dutasteride were given at 1 uM. Dietary supplement and 5-ARI toxicity was assessed using MTT proliferation and survival assays. Radiosensitivity was measured using conventional clonogenic assays (0.5-4 Gy, dose rate = 0.69 Gy min⁻¹).

Results: No significant changes were evident in the proliferative responses of paired cell lines (by tumorigenicity/AR status) following treatment with 5-ARIs plus dietary supplements so one of each pair was evaluated for survival. In the LNCaP and RWPE-1 cells, treatment with Prostate Rx alone reduced survival to 55% and 25% respectively. In LNCaP cells the combination of finasteride with Prostate Rx decreased survival to 25% and in combination with Trinovin, survival decreased to 40%. Treatment with dutasteride did not change survival. In normal RWPE-1 cells, 5-ARIs in combination with Prostate Rx did not decrease survival while a 30% reduction in survival was seen in cells treated with Trinovin plus dutasteride. Radiosensitivity was increased in LNCaP cells treated with Prostate Rx alone (SF₁Gy decreased from 0.9 to 0.25) and in combination with 5-ARIs (SF₁Gy 0.6 to 0.2 for finasteride and 0.7 to 0.05 for dutasteride). There was also a pronounced decrease in survival of the normal prostate RWPE-1 cells in combination with finasteride (SF₁Gy decreased from 0.9 to 0.01) and dutasteride (SF₁Gy decreased from 0.9 to 0.15) in the presence of Prostate Rx. Trinovin treatment was found to have little effect on radiosensitivity. No change in survival was seen in the DU-145 cell line following any combination of treatments.

Conclusions: Prostate-specific dietary supplements changed the biological effect of finasteride and dutasteride. This was further exacerbated following radiation treatment, particularly in the normal cell line. These data suggest that the use of prostate specific dietary supplements should also be discouraged when either radiation and/or 5-alpha-reductase inhibitors are prescribed.