**Androgen Deprivation Therapy Enhances Cancer Stem Cell Population in Prostate Cancer**

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**Background:**

Prostate cancer is the second most common cancer in the United States and the second leading cause of death in men. Androgen-Deprivation Therapy (ADT) is a current treatment modality for advance-stage prostate cancer, but it remains controversial. More than 30% of patients who have undergone ADT show signs of cancer recurrence and/or androgen-independent disease. Some adverse effects of ADT includes hot flashes, metabolic disorders, alteration in bone mineral density, cardiovascular problems, and sexual dysfunction.Cancer stem cells (CSCs) are a small percentage of cells in a tumor that reinitiates tumor growth. The androgen‐independent and therapy resistance characteristics of CSCs suggest their potential role in prostate cancer and in the progression to castrate‐resistant prostate cancer. We determined whether androgen-deprivation therapy results in enrichment of CSCs using ALDH1 as a stem-cell marker.

**Hypothesis and Methods:**

ALDH1 expression was determined in subset of patients with and without ADT by immunohistochemistry. Additional experiments utilized androgen-responsive human prostate cancer LNCaP and 22Rv1 cells subjected to mock ADT conditions in culture system to assess ALDH1 levels by Western Blotting assay.

**Results:**

Immunohistochemistry method exhibited that in many of the non-ADT specimens stained for ALDH1 expression, either had a weak expression that was diffuse or a moderate expression in some focused regions. Meanwhile, ADT specimens stained for ALDH1 expression, a moderate or stronger expression of ALDH1 was noted throughout the sample. ALDH1 expression was scored in a scale from 0-3. The average score for non-ADT specimens was 1.571 while the average score for the ADT specimens was 2.263, which was comparatively higher than non-ADT specimens. Similarly, prostate cancer cells subjected to ADT conditions using charcoal stripped serum exhibited higher ALDH1 expression compared to the cells grown in complete cell culture medium. A progressive increase was observed in the ALDH1 levels in time dependent manner in cells undergone ADT.

**Conclusion:**

Taken together, our results suggest that androgen deprivation therapy leads to greater ALDH1 expression supporting CSC enrichment. Further studies are required to determine the involvement of CSCs in CRPC acquisition as well as the pathways and factors contributing to its expansion in response to ADT.