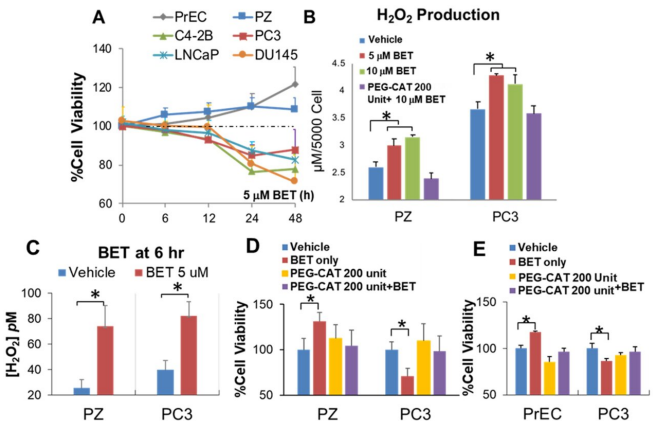
Betamethasone could improve outcomes for prostate cancer radiation therapy

12 August 2022, by Elizabeth Chapin



BET induces PCa cell death while increasing non-cancer prostate cell viability through mediation of H_2O_2 production. Cells were treated with 5 µM BET at various time points. (A) Cell viability based on MTT assay. (B) Extracellular H_2O_2 production (µM) based on Amplex Red method (24 h). (C) Intracellular H_2O_2 production was measured using the aminotriazole-(3-AT)-mediated inactivation of CAT method (6 h). (D,E) Cell viability after treatment with PEG-CAT prior to BET. * p-value ? 0.05 when compared with vehicle. n = 3. Credit: *International Journal of Molecular Sciences* (2022). DOI: 10.3390/ijms23126409

A new study published by University of Kentucky Markey Cancer Center researchers suggests that the common steroid betamethasone could be used to reduce unwanted side effects of radiation treatments for prostate cancer.

The research was published in the *International Journal of Molecular Sciences* on June 8.

The lab study led by Luksana Chaiswing, Ph.D., assistant professor in the U.K. College of Medicine's Department of Toxicology and Cancer Biology, is the first to demonstrate that betamethasone protects normal prostate cells from injury induced by radiation therapy, while making the cancer cells more susceptible to the treatment.

Prostate cancer is the second leading cause of cancer deaths among men in the U.S. While radiation therapy is important to control the growth of prostate cancer, it presents a significant risk of increasing unwanted side effects, including injury to normal tissues.

"New therapies aimed at protecting against normal tissue injury while also increasing radiation therapy effectiveness are urgently needed," Chaiswing said. "The development of such approaches would have a major impact on prostate cancer control and the quality of life of patients."

The team screened around 700 Food and Drug Administration-approved drugs for properties including protecting non-cancer cells against radiation therapy induced cytotoxicity, killing prostate cancer cells and increasing hydrogen peroxide levels in both cancer and non-cancer cells .

Betamethasone, a corticosteroid that is approved for treatment of inflammation and cancer of the hematopoietic system, was one of the top five drugs with all of the desired properties.

Betamethasone increases hydrogen peroxide levels, which activates a protective protein called "RelB" in normal, non-cancerous prostate cells.

"The outcome of this project could lead to a new anticancer regimen that improves the efficacy of radiation therapy by sensitizing tumor tissue to radiation while simultaneously protecting normal tissue from radiation-induced side effects, which could lead to improved quality of life for cancer survivors," Chaiswing said.

More information: Luksana Chaiswing et al, The RelB-BLNK Axis Determines Cellular Response to a Novel Redox-Active Agent Betamethasone during

Radiation Therapy in Prostate Cancer, *International Journal of Molecular Sciences* (2022). DOI: 10.3390/ijms23126409