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Effects of Lycopene on Protein Expression in Human Primary Prostatic Epithelial Cells.

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Abstract

Clinical trials and animal studies have suggested that **lycopene**, the red carotenoid found in tomatoes, might be useful for the prevention of prostate cancer in the diet or as a dietary supplement through a variety of chemoprevention mechanisms. As most mechanism of action studies have used prostate cancer cells or males with existing prostate cancer, we investigated the effects of **lycopene** on protein expression in human primary prostatic epithelial cells. After treatment with **lycopene** at a physiologically relevant concentration (2 μmol/L) or placebo for 48 hours, the primary prostatic epithelial cells were lysed and fractionated using centrifugation into cytosolic/membrane and nuclear fractions. Proteins from **lycopene**-treated and placebo-treated cells were trypsinized and derivatized for quantitative proteomics using isobaric tags for relative and absolute quantitation (iTRAQ) reagent. Peptides were analyzed using two-dimensional microcapillary high-performance liquid chromatography-tandem mass spectrometry to identify proteins that were significantly upregulated or downregulated following **lycopene** exposure. Proteins that were most affected by **lycopene** were those involved in antioxidant responses, cytoprotection, apoptosis, growth inhibition, androgen receptor signaling, and the Akt/mTOR cascade. These data are consistent with previous studies suggesting that **lycopene** can prevent cancer in human prostatic epithelial cells at the stages of cancer initiation, promotion, and/or progression. Cancer Prev Res; 1-9. ©2013 AACR.

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