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Induction of apoptosis in human bladder cancer cells by green tea catechins

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ABSTRACT

Cell culture and animal studies have demonstrated strong chemopreventative effects of green tea and its associated polyphenols in multiple cancers, though the exact mechanisms of action are not well understood. This *in vitro* study examined the antiproliferative/pro-apoptotic potential of green tea extract (GTE), polyphenon-60 (PP-60), (-)-epicatechin gallate (ECG) and (-)-epigallocatechin-3-gallate (EGCG) in both normal and malignant human bladder cells. Cell growth (proliferation/apoptosis) was measured in UROtsa (normal), SW780 (tumorigenic; low-grade), and TCCSUP (tumorigenic; high-grade) human bladder urothelial cells by cell proliferation (XTT) assay after treatment with 0-80 μg/mL of GTE, PP-60, ECG and EGCG for 72 h. Molecular signaling pathways of catechin-induced apoptosis were analyzed using Human signal transduction RT^2 Profiler PCR array (SuperArray). Compared to control-treated cells, treatment with catechin agents significantly suppressed cell growth in a dose-dependent fashion ($P < 0.01$), with strongest effects evoked by ECG and EGCG in UROtsa cells, ECG in low-grade RT4 and SW780 cells, and PP-60 and EGCG in high-grade TCCSUP and T24 cells. Microarray analysis indicated distinct differences in mRNA gene expression regarding growth signaling pathway activation induced by EGCG in normal/tumorigenic human bladder cell lines, providing a rationale for the putative therapeutic usage of green tea polyphenols against bladder disease.

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