Ellagic acid, a component of pomegranate fruit juice, suppresses androgen-dependent prostate carcinogenesis via induction of apoptosis.


Abstract

BACKGROUND: Ellagic acid (EA), a component of pomegranate fruit juice (PFJ), is a plant-derived polyphenol and has antioxidant properties. PFJ and EA have been reported to suppress various cancers, including prostate cancer. However, their chemopreventive effects on development and progression of prostate cancer using in vivo models have not been established yet.

METHODS: The transgenic rat for adenocarcinoma of prostate (TRAP) model was used to investigate the modulating effects of PFJ and EA on prostate carcinogenesis. Three-week-old male transgenic rats were treated with EA or PFJ for 10 weeks. In vitro assays for cell growth, apoptosis, and Western blot were performed using the human prostate cancer cell lines, LNCaP (androgen-dependent), PC-3 and DU145 (androgen-independent).

RESULTS: PFJ decreased the incidence of adenocarcinoma in lateral prostate, and both EA and PFJ suppressed the progression of prostate carcinogenesis and induced apoptosis by caspase 3 activation in the TRAP model. In addition, the level of lipid peroxidation in ventral prostate was significantly decreased by EA treatment. EA was able to inhibit cell proliferation of LNCaP, whereas this effect was not observed in PC-3 and DU145. As with the in vivo data, EA induced apoptosis in LNCaP by increasing Bax/Bcl-2 ratio and caspase 3 activation. Cell-cycle related proteins, p21\textsuperscript{WAF}, p27\textsuperscript{Kip}, cdk2, and cyclin E, were increased while cyclin D1 and cdk1 were decreased by EA treatment.

CONCLUSIONS: The results indicate that PFJ and EA are potential chemopreventive agents for prostate cancer, and EA may be the active component of PFJ that exerts these anti-cancer effects.


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KEYWORDS: apoptosis; chemoprevention; ellagic acid; pomegranate; prostate cancer

PMID: 25284475 [PubMed - as supplied by publisher]