



# Nutrient Synergy Counteracts Carcinogenic Activity of Estrogen in Cultured Human Cancer Cells (2003)

Ivanov V, Roomi MW, Niedzwiecki A, Rath M.

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## Abstract

### **Introduction:**

Hormone-replacement therapy can increase risk of tumor development in estrogen-sensitive tissues in menopausal women.

### **Objective:**

In this study we tested whether Nutrient Synergy (NS), a specific mixture of ascorbic acid, lysine, proline, arginine, cysteine and green tea extract, can counteract the carcinogenic effects of 17-beta estradiol, an active metabolite of human estrogen.

### **Methods:**

Human breast cancer MCF-7 and prostate cancer LNCap cells were tested for cell growth by DNA synthesis assay. Invasiveness was assayed by cell penetration through Matrigel-covered membrane. Matrix metalloproteinase (MMP) activity was assayed by zymography. Vascular endothelial growth factor (VEGF) secretion was measured by ELISA.

### **Results:**

Estradiol stimulated cell growth and invasion of MCF-7 in dose-dependent manner. These stimulating effects were completely abolished by addition of 100 µg/ml NS. Inhibition of cell invasion by NS was supported by significant decrease in MMP-9 expression. Estradiol stimulated LNCap cell proliferation. NS attenuated this stimulation. Addition of estradiol to MCF-7 cells significantly increased VEGF secretion, which was blocked by Nutrient Synergy.

### **Conclusions:**

Thus, in the experimental model of human estrogen-sensitive cancer tissue, Nutrient Synergy demonstrated a strong potential to inhibit pro-carcinogenic effects of estradiol, which are directly related to tumor growth, neovascularization and metastasis formation.

**Comment:**

Recent clinical studies have shown that hormone-replacement therapy (HRT) in menopausal women increases the risk of tumor development in estrogen-sensitive tissues. In this study, estradiol stimulated breast cancer (MCF-7) cell growth, MMP expression, matrix invasion, and VEGF secretion (measure of angiogenesis) in culture. These pro-carcinogenic effects of estradiol were significantly inhibited by Nutrient Synergy, suggesting NS is an excellent candidate for preventative and therapeutic use in the treatment of estrogen-related breast cancer.

