



## Anti-Tumorigenic Activity of Nutrient Synergy in Human Breast Cancer Lines MDA-MB-231 and MCF-7 (2003)

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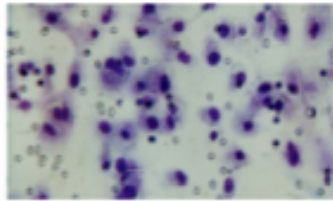
### Abstract

Worldwide, breast cancer is the most prevalent cancer in women. Metastasis potential and invasiveness of breast cancer are attributed to up-regulation of matrix metalloproteinases (MMPs). In the current study, we studied the effect of Nutrient Synergy (NS) on invasive potential of human breast cancer cell lines. NS is a specific mixture of lysine, proline, ascorbic acid and epigallocatechin gallate, which we have previously shown to exert potent synergistic antitumor activity by inhibiting extracellular matrix invasion by cancer cells. In this study we tested the effect of NS on estrogen-receptor positive (ER+) MCF-7 and estrogen-receptor negative (ER-) MDA MB-231 breast cancer cell lines. Metastatic parameters: MMP expression by zymography, cellular invasion through Matrigel and proliferation/cytotoxicity by MTT were studied. Invasion of MDA-MB-231 through Matrigel was inhibited by 50%, 60% and 95% by 10, 50 and 100 µg/ml of NS, respectively. NS was not toxic to MDA-MB-231 at 10 µg/ml, and showed slight toxicity at 100 µg/ml. However, it exhibited significant toxicity at 1000 µg/ml. Neither MMP-2 nor MMP-9 were detected by gelatinase zymography. In contrast, NS was not toxic to MCF-7 at 10, 50, 100 and 500 µg/ml, and exhibited slight toxicity at 1000 µg/ml. Interestingly, MCF-7 was not invasive through Matrigel and did not express any MMP activity. These results suggest that NS is a valuable and promising candidate for ER- MDA-MB-231 breast cancer cells. Further studies will be required for ER+, MCF-7 breast cancer cells to determine the efficacy of NS.

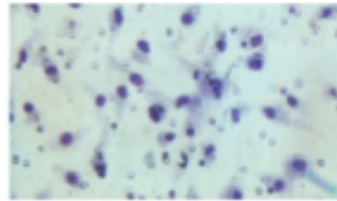
#### **Comment:**

Breast cancer, worldwide the most prevalent cancer and the second leading cause of cancer deaths in women today (after lung cancer) metastasizes by the enzymatic destruction of surrounding connective tissue to metastasize. This study demonstrated that the nutrient mixture of lysine, proline, ascorbic acid and epigallocatechin gallate exerted potent synergistic antimetastatic effect on human breast MDA-MB-231 cancer cells by inhibiting MMP expression and Matrigel invasion. These results suggest that this nutrient formulation is a valuable and promising candidate for treating estrogen insensitive breast cancer.

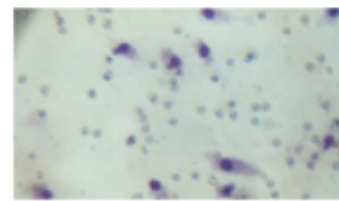
## NS Inhibited Matrigel Invasion of Human Breast Cancer Cells MDA-MB-231



Untreated



NS 10 mcg/ml



NS 100 mcg/m

