



Inhibitory Effects of Ascorbic Acid, Proline, and Lysine Supplementation on Matrigel Invasion by Human Breast Cancer Cells MDA-MB-231 (2002)

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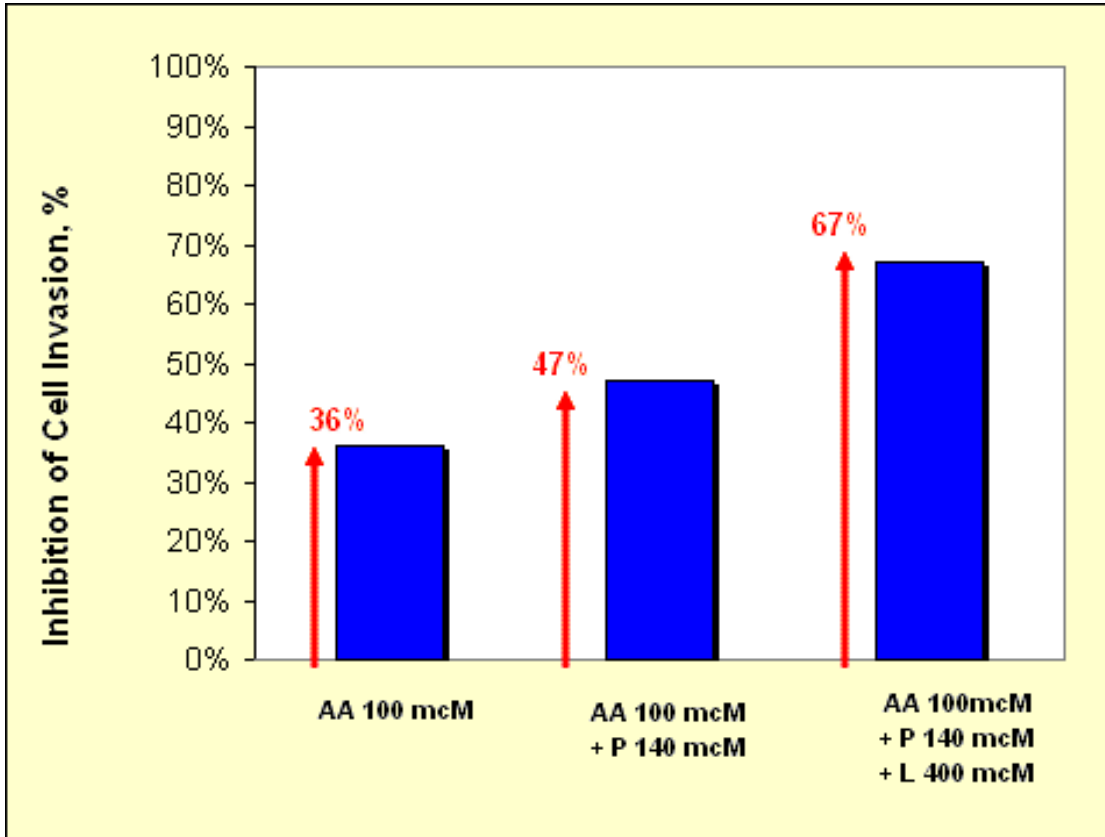
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Abstract

Worldwide, breast cancer is the most prevalent cancer and the second leading cause of cancer deaths in women today (after lung cancer). Though approximately 77% of breast cancer cases occur in women over 50 years of age, younger women tend to have more aggressive breast cancers than older women, resulting in lower survival rates. Normal human dermal fibroblasts (NHDF) were grown to confluence on insert of "Improved Matrigel Invasion Chamber" using DMEM media. The media was withdrawn and the insert and the well were washed with sterile PBS. Human breast cancer cells (5×10^4) suspended in Liebovitz's media were seeded on the insert. Various supplements were added to the Liebovitz's media and 750 μ l and 200 μ l media were added to the well and on the insert respectively. The chambers were incubated in a free gas exchange incubator for 22 hours. After incubation the media was withdrawn and the cells on the upper surface of insert were wiped off with cotton swab. The cells on the lower surface were stained. Supplementation of media with 100 μ M ascorbic acid (AA) reduced the invasion by 36%. Supplementation with AA with 140uM proline (P) further reduced the invasion by 47%. Addition of 400 μ M lysine to AA and P in the supplement reduced invasion to 67%. Further studies with graded levels of Lysine with AA and P showed that there was linear response to lysine up to 800 μ M level. These results suggest that the synergistic effect of the nutrient mixture of ascorbic acid, lysine and proline is a valuable and promising candidate for therapeutic use in the treatment of estrogen insensitive breast cancer cells, by inhibiting invasion.

Comment:

The results from this study demonstrated that while an individual nutrient, such as ascorbic acid, can inhibit the invasion of cancer cells through Matrigel (a model for extracellular matrix), the synergistic effect of a combination of ascorbic acid, lysine, and proline significantly enhances inhibition of invasion. This implies that this nutrient mixture is a promising candidate for therapeutic use in the treatment of breast cancer cells, by blocking metastasis.



Matrigel invasion of breast cancer cells (MDA MB-231) was inhibited by 36% over control by AA(Ascorbic Acid), 47% by AA + P(Proline), and 67% by AA + P + L(Lysine)