



Inhibition of Matrix Metalloprotenase-2 Secretion and Invasion by Human Ovarian Cancer Cell Line SK-OV-3 with Lysine, Proline, Ascorbic Acid, and Green Tea Extract

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Abstract

Introduction:

Based on the poor prognosis associated with ovarian cancer and reported anti-cancer properties of specific nutrients, we investigated the effect of a nutrient mixture (NM) containing lysine, proline, arginine, ascorbic acid, and epigallocatechin gallate on human ovarian cancer cells SK-OV-3 by measuring: cell proliferation, modulation of MMP-2 and -9 secretion, and cancer cell invasive potential.

Materials and Methods:

Human ovarian cancer cells SK-OV-3 (ATCC) were grown in McCoy medium in 24-well tissue culture plates. At near confluence, the cells were treated with NM, dissolved in media, and tested at 0, 10, 50, 100, 500, and 1000 µg/ml in triplicate at each dose. Cells were also treated with PMA 200 ng/ml to study enhanced MMP-9 activity. Cell proliferation was evaluated by MTT assay, MMP secretion by gelatinase zymography, and invasion through Matrigel.

Results:

Human ovarian cancer cell growth was not significantly affected by NM. Zymography demonstrated only MMP-2 secretion. NM inhibited MMP-2 secretion in a dose-dependent fashion with virtual total inhibition at 50 µg/ml NM concentration. Invasion of human ovarian cancer cells through Matrigel decreased in a dose-dependent fashion, with 90% inhibition at 500 µg/ml NM and 100% inhibition at 1000 µg/ml NM ($p < 0.0001$).

Conclusion:

The combination of lysine, proline, arginine, ascorbic acid, and green tea extract tested inhibited critical steps in cancer development and spread, such as MMP secretion and invasion, indicating its potential as a treatment modality against ovarian cancer.