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## Cancer Therapy

# The inhibitory effect of flaxseed on the growth and metastasis of estrogen receptor negative human breast cancer xenografts attributed to both its lignan and oil components

Linda Wang, Jianmin Chen, Lilian U. Thompson <sup>\*†</sup>

Department of Nutritional Sciences, Faculty of Medicine, University of Toronto, Toronto, ON, Canada  
**email:** Lilian U. Thompson ([lilian.thompson@utoronto.ca](mailto:lilian.thompson@utoronto.ca))

\* Correspondence to Lilian U. Thompson, Department of Nutritional Sciences, Faculty of Medicine, University of Toronto, 150 College St., Toronto, Ontario, Canada M5S 3E2

† Fax: +416-978-5882.

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### KEYWORDS

flaxseed • lignans • flaxseed oil • breast cancer • metastasis • MDA-MB-435

### ABSTRACT

Our previous studies have shown that dietary flaxseed (FS) can reduce the growth and metastasis of human estrogen receptor negative (ER-) breast cancer in nude mice. The aims of our study were to determine (i) whether the tumor inhibitory effect of FS was due to its oil (FO), lignan secoisolariciresinol diglycoside (SDG), or both components, and (ii) whether the effect on tumor growth was related to increased lipid peroxidation. Athymic nude mice were orthotopically injected with ER- breast cancer cells (MDA-MB-435) and 8 weeks later were fed either the basal diet (BD) or BD supplemented with 10% FS, SDG, FO, or combined SDG and FO (SDG + FO) for 6 weeks. The SDG and FO levels were equivalent to the amounts in the 10% FS. Compared to the BD group, the tumor growth rate was significantly lower ( $p < 0.05$ ) in the FS, FO, and SDG + FO groups, in concordance with decreased cell proliferation and increased apoptosis; however, these did not significantly relate to the lipid peroxidation, indexed as malonaldehyde (MDA), in the primary tumors. Lung metastasis incidence was reduced (16-70%) by all treatments, significantly in the FS and SDG + FO groups. The distant lymph node metastasis was significantly decreased (52%) only in the FO group. Although the total metastasis incidence was lowered

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(42%) significantly only in the SDG + FO group, all treatment groups did not differ significantly. In conclusion, FS reduced the growth and metastasis of established ER- human breast cancer in part due to its lignan and FO components, and not to lipid peroxidation. © 2005 Wiley-Liss, Inc.

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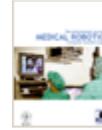


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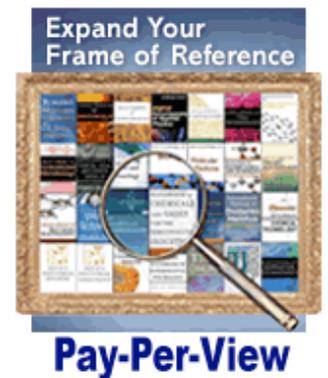
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