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

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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

(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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