

# Effects of EPA and DHA on the Incidence, Growth and Metastases of Breast Cancer

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# 1995 Fiscal Year Final Research Report Summary

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## Effects of EPA and DHA on the Incidence, Growth and Metastases of Breast Cancer

Research Project

### Project/Area Number

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06671191

### Research Category

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Grant-in-Aid for General Scientific Research (C)

### Allocation Type

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Single-year Grants

### Research Field

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General surgery

### Research Institution

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Kanazawa University

### Principal Investigator

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### Project Period (FY)

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1994 – 1995

### Keywords

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Breast cancer / EPA / DHA / MM48 mammary / MDA-MB-231 / Prostaglandin / Leukotriene / MCF-7

### Research Abstract

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Differences in the incidence and prognosis of breast cancer between Western women and Japanese or Eskimos (Greenland and Alaska) women may arise from contrasting patterns of dietary fat intake. Whereas the former group consumes high-fat diets containing n-6 polyunsaturated fatty acids (PUFAs), primary linoleic acid (LA), the latter group consumes large amounts of fat derived from fish oils containing n-3 PUFAs, mainly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). An inverse relationship has been found between the incidence of breast cancer and the level of fish consumption, suggesting a protective role of n-3 PUFAs from human breast cancer. Thus, n-3 PUFAs have a potential role as chemopreventive and treatment agents in breast cancer. Therefore, we have studied the promotive or inhibitory effects of linoleic acid, EPA and DHA on breast cancer in vivo and in vitro.

(1) While linoleic acid promoted the growth and metastases of MM48 mammary tumor transplanted into mice, EPA and DHA inhibited them.

(2) In an in vitro study, linoleic acid stimulated the secretion of prostaglandin E and leukotriene B and cell growth of MDA-MB-231 human breast cancer. In contrary, EPA and DHA inhibited them, particularly at the EPA/n-6 ratio of 1 : 0.69 and the DHA/n-6 ratio of 1 : 2.08. Moreover, the cell growth was correlated with the prostaglandin level rather than the leukotriene level.

(3) In another in vitro study, linoleic acid stimulated the cell growth of MAD-MB-231 and MCF-7. Moreover, linoleic acid stimulated the c-myc expression in MCF-7.

Therefore, it was suggested that the promotive or inhibitory effects of linoleic acid, EPA and DHA are mediated via the arachidonic products or oncogen such as c-myc. However, their exact mechanisms still remained unclear and further studies are needed.

## Research Products (18 results)

All Other

All Publications (18 results)

- [Publications] 江嵐充治、野口昌邦: "Effects of linleic acid and etcosanoid synthesis inhibitors on the growth and c-myc oncogene expression of humanbreast cancer cells." International Journal of Oncology22GD01:8. 145-151 (1996) ▼
- [Publications] 江嵐充治、野口昌邦: "In vitro effects of eicosanoid synthesis inhibitors in the presence of linoleicacid on MDA-MB-231 human breast cancer cells." Breast Cancer Research. 37. 29-37 (1996) ▼
- [Publications] 太田長義・野口昌邦: "The effects of high dietary fat and indomethacin on 7,12-dimethylbenz (a) anthracene-induced mammary carcinomas in rats." Oncology Reports. 3. 305-312 (1996) ▼
- [Publications] 木下一夫・野口昌邦: "Effects of linoleicacid,eicosapentaenoic acid and docosahexaenoic acid on the growth and metastasis of MM48 mammary tumor transplants in mine." International Journal of Oncology22GD04:8. 575-581 (1996) ▼
- [Publications] 野口昌邦: "Effects of indomethactin with or without linoileic acid on human breast cancer cells in vitro." Prostaglandins Leukotriens and Essentral Fatty Acids. 52. 381-386 (1995) ▼
- [Publications] 野口昌邦: "Effects of eicosapentaenoic and docosahexaenocacid on Cell growth and prostaglandin E and leukotriene B production by a human breast cancer cell line." Oncology. 52. 458-464 (1995) ▼
- [Publications] 野口昌邦: "The role of fatty acids and eicosanoid synthesis inhibitors in breast carcinoma." Oncology. 52. 265-271 (1995) ▼
- [Publications] 野口昌邦: "Effects of Proxicam and Esculetion on the MDA-MB-231 Human Breast Cacer Cell Line." PROSTAGLANDINS LEUKOTRIENES AND ESSENTIAL FATTY ACIDS. 53. 325-329 (1995) ▼
- [Publications] 木下一夫・野口昌邦: "Inhibitory effects of purified eicosapentaenoic acid and docosahexaenoic acid on growth and metastasis of murine transplantable mammary tumor." Journal of In vivo Research. 8. 371--374 (1994) ▼
- [Publications] Earashi, M., Noguchi, M.: "Effects of linoleic acid and eicosanoid synthesisinhibitors on the growth and c-myc oncogene expression of humanbreast cancer cells" Int. J.oncol.8. 145-151 (1996) ▼
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- [Publications] Ohta, N., Noguchi, M.: "The effects of high dietary fat and indomethacin on 7,12-dimethylbenz (a) anthracene-induced mammary carcinomas in rats." Oncology Reports. 3. 305-312 (1996) ▼
- [Publications] Kinoshita, K., Noguchi, M.: "Effects of linoleic acid, eicosapentaenoic acid, and docosahexaenoic acid on the growth and metastasis of MM48mammary tumor transplants in mice." Int. J.Oncol.8. 575-581 (1996) ▼
- [Publications] Noguchi, M.: "Effects of indomethacin with or without linoleic acid on human breast cancer cells in vitro." Prostaglandins Leukotrienes and Essential Fatty Acids. 52. 381-386 (1995) ▼
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[Publications] Noguchi, M.: "The role of fatty acids and eicosanoid synthesis inhibitors in breast carcinoma." *Oncology*. 52. 265-271 (1995) ▼

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