

New Light on Potentiation and Promotion of Tumour Growth

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Professor Raymond Kearney from the Department of Infectious Diseases at Sydney University has recently demonstrated that vegetable oils such as sunflower and safflower oils which are rich in linoleic acid, can be potent promoters of tumour growth. Linseed oil, on the other hand, which is rich in alpha linolenic acid tends to reduce the growth of tumours.

Using mice which have been injected subcutaneously with weakly antigenic HI tumours, Professor Kearney has also found that the dietary balance of the omega-6 and omega-3 fatty acids is critical. A dietary ratio of Cis-linoleic acid to alpha-linolenic acid of 2:1 (in a 10% isocaloric oil-enriched diet) gave the greatest tumour promoting effects. Using the reverse ratio the tumour size was significantly reduced in experimental mice.

With the same animal model Kearney has also shown that endotoxin, the lipopolysaccharide component of the cell wall of gram negative bacteria such as *E. coli*, will potentiate the growth of weakly antigenic tumours. In practical terms, exposure to endotoxin at the time of surgery or the development of a post-operative infection may carry a worse prognosis for the patient as inflammation at the site of infection can generate mediators which may potentiate the growth of a few hundred tumour cells at another site. Metastases may grow faster

and overwhelm non-specific and specific immunity.

When endotoxin is administered parenterally it stimulates macrophages and other cells to release mediators such as platelet activating factor (PAF) which in turn can generate growth factors for tumours.

Kearney also points out that another environment factor which stimulates PAF release besides bacterial endotoxin is the polysaccharide component of yeast called zymosan. In this respect, he admits that prognosis in early cancer patients should be improved by avoiding dietary yeast products. Animals that are given sublethal doses of PAF, enough to kill half of the group, all start to survive after they are fasted for 12-24 hours on carrot juice or water.

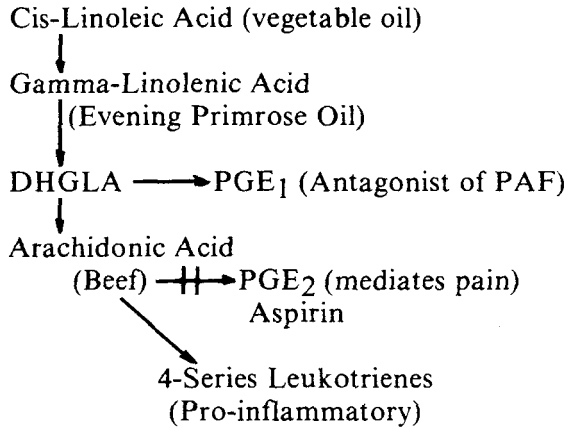
There is good evidence to show that prostaglandin E₁ (PGE₁), is an antagonist of PAF production. This indicates that Evening Primrose or Black Currant Seed Oils which are good sources of the gamma-linolenic acid (a precursor for PGE₁), may be useful nutrition supplements.

In addition, there are several lines of evidence to suggest that fish oil concentrates containing eicosapentanoic acid (EPA) may favour the production of less inflammatory leukotrienes, a desirable situation where inflammation is a risk factor for cancer patients. Kearney says "We have found that indomethicin and aspirin when given orally can have a slight anti-tumour effect. However, if inflammation is present anywhere in the body (and this is usually the case when

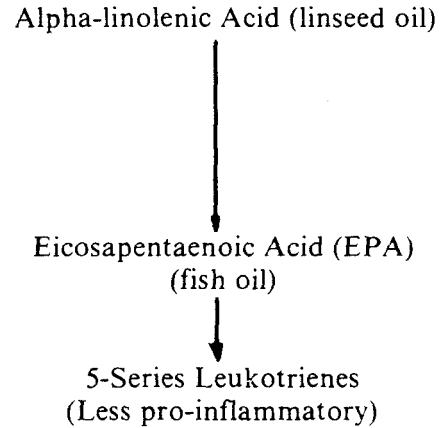
1. Editorial Office, International Clinical Nutrition Review, P.O. Box 370, Manly, New South Wales 2095, Australia.

Effect of Dietary Oils on Prostanoid Pathways

OMEGA-6 PATHWAY



OMEGA-3 PATHWAY



these medications are prescribed), these drugs can actually potentiate tumour growth." The mechanism for this probably involves the blocking of cyclo-oxygenase thus enhancing substrate flow from arachidonic acid to pro-inflammatory leukotrienes of the 4-series.

On the basis of present information, Kearney suggests that the total dietary fat intake of early cancer patients should be lowered and the balance changed to favour more fish oil and/or alpha-linolenic acid (linseed oil) together with gamma-linolenic acid (Evening Primrose Oil). Surgeons performing cancer surgery or biopsies

should also be aware of the special problems related to post-operative infections and inflammation which can potentiate tumour growth. No doubt in the future PAF antagonists will be used by all cancer surgeons and patients will be advised to adhere to strict anti-"tumour promotion" diets. Such diets will be high in fibrous leafy green, yellow and red vegetables and seafoods, and low in yeast products and total fat with an increased emphasis on the dietary omega-3 fatty acids.