

POLYUNSATURATED OILS AND CANCER – from Second Opinions UK.

(www.second-opinions.co.uk/fats_and_cancer.html)

Introduction

Up to the 19th-century, fat was relatively expensive and butter was a luxury. The poor lived mainly on potatoes and bread, which were cheap, supplemented whenever possible with whatever source of protein and fat they could afford. Not surprisingly, mortality was high amongst the poorer classes. To fill the gap in the market cheap substitutes for butter began to be produced in the last quarter of the Victorian era. Made from cheaper fats and coloured yellow to mimic the look, if not the taste of butter, they were called margarine. And this started, quite slowly at first, a radical change in the types of fat we, as a nation, ate.

Originally margarines were made of beef suet, milk and water. Later the recipes changed to include lard, whale oil and the oils of olive, coconut, ground nut and cottonseed. By the middle of the 20th-century an emulsion of soya bean and water was substituted for the milk and margarines could be made entirely of inexpensive oils from vegetable sources. In all these forms, margarine was the poor relation to butter.

In the 1920s a new disease had suddenly 'taken off' all over the industrialised world. By the 1940s it had become a leading cause of premature death – and nobody knew why. In 1950, an American scientist hypothesised that cholesterol might be to blame. ⁽¹⁾ In 1953, another American, Ancel Keys, compared levels of this disease in seven countries with the amounts of fat in those countries. ⁽²⁾ And so was born the 'Diet-Heart' hypothesis, for the new disease was coronary heart disease.

To reduce the risk of a heart attack, Ancel Keys recommended cutting down on the vegetable oils and margarines. However, it was discovered that vegetable oils, which are composed largely of unsaturated fats and oils, tended to lower blood cholesterol levels, while saturated fats tended to raise them. And by that time, it had been decided, largely by majority vote, ⁽³⁾ that raised cholesterol increased the risk of a heart attack. With the advent of the 'Prudent Diet' in the USA in 1982, and COMA's introduction of 'healthy eating' in Britain two years later, the fats in our diet changed even more dramatically: we were told to avoid animal fats such as butter and lard, which have a larger proportion of saturated fats, in favour of largely polyunsaturated vegetable margarines and cooking oils. Now margarines could be priced to rival butter. Recently, margarines have been developed specifically to lower cholesterol levels, and prices have risen again. Benecol, made from tree bark is considerably more expensive than butter.

*See **Explanation of Terms in Fatty Acids** to understand how different fats react in different circumstances. These are essential to understand how cancers start or are promoted.*

Margarine – a natural food?

The polyunsaturated fats used to make margarine are generally obtained from vegetable sources: sunflower seed, cottonseed, and soybean. As such they might be thought of as natural foods. Usually, however, they are pressed on the public in the form of highly processed margarines, spreads and oils and, as such, they are anything but natural.

In 1989, the petroleum-based solvent, benzene, that is known to cause cancer, was found in Perrier mineral water at a mean concentration of fourteen parts per billion. This was enough to cause Perrier to be removed from supermarket shelves. The first process in the manufacture of margarine is the extraction of the oils from the seeds, and this is usually done using similar petroleum-based solvents. Although these are then boiled off, this stage of the process still leaves about ten parts per million of the solvents in the product. That is 700 times as much as fourteen parts per billion.

The oils then go through more than ten other processes: degumming, bleaching, hydrogenation, neutralization, fractionation, deodorisation, emulsification, interesterification, . . . that include heat treatment at 140-160C with a solution of caustic soda; the use of nickel, a metal that is known to cause cancer, as a catalyst, with up to fifty parts per million of the nickel left in the product; the addition of antioxidants such as butylated hydroxyanisole (E320). These antioxidants are again usually petroleum based and are widely believed to cause cancer.

The hydrogenation process, that solidifies the oils so that they are spreadable, produces *trans* -fatty acids that rarely occur in nature.

The heat treatment alone is enough to render these margarines nutritionally inadequate. When the massive chemical treatment and unnatural fats are added, the end product can hardly be called either natural or healthy.

You may be interested in a list of the ingredients that may be present in butter and margarine:

Butter:

milk fat (cream),
a little salt,

Margarine:

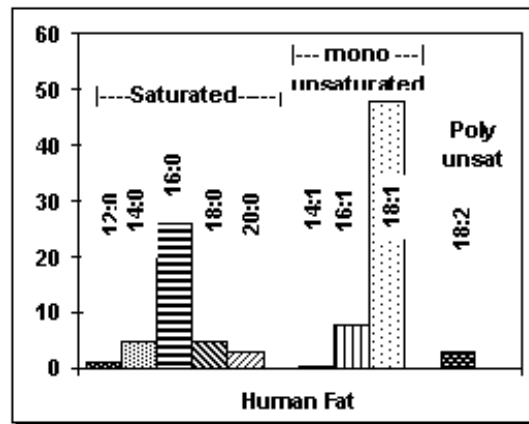
Edible oils,
edible fats,
salt or potassium chloride,
ascorbyl palmitate,
butylated hydroxyanisole,
phospholipids,
tert-butylhydroquinone,
mono- and di-glycerides of fat-forming fatty acids,
disodium guanylate,
diacetyltartaric and fatty acid esters of glycerol,
Propyl, octyl or dodecyl gallate (or mixtures thereof),
tocopherols,
propylene glycol mono- and di-esters,
sucrose esters of fatty acids,
curcumin,
annatto extracts,

tartaric acid,
3,5,trimethylhexanal,
 β -apo-carotenoic acid methyl or ethyl ester,
skim milk powder,
xanthophylls,
canthaxanthin,
vitamins A and D.

Dietary fat patterns

The total amount of fats in our diet today, according to the MAFF National Food Survey, is almost the same as it was at the beginning of this century. What has changed, to some extent, is the types of fats eaten. At the turn of the century we ate mainly animal fats that are largely saturated and monounsaturated. Now we are tending to eat more polyunsaturated fats – it's what we are advised to do. In 1991, two studies, from USA ⁽⁴⁾ and Canada, ⁽⁵⁾ found that linoleic acid, the major polyunsaturated fatty acid found in vegetable oils, increased the risk of breast tumours. This, it seems, was responsible for the rise in the cancers noted in previous studies. Experiments with a variety of fats showed that saturated fats did not cause tumours but, when small amounts of polyunsaturated vegetable oil or linoleic acid itself was added, this greatly increased the promotion of breast cancer.

Body cell walls are made of cholesterol, protein and fats. The graph below demonstrates that the human body's fat make-up is largely of saturated and monounsaturated fatty acids. We contain very little polyunsaturated fat. Cell walls have to allow the various nutrients that body cells need from the blood, but stop harmful pathogens. They must be stable. An intake of large quantities of polyunsaturated fatty acids changes the constituency of cholesterol and body fat. Cell walls become softer and more unstable.



Polyunsaturated fats suppress the immune system

Polyunsaturated fats (PUFs) are greatly immunosuppressive, and anything that suppresses the immune system is likely to cause cancer. The first person to suggest that polyunsaturated fats cause cancer was Dr R A Newsholme of Oxford University, England. ⁽⁶⁾ What Newsholme wrote was that when our bodies get sufficient nutrition, our diet includes immunosuppressive PUFs which make us prone to infection by bacteria and viruses. When we are starved, however, our body stores of PUFs are depleted. This allows our bodies' immune systems to recover which, in turn, allows us to

fight existing infection and prevent other infections. He was making the point that the immunosuppressive effects of PUFs in sunflower seeds are useful in treating autoimmune diseases such as multiple sclerosis, ⁽⁷⁾ and that the same fatty acids could be used to suppress the immune system to prevent rejection of kidney transplants.

It was during the early days of kidney transplantation that doctors first encountered the problem of tissue rejection as their patients' bodies destroyed the alien transplanted kidneys. If transplantation were to be a success, they had to find a way to suppress the immune system. Newsholme had said that there was no better way to immunosuppress a renal patient than with sunflower seed oil. So kidney transplant doctors fed their patients linoleic acid. ⁽⁸⁾ (Linoleic acid is the major polyunsaturated fatty acid in vegetable oils.) But the transplant doctors were then astonished to see how quickly their patients developed cancers: some cancers were up to twenty times as frequent as was expected.

This was in line with heart trials using diets that were high in PUFs which, reported an excess of cancer deaths from as early as 1971. ⁽⁹⁾

By the early 1980s, we were being exhorted by doctors and nutritionists to eat more PUFs because they were 'good for us' despite the fact that *Oncology Times* carried a paper in January 1980 from the University of California at Davis that mice fed PUFs were more prone to develop melanoma. In May 1980, the same publication carried a similar report from Oregon State University which said that PUFs fed to cancer-prone mice increased the numbers of cancers formed.

In 1989 there was a report of a ten-year trial at a Veterans' Administration Hospital in Los Angeles. In this trial half the patients were fed a diet which had double the amount of PUFs as compared to saturated fats. In the half of the patients on the high PUF diet there was a fifteen percent increase in cancer deaths compared to the saturated fat group. ⁽¹⁰⁾ The authors of the report said that the PUFs had been the cause of the increase in cancer deaths. The *British Medical Journal* carried an editorial in its 6 October 1973 issue which asked if PUFs were carcinogenic. It came to the conclusion that they were.

Wayne Martin likes to tell a story which suggests just how cancer-causing are PUFs. In 1930 in the USA, eighty percent of men smoked cigarettes and the tar content of cigarettes was much higher than it is today. The death rate at that time from lung cancer was very low. In 1955 doctors decided that PUFs were good in terms of heart disease protection. After this lung cancer deaths increased so dramatically. By 1980 although the number of American men who smoked had dropped to only thirty percent, three times as much PUF was being eaten – and there were sixty times as many lung cancer deaths. ⁽¹¹⁾

In 1990, Martin called Newsholme's Oxford University office but by then Newsholme had retired. Martin spoke to his successor to find that they were still treating autoimmune diseases with PUFs. By then they were using fish oil. The doctor said the reason for the fish oil was that the degree of immunosuppression increased with the degree of unsaturation and fish oil was much more unsaturated than sunflower oil. Martin asked the doctor why they were not talking about PUFs causing cancer. The doctor replied that if he did that he would be run out of Oxford.

Carcinogens – background radiation, ultraviolet radiation from the sun, particles in the air we breathe and the food we eat – continually attack us all. Normally, the immune system deals with any small focus of cancer cells so formed and that is the end of it. But linoleic acid suppresses the immune system. With a high intake of margarine, therefore, a tumour may grow too rapidly for the weakened immune system to cope thus increasing our risk of a cancer.

Polyunsaturated fats cause cancer

Since 1974, the increase of polyunsaturated fats has been blamed for the alarming increase in malignant melanoma (skin cancer) in Australia. ⁽¹²⁾ We are all told that the sun causes it. Are Australians going out in the sun any more now than they were fifty years ago? They are certainly eating more polyunsaturated oils: in Australia in 1995 I saw that even the cream on milk was removed and replaced with vegetable oil. Victims of the disease have been found to have polyunsaturated oils in their skin cells. Polyunsaturated oils are oxidised readily by ultra-violet radiation from the sun and form harmful 'free radicals'. These are known to damage the cell's DNA and this can lead to the deregulation we call cancer. Saturated fats are stable. They do not oxidise and form free radicals.

Malignant melanoma is also said to be increasing in this country. Does the sun cause this? In Britain the number of sufferers is so small as to be relatively insignificant. Even so, it is not likely that the sun is to blame since all the significant increase is in the over-seventy-five-year-olds. People in this age group tend to get very little sun.

That the sun is not to blame is confirmed by other findings:

- Melanoma occurs ten times as often in Orkney and Shetland than it does on Mediterranean islands.
- It also occurs more frequently on areas that are *not* exposed to the sun.
- In Scotland, for example, there are five times as many melanomas on the feet as on the hands;
- and in Japan, forty per cent of pedal melanomas are on the soles of the feet . ⁽¹³⁾

Polyunsaturated fats promote cancer

Many laboratories have shown that diets high in polyunsaturated fatty acids promote tumours. Cancer promotion is not the same as cancer causing. The subject is complex; suffice to say here that promoters are substances that help to speed up reproduction of existing cancer cells.

It has been known since the early 1970s that it is linoleic acid that is the major culprit. As Professor Raymond Kearney of Sydney University put it in 1987: 'Many laboratories have shown that a greater proportion of polyunsaturated fats are superior to diets rich in saturated fats in promoting the yield of experimental mammary tumours. In such studies, omega-6 linoleic acid appeared to be the crucial fatty acid . . .' and 'Vegetable oils (eg Corn oil and sunflower oil) which are rich in linoleic acid are potent promoters of tumour growth.' ⁽¹⁴⁾

Polyunsaturated fats and breast cancer

A study of 61,471 women aged forty to seventy-six, conducted in Sweden, looked into the relation of different fats and breast cancer. The results were published in January 1998. This study found an inverse association with monounsaturated fat and a positive association with polyunsaturated fat. In other words, monounsaturated fats protected against breast cancer and polyunsaturated fats increased the risk. Saturated fats were neutral. ⁽¹⁵⁾

Flora margarine, the brand leader, is thirty-nine percent linoleic acid; *Vitalite* and other 'own brand' polyunsaturated margarines are similar. Of cooking oils, sunflower oil is fifty percent and safflower oil seventy-two percent linoleic acid. Butter, on the other hand, has only a mere two percent and lard is just nine percent linoleic acid. Linoleic acid is one of the essential fatty acids. We must eat some to live, but we do not need much. The amount in animal fats is quite sufficient.

Because of the heart disease risk from trans-fats in margarines, in 1994 the manufacturers of *Flora* changed its formula to cut out the trans fats and other manufacturers have since followed. But that still leaves the linoleic acid.

The anti-cancer fat

Linoleic acid is one of the essential fatty acids that our bodies need but cannot synthesise. We must eat some to survive. Fortunately there is one form of linoleic acid that is beneficial. Conjugated linoleic acid (CLA) differs from the normal form of linoleic acid only in the position of two of the bonds that join its atoms. But this small difference has been shown to give it powerful anti-cancer properties. Scientists at the Department of Surgical Oncology, Roswell Park Cancer Institute, New York ⁽¹⁶⁾ and the Department of Biochemistry and Molecular Biology, New Jersey Medical School, ⁽¹⁷⁾ showed that even at concentrations of less than one percent, CLA in the diet is protective against several cancers including breast cancer, colorectal cancer and malignant melanoma.

Conjugated linoleic acid has one other difference from the usual form – it is not found in vegetables but in the fat of ruminant animals. The best sources are dairy products and the fat on red meat, principally beef. ⁽¹⁸⁾

It has been suggested that the consumption of red meat increases the risk of colon cancer, yet in Britain there is no evidence to support this. ⁽¹⁹⁾ It is interesting that all the evidence implicating red meat in cancer comes from the USA – where they cut the fat off.

Conclusions

Saturated fats and animal fats are usually blamed for all manner of diseases in Western society. But look at the facts:

- In the 19th-century, when animal fats were all that was available, cancers were rare (as was heart disease).
- Polyunsaturated fats and oils are used to suppress the immune system, such immunosuppression is known to cause cancers to start and promote cancer.
- In this last century there has been a change in favour of polyunsaturated fats and oils – and cancer rates have soared.

Unfortunately, as polyunsaturated fatty acids are also essential to the body; we must have some. So a proper balance must be struck. Whether the dramatic increase in the numbers of cancers in the last century was as a result of a similarly dramatic rise in our intake of polyunsaturated vegetable oils is not known – but the evidence strongly favours such a conclusion.

Under the circumstances, it seems prudent to get what linoleic acid we need from animal sources. Or to restrict polyunsaturated oil consumption so that linoleic acid is no more than three percent of the total fat intake.

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