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Fats that Heal Fats that Kill

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INTRODUCTORY REMARKS BY NORMAN FRITZ

The information in this Newsletter will be of great value for many of our members, friends, and Gerson Therapy patients. Many readers will realize it is wise to include one or more spoonfuls of good flax seed oil daily in their diet--and/or to eat organic flax seed that naturally contains about 50% oil. The seed is more easily digested if pulverized, as in a seed mill.

We were fortunate in July 1987 when Udo Erasmus came to the Cancer Control Society Convention. He introduced us to his excellent 1986 book **FATS AND OILS, The Complete Guide to Fats and Oils in Health and Nutrition**. He will be speaking on **Fats that Heal, Fats that Kill** at the 1988 Cancer Control Society Convention at 5:00 PM on July 4th in Los Angeles.

At the same time we learned about the high quality flax seed oil available in Canada. Then we realized that for 28 years, Gerson Therapy patients had been getting the wrong oil. We immediately arranged for the Gerson Therapy Hospital in Mexico to obtain the good flax oil for the hospital patients. Patients appear to be doing better with this oil.

We believe this flax seed oil may be the most significant improvement in the Gerson Therapy since Dr. Max Gerson's death in 1959.

Before continuing with Udo's article, **Fats That Heal, Fats That Kill**, which effectively condenses many of the important points in his **FATS AND OILS** book, several considerations are of special interest to many Gerson Therapy students.

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Flax seed oil may be the most significant improvement in the Gerson Therapy in the last 30 years.

Flax oil is one of the few oils that contain the only two essential fatty acids required by the body--linoleic acid and linolenic acid. Science and the public have not generally recognized that we need more linoleic acid in our body and diet than any other essential nutrient, including any amino acid. Less linolenic acid is required. Linolenic acid, however, is usually deficient in most people's diets.

The high degree of unsaturation of the essential fatty acids is what makes them valuable to the body. This unsaturation also allows them to easily become rancid--particularly true for linolenic acid. As a result, manufacturers have made food oils so they won't become rancid--thus eliminating much of the essential fatty acids and making the oils toxic.

Therefore, people buying "cold pressed" oils, even linseed oil from health food stores, have not obtained the essential fatty acids they expected.

The "good" flax oil has been manufactured, bottled, shipped and stored in the absence of heat, light and air (oxygen)--the three things that make oil rancid. This oil comes in black bottles to exclude light that makes oil rancid 1000 times faster than oxygen alone. It is sealed under inert gas to exclude oxygen.

Many people in their fear of saturated fats have deprived themselves of essential fatty acids as well.

Max Gerson had experimented with oils for his patients for many years. However, in his early 1958 classic book **A Cancer Therapy--Results of 50 Cases**, he included no requirements for oil.

In November 1958 Gerson wrote to his good friend Dr. Albert Schweitzer in Africa. Gerson reported that he was then using 2 tablespoons of flax oil

daily for his cancer patients, following the work of Johanna Budwig, a German M.D. and biochemist.

Dr. Budwig (now 80) began her work with cancer about 1953. Other researchers as early as 1888 had shown that starving dogs deteriorated more rapidly on either protein or on fats. The dogs recovered rapidly, however, when they received both good proteins and good fresh flax oil.

Budwig found that the blood of cancer patients was deficient in the essential fatty acids. She found a yellow-green protein substance in the blood instead of the healthy red blood pigment, hemoglobin. This explained the anemia of cancer--an oxygen deficiency disease. The abnormal division of cancer cells can perhaps partly be explained as a deficiency of linoleic acid and sulphur-rich proteins necessary for cell membrane production.

Dr. Budwig gave her cancer patients a mixture including 4 oz. of non-fat cottage cheese (we prefer it raw) and three tablespoons of fresh flax oil with other dietary improvements.

She found that within 3 months the yellow-green was replaced with red; proper lipoproteins and phosphatides appeared; anemia was alleviated; tumors receded and disappeared; vitality returned and the patients recuperated. Symptoms of cancer, diabetes, or liver disease disappeared.

The essential fatty acids have profound effects in our lives from conception to death. Udo describes many of these effects in his article and more in his book, **FATS AND OILS**.

Veg-Omega-3, a high quality flax seed oil, can be ordered by health food stores from the U.S. distributor, Spectrum Naturals, in Petaluma, CA.

A few of the functions of essential fatty acids follow:

1. They are essential components, along with proteins, in the structure of every cell wall and internal cell components.
2. They are required for energy production and oxidation in the body.
3. They are essential for proper sperm formation for conception.
4. They are essential in the foetus for brain and nerve formation and in human mother's milk for continued brain and nerve growth. Cow's milk, as in baby formulas, is almost devoid of essential fatty acids. These deficiencies are strongly implicated in learning disabled children.
5. Essential fatty acids increase the ease of dissolving body fat into the body fluids. Therefore, they can remove arteriosclerosis and permit good weight control.
6. Their deficiencies appear to be important factors in most human illness.

Beginning with the 1975 edition of Gerson's **A Cancer Therapy**, we included the requirement for the flax seed (linseed) oil. Gerson's book always has required an 8 oz. cup of cottage cheese and 8 oz. of yogurt daily for each patient shortly after beginning the therapy.

FATS AND OILS, The Complete Guide to Fats and Oils in Health and Nutrition, 363 pages, can be ordered from the Gerson Institute. The prices are: \$14.50 U.S. paperback and \$27.50 U.S. hard cover plus \$2.00 shipping. California residents please add sales tax of \$0.94 paperback and \$1.79 hard cover. Our book list includes numerous books, audio, and video tapes. Copies of this Newsletter are \$2.00 plus \$1.00 shipping.

Fats that Heal

Fats that Kill

This article was transcribed from a lecture.

Welcome to this presentation about fats that heal and fats that kill!

OVERVIEW

Let me begin with a brief overview of what we will cover here. We will start with a discussion of the essential fatty acids: what they are, the derivatives and prostaglandins that the body makes from them, and what we know about the functions of all of these substances in health and disease. We will cover food sources, our daily requirement for them, and their sensitivity to destruction. Then we'll talk about the non-essential fatty acids, cholesterol, excess calories and trans-fatty acids. Then we will cover therapy with oils. Finally, we will talk about processing, new directions in manufacturing, and recent research and clinical findings.

CONTEXT

Before we start, I'd like to give you a larger nutritional context into which to fit our discussion of fats and oils and their effects on health. I provide that context by making five statements.

First: the entire human body is made from food, plus air and water. In 9 years of study of life sciences at the University of British Columbia with professors and researchers, I never heard that statement made once. It took me several years to come to accept that something this simple could have been missed by so many dedicated, knowledgeable experts in so many prestigious institutions with so much money, studying diseases,

trying to understand the problems, and trying to find answers. Not once in 9 years did I hear that the entire human body is made from food.

Yet that one simple statement has profound implications. The quality of our health reflects in large measure the quality of the foods which we eat, from which our bodies are made.

Photograph by S. Erasmus



AUTHOR UDO ERASMUS

Second: Research has discovered 45 essential nutrients. "Essential" means: we absolutely have to have them to live and be healthy; our (human) bodies cannot make them from other substances; and we must therefore obtain them, in their natural state,

from the foods we eat (or from food supplements). Deficiency of any of the essential nutrients *has* to result in deterioration of health and lead to degeneration ending in death, unless adequate minimum concentrations of that essential nutrients are returned to the deficient diet. These 45 essential nutrients include 20 minerals, 15 vitamins, 8 essential amino acids (building blocks for proteins), and 2 essential fatty acids (building blocks for fats and oils). For optimum health, we need optimum quantities of every one of these 45 nutrients every day.

Third: Large-scale nutritional surveys have shown that over 60% of the North American population is deficient in one or more essential nutrients. The surveys measured only 10 of the 45 known essential nutrients. They only tested for minimum quantities to prevent deterioration, not optimum quantities for optimum health. An only partial survey of minimum essential nutrient requirements turned up over 60% deficiency. This means that over 60% of the North American population *has* to be degenerating because of their deficiencies in essential nutrients.

Fourth: 78% of the North American population dies as a result these degenerative conditions. Included are cardiovascular disease, which kills 50% of the population; cancers, 23%; diabetes, 5%; and multiple sclerosis, 0.1%. Cystic fibrosis, which also has a major genetic component, claims a smaller number of victims. This totals 78.1% of the population. All of these

fatal degenerative diseases have a major fatty component. I became very interested in fats and oils when I learned these statistics during my studies.

Other degenerative conditions with a major fatty component include arthritis; premenstrual syndrome; osteoporosis, which is as much a fatty problem as a calcium problem, and doesn't respond all that well to calcium supplements; some cases of sterility and miscarriage; some behavioral afflictions, including schizophrenia, manic depressive (or bipolar) disorder and depression; fatty degeneration of inner organs such as liver, kidney and brain; some skin afflictions; gall and kidney stones; proneness to infection; inflammatory conditions; and failure of wound healing. Most of the degenerative conditions from which North Americans suffer are nutrition-based, and fat-based as well.

Fifth: It hasn't always been this way.

In 1900, cardiovascular disease killed one in seven. Now, one in two. In 88 years, a 350% increase in spite of - or perhaps because of--advances in technology and how they have been applied to food processing. In 1900, one in thirty people died of cancer. Today cancer claims one in four, an increase of over 600% in 88 years. Incidence of other degenerative diseases followed a similar steep rise.

FATTY ACIDS

With this background, let's turn to fats and oils.

The major functional components of all fats and oils are called fatty acids, and hundreds of different kinds of fatty acids are found in nature. They vary in the length of their carbon chains: some are short, others medium sized, still others long. Some have side branches. Some are bent in one place, others in more than one, up to 6 places. Some of them are saturated or hard, some unsaturated or liquid. Some are monounsaturated, others polyunsaturated. Some are toxic, some are neutral. Some are cis-, some trans-. Some are used for the production of energy, others are important structural components. Most are non-essential and two are essential.

ESSENTIAL FATTY ACIDS

Of the hundreds of different fatty acids found in nature, about 20 are common in human foods, and two are essential to human health. These essential two are therefore called *essential fatty acids*.

I will repeat what "essential" means when talking about a nutrient: you absolutely have to have it to live and be healthy; your body cannot make it from other substances; you die if you don't get any; and you therefore have to obtain it, in its natural state, from the foods that you eat.

I'll now refer to the overview diagram.

The essential fatty acids are found in the two square boxes at the top left of the diagram. Essential fatty acids are the parents of two families: the Omega 3 family and the Omega 6 family. The top line is occupied by the Omega 3 family. It has several members, of which I will point out the most important.

The Omega 3 essential fatty acid itself is called alpha-linolenic acid or ALNA. Its richest food source is flax, and we will talk about flax later. From the Omega 3 essential fatty acid, a normal healthy body makes a derivative known as stearidonic acid or SDA. Stearidonic acid is attracting attention as a constituent of black currant seed oil, which has therapeutic possibilities. Little controlled research has been done using this oil so far. From stearidonic acid, through a couple of steps, the body makes a fatty acid which is called EPA for short. It has the nearly impossible longer name: eicosapentaenoic acid.

We find EPA in fish oils. The stories that link fish oils with heart health, clean arteries and relief of arthritis and psoriasis all revolve around the presence of EPA in these oils. EPA is the parent from which the body makes a group of hormone-like regulating substances called the Prostaglandin 3 (PG3) series. We'll come back to these prostaglandins in a minute. From EPA, through a couple of more steps, the body makes the final Omega 3 derivative called DHA or docosahexaenoic acid. DHA is also found in fish oils, and is required both for brain development in the unborn

and for adult brain function. These, then, are the important members of the Omega 3 family, the top line in the diagram.

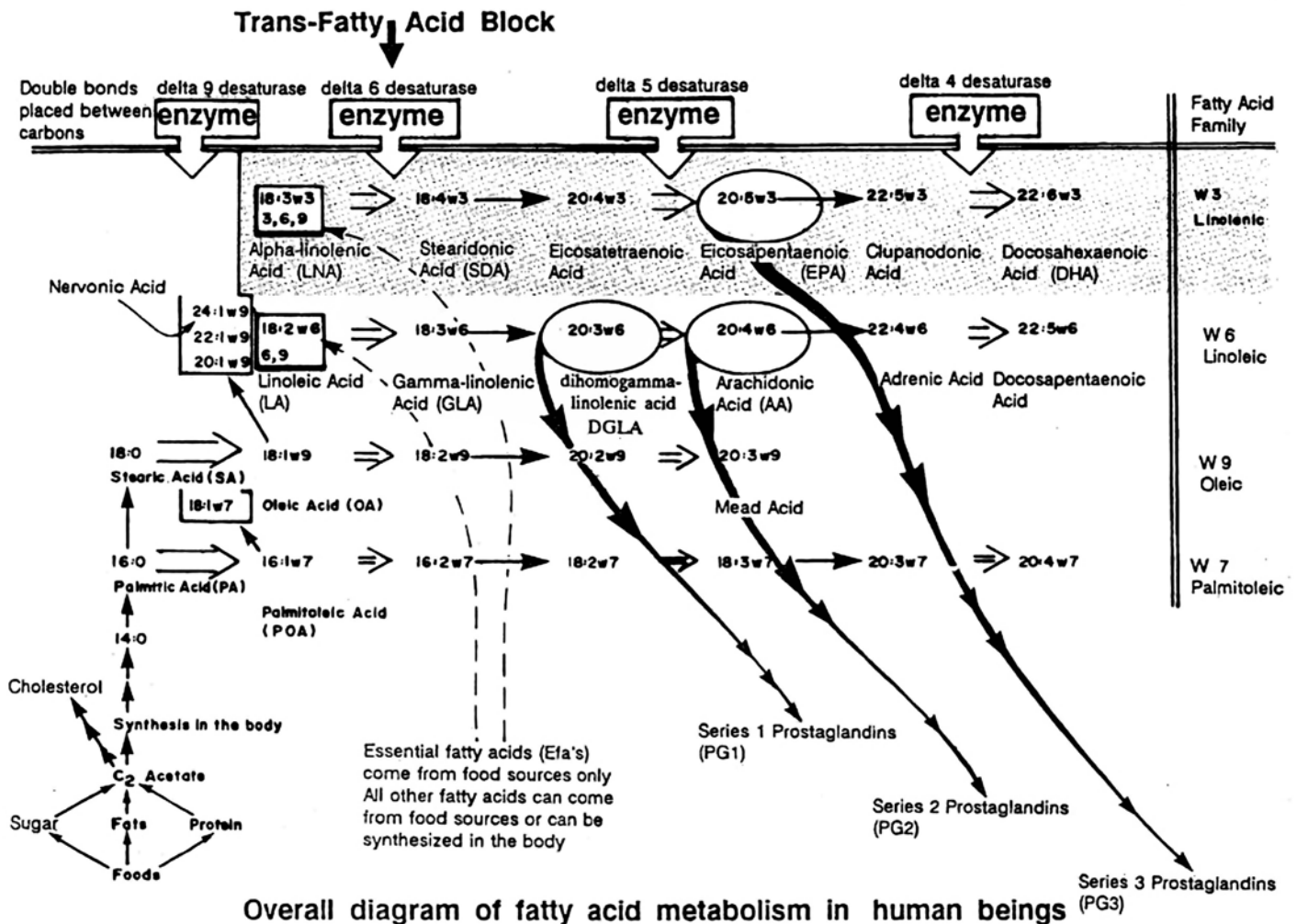
The Omega 6 family of fatty acids occupies the second line. The essential fatty acid itself is called linoleic acid or LA. It is found in most seed oils. From LA, a healthy body makes a derivative called gamma-linolenic acid or GLA. GLA is present in human mother's milk, and was made famous by Dr. David Horrobin's extensive research with evening primrose oil, of which it is a constituent. GLA also occurs in black currant and borage seed oils. From GLA, the body makes dihomogamma-linolenic acid or DGLA. DGLA is also found in mother's milk and it is the parent of the hormone-like Prostaglandin 1 (PG1) series. We'll return to these. From DGLA, the body makes arachidonic acid or AA. AA is the parent of another group of hormone-like substances, the Prostaglandin 2 (PG2) series. Medical researchers have studied the PG2 series extensively, because they mediate a number of degenerative conditions. Arachidonic acid is found in meat, dairy products and eggs, which explains in part why diets high in these products predispose us to degenerative diseases. These then are the important members of the Omega 6 family.

ESSENTIAL FATTY ACID FUNCTIONS

As I said before, Omega 3 and 6 fatty acids are essential, and we can't live without them. If we lack them, we degenerate slowly. If they are completely missing, we deteriorate, and when our body's stores of these essential fatty acids are used up, we die. Since that is so, a good question to ask is: Why are they important? If we can't live without them, they must have some critically important functions. What do they do?

Essential fatty acids and their derivatives serve a number of major vital functions in the body and in health.

First, essential fatty acids are required for the transport and metabolism of both cholesterol and triglycerides. They are able to lower



high cholesterol levels by up to 25% and high triglyceride levels up to 65%.

Second, essential fatty acids, and especially the Omega 3s, are required for normal development of the brain. In the adult, they are required for brain function. In the human foetus, brain development begins six weeks after conception, and is completed about one year after birth. In animal studies it has been shown that when the mother's diet is deficient in Omega 3 fatty acids, her adult offspring show permanent learning disabilities. We haven't done controlled experiments on human populations, but we know that Omega 3 fatty acids are required for human brain development, and if you think about increasing incidence of learning disabilities of our school children, you might guess that we have a similar situation of Omega 3 deficiencies.

In the adult, Omega 3s are required in

visual function (retina), brain and nerve function (synapses), adrenal function (stress), and testis function (sperm formation). Clinical studies indicate that Omega 3s bring a sense of calmness. They interfere with the production of chemicals which the body makes in response to stress. They improve the behavior of schizophrenics and juvenile delinquents resistant to counselling.

Third, essential fatty acids and their derivatives are components required in the structure of the membranes that surround each cell in our body and each organelle (the little factories that carry on various specific cellular activities) within each cell. When we lack essential fatty acids, we end up with leaky membranes. Substances which ought not to, pass in and out of cells, with several effects on the organism. The electrical potential of the cells is altered; vitality is lowered; gastrointestinal problems arise; skin

afflictions occur; and allergic reactions take place because foreign substances get into our body. Then our immune system has to deal with those foreign substances.

Fourth, essential fatty acids stimulate metabolism, increase metabolic rate, increase oxygen uptake, and increase energy production. These effects can be measured on the cellular level. Oxidation and energy production are the most important moment to moment functions of every cell. How do these important functions work? Through oxidation, molecules of food are broken down into carbon dioxide and water. Oxygen is a necessary part of that process. Energy is released during oxidation, and this energy is the energy our cells require to do their work on the molecular level. This energy is also our vitality, the energy we use to think, to act and to accomplish.

Essential fatty acids, especially Omega 3s, slow down growth of cancer cells, candida and other anaerobic organisms which do not like oxygen.

Where does the energy come from? Sunshine energy is trapped by electrons in chlorophyll molecules in green leaves. These electrons become excited and reactive, and through a complex chain of electrical and molecular events, form bonds with the other atoms to make molecules. The sunlight energy is stored on the electrons involved in these bonds. When we eat those molecules (or animals who ate them) as food, our bodies break the molecules down again by oxidation, the reverse of the process that the plant used to build them. Stored sunlight energy, released as molecules are broken down, is the energy we live on.

Essential fatty acids stimulate the process of oxidation because they attract and somehow reversibly react with or activate oxygen. This means that they increase lowered vitality, which accompanies most degenerative conditions. People who begin to take essential fatty acids when they have been deficient feel an increase in their energy level. Athletes and others appreciate finding that their muscles recover more rapidly from fatigue after exercise when essential fatty acid intake increases, because they speed lactic acid breakdown, which is oxygen dependent. Athletes also experience greater stamina and higher plateaus of performance.

Finally, essential fatty acids, especially Omega 3s, slow down growth of cancer cells, candida and other anaerobic organisms which do not like oxygen.

Fifth, a function of fatty acids, and this is what much of the recent research excitement is about, is that **from essential fatty acids, the body makes derivatives** (shown in the ellipses on the diagram) **which are the parents of hormone-like substances collectively termed prostaglandins** (shown at the bottom of cascading arrows on the diagram). Prostaglandins have five known functions.

First, they regulate platelet stickiness, so you might expect their involvement in the clotting diseases: heart attack, stroke, pulmonary

embolism, peripheral arterial disease, (which can lead to gangrene), clots in the veins (phlebitis), and so on. The PG1 series makes platelets less sticky. The PG2 series has some members which make platelets more sticky (thromboxanes) and others which make them less sticky (prostacyclins), a mixed blessing. The PG3 series makes platelets less sticky, and EPA, the parent of the PG3s, keeps arachidonic acid from cascading to form the PG2 series, thus preventing or slowing down the production of substances which make platelets more sticky. So the "good" PG3s keep the "bad" PG2s from getting out of hand.

Second, prostaglandins regulate arterial muscle tone, which involves them in blood pressure regulation. When arteries relax, blood pressure goes down. When they constrict, blood pressure goes up. PG1s relax the arteries; PG2s constrict them and increase blood pressure; and PG3s lower blood pressure and keep the PG2s from getting out of line. Long term effects of high blood pressure include heart and kidney failure, certain kinds of strokes (burst blood vessels) and aneurisms.

Third, prostaglandins regulate inflammatory response. Inflammation characterizes the diseases that end in "itis". Starting at the top of the body and going down, we have meningitis, tonsillitis, sinusitis, otitis, gingivitis, bronchitis, esophagitis, gastritis, ileitis, and colitis. We also have appendicitis, cystitis, urethritis, hepatitis, nephritis, pancreatitis, splenitis, arthritis, bursitis, myositis (muscle), tendonitis, neuritis, arteritis, phlebitis (veins). There is an inflammatory condition for every tissue in the body! Lupus is inflammation of the connective tissue and psoriasis is inflammation of the skin. The PG1s decrease inflammation and the PG2s (leukotrienes) increase it. The PG3s decrease inflammation and keep a lid on PG2 production.

Fourth, prostaglandins regulate sodium excretion through the kidney. When sodium is excreted, water goes with it: 21 molecules of

water for each ion of sodium. Conversely, when sodium is retained, water is also retained, leading to conditions involving water retention or edema. Swollen ankles associated with aging or after a hard day's work involve water retention. So do ovarian cysts. Pre-menstrual syndrome involves water retention in the uterus, water retention in the breasts with breast pain, and water retention in the brain, resulting in behavioral problems. Some types of obesity involve water retention. Late stages of cardiovascular disease and cancer (ascites) also involve water retention.

The PG1s increase sodium and water excretion, resulting in loss of held water. PG2s increase sodium and water retention. The PG3s increase sodium and water loss and keep the PG2s in line.

Fifth, prostaglandins regulate immune function. The PG1s stimulate immune response; PG2s inhibit it; and PG3s enhance immune function and keep the PG2s in check. When we talk about immune function, cancer and AIDS come to mind. These days, we think of them in reverse order. Allergies also involve deficient immune function.

Immune function requires essential fatty acids to kill infectious organisms. How? From essential fatty acids, immune cells form peroxides, then hydrogen peroxide, which breaks up into water and oxygen. Released locally in the area of infection, the oxygen kills the invaders. Other cells then gobble up the debris and metabolize, re-cycle or excrete it.

You might ask a really good question at this point. Why would the body be so stupid as to make the series 2 prostaglandins which create problems for us? PG2 production is triggered by stress, and does have a purpose.

If we were living in the jungle, involved in fight or flight behavior in response to stress or danger, sticky platelets would help to stop bleeding sooner after injury. Sodium and water retention would provide excess fluids which we could afford to lose after

"Omega-3 essential fatty acid, as in flax seed oil, is a miracle food, because it is the most commonly lacking essential nutrient."

The richest source of linolenic essential fatty acid (Omega-3) is flax seed oil.

injury. Increased blood pressure would bring more oxygen to the tissues for the burst of energy required for fight or escape. Inflammatory response would speed healing by opening blood vessels to bring extra nutrient-filled blood to injured tissues. Lowered immune response would delay the need for energy at a time that energy is better used to fight or flee.

But we don't live in the jungle now. We still have the stresses that increase adrenalin production and trigger the arachidonic acid cascade which produces the PG2s. When the boss yells at us, we still react. But we don't get to hit him, and we can't run away. We don't work off the stress physically. We just take it. We end up in a chronic situation of stress, increased PG2s, sticky platelets, high blood pressure, edema, inflammation and lowered immunity. Ultimately, these create degenerative conditions.

SUMMARY

By tracing the biochemistry that we now know, and listing the relationships and functions of the essential fatty acids, their derivatives and the prostaglandins, we have covered most major degenerative conditions and shown many of their relationships to fats.

SOURCES AND REQUIREMENTS

The next obvious questions to answer about the Omega 3 and 6 fatty acids are: sources and requirements.

Omega 6

Where do we get Omega 6 essential fatty acids? There are a number of good sources of linoleic acid in our diet, mostly vegetable seed oils and the seeds themselves. The oil highest in Omega 6 is safflower, which contains about 75% Omega 6. Sunflower oil contains 65%, corn oil 54%, sesame 45%, peanut 29%, almond 17% and olive about 8%. All of these oils contain very little Omega 3, less than 1% (reference *Fats and Oils*, page 231).

How much Omega 6 do we need? 1

to 2% of daily calories as Omega 6 is what most normal adults require in order to prevent degeneration. A little more might be okay. How much do we actually get? We consume about 8.5% of our calories as Omega 6 fatty acids. Experts generally agree now that we consume both an excess of Omega 6s and too little Omega 3s. Although Omega 6s are essential, excess Omega 6 consumption (safflower, sunflower, corn and cotton seed oils contain over 50% Omega 6s and virtually no Omega 3s) promotes tumor formation. Although Vitamin E protects against tumor promotion by Omega 6s, refined oils have had this essential protective nutrient removed.

Omega 3

What about the Omega 3s? Only a few sources in our food supply contain adequate quantities of Omega 3s for human requirements. The richest source of Omega 3s is flax, whose oil contains 55-65% Omega 3s and 15-25% Omega 6s. Pumpkin seed oil contains 0-15% Omega 3s and about 50% Omega 6s. Soy bean oil contains 7 to 9% Omega 3s and 57% Omega 6s. Walnut oil is 3 to 11% Omega 3s and about 50% Omega 6s. Our Omega 3 oils also contain Omega 6s, but our Omega 6 oils are poor sources of Omega 3s. Purslane and dark green vegetables contain up to 0.4% Omega 3s, which is not enough for human requirement, and the membranes of all living cells contain traces of Omega 3s.

Fish oils contain up to 30% derivatives of Omega 3 essential fatty acids as EPA and DHA, and up to 5% of the Omega 3 essential fatty acid. The best fish are high-fat, cold water fish including salmon, sardines, tuna, mackerel, rainbow trout and eel. Lean fish contain small quantities. Fish liver oils (cod, halibut, shark, etc.) contain EPA and DHA, along with vitamins A and D which in excess can be toxic (but to be fair, you'd have to be very stupid and try hard to overdose on fish liver oils. You'd gag on the taste long before reaching a toxic dose).

How much Omega 3 do we need? Only a few studies have been done,

with patients whose intravenous formula did not contain Omega 3s. They developed deficiency symptoms, which were relieved by about 0.5% of daily calories as alpha-linolenic acid. The maintenance dose, estimated by examining the Omega 3 content of traditional diets of groups of people free of degenerative conditions, appears to be around 2% of daily calories (5 grams of pure Omega 3 essential fatty acid per day). Eskimos got 4.1% of their calories as Omega 3s. As the content of Omega 6s in our diet increases, we need increased amounts of Omega 3s to compensate. How much Omega 3 do we get in our diet? The average North American intake has been measured as 0.4% of calories. This means that we are getting less than the minimum required to prevent degeneration, and only one-fifth of the optimum to maintain health. The average North American has to be deteriorating because of insufficient Omega 3.

Deficiency of the Omega 3s which keep a handle on the production of deleterious PG2s, combined with an excess of Omega 6s which push the arachidonic acid cascade to produce the PG2s unchecked, is one of the major imbalances in our fat nutrition. Biochemists have suggested that the ideal ratio of Omega 3s to Omega 6s should be 1:4 or 1:5. Greenland Eskimos who were free of degenerative diseases had an Omega 3 to 6 ratio of 2.5:1 on their traditional diet. Our ratio today is about 1:20 and for many people, it is even lower. Between 1850 and today, our consumption of Omega 3s went down to 1/6 of its 1850 level.

SENSITIVITY

Finally, a few words about essential fatty acid sensitivity. Essential fatty acids are chemically very reactive. This ability to react readily is what makes them so valuable to the body. It also makes them very sensitive to destruction by several factors. Light is the most destructive. It destroys essential fatty acids, through free radical chain reactions, a thousand times more rapidly than does the next

Olive oil contains 92% non-essential fatty acids and only 8% essential fatty acids.

Excess non-essential fatty acids block conversion of the essential fatty acids resulting in functional essential fatty acid deficiency.

most destructive influence, oxygen, which destroys essential fatty acids by peroxide formation (rancidity) very quickly. Oils high in essential fatty acids (especially Omega 3s) are used as "drying" oils in paint, linoleum and concrete sealers. They react rapidly with oxygen (air) and dry in a thin film. The third destructive influence is high temperature, such as that reached in refining oils (deodorization), in hydrogenation, and in frying. I'll say more about that later.

One last point. All of the 45 essential nutrients except the Omega 3 and 6 essential fatty acids can be dried and stored for a long time with minimal deterioration. The essential fatty acids deteriorate rapidly. If health is our concern, the oils containing them need to be fresh, protected from deterioration, and made and handled with exceptional care. Their short shelf life indicates that they should be treated like perishables such as lettuce and milk.

That concludes what I want to say about the essential fatty acids for now.

NON-ESSENTIAL FATTY ACIDS

I want to talk now about the non-essential fatty acids, which are all the fatty acids on the diagram except the top 2 lines.

The hard fats: beef, pork and lamb fats, dairy fats: butter, cream, sour cream, cheese and cream cheese; and coconut fat and palm kernel fat are high in non-essential fatty acids of the saturated type.

Oils also contain non-essential fatty acids, both saturated and mono-unsaturated. I said previously that olive oil contains about 8% essential fatty acids. The other 92% are non-essential. Almond oil is 83% non-essential; peanut oil is 71% non-essential; and so on up to safflower, which is 25% non-essential. All oils contain some non-essential fatty acids. Flax seed oil contains about 20% non-essential fatty acids; pumpkin seed oil contains 35% non-essential, and so on. These have to be included in our intake of non-essential fatty acids.

A third source for non-essential fatty acids is all calories that are in excess of what the body uses up in its moment-to-moment activity. These excess calories could come from protein, or fats, or refined carbohydrates. Whole grains and other complex and fiber-rich carbohydrates are broken down into sugar (glucose) at about the rate at which the body burns glucose for energy, and therefore don't produce excess calories. Our most dangerous source of excess calories is sugar (glucose, dextrose, fructose, table sugar, brown and turbinado sugars, honey, corn, maple and rice bran syrups, and to lesser extents barley and other malts and refined starches in white flours, noodles and pastas). Sugar requires almost no digestion and is therefore absorbed very rapidly into the bloodstream, flooding it and creating a toxic condition. To correct this condition, insulin is secreted by the pancreas and stimulates the cells to take up the excess sugar. Then cells convert the absorbed sugar into non-essential fatty acids and cholesterol.

Since the body can make non-essential fatty acids from other substances, it does not require them in the diet (this is the definition of non-essential).

The body can use the non-essential fatty acids that it makes or gets from food as energy storage, for energy production and in membrane structures. In excess, however, non-essential fatty acids compete for an enzyme called D-6-D or Delta-6-Desaturase, which is shown at the top of the diagram, second enzyme from the left. This enzyme converts essential fatty acids into their first derivative, that is: ALNA to SDA; and LA to GLA. It also converts the non-essential fatty acids into their first derivatives. Because of competition for enzyme attention, an excess of non-essential or relative deficiency of essential fatty acids results in a slow-down of essential fatty acid functions. What is the critical ratio? If you have 50% essential fatty acids (in acceptable Omega 3 to Omega 6 ratio) and 50% non-essential, you're in

good shape. If you have 25% essential and 75% non-essential, you're border-line. If you have 5% essential and 95% non-essential, the non-essential fatty acids completely block the conversion of the essential fatty acids, resulting in functional essential fatty acid deficiency.

What is our diet like? It is borderline, around 9% and 91%, most of the 9% being Omega 6.

Let me return one more time to sugar and excess calories, because they create another fat-related condition. Excess sugar absorbed by the cells, and excess calories from any source are converted not only into non-essential fatty acids, but also into cholesterol (one reason why excess sugar results in gorged foam cells in arteries and in atherosclerotic plaque), through a 2-carbon fragment called acetate (produced in the Krebs or energy-producing citric acid cycle in the mitochondria), which is the parent of both. This is shown at the bottom left hand corner of the diagram.

The most dangerous nutritional combination is cholesterol combined with saturated fatty acids. Both are hard at body temperature (37C or 98F) and therefore tend to be hard in the body. Cholesterol melts at 149C or 300F; the 16-carbon saturated fatty acid (palmitic acid) at 63C or 145F; the 18-carbon saturated fatty acid (stearic acid) at 71C or 160F. In contrast, LA melts at -5C or 23F; ALNA at -12C or 10F; EPA at -55C or -67F; and DHA at -45C or -49F. These essential fatty acids and their derivatives help to liquefy the hard fats and cholesterol and to make them easier to move in the bloodstream and back out of the deposits in arteries and other tissues. This is highly desirable for removing the stored hard fats of overweight people.

When doctors advise us to avoid red meat, they misinform us. We should avoid the 20-40% hard white fat bred into the red meats of beef as a result of marketing considerations. Red meats from moose, deer, or wild cattle in Africa contain only 1 to 3% body fat, and are not associated with

Many people become aware of a significant increase in their energy level when they start taking essential fatty acid

There is no shred of evidence to show that margarine is good for our hearts.

cardiovascular problems. Mutton is 25%-40% fat, wild sheep about 5%.

Wild pig is 1.3% fat and domestic pig is 35 to 65% fat. In Europe, up to 10% of pigs die of heart attacks on the trains that transport them to slaughter houses. You might say that they choke on their own fat. When man eats such pigs, he prepares himself for a similar fate. Effects on human health were not considered when the decisions that resulted in fat cattle, pigs and mutton were made. Besides being more lean, wild (natural) animals' fats contain more essential fatty acids than do domestic ones.

One final point about hard fats. They are chemically slow, react only slowly with other substances and tend to be "dumped" in arteries, in cells, in organs, in fatty tumors, etc., resulting in fatty degeneration.

TRANS-FATTY ACIDS

One other group of non-essential fatty acids bears mention. These are the trans- fatty acids produced by frying, deodorization and hydrogenation of oils. Trans- fatty acids are the twisted sisters of essential and mono-unsaturated fatty acids. We find them in large quantities in margarines, shortenings, shortening oils, partially hydrogenated vegetable oils and fried and deep fried oils. Their shapes have been altered by rotation; they are harder than the fatty acids from which they were made. They interfere with essential fatty acid function by tying up enzymes non-productively and make essential fatty acid deficiency worse. They now constitute 15% of all the fats we consume, beginning from almost zero in 1911. Statistically, the increasing levels of trans- fatty acids in our foods are closely associated with increasing cancer incidence over the last 80 years.

CO-FACTORS REQUIRED FOR FAT METABOLISM

I want to list now the other essential nutrients involved in fat metabolism. The release of essential fatty acids from storage in the membranes, in order to convert them into derivatives

and prostaglandins, requires calcium. In order to protect the essential fatty acids from destruction---by free radical chain reactions and from forming toxic peroxides, hydroperoxides, aldehydes and ketones by oxidation---requires anti-oxidant nutrients. These include Vitamin E, Vitamin A or carotene, selenium, and other molecules that the body produces. In order to convert essential fatty acids into derivatives and prostaglandins requires enzymes made of proteins containing eight essential amino acids as constituents. For these enzymes to be able to work properly, they require mineral and vitamin co-factors. Making prostaglandins from essential fatty acids requires Vitamin C, Vitamin B3, Vitamin B6, zinc, magnesium and copper. To build up and break down fatty acids for energy requires Vitamins B2, B5, B7, B9, B12, potassium and iron. To metabolize sugar properly requires Vitamin B1 and chromium. All these are essential nutrients: the body can't make essential nutrients; absolutely has to have them, dies if it doesn't get them, and has to obtain them from food sources. Out of the 45 known essential nutrients, at least 29 are involved in fat metabolism.

Two points emerge from this information. First, whenever we talk about health, we're talking about getting optimum amounts of all 45 essential nutrients required for optimum physical health. We have the knowledge and the means to systematically design optimum nutritional programs. Between what we know and what we practice, however, there is a huge gap. Both education and the manufacture of products made with health in mind are necessary to close that gap.

Second, a person may die of a disease of fatty degeneration, which includes most of the degenerative conditions, because of a lack of zinc, or Vitamin C or B3, or B6, or any of the other essential nutrients required in fat metabolism. That brings us again to the recognition that if we are looking for health, we have to go with a complete nutritional program.

THERAPY WITH OILS

Therapy with oils is based on a simple assumption. If we supply the body with the essential nutrients it lacks, we will likely improve health.

Four oils are used in therapy. The first is flax seed oil, which contains both essential fatty acids and is especially rich in the lacking Omega 3 essential fatty acid, ALNA. The second is evening primrose oil, which contains the Omega 6 essential fatty acid LA, plus a little of the first derivative that the body in its normal state makes from it, GLA. The third is fish oils which contain derivatives of the Omega 3s---EPA and DHA. The fourth is black currant seed oil, which contains both essential fatty acids and the first derivatives of both, SDA and GLA. This last oil looks promising if properly made. Clinical reports are positive, but little controlled research has been done.

A study which compared the therapeutic efficacy of the other 3 oils in therapy found that the oil from flax gave the best results in about 60% of the clinical cases tested. The other 40% were divided between fish oil and evening primrose oil.

Some people, in order to cover all their bases, take all three. So they obtain essential fatty acids from flax and perhaps sunflower or sesame seed oil for Omega 6s and take evening primrose oil and fish oil for Omega 6 and 3 derivatives, respectively, on top of that.

You might ask: If the body can convert essential fatty acids into derivatives, why would we need fish oil and evening primrose oil at all? Many people don't. About 2/3 of the world's population consumes neither evening primrose nor fish oil, yet lives as healthy as we do. But there are certain conditions which block the functions of the enzyme that converts essential fatty acids into derivatives. We have already alluded to some of these. Saturated fats, cholesterol, trans-fatty acids and zinc deficiency inhibit the function of the Delta-6-Desaturase enzyme.

Flax seed oil is famous for its ability to make skin soft, smooth, and velvety.

Frying makes oils toxic by exposing them to the destructive effects of heat, light, and oxygen, often at the same time.

Deficiency of the essential fatty acids will appear as though there were a block in the enzyme. With age, the D-6-D enzyme system becomes less efficient. Diabetes often starts with essential fatty acid deficiency. Viral infections also slow down the D-6-D. If the enzyme is inhibited, you need to either lift the inhibiting influences or give oils that already contain the derivatives, to bypass the D-6-D block. Primrose oil contains the Omega 6 derivative, GLA; fish oils provide EPA and DHA, derivatives of the Omega 3 essential fatty acid. Black currant seed oil contains derivatives of both Omega 3 and 6.

My first recommendation to people is always: Begin with a reliable source of both essential fatty acids in their natural state, and see if they maintain or improve your health. I have several reasons for this suggestion.

First, it is the most economical way to obtain your Omega 3s and 6s. Nutritional oils cost 1/8 to 1/12 as much as capsules. For optimum health, we require substantial amounts of oil daily.

Second, the further left on the diagram the Omega 3s and 6s are, the more stable they are. Alpha-linolenic acid is five times more stable than EPA. Greater stability means less deterioration and a fresher product.

Third, by giving your cells the basic ingredients, you let them decide where and when and how much of the derivatives to make, according to their changing requirements. Your body has better metabolic control.

Fourth, the less processed the oil, the more likely it is to have retained both freshness and associated factors. For instance, unrefined oils contain phytosterols, which help to lower cholesterol by blocking its absorption from foods of animal origin. Fish oils particularly, because of their chemical sensitivity, have to be refined and are quite easily destroyed during the processing by light, air and heat, losing their quality. Some fish liver oils have also been reported to contain toxic environmental pollutants.

My second recommendation is to decrease the consumption of hard fats, trans-fatty acids, cholesterol and sugar (which turns to hard fats and cholesterol) to prevent their enzyme-blocking effects.

Third, I recommend a total nutritional program which includes fiber, acidophilus and optimum amounts of all essential co-factors for enzyme function. If these three nutritionally sound measures don't help, you may have to graduate to Omega 3 and 6 derivatives. Evening primrose oil and fish oil together, or black currant seed oil contain both derivatives.

There also is a possibility that certain groups of people (West Coast Indians, Eskimos, Scandinavians, Welsh-Irish and Japanese) have a genetic deficiency in the D-6-D enzyme. These people would require Omega 3 and 6 derivatives from their diet. Only scant work has been done on this topic, and perhaps 10% of the population might be affected. Dr. Budwig, one of my teachers in Germany, when asked what she thought about the genetically determined block, said, "Ach! Somevun chust vant to make money!" But it is possible that a genetic block exists in some people.

PROCESSING

I want to talk about processing by telling a story called "From Seed to Margarine". We start with seeds, which contain many essential nutrients. They contain fiber and mucilage. They contain complete protein, one or both essential fatty acids, many minerals and several vitamins. Seeds are very nutritious. They contain enough nutrition and energy to produce an entire new plant. All you add is water. We take this nutritious seed, and press out the oil. In so doing, we have separated the oil from the fiber, the mucilage, the protein, and some of the minerals and vitamins that were present in the seed. We end up with the best fresh oil possible if it has been mechanically pressed (rather than solvent extracted) and is unrefined (or crude). Such an oil contains essential fatty acids, some

minerals and some vitamins, particularly the fat-soluble, protective anti-oxidant vitamin E and carotene.

Then we degum the oil. We take out lecithin (which we concentrate and sell separately in health food stores); remove the natural gums; take out the chlorophyll; extract the vitamins (we concentrate vitamin E for sale as a supplement) and remove the minerals.

We refine the oil with strong acid and a very strong base called sodium hydroxide, the same stuff that dissolves everything in your sink and pipes, known as Drano.

We bleach the oil to remove the remaining carotene, chlorophyll and associated factors present naturally in oils. By the time we are finished, we have removed every essential nutrient except essential fatty acids from the oils. In bleaching, we produce toxic peroxides and unpleasant flavor and odor components that weren't present in the original seed or its fresh oil.

In order to remove these, we subject the oil to a process called deodorization: steam distillation at an excessively high temperature (240C or 464F). At that temperature, up to 13% of the essential fatty acid molecules are twisted into trans-fatty acids which interfere with essential fatty acid functions and worsen deficiency. We now have a bland, colorless, odorless, tasteless oil. At this point, you can't tell the difference between oils that come from corn, sesame, sunflower or safflower. All are tasteless. All essential nutrients except essential fatty acids (EFAs) have been removed, and even some of these have been destroyed.

We sell this highly processed oil in both supermarkets and health food stores in transparent glass bottles, subject to light-induced free radical chain reactions. The oil often sits in vats for weeks, exposed to oxygen, before it is bottled. We may have added artificial anti-oxidants like BHA or BHT or TBHQ, to replace the natural anti-oxidants carotene and vitamin E. These protect the oil, but don't fit into the body's precise molecular architecture and may create

If we supply the body with the essential nutrients it lacks, we will likely improve health.

side effects and health problems, which we could have avoided by leaving the natural anti-oxidants in the oil in the first place. We may winterize the oil, a cosmetic function designed to prevent oil from going cloudy in the fridge. In the home, we use such oils for frying, where we expose them to the destructive effects of light, oxygen and excessive heat, all at the same time, further destroying the essential fatty acids remaining in the oil.

And so we have really done a job on the nutritious seed, and you'd think we'd stop there, but we don't. We then take this refined oil, subject it to high temperature for a long time (six to eight hours), bubble hydrogen through it in the presence of a metal catalyst, and systematically destroy the essential fatty acids: first the chemically most active Omega 3 alpha-linolenic acid if it is present in the oil, then the less active Omega 6 linoleic acid, and then some non-essential components also. Through this process, called hydrogenation, we end up with margarine or shortening, the final, dead remnant of a seed from which we have systematically removed or destroyed every essential nutrient.

The Canadians have really outdone themselves. We have Wayne Gretzky's genius in hockey. We have also managed to produce and market a margarine that is 60% trans- fatty acids (twisted molecules) and has only 5% essential fatty acids left in it. Different margarines on the market vary in their content of trans-fatty acids and essential fatty acids.

Hydrogenation is a random process, so you never know exactly what you'll get. Trans-fatty acids show better statistical correlation with increased cancer incidence over the last 70 years than does our consumption of vegetable oils or our total fat consumption. While that correlation is not proof, it should alert us to some possibilities. Speaking of possibilities, there is no shred of evidence to show that margarines are good for our hearts. That is good advertising. The evidence points in another direction.

We haven't only processed the nutrients out of our oils. We take sugar beets and sugar cane, which contain fiber, sugar, some protein (fairly low), a bit of fat (also low), and the minerals and vitamins required to metabolize sugar. By the time we finish refining, we have a product that is 99.9% pure sugar (0.1% is still there because we haven't been able to remove essential nutrients perfectly). Sugar is not an essential nutrient. The body can make it from other substances. In its refined form, it is toxic. We've removed virtually all the essential nutrients present in sugar beet or sugar cane.

We haven't only done that with seeds and beets. We have also processed the grains. We remove the bran (fiber) that provides the bulk. We remove the germ that contains the essential fatty acids which become rancid when we grind whole grains into flour. We remove 50-95% of all minerals and vitamins, about one third of the protein, and end up with highly concentrated, non-essential starch from which we make bread, noodles and macaroni.

Then, in a burst of pure genius, we brought all three of these products together in the symbol of true North American progress--the doughnut. White flour, glazed with white sugar, cooked in white oil. When we worship the doughnut by eating it, we become constipated and foul-breathed, fat hangs over our belts, as we turn into doughnuts ourselves.

NEW DIRECTIONS

I want to turn briefly to new directions in oil making. I'll start by telling you how it began for me. Fascinated with living things, I studied Life Sciences at the University of British Columbia for 9 years. I studied Physics, Chemistry, Biology, Botany, Zoology, Physiology, Biochemistry, Genetics, Psychology and so on. I collected a lot of information and some understanding, and many papers. Human Nature holds my greatest interest. I soured on medicine when I realized that I would learn only about illness there. I wanted to know what

health is. I left the Ivory tower when geneticists began talking about cloning people and super-races. I wanted to use science for people's benefit, rather than for mad schemes.

I became interested in the nutritional aspect of human health after I was poisoned. I had sprayed 2,4-D and several other pesticides extensively and had been mega-careless, saying "My body is a garbage can which can burn anything." I now know that health is a quality which requires special care. The medical profession couldn't help. Then I realized that my health is my responsibility. I discovered after the fact that 2,4-D is carcinogenic: that meant I had cancer to look forward to. Nutrition was my only realistic option for self-help. Someone recommended vitamin A as a detoxifier. Then I heard that Vitamin C and other essential nutrients build immune function and that Vitamin E traps free radical electrons. One by one, I learned about the 45 essential nutrients and their necessity for human health, and became fascinated with their therapeutic potential. I found out that most of the degenerative conditions, including cancer, have a major fatty component. I was motivated because of my condition to understand fats and oils, but found the information in the textbooks and popular literature to be contradictory, confusing and frustrating, and decided to get to the bottom of it. That's how I got into fats and oils.

Dr. David Horrobin of the Efamol Research Institute personally sparked my interest in essential fatty acids during a conversation at a convention. A little later, I came across a German book called "The Fat Syndrome", in which the author, Dr. Johanna Budwig, describes in lucid detail the role of essential fatty acids in health, how they act in the various organs and tissues, and their functions in our cells. Her book is brilliant, and so clearly written that I got really excited, went to Germany, picked her sizeable brain, and studied her German research. Her last research paper was published in 1953. Since then she has

With flax oil as the key ingredient in her treatment, Dr. Budwig has over 1,000 documented successful cancer case histories!

published 12 books. She has documented over 1,000 successful cancer case histories. The magic ingredient in her treatment is fresh flax seed oil, which first swells and then dissolves tumors. At a feisty 80 years old she is still advising patients. Back in North America, I buried myself full-time for 3 years in the English-speaking journals, to see if Dr. Budwig's claims line up with our research (they do!), to sift through the massive scientific literature on fats and oils, to organize it in a coherent fashion, and to write the book **FATS AND OILS**. I collected information for 3 more years before I went to Germany. Before I began, I figured that the entire project should take no more than 6 months.

In 1986, **FATS AND OILS: The Complete Guide to Fats and Oils in Health and Nutrition** was published, and I began to be invited to lecture on my favorite topic. At one of my talks, some people brought me a sample of oil in a little brown glass bottle. They were really proud of their new flax seed oil. During the question period, I held up their sample and said to them, "This oil, because it is extremely sensitive to destruction by light, should not be packaged in glass." They were visibly upset, because I had panned their oil in front of a large audience, and they had come with samples to give out. I told them, "If you want to make oil with human health in mind, I'd be glad to help you." About a week later, after they'd cooled off, we sat down and talked. I said, "My field is health education, and I have to tell it the way the research finds it. These are not my ideas. They come from research and from clinical practice. Because I put myself on the line for people's health, I have to be very particular. Health is a quality, and the products I recommend for the improvement of health have to be made with quality." I became a consultant to Omega Nutrition.

We asked ourselves two questions. If human health is our goal, how should oils be made? Which oils should we make? Asking these questions led us to use technology in a new way.

The process developed by Omega Nutrition began long before I met them at my talk, and took about four and one-half years of planning and design. They had to take the existing oil-pressing machine, modify it, and custom-make components that are not commercially available in order to protect the sensitive oil from destruction—from before the seed is broken until after the oil is enclosed in a completely opaque container.

Flax seed oil is the most sensitive of all the seed oils, because it is the richest food source of the essential Omega 3 alpha-linolenic acid, which reacts five times more quickly than does the Omega 6 linoleic acid. (EPA in fish oils reacts five times more rapidly than even alpha-linolenic acid. Fresh fish doesn't have a "fishy" flavor. That "flavor" is really chemical deterioration. Fish oil manufacturers regularly lament the impossibility of keeping fish oils fresh. They can clean the oil, but its flavor reverts again and again to a fishy taste).

Omega Nutrition decided to manufacture flax seed oil. Its sensitivity tests the quality of the design of their system. More important, flax seed oil is our richest natural source of the essential nutrient most consistently lacking in our foods. At about 55-65% alpha-linolenic acid, flax seed oil is almost twice as rich in Omega 3s as fish oils, which run about 30%. It is more stable than EPA and fish oil; requires less processing (keeping its nutrients intact), costs less, provides Omega 3s for both vegetarians and meat-eaters, and has a long history and tradition of food use and successful clinical application in degenerative conditions. It tastes superb when properly made. North Americans used to export flax seed to Europe and then import rancid flax seed oil. Why not bring the industry home?

First, starting with certified organic flax seed, Omega Nutrition pioneered a painstakingly careful method for manufacturing exceptionally high quality oils, with health as their goal. They call it the Omegaflor Process, and

there are now several oils on the market made by the Omegaflor method.

Second, Omega Nutrition addressed packaging issues. There are three possibilities for packaging oil: glass, metal and plastic. Glass allows light, the most destructive influence, to deteriorate the precious Omega 3s. According to Dr. Budwig and North American research findings, even brown glass is unacceptable for fresh, unrefined oils, because even the longer wave lengths of light react with and deteriorate unrefined oils.

Metals, especially along seams, speed oil breakdown, and may "bleed" lead.

That leaves plastics, some of which are good packaging materials, and some of which are not. Because earlier plastic materials dissolved in oil, plastics still have a poor reputation, although the industry has become highly specialized and diversified. Some people, when they see oil in a plastic container, wonder if they will also find the plastic container in the oil. About 168 different kinds of synthetic materials are manufactured commercially. Three of these are good packaging materials for oil. They are government approved, research approved, and approved by essential fatty acid experts. Safe plastics are now used widely, and are accepted even by people particular about their health. Today, we package and store all kinds of foods in plastic containers. We drink hot liquids from plastic cups. We use plastic cutlery. There's Tupperware. We wrap our sandwiches in plastic. Plastics have become a part of our everyday life. Even our milk and vitamins are packaged in plastic. Appropriate plastics have the advantage of being durable, inert and completely opaque. The last of these is vital to protect these oils from light.

Third, Omega Nutrition decided to use an inert gas heavier than air which, being less diffusive, protects oil more effectively than does nitrogen.

One tablespoon of flax oil per day is an average adult maintenance requirement.

Fourth were shelf life issues. Fresh flax seed oil is alive and deteriorates with time by reacting with itself. It needs to be marketed like lettuce, eggs and milk, rather than the way that dead oils are usually marketed, with an eternal shelf "life". Taking their cue from Europeans, who are familiar with this oil, Omega Nutrition decided to guarantee the superior quality and freshness of their flax oil for only 3 months. They stamp both pressing and expiration date on each container, three months apart (4 months if shipped and kept under refrigeration).

The dating forces distributors to demand-order and to move the oil rapidly. Dating also warns consumers against buying deteriorated oil. Only the most conscientious distributors are willing to rise to this challenge, and Omega Nutrition has turned down a number of interested distributors who were unwilling to meet these stringent quality-ensuring guidelines. Freezing the oil extends the shelf life considerably, but because they have no control over the treatment of the oil once it leaves their hands, they decided to maintain the short shelf life.

Fifth, they chose a small container, three weeks supply for a normal healthy adult. Only when the market is really established will they consider family size containers, because what makes this oil precious is its freshness. They recommend refrigeration because the lower the temperature, the slower the deterioration, the longer the oil stays fresh. A slight bitter after taste denotes the beginning of deterioration of the oil. This bitter taste takes over the oil as it deteriorates more. Finally, they named the oil flax seed oil. This distinguishes this flax oil, made only with human health in mind, from linseed oil, which is the name given in North America to paint-grade oils made without care, which may then be "cleaned up" for human consumption by further destructive processes. Some people have consumed paint-grade linseed oil boiled in lead in the hope of enhancing their health. Omega Nutrition decided to avoid this

confusion. For human consumption, only flax seed oil is recommended.

Flax seed oil can replace less nutritious oils in salads, on cereal, in soups, on vegetables, in mayonnaise, with yogurt, in shakes, and just about anywhere. It should not be used for frying or deep frying. Some people mix it with butter, 1:1, or with olive oil, to improve the nutrient quality of these two popular foods. One tablespoon per day is an average adult maintenance requirement. Many people prefer more, up to 2 or 3 tablespoons per day. In therapy 2 to 5, and up to 10 tablespoons per day are used. The only symptom reported from getting too much flax seed oil is an excess of energy which precludes sleeping. For most people, too much energy is a problem they would like to have.

People sometimes wonder or ask if I own part of the company. I don't. I think that Omega Nutrition Flax Seed Oil, [REDACTED]

[REDACTED] stems from an exceptional commitment to health, exceptionally thorough planning, and exceptionally conscientious effort. I think it is an oil of exceptional quality and value, which sets a precedent and a new direction in the manufacture of oils made with human health in mind. I am pleased to be able to tell you about this oil. However, I am an educator. My first love is writing, teaching, informing, counselling and challenging. I make a comfortable living as president of Designing Health, Inc. It is in that capacity that I speak to you.

RECENT RESEARCH AND CLINICAL STUDIES

I'd like to wind up by telling you about some recent research using oils.

In the late 1950's, Dr. Max Gerson, based on Budwig's work, began using fresh flax seed oil imported from Germany to help dissolve tumors. The Gerson Clinic uses Flax Seed Oil, with good results, in the treatment of cancer. They give two tablespoons per day, along with a comprehensive

treatment program. Gerson also found that the oil lowers cholesterol levels. People interested in a nutritional approach to the treatment of cancer can contact the Gerson Institute in Bonita, California.

I have mentioned Dr. Budwig's work in Germany with more than 1,000 documented successful cancer case histories. She uses up to 10 tablespoons of fresh flax seed oil per day, 7 1/2 as oil, and the rest from about 8 tablespoonfuls of freshly ground flax grain. That's 1350 calories a day just from oil, but calories are the least concern of a terminal cancer patient who is wasting away. Budwig considers the flax oil to be the key ingredient of her treatment, and supports it with sulfur-rich protein, whole grains, fresh vegetables and juices, some fresh fruit, and a few herbs. She uses no supplements.

The Linus Pauling Institute recently completed a study in which they tested the effects of various fats on breast cancer production in cancer-prone mice. They found that lard produced 32 tumors; corn oil, 60; safflower oil, 66; fish oils, 6; and linseed oil, only 2. They now want to test these oils, plus olive oil and butter on the production of colon cancer.

Dr. Donald Rudin tested the effects of linseed oil on patients with various degenerative conditions. He obtained "spectacular" results with schizophrenia and juvenile delinquency that did not respond to counselling. He obtained good results with both rheumatoid and osteoarthritis. He found that it effectively relieves fatigue, dry skin and irritability, and helps in allergies, inflammatory conditions, menopausal problems, migraine headaches, and irritable bowel syndrome. It also lowers cholesterol levels. He calls Omega 3 oils the nutrition breakthrough of the '80's. Asked on a recent New York radio show: "Which of your patients is a candidate for linseed oil?", he said "Every one!" Dr. Rudin has just begun to use the fresh Flax Seed Oil, because it tastes good. Linseed oil usually tastes either bland or like

Dr. Rudin used flax seed oil to get "spectacular" results with schizophrenia and juvenile delinquency

turpentine. Dr. Rudin uses from 2 to 5 tablespoons of the oil per day, depending on the condition and the patient's need.

A double blind, placebo-controlled study in England tested the effects of taking a combination of evening primrose and fish oil on rheumatoid arthritis. The study found that 60% of the patients receiving this oil combination were able to completely discontinue their non-steroidal anti-inflammatory drugs. Another 20% were able to cut their dose of these drugs in half. The final 20% reported improvements, but maintained their drug dose. When the oil was replaced by placebo, all patients deteriorated again within 3 months. The researcher concluded: This opens a completely new treatment for rheumatoid arthritis.

In November 1986, the Journal of the National Cancer Institute published research which shows that some Omega 3 and 6 fatty acids selectively kill human cancer cells in tissue culture without harming the normal cells. They chose breast, prostate and lung cancer cell lines for their study. Of the Omega 3 family, alpha-linolenic acid and EPA were effective, with EPA acting more rapidly. DHA was ineffective, and SDA was not tested. Of the Omega 6 family, GLA, DGLA and AA killed cancer cells. Linoleic acid (the essential fatty acid) was ineffective.

A biochemist at the University of Guelph has shown that alpha-linolenic acid from flax seed oil is converted in our bodies to DHA, in which form it is stored, and can be re-converted to EPA whenever the latter is needed to produce PG3's in our cells.

Another biochemist at the University of Chicago in Urbana, Illinois has just reported in the Journal of the American Oil Chemists' Society that linseed oil fed to mice slowed down tumor size and growth, increased their mean survival time and decreased metastases.

CONCLUSION

I will conclude now. There is a lot of excitement about the use of oils rich in essential fatty acids and their derivatives (in their natural, unspoiled state) in therapy. What pioneering healers using natural methods have found over the last 30 years, and what research is now showing and confirming, indicates that we are on the verge of a brand new era in the increasing, self-responsible use of nutrition for the maintenance of physical health and the reversal of degenerative conditions, most of which are largely nutritionally based. I'm pleased to be a part of that excitement. I am particularly pleased to have the opportunity to share this information with you, because it has the potential to improve the quality of many, many human lives. Essential fatty acids---because they require so much care in order to unfold their beneficial effects on health---are helping to remind us to take greater care of the gifts of health, of nature and of life.

Finally, a plug for my book: **FATS AND OILS**. There is much information in the book which I haven't covered here. You will probably take a month to absorb it all. **FATS AND OILS** is receiving rave reviews from both lay readers and professionals. It is simply written, filled with research, common sense and historical context. There's even a touch of humor. It contains a few biochemical diagrams that can be ignored without losing the story. **FATS AND OILS** is available in both hard cover and soft cover editions.

Thank you for taking the time to read this article. I hope that what you have read here is helpful to you.

Designing Health™ is a company that is dedicated to consumer health education and the formulation and support of high quality products manufactured with human health in mind.

BOOK REVIEW

By ROBERT ZIELKE

Board of Directors, Gerson Institute

FATS AND OILS: The Complete Guide to Fats and Oils in Health and Nutrition

BY UDO ERASMUS

Nutritional books with practical usefulness are rare, and books dealing with the complex yet essential subject of dietary fats in a comprehensive outlook are rarer still. To be presented with both in one work is truly a pleasant surprise. The work is of practical value to the nutritional consumer in that it integrates the whole complex subject of fats, and particularly essential fatty acids, into a workable dietetic outlook.

Fats and Oils by Udo Erasmus shows an unusual blend of scientific clarity, instructive integration and practical application, topped with enough interesting background, asides and humor to maintain the reader's interest. A very complex and difficult subject has been made interestingly clear. The book is fascinating and encyclopedic in its facts on fats.

OMEGA Nutrition flax seed oil can be ordered by health food stores from the U. S. distributor Arrowhead Mills in Hereford, Texas or by contacting OMEGA Nutrition at 800-661-3529

FATS AND OILS, The Complete Guide to Fats and Oils in Health and Nutrition, 363 pages, can be ordered from the Gerson Institute. The prices are: \$14.50 U.S. paperback and \$27.50 U.S. hard cover plus \$2.00 shipping. California residents please add sales tax of \$0.94 paperback and \$1.79 hard cover. Our book list includes numerous books, audio, and video tapes. Copies of this Newsletter are \$2.00 plus \$1.00 shipping.

The Value of Flax Oil

BY UDO ERASMUS

Flax oil is our richest source of the valuable omega-3 fatty acids. At 50-60% omega-3s, flax oil contains almost twice as much of these miracle nutrients as do fish oils, which go up to about 30% maximum of omega-3s. Why do I call omega-3s miracle nutrients? Because they are the most commonly lacking in our foods. Providing our bodies with adequate amounts of the essential omega-3s works wonders for our health.

WHAT CAN FLAX OIL DO?

Research and clinical experience show that omega-3s have beneficial effects in:

1. Heart Disease. Omega-3s lower high blood cholesterol and triglyceride levels by as much as 25% and 65% respectively. Max Gerson used flax oil for its cholesterol-lowering effect in his New York clinic.

Omega-3s decrease the probability of a clot blocking an artery in the brain (stroke), heart (heart attack), lungs (pulmonary embolism) or other organ (peripheral vascular disease---that is gangrene). Omega-3s will lower high blood pressure.

2. Cancers. Omega-3s dissolve tumors. Max Gerson used flax oil for this purpose in his clinic. Dr. Budwig in Germany has over 1000 documented cases of successful cancer treatment using flax oil along with additional nutritional support. She has been using fresh flax oil successfully in cancer therapy for over 30 years now.

More recent research shows that omega-3s kill human cancer cells in tissue cultures without destroying the normal cells in the same culture. Breast, lung and prostate cancer cell lines were studied.

3. Diabetes. This disease, according to Dr. Budwig, has its origin in deficiency of omega-3 (as well as omega-6) fatty acids, and is made worse by concurrent lack of vitamins and minerals.

4. Arthritis. Omega-3s have been found to be effective in the successful treatment and prevention of arthritis. Both fish oils and flax oil have been used. More recently, research using combinations of the omega-3 and -6 fatty acids found that 60% of rheumatoid arthritics were able to completely discontinue their non-steroidal anti-inflammatory drugs (NSAIDs) and another 20% were able to reduce their dosages of NSAID in half.

5. Asthma. Flax oil can relieve asthma noticeably, sometimes within a few days of starting to take the oil.

6. Premenstrual Syndrome. Many cases of PMS are completely relieved within one month with fresh flax oil. Vitamins and minerals are also very important.

7. Allergies. Omega-3s help to decrease allergic response. Since the body must be rebuilt, a longer time is needed before allergies are alleviated. Total nutritional support is required.

8. Inflammatory tissue conditions. Included here are the diseases which end in -itis, which include meningitis, bursitis, tendonitis, tonsillitis, gastritis, ileitis, colitis, arteritis, phlebitis, prostatitis, nephritis, splenitis, hepatitis, pancreatitis, otitis, etc. as well as psoriasis and lupus. All of these inflammatory conditions may be helped by the omega-3s.

9. Water retention. Flax oil helps the kidneys remove sodium and water. Water retention (edema) is involved in swollen ankles, some forms of overweight, PMS, and late stages of cancer and cardiovascular disease.

10. Skin Conditions. Flax oil is famous for its ability to make skin smooth, soft and velvety. It will also alleviate those skin conditions whose origin is the lack of the omega-3s in the diet.

11. Vitality. One of the most noticeable signs of improved health from the use of flax oil is increased vitality, more energy. Athletes notice that their fatigued muscles recover from exercise more quickly. Omega-3s increase stamina.

12. Calmness under stress. Many people find this calming effect of fresh flax oil to be its most pleasant. Omega-3 fatty acids prevent excess toxic biochemicals which our bodies produce under stress.

13. Other conditions. Flax oil can also be helpful in multiple sclerosis (in places where essential fatty acid consumption is high, multiple sclerosis is very rare); omega-3s are required for the development of the brain of the fetus and for brain function in the adult; omega-3s are necessary for visual function (retina), adrenal function (stress), and sperm formation; cystic fibrosis (omega-3-containing oils will loosen the viscous mucous secretions and relieve breathing difficulties); some cases of sterility and miscarriage; some glandular malfunctions; some behavioral problems (schizophrenia, depression, manic-depressive disorder, etc.); addictions (to drugs or alcohol); and pathologically deviant behaviors.

Because they are the essential nutrients most commonly lacking in the North American diet, omega-3s are recommended for everybody. In order for the omega-3 fatty acids in flax oil to unfold their vital functions, the other essential nutrients (proteins, vitamins and minerals) must also be present in the diet in adequate amounts.

The Value of Flax Oil

(continued)

HOW IS FLAX OIL MADE?

Fresh flax oil, even when made with the utmost care and kept cool and closed, retains its vital nutrients unspoiled for only 4 months. Light, oxygen (air) and high temperatures destroy the omega-3s very rapidly. Once opened, flax oil should be consumed within 3 to 6 weeks. The container for flax oil must allow no light to come in contact with the precious oil. The oil must be pressed at a low temperature. Flax oil must be completely protected from light and air between the time it is locked in the seed and the time that is protected in the opaque container. Only oil made with this required care is worth using to enhance health.

HOW MUCH FLAX OIL?

Dr. Budwig uses up to 8 tablespoons of fresh flax oil daily in her cancer therapy. The Gerson clinic used 2 tablespoons daily for the first 4 weeks of therapy, and a maintenance dose of 1 tablespoon per day from then on. Dr. Rudin uses 2 to 5 tablespoons per day, depending on the patient's individual condition and needs.

HOW TO USE FLAX OIL?

Flax oil can be substituted for other, less nutritionally valuable oils in salad dressings, mayonnaise, shakes, etc. It can be mixed with olive oil or butter to enhance their nutritional value. It can be mixed with skim milk protein (baking cheese, cottage cheese, low-fat yogurt, kefir), then sweetened with fruit, maple syrup or honey to provide

a delicious nutritious breakfast or as dessert. The mixture of oil with skim milk protein can also be used in main dishes by adding vegetables, greens and spices. The flax oil-protein mixture is a versatile base for any kind of meal. Allergic to dairy? Use tofu with onions/garlic instead of milk protein.

IS FLAX OIL FOR EVERYONE?

Almost. Occasionally, someone will experience an allergic skin rash with the oil. That person must detoxify their immune system or obtain their essential omega-3s from one of the lesser sources: fresh pumpkin seed, soybean, walnut or fish oil. Second, nausea results from exceeding the liver's capacity for fats and oils. People with impaired liver function need to build up their capacity gradually, starting with small doses.

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