WHO 1990
Diet, Nutrition and the Prevention of Chronic Diseases

“Medical and scientific research has established clear links between dietary factors and the risk of developing coronary heart disease, hypertension, stroke, several cancers, osteoporosis, diabetes, and other chronic diseases.”

Dietary Pattern Implicated

“...such diseases are embodied in the so called ‘affluent’ diet, a pattern of eating typified by high consumption of energy-dense foods of animal origin and of foods processed or prepared with added fat, sugar and salt.”

WHO Recommended Pattern

“...the health needs of the population are best met by a high carbohydrate diet. Such a diet is characterized by a frequent consumption of vegetables, fruits, cereals and legumes.”

Unanimous Agreement

In June 1999, four top health organizations in the U.S. jointly endorsed a nutritious eating plan to reduce heart disease, stroke, cancer, and diabetes.

- National Institutes of Health
- American Heart Association
- American Cancer Society
- American Academy of Pediatrics

The Unified Dietary Guidelines

1. Eat a variety of foods.
2. Choose most of what you eat from plant sources.
3. Eat five or more servings of fruits and vegetables each day.
4. Eat six or more servings of bread, pasta, and cereal grains each day.
5. Eat high-fat foods sparingly, especially those from animal sources.
6. Keep your intake of simple sugars to a minimum.
The Link between Diet Chronic Diseases

- Heart Disease
- Cancer
- Diabetes

One bite of his triple cheese meat lovers pizza and Fred could have sworn he heard some of his smaller arteries slam shut!

Dietary Factors Increasing Heart Disease Risk

- Excessive energy intake
- Saturated fat
- Trans fatty acids
- Cholesterol
- Refined carbohydrates
- Animal protein
- Oxidative stressors

Dietary Factors Reducing CAD Risk

- Soluble fiber
- Antioxidant vitamins
- Phytochemicals
- Plant protein
- Plant sterols
- Omega-3 fatty acids
- Folate, vitamins B-6 and B-12

Heart Disease in Vegetarians

- Death rates from heart disease in vegetarian men are less than half those of the general population, with somewhat smaller differences seen in women.
- Death rates from heart disease in vegetarians are less than one quarter that of similar health conscious nonvegetarians.

David Jenkins, Toronto
Vegetarian Diet vs Drugs 2003

- High fiber vegetarian diet
  - diet rich in almonds, soy protein, vegetables and grains
  - lowered cholesterol by almost 29% in 1 month.
- Cholesterol-lowering medication
  - lowered cholesterol by 30.9%.
Could Vegetarians Do Even Better?

- Quite possibly!
- Even with whole foods vegetarian diets, there are two risk factors that may be elevated in vegetarians:
  - platelet aggregation
  - homocysteine

Maximizing the Vegetarian Advantage

- Eat a whole foods, plant-based diet.
- Ensure adequate vitamin B12 intake.
- Ensure sufficient intake and balance of essential fatty acids.

House Special

- Double Deluxe Bacon Cheeseburger
- Extra Large Fries
- Large Coke

ONLY $4.95
(chemotherapy extra)

Food, Nutrition and the Prevention of Cancer (WCRF and AICR, 1997)

- Approximately 75% of all cancers are related to lifestyle factors.
- Improving diet and exercise could prevent 30-40% of all cancers.
- Eating more vegetables and fruits could eliminate 20% of cancers.

Estimated Percent Preventable by Diet

Top 12 Cancer Sites

66-75% → stomach, colon, rectum
50-75% → esophagus
33-66% → liver
33-50% → breast, mouth, pancreas, larynx
20-33% → lung
10-20% → bladder, prostate

Dietary Factors Potentially Increasing Cancer Risk

- Animal fats
- Meat, especially grilled, cured and smoked meat, poultry and fish
- Trans fatty acids
- Refined grains
- Fried foods
- Alcohol
- Salt
- Food contaminants
Dietary Factors Reducing Cancer Risk

• Vegetables
• Fruits
• Phytochemicals
• Carotenoids in food
• Vitamins C, E and folate
• Selenium and calcium
• Dietary fiber
• Whole grains

Risk in Vegetarians

• Vegetarians experience lower death rates from cancer, compared with the general population.
• Some, but not all, studies have found less risk of cancer among vegetarians, when compared with similar health conscious nonvegetarians.
• People who had been vegetarian for over 20 years appear to enjoy the greatest advantages.

Why the Vegetarian Advantage?

"Any effect of vegetarian diets is likely to be due not only to the exclusion of meat, (which has been judged by the panel to increase the risk probably of colorectal cancer and possibly of cancers of the pancreas, prostate, kidney and breast), but also due to the inclusion of a larger number and wider range of plant foods containing an extensive variety of potential cancer-preventive substances."  

Maximizing the Vegetarian Advantage

• Eat a variety of whole plant foods each day.
• Eat 8+ servings of vegetables and fruits each day.
• Limit total, saturated and trans fatty acid intake.
• Choose minimally processed foods.
• Minimize alcohol intake.
• Avoid excessive sodium.

Type 2 Diabetes

Major Classes of Diabetes

• Type 1 - 5% of cases
  – Beta-cell destruction, usually leading to absolute insulin deficiency
    • sudden onset
    • daily insulin injections required

• Type 2 - 95% of cases
  – Insulin resistance and/or reduced secretion
    • gradual onset
    • may be controlled with diet and exercise, oral medications or insulin
Type 2 Diabetes ...the Modern Epidemic

- Percent of North Americans with diabetes: 8%
- Percent of North Americans with insulin resistance syndrome: 15-25%
- Increase in type 2 diabetes in North America between 1958 and 1997: 6 times
- Increase in type 2 diabetes in people in their 30's from 1990-1998: 70%
- Newly diagnosed children and teens with type 2 diabetes: 33%

Overweight and Obesity Dramatically Increases Risk of Type 2 Diabetes

Risk of Type 2 Diabetes in Women (Relative to those with BMIs of less than 22)
- BMI 25-26.9 - 8.1 times higher
- BMI 27-28.9 - 15.8 times higher
- BMI 29-30.9 - 27.6 times higher
- BMI 31-32.9 - 40.3 times higher
- BMI 33-34.9 - 54.0 times higher
- BMI 35+ - 93.2 times higher (Colditz, 1995)

Dietary Factors Potentially Increasing Diabetes Risk
- Excessive energy consumption
- Saturated fat
- Trans fatty acids
- Refined carbohydrates
- Meat, especially processed
- Excessive sodium
- Excessive alcohol
- Environmental contaminants

Dietary Factors Reducing Diabetes Risk
- Whole plant foods
- Fiber
- Trace minerals - magnesium and chromium
- Phytochemicals
- Antioxidant nutrients
- Plant protein
- Essential Fatty Acids

Risk in Vegetarians vs Nonvegetarians

Seventh-day Adventist Prospective Diabetes Study

Risk of diabetes in male VEG vs NV: 53% lower.
Risk of diabetes in female VEG vs NV: 55% lower.
Risk of diabetes in VEG vs NV aged 50-69: 76% lower.

Maximizing Protection
- Eat mainly whole plant foods.
- Limit refined carbohydrates.
- Keep fiber intake above 35 gms/day.
- Include moderate amounts of monounsaturated fats.
- Insure sufficient omega-3 fatty acids.
- Insure sufficient trace mineral intake from legumes, nuts and seeds.
IF YOU DON'T CHANGE DIRECTIONS, YOU WILL WIND UP WHERE YOU ARE HEADING!

MARK TWAIN

Dr. R. Deckelbaum
Co-author of the Unified Guidelines

“The good news is that we don't need one diet to prevent heart disease, another to decrease cancer risk and yet another to prevent obesity and diabetes – a single healthful diet cuts across disease categories to lower the risk of many chronic conditions.”

Plant-based Diets are Best!

- People eating plant-based diets live longer and suffer about half the rates of heart disease, cancer and type 2 diabetes, and significantly less obesity, kidney disease, GI diseases, gallstones, rheumatoid arthritis and dementia diseases compared to the general population.

Marion Nestle
Chair Nutrition Department - New York University
Chair American Cancer Society - Dietary Guidelines Committee
Director for Nutrition Policy US Dept. of Health 1986-88
Managing Editor Surgeon General's Report

“There is no question that largely vegetarian diets are as healthy as you can get. The evidence is so strong and overwhelming and produced over such a long period of time that it’s no longer debatable.”

You Are What You Eat!

Top 10 Sources of Calories in the U.S. Diet

- White bread, rolls, crackers
- Cookies, cakes, etc.
- Alcoholic beverages
- Milk and cheese
- Hamburgers
- Beef steaks, roasts
- Soft drinks
- Hot dogs, ham, lunch meat
- Eggs
- French fries, potato chips
Step 1... Take out the Trash

- Saturated fat
- Trans fatty acids
- Excess cholesterol
- Refined carbohydrates
- Harmful chemical residues

Constructing the Optimal Diet...
two simple steps

Step By Step

Saturated Fat

- Excess Saturated Fat Increases Risk of Disease:
  - Heart disease
  - Several cancers
  - Type 2 diabetes
  - Gallstones
  - Kidney disease

Saturated Fat Sources

- Major source - animal foods.
  - Dairy - 66% saturated
  - Meat - 40-50% saturated
  - Poultry - 34% saturated
  - Eggs - 30% saturated
  - Fish - 20% saturated

- Minor source - tropical oils.
  - Coconut oil - 87% saturated
  - Palm and palm kernel oil - 50 and 81% saturated

Average and Recommended Intakes

- Recommended Saturated Fat Intakes
  - <10% of calories (< 22 g / 2000 kcal)
  - <7% of calories for high risk populations (< 16 g / 2000 kcal)

- Average Saturated Fat Intakes
  - Nonvegetarians - 10-14% of calories (22-31 g / 2000 kcal)
  - Vegetarians - 8-10% of calories (18-22 g / 2000 kcal)
  - Vegans - 4-7% of calories (9-16 g / 2000 kcal)

Saturated Fat in Food

<table>
<thead>
<tr>
<th>Food</th>
<th>Saturated Fat (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double cheeseburger</td>
<td>18 g</td>
</tr>
<tr>
<td>7- bone steak, 6 oz</td>
<td>15 g</td>
</tr>
<tr>
<td>Cheese, 1 oz</td>
<td>6 g</td>
</tr>
<tr>
<td>Milk, whole, 8 oz</td>
<td>5 g</td>
</tr>
<tr>
<td>Avocados, ½ medium</td>
<td>2 g</td>
</tr>
<tr>
<td>Nuts or seeds, 1 oz</td>
<td>1-2 g</td>
</tr>
<tr>
<td>Tolu, firm, ½ cup</td>
<td>0.6 g</td>
</tr>
<tr>
<td>Olives, 10 large</td>
<td>0.6 g</td>
</tr>
</tbody>
</table>
Plant Foods are Low in Saturated Fat!
- A whole foods plant-based diet can easily provide no more than 10 grams of saturated fat:
  - 10 servings of fruits and vegetables
  - 8 servings of whole grains
  - 2 serving of beans
  - 1 serving of tofu
  - 2 servings of soymilk
  - 1 ounces of nuts
  - 1 ounces of seeds

Trans Fatty Acids
- Unsaturated fats that have been turned from liquid oils to solid fats.
- Formed in one of two ways:
  - By the process of hydrogenation - the addition of hydrogenation under pressure
  - Naturally from bacterial fermentation within the intestinal tracts of ruminant animals

Trans fatty acid Sources
- 90% from processed and fried foods
  - margarine, shortening
  - cookies, crackers, baked goods and other processed foods containing hydrogenated or partially hydrogenated vegetable oils
  - deep fried foods cooked in hydrogenated oils
- 10% from meat and dairy products

Bad News
- Change the structure of the cell wall, distorting its shape, flexibility and permeability.
- Increase total cholesterol and Lp(a), and decrease HDL cholesterol, increasing risk of heart disease. Gram for gram, trans fats are considered at least twice as damaging as saturated fats.

Nurses Health Study
- Intake of trans fatty acids was strongly associated with risk of heart disease and type 2 diabetes:
  - For each 1% of energy intake as trans fatty acids (about 2.2 g/day), risk of CAD increased by 33-35%.
  - For each 2% increase in energy from trans fatty acids (about 4.4 g/day) increased risk of type 2 diabetes by 40%.

Average and Recommended Intakes
- Average Intakes
  - 2-5% of calories (5-10 g/2000 kcal)
- Recommended Intakes
  - < 1% of calories (< 2.2 g/2000 kcal)
Trans Fatty Acids in Selected Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>Trans fatty acids (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microwave popcorn (3.5 oz)</td>
<td>7.5</td>
</tr>
<tr>
<td>French fries, large</td>
<td>5.0</td>
</tr>
<tr>
<td>Donut, honey-glazed, 1</td>
<td>3.8</td>
</tr>
<tr>
<td>Shortening, 1 Tbsp</td>
<td>3.7</td>
</tr>
<tr>
<td>Margarine, hard, 1 Tbsp</td>
<td>3.1</td>
</tr>
<tr>
<td>Crackers, small, 8</td>
<td>2.6</td>
</tr>
<tr>
<td>Margarine, soft, 1 Tbsp</td>
<td>1.4</td>
</tr>
<tr>
<td>Potato chips, 2 oz.</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Cholesterol

- Excess cholesterol can increase risk of heart disease and several types of cancer (endometrium, lung and pancreas).

Cholesterol Sources

- Cholesterol is found only in animal foods!
  - Human body makes about 800-1000 mg/day.
  - No additional dietary cholesterol is needed.

Cholesterol in Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>Cholesterol (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver (poultry)</td>
<td>570</td>
</tr>
<tr>
<td>Egg, 1 large</td>
<td>210</td>
</tr>
<tr>
<td>Shrimp, 3 oz.</td>
<td>165</td>
</tr>
<tr>
<td>Beef, pork, poultry, 3 oz.</td>
<td>75</td>
</tr>
<tr>
<td>Fish, 3 oz.</td>
<td>50-75</td>
</tr>
<tr>
<td>Milk, whole</td>
<td>35</td>
</tr>
<tr>
<td>Butter, 1 Tbsp.</td>
<td>30</td>
</tr>
<tr>
<td>Nuts, seeds, grains, fruits, vegetables and legumes</td>
<td>0</td>
</tr>
</tbody>
</table>

Refined Carbohydrates

- Diets rich in refined carbohydrates increase risk of disease:
  - Increase triglycerides and decrease HDL cholesterol, increasing risk for heart disease.
  - Adversely affect blood sugar, and increase insulin resistance, increasing risk for type 2 diabetes.
  - Increase incidence of GI disorders, including some cancers.
  - Increase risk of obesity.

Carbohydrates are not the problem, refined carbohydrates are!

- The lowest rates of chronic disease in the world are in areas with the highest carbohydrate intakes.
- Source of carbohydrates are primarily unrefined plant foods.
What are Refined and Unrefined Carbohydrates?

- **Refined Carbohydrates**
  - Sugars - white sugar, brown sugar, syrup, candy, soda pop.
  - Starches - white flour products, white rice products.

- **Unrefined Carbohydrates**
  - Sugars - fruits and vegetables.
  - Starches - whole grains, root vegetables, legumes, nuts and seeds.

The Great Grain Robbery: Nutritional Bankruptcy!

Refining grains removes:
- 80-90% of the fiber
- 70-80% of the vitamins and minerals
- 95% of the phytochemicals

Current Intakes of Refined Carbohydrates

- As much as 70 percent of energy intakes in standard American diets come from refined carbohydrate foods - foods rich in starch and sugar.
- Most are consumed as breads, cereals, soda, fruit drinks, baked goods, dairy desserts, sugars, jams, syrups and candy.

Sugar Shock

- A hundred years ago people ate about 20 pounds (9 kg) of sugar a year or 6 teaspoons a day (30 mL).
- Today, we eat an average of about 78 pounds (35 kg) per year, 25 teaspoons per day (125 mL), or 22 percent of our total calories.

WHO Suggested Intakes for the Healthy Population

- Maximum intake of 10% of calories as sugar.
  - 1600 calories: maximum 10 tsp./ day
  - 2000 calories: maximum 13 tsp./day
  - 2400 calories: maximum 16 tsp./day
  - 2800 calories: maximum 19 tsp./day

Sugar Content of Common Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>Sugar Content (tsp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slush, 32 oz.</td>
<td>26</td>
</tr>
<tr>
<td>Frutopsa, 20 oz.</td>
<td>18</td>
</tr>
<tr>
<td>Soda, 12 oz.</td>
<td>10-13</td>
</tr>
<tr>
<td>Cinnamon</td>
<td>12</td>
</tr>
<tr>
<td>Lowfat fruit yogurt</td>
<td>7</td>
</tr>
<tr>
<td>Chocolate bar</td>
<td>4-7</td>
</tr>
</tbody>
</table>
GET MOST OF YOUR CARBOHYDRATES FROM WHOLE PLANT FOODS!
Choose intact, whole grains, vegetables, fruits, legumes, nuts and seeds.

LIMIT INTAKE OF REFINED CARBOHYDRATES - both starches and sugars!
Reasonable upper limit: 2 servings per day.

Harmful Chemical Residues
- Heavy Metals
- Pesticides, Herbicides
- Other Environmental Contaminants
- Hormones, Antibiotics
- Food Additives and Preservatives
- Mycotoxins
- Microbial Toxins
- Acrylamide
- Oxidative, Hydrolytic and Pyrolytic Products

Health Risks
- Food contaminants can promote oxidative damage in the body and accelerate disease processes.
- Many of these substances are fat-soluble and prone to bioaccumulation, thus efficiently move up the food chain.

Minimizing Food Contaminants
- Eat lower on the food chain - more plant foods; fewer animal foods.
- Go organic!
- Use fewer processed foods.
- Avoid deep-frying and minimize other very high temperature cooking.
- Store foods with care.

Step 2...
Pile on the Protectors
- Phytochemicals
- Fiber
- Plant Protein
- Plant sterols and stanols
- Healthful fats
Phytochemicals

- Naturally occurring chemicals found in plants.
  - Give plants flavor, color, texture and odor.
  - Regulate plant growth.
  - Defend against attack by insects, etc.
- Powerful compounds also protect people.
- Not present in animal foods.

Phytochemical Champions

**Cruciferous Vegetables**
- **Indoles**
  - induce protective enzyme systems
  - decrease 16-hydroxy radical of estradiol
- **Isothiocyanates**
  - induce detoxifying enzyme systems

**Umbelliferous Vegetables**
- **Coumarins**
  - inhibit blood coagulation
- **Flavones**
  - antioxidants
- **Carotenoids**
  - antioxidants
- **Phthalides and polyacetylenes**
  - anti-tumor activity

**Allium Vegetables**
- **Allicin**
  - antiviral, antibacterial, antifungal antyeast, anticancer activity
- **Ajoenes**
  - antithrombic activity
- **Viniylthiins**
  - antasthmatic activity
- **Allyl sulfides**
  - anticancer, anti-CVD activity

**Citrus Fruits**
- Over 170 different phytochemicals in an orange.
  - 60 flavonoids - potent antioxidants; inhibit conversion of AA to PGE2
  - 40 limonoids - reduce cholesterol synthesis
  - 20 carotenoids - antioxidants
Berries

- Blueberries ranked highest in ORAC in a USDA study when compared to 40 other vegetables and fruits.
- Phenolic compounds
  - anthocyanins – strong antioxidants
  - flavonoids – anticancer, anti-CVD activity
  - phenolic acids – antioxidant, anticancer activity

Dietary Fiber
...just passing through?

- Fiber is found only in plant foods.
- Health Benefits:
  - Weight control
  - Cholesterol reduction
  - Blood sugar control
  - GI health

Recommended and Actual Intakes

Goal: 35-50 grams/day

Actual Intakes:
- Nonvegetarians: 10-20 grams/day
- Vegetarians: 30-40 grams/day
- Vegans: 40-50 grams/day

Types of Fibre

- Soluble Fibre:
  - Reduces blood cholesterol and controls blood sugar.
  - Becomes thick and sticky in water
  - Sources:
    - oat, beans, barley, peas, flaxseeds, several fruits and vegetables.

- Insoluble Fibre
  - Keeps GIT clean and healthy.
  - Structural fibre: absorbs water; does not become sticky.
  - Sources:
    - wheat bran, and all other whole plant foods.

It’s Easy to Get 35-50 Grams of Fiber!

- 35-50 grams of fiber =
  - 5 servings whole grains
  - 8 servings vegetables and fruits
  - 2 servings legumes
  - 1 serving nuts or seeds

Plant Protein

Protein-rich plant foods have plenty of protein plus unique nutritional qualities:

- High in fiber
- Cholesterol-free
- Low in total and saturated fat
- Rich sources of protective phytochemicals
- High in vitamins and minerals, including calcium and folate.
Most Americans Consume Excessive Protein

- Americans consume about 50% more protein than they require or about 90 to 100 grams of protein daily.
- People on high protein diets consume well over 100 grams of protein daily, and often 200 grams of protein or more.

Problems with Excessive Protein

- Diets providing in excess of 20% of calories from protein, particularly from animal sources may:
  - Have a detrimental effect on renal function
  - Increase blood cholesterol levels
  - Induce urinary calcium losses
  - Increase risk of colorectal cancers
  - Trigger “leaky gut syndrome”

Plant Sterols and Stanols

- Naturally occurring plant compounds, similar in structure to cholesterol.
- Block cholesterol absorption from the gut.

Dietary Sources

- Richest sources: seeds, sprouts
- Good sources: nuts, olives, avocados, legumes
- Other sources: vegetables, grains, fruits

Average Intakes

- Average Western Diet: 180-300 mg/day
- Traditional Asian Diet: 350-400 mg/day
- Vegan Diet: 600-800 mg/day

Healthful Fats

- Monounsaturated fats
- Polyunsaturated fats
Monounsaturated Fats

- Neutral or protective - considered “good fat”.
- Diets rich in monounsaturated fats may reduce blood pressure, and improve blood flow, cholesterol and blood sugar levels.
- Major sources (50%+ mono): olives, olive oil, most nuts, avocados, canola oil and high oleic sunflower and safflower oil.

Nuts are Healthful Foods

- Great sources of:
  - Vitamins, including vitamin E, B-vitamins and folate.
  - Trace minerals, including selenium, chromium and copper.
  - Plant protein, phytochemicals and fiber.
  - Arginine
- Regular consumption reduces risk of chronic disease:
  - About 50% risk reduction in CVD
  - About 20-30% risk reduction in type 2 diabetes

Polyunsaturated Fats

There are two polyunsaturated fatty acids necessary for life:

- Linoleic acid - omega-6 fatty acid family.
- Alpha-linolenic acid - omega-3 fatty acid family.

Sources of Polyunsaturated Fat

Omega-6 Fatty Acids
\[
\rightarrow \text{Linoleic acid (LA)}
\]
Sources:
- Seeds (sunflower, safflower, sesame, grape, pumpkin, hemp and poppy), walnuts, corn, soy, grains, and wheat germ.

Omega-3 Fatty Acids
\[
\rightarrow \text{Alpha-linolenic acid (ALA)}
\]
Sources:
- Seeds (flax, hemp, chia, canola), walnuts, soy, greens and wheat germ.

A Matter of Balance!

Optimal balance is about 2:1 to 6:1.
- Most people consume 10-20 times as much omega-6 fatty acids as omega-3 fatty acids.
- This imbalance may increase risk of disease.

Recommended Intakes (WHO/FAO)

- Omega-6 Fatty Acids: 5-8% of calories
- Omega-3 Fatty Acids: 1-2% of calories (about 2-6 grams a day)
Sources of Alpha-linolenic Acid

- Flaxseed oil → 8.0 gm/Tbsp.
- Hempseed oil → 2.7 gm/Tbsp.
- Walnuts → 2.7 gm/oz.
- Flaxseeds → 2.6 gm/Tbsp.
- Soybeans → 1.1 gm/½ cup
- Soy oil → 1.0 gm/Tbsp.
- Leafy Greens → 0.1 gm/cup
- Wheat germ → 0.1 gm/ 2 Tbsp.

Do we need fish to get enough omega-3 fatty acids?

Not Necessarily!

- Fish and fish oil are concentrated sources of long-chain omega-3 fatty acids, however, there are many valid concerns about fish consumption.

Fussy About Fish?

- Contamination with heavy metals – mercury, lead and cadmium.
- Contamination with industrial pollutants – PCBs, DDT and dioxin.
- Ecological concerns – depletion of fish stocks.
- Ethical concerns – by-catches.

Vegetarians Can Get DHA from Cultured Microalgae!

DHA supplements based on cultured microalgae:

- O-Mega-Zen3 by NuTru (Veggie Caps)
  - 300 mg/capsule
  - clean source

Limit Omega-6 Fatty Acids, if excessive

- Primary sources of omega-6 fatty acids:
  - Processed foods and snack foods
  - Margarine, mayonnaise and salad dressings
  - Cooking oils
    - Safflower, grape seed, sunflower and corn oil (60-75% n-6)
    - Soy, cottonseed oil and sesame oil (45-50% n-6)
It is a Great Life!

“In health there is freedom. Health is the first of all liberties.”
Henri Frederic Amiel