Low-Fat, Low-Salt, Whole-Food Vegan
Staying Healthy into Ripe Old Age
PART I

Nutrition for Cancer Prevention and Control
The Puzzle of “Western Cancer”

- Until recently, *age-adjusted* death rates from many common life-threatening cancers were at least several-fold higher in westernized countries than in Asia, Africa, or Central America.

- These cancers include those of the breast, prostate, colon-rectum, pancreas, ovary, uterine endometrium, as well as leukemias and lymphomas.
# Age-Adjusted Cancer Mortality

US. vs. Japan – 1955

## Figure 1


<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>Japan</td>
</tr>
<tr>
<td>Lung</td>
<td>92</td>
</tr>
<tr>
<td>Pancreas</td>
<td>20</td>
</tr>
<tr>
<td>Colon</td>
<td>28</td>
</tr>
<tr>
<td>Bladder</td>
<td>11</td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
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<tr>
<td>Ovary</td>
<td>-</td>
</tr>
<tr>
<td>Prostate</td>
<td>15</td>
</tr>
<tr>
<td>Lymphomas</td>
<td>14</td>
</tr>
<tr>
<td>Leukemias</td>
<td>13</td>
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</tbody>
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(Per 100,000 persons/year)
What’s the Explanation?

• Not genetic – African-Americans and Asian-Americans rapidly acquire the cancer risks of their adopted country
• Not environmental contaminants – Western societies have experienced high rates of Western cancers throughout the 20th Century
• Characteristic diet and lifestyle of western societies is likely to blame
Kenneth Carroll

Correlation of dietary fat with international cancer mortality
Dr. Colin Campbell and the Role of Protein in Cancer Induction

• Asked to investigate an outbreak of liver cancer in Filipino children eating aflatoxin-contaminated peanut butter, Campbell found that most cases occurred in children whose diets were “enriched” with non-fat milk protein.

• In rodent studies, a casein-based diet promoted liver cancer in carcinogen-treated rats more effectively than a soy-based diet.
Campbell’s China Health Project

- Largest epidemiological study ever attempted – correlated age-adjusted rates of various disorders in 30 provinces of rural China with the characteristic dietary and lifestyle patterns in those provinces.

- Overall conclusion: **Risks for Western cancers and most other “Western” diseases (notably coronary disease and diabetes) correlated with the fraction of calories provided by animal products**

- Involuntary caloric restriction not the explanation – rural Chinese tend to eat more calories proportionate to their body size than Westerners do.
Impact of Animal Products on Prostate Cancer Risk

- WHO has published data on percent of diet provided by animal products in 59 countries, ca. 1979-1981
- 6 countries received less than 10% of calories from animal products (Egypt, Guatemala, Honduras, South Korea, Sri Lanka, Thailand)
- In 20 countries, over 1000 kcals daily came from animal products
Prostate Cancer contd.

- Average age-adjusted prostate cancer death rate in the quasi-vegan countries: 1.96 per 100,000 population
- Average rate in the 20 countries with high animal product intake: 29.91 per 100,000 – about 15-fold higher!

- Differential in incidence of serious prostate cancer would be even greater, since availability of sophisticated medical care was limited in the quasi-vegan countries
Dietary Modulation of Cancer-Promoting Hormonal Activities

During the 1990s, it became clear that certain hormones found in blood can sometimes boost cancer incidence and promote cancer spread by:

- Increasing the proliferation of pre-cancerous cells or cancer cells
- Blocking their ability to “commit suicide” (apoptosis)

These hormones include: insulin, free IGF-I, and free sex hormones (estrogen, testosterone)

Diet and lifestyle can modulate these hormonal activities!
A Role for “High-Quality” Protein in Cancer Induction?

• Diets relatively low in certain essential amino acids tend to decrease hepatic production of IGF-I
• Plant proteins, as contrasted with animal proteins, tend to be relatively low in methionine and lysine
• Vegan diets tend to be relatively low in protein relative to omnivore diets, and feature “lower quality” protein
• Vegans tend to have lower blood IGF-I levels than vegetarians or omnivores (no vegan linebackers!)
Insulin’s Role in Cancer Induction

• High insulin levels can promote cancer both directly and by raising levels of free IGF-I.

• Insulin levels also suppresses the liver’s production of sex hormone-binding globulin – a protein that binds to and suppresses the activity of sex hormones.

• High insulin levels have been correlated with decreased chance for long-term survival in breast and colon cancers.

• Insulin levels are determined primarily by:
  ▪ Insulin sensitivity
  ▪ The meal stimulus to post-prandial insulin release
Optimizing Insulin Sensitivity

If your muscle and liver are highly sensitive to insulin, your pancreas makes less of it and your liver removes it from your blood more avidly.

Insulin sensitivity is promoted by:

- Leanness – whereas abdominal obesity (as opposed to gynoid obesity) has an adverse impact.
- Regular aerobic exercise, and resistance exercise of large muscle groups; this effect is transient – don’t go two consecutive days without exercise.
- Diets very low in fats, and especially saturated fats; the ratio of saturated to unsaturated fats is a key determinant of insulin sensitivity.
Moderating Postprandial Insulin Levels

• High glycemic-index starches and sugars cause a large and rapid increase in insulin levels following meals

• Concurrent ingestion of dietary protein potentiates this effect

If you want high postprandial insulin, a burger is ideal!
Insulin Levels Tend to be Lower in Vegans

- Long-term consumption of vegan diets is associated with leanness
- Even when vegan diets are not low in fat, a low ratio of saturates to unsaturates is favorable to insulin sensitivity
- Vegan protein intake tends to be moderate, so potentiating effect of dietary protein on carbohydrate-triggered insulin release is less prominent
The Pritikin Program couples very-low-fat, whole-food, quasi-vegan diets with daily aerobic exercise training.

Barnard first demonstrated that, even in the short-term, the Pritikin lifestyle program tended to lower blood levels of insulin, free IGF-I, and free estrogen and testosterone.

These reductions are even more profound in people who have followed the Pritikin lifestyle for years.
Impact on Prostate Cancer Cells

• Barnard’s group took blood samples from Pritikin patients prior to and 3 weeks after initiating the program; blood was also taken from long-term adherents of the Pritikin program

• A human prostate cancer cell line (LNCaP) was incubated with serum derived from these blood samples

• Results: prostate cancer cells incubated in post-Pritikin serum grow more slowly, and died more rapidly (via apoptosis), than those incubated in pre-Pritikin serum. Growth rate was even slower, and rate of apoptosis dramatically higher, with serum from long-term Pritikin adherents

These differences were decreased or abolished if IGF-I, insulin, or testosterone were added to the incubations – showing that modulation of these hormones was responsible for the observed effects.
Effect of diet and exercise on serum IGF-1 and IGFBP-1.
Barnard Tables

Effect of diet and exercise on cancer cell growth.
The Ornish Clinical Trial

- Patients with early-stage (pre-surgical) prostate cancer were randomized to either participate in a special lifestyle program or to receive standard care.
- The regimen was similar to the Ornish regimen for heart disease – very-low-fat whole-food diet, regular walking exercise, stress reduction techniques – with the exception that the diet was completely vegan.
- After one year: PSA dropped by 4% in experimental group, rose by 6% in control group.
- After two years: 13 of 49 control patients had received traditional prostate cancer therapy (surgery, radiotherapy, and/or androgen deprivation) as compared to 2 of 43 patients in the lifestyle group.
Women’s Intervention Nutrition Study

- This randomized trial enrolled over 2,400 women with early stage, post-surgical breast cancer.
- Half were asked to reduce dietary fat to 15% of calories; a reduction to 20% of calories was actually achieved, and on average women in this group lost 6 pounds of weight.
- After an average of 5 years of follow-up, risk for cancer recurrence was 24% lower in the low-fat group; this benefit was specific to patients with estrogen-negative tumors.
- Improved insulin sensitivity with lower serum insulin levels may have been responsible for the benefit, as high insulin levels correlate with poor prognosis in breast cancer.
Diets Rich in Animal Products May be More Mutagenic

- Adverse modulation of cancer-promoting hormonal activities may not be the only way in which Western diets influence cancer risk: such diets often have increased mutagenic and decreased anti-mutagenic activities.

- Potent carcinogens known as heterocyclic amines are produced when flesh foods are cooked, owing to reactions involving the compound creatine.
Mutagenic contd.

- Heme iron from flesh foods may have mutagenic activity for colon epithelium, and promotes increased iron absorption
- Free iron atoms in the vicinity of cellular DNA can promote mutations

- A recent controlled trial observed a one-third reduction in incidence of new visceral cancers in patients who were iron depleted by repeated phlebotomy
- Vegetarians typically have half the body iron stores of omnivores
Plant-based Diets Often Rich in Anti-mutagenic Phytochemicals

- Fruits, vegetables, whole grains, beans, coffee, and teas contain a range of phytochemicals, some of which help to prevent cancer by promoting increased production of enzymes that detoxify carcinogens and protect cells from free radicals.
- Green tea, garlic, onions, cruciferous vegetables (e.g. broccoli, cabbage), red wine, Concord grape juice, pomegranate juice appear to have valuable potential in this regard.
- Green tea and pomegranate juice may also have potential for cancer therapy.
A New Understanding of Western Cancer

- Populations at low risk for Western cancers are quasi-vegan, and are characterized by lifelong leanness and good insulin sensitivity reflecting leanness, regular physical activity, and a diet low in fats and especially saturated fats.

- A moderate intake of protein, primarily from “low quality” plant sources, results in relatively low IGF-I levels in these groups.

- Lower insulin/IGF-I activities are associated with delayed menarche – a key factor in breast cancer prevention.

- Role of dietary animal protein in cancer induction is not yet widely acknowledged because it cannot be confirmed in Western epidemiological studies – too few lifelong vegans!

- The impact of animal protein on IGF-I is maximized at low levels exceeded by most Western diets.
Prudent Dietary Advice for Cancer Patients – Carbohydrates

- The majority of dietary calories should come from the starches or sugars found in whole grains, beans, fruits, and vegetables.
- Emphasize lower-glycemic-index (i.e. slowly digested) sources: pasta, intact whole grains (as in sprouted grain breads), long-grain rice (e.g. Basmati), beans, old-fashioned oatmeal, fruits and fruit juices.
- Avoid flour products (such as ordinary breads) and added sugars.
Prudent Dietary Advice for Cancer Patients – Proteins

• Except on rare occasion, avoid animal products, most of which are protein-rich; this includes non-fat dairy
• Whole grains and a moderate intake of beans provides plenty of protein for optimal health
• Keep total protein intake moderate; avoid supplemental intakes of plant proteins (no soy protein powders, for example)
Prudent Dietary Advice for Cancer Patients – Fats

- Saturated fats – from animal products or tropical oils – should be strictly avoided
- Limit your intake of added oils, nuts, or avocados
- Supplemental fish oil (long-chain omega-3) does not impair insulin sensitivity, and may work in various ways to slow cancer spread
- Whether a very-low-fat vegan diet is more protective than a moderate fat vegan diet is not yet clear; a very-low-fat diet, in conjunction with regular exercise, may promote worthwhile weight loss in those who are not optimally lean
Caffeine is Immunosupportive

- Some cancers make adenosine, a hormone which “turns off” immune cells attacking the tumor
- Caffeine inhibits adenosine receptors, blocking the immunosuppressive activity of adenosine
- Caffeine slows the growth of certain adenosine-producing human cancers implanted in rodents
- Cancer patients who tolerate caffeinated coffee should indulge frequently
Response May Be Tumor-Specific

- Not all cancers utilize insulin, IGF-I, and/or sex hormones as growth factors.
- Therefore, these dietary strategies will probably work against some cancers, but not others.
- Current clinical data suggest that a high proportion of prostate, breast, and colorectal cancers may be responsive to dietary/lifestyle measures that modulate insulin/IGF-I.
IGF-1 has growth activity for many, not all cancers. Sensitive cancer cells to this hormone:

- Multiply faster
- Increase their capacity for metastasis
- Induce angiogenesis
- Decrease apoptosis
- Are less prone to be destroyed by chemotherapy
The Mediterranean Diet Alternative

- For those unwilling to go all the way to a pure vegan diet, the Mediterranean Diet may represent a reasonably health-protective alternative
- As compared to typical American omnivore diets, the traditional Mediterranean Diet is much lower in meats, higher in fish and starches, and much higher in fruits and vegetables
- The Mediterranean Diet also features red wine, garlic, and olive oil
- This diet can be expected to have a favorable impact on insulin sensitivity, and thus may be modestly beneficial for cancer control; it also may help to prevent vascular disorders and diabetes