VII. THE HIGH COST OF MEAT

The U.S. medical budget was about $760 billion in 1991. It's projected to go to $2 trillion by AD 2000. About $577 billion of the initial figure went for patient care\(^1\) and $270 billion of that went to the treatment of diseases now known to be partly the result of animal source food consumption.

The US Public Health Service keeps track of major killers. Not all these problems have an obvious relationship to diet and others that do are not shown.\(^2\)

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\(^2\)ibid. Tables 1 and 24.
There are multiple factors in the cause of most disease. World Health Organization\(^3\) and Food and Agriculture Organization data\(^4\) show that the following diseases correlate with animal food consumption.

In the graphs below, the Y axis contains the disease, the X axis contains the animal source dietary risk factor. R is the correlation coefficient which reflects the "goodness of fit" of the data points to the sloping regression line. The p-value is the probability the apparent relationship is merely a mathematical coincidence.\(^5\) An R of 1 would indicate a direct linear relationship, while an R of zero would indicate no relationship. A p-value of .05 indicates a 5% chance of mathematical coincidence but numbers less than .05 are traditionally taken to suggest a non-coincidental relationship.\(^6\)

If one purposely set out to plug the circulation, short of inserting corks, it would be hard to find a better combination than cholesterol, which deposits in artery walls, and animal fat, which slows red blood cells in capillaries.\(^7\) Animal fats are heavier and stickier than vegetable fats and have higher melting points. Lard, for example, is solid at room temperature while olive oil still flows. The heavier the fat, the more it agglutinates blood cells.\(^8\) Photomicrographs taken after a high fat meal show clumping red cells.\(^9\) After a fatty meal the viscosity of the blood increases, a centrifuged blood sample shows a layer of white fat on top, and the circulation in the capillaries slows to a crawl. If it stops completely, it clots. That may explain this:\(^10\)

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\(^4\)See note 49. FAO.


\(^6\)Ibid. p 93.

\(^7\)See note 152. Williams.

\(^8\)Williams A. Increased blood cell agglutination following ingestion of fat, a factor contributing to cardiac ischemia, Coronary insufficiency, and anginal pain. Angiology. 1957;8:29.


Graphing thrombosis against the percent of Calories from foods of plant origin produces an inverse correlation of -.86 and a p-value of .0004.

Animal fat comes with its own supply of cholesterol which deposits in vascular linings and causes coronary heart disease (CHD). Other authors\(^1\) have observed a linear relationship between animal food consumption and CHD. The following database did not discriminate CHD from other forms of heart disease but the results are similar.\(^2\) The computed R value is .76 and the p-value in this graph indicates only a .0004% chance that this apparent linear relationship reflects only a mathematical coincidence.

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Another inverse correlation with plant food consumption appears. It is most obvious for percent of Calories from plant food rather than grams of vegetable fat per person per day. Vegetable fat is not a health promoter, either.

Not surprisingly, similar inverse correlations were found for most of the following graphs, but this is somewhat trivial since the more Calories from plant food, the fewer the grams of animal fat in the diet.

Many types of cancer are related to carcinogen exposure. Animal fat increases the synthesis and excretion of carcinogenic bile acids that are made from cholesterol. Simultaneously the lack of fiber in animal source food slows intestinal transit time, thus exposing the bowel lining to these carcinogens for a longer period of time, so the mucosal exposure is greater (next page):

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Animal fat also induces excessive and fluctuating levels of sex hormones\textsuperscript{15} that are synthesized from fat's good buddy, the cholesterol molecule. Most types of breast cancer are hormone dependent.\textsuperscript{16}


Although a recent mail survey of 90,000 American nurses found no relationship between fat consumption and breast cancer, none of the women in the study were vegan (the minimum daily cholesterol intake\textsuperscript{17} was 247 mg.) and none of them were on the 10-15\% fat intake of the countries in the lower left of the above graph.\textsuperscript{18} In effect, a study done to test the international evidence that low-fat diets protect against breast cancer omitted the key population group.

The survey has since received appropriate criticism from breast cancer specialist, Robert Kradjian, M.D.\textsuperscript{19} A later study\textsuperscript{20} suggests that low fat intake even reduces mortality in women who already have undergone treatment for the disease.

Furthermore, the risk vs incidence of a specific disease often follows a sigmoid curve. At low levels of individual risk nothing happens. Then as the threshold is reached, disease rates rapidly increase, leveling off when risk has maximized and random chance takes over. The sigmoid curve is found throughout nature and applies to cardiovascular risk, hemoglobin dissociation, and the hysteresis curve of electromagnetism. The breast cancer researchers may have been measuring incidence rates past the maximum risk level of a sigmoid curve while linearity only appears after a summation of sigmoid curves, one from each country.

\textbf{The Sigmoid Risk Curve}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{sigmoid_curve.png}
\caption{The Sigmoid Risk Curve}
\end{figure}


\textsuperscript{18} See note 160. Carroll.


Most types of prostate cancer are also hormone dependent.\textsuperscript{21}
Cancer of the womb is hormone dependent and appears to follow the same pattern:\(^{22}\)
A recent German study of age-matched males showed the vegetarians to have about twice the natural killer-cell activity of their omnivore controls, an important factor in preventing loose tumor cells from migrating through the circulatory system looking for a new home. There is a higher aggregate death rate from cancer in populations consuming animal foods.

Beef and dairy proteins have been identified as a trigger for lymphoma (lymphatic cancer) and Hodgkins Disease, probably the "confusion" effect of protein similarity on the immune system.

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Ninety percent of insulin-dependent diabetes mellitus (IDDM) patients have antibodies to their own pancreatic islet cells. A recent study reported antibodies to bovine serum albumin in 142 out of 142 newly-diagnosed IDDM patients. Do fragments of animal protein induce cross-reactive antibodies? Another investigator noted a direct correlation between IDDM incidence and consumption of unfermented cow milk proteins as well as an inverse correlation with the prevalence of breast feeding. This chart took the reported incidence of IDDM country by country and matched it against FAO animal source calcium data.

Insulin Dependent Diabetes vs Animal Calcium (Dairy)

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27 See note 75. Robbins. p 998.


Adult onset diabetics tend to be overweight. They may have normal circulating levels of insulin but the insulin can't find its receptor site on cells. With no insulin on its receptors, the cell has no way of absorbing glucose which stays outside in the serum or spills over in the urine.

In 1954 Swank reported "sludged blood" in fat-fed subjects. Photomicrographs showed a coating on red blood cells following high fat meals. Since that time at least three other investigators have incidentally reported similar phenomena but an extensive literature search failed to turn up definitive proof one way or the other. If a fat (or perhaps a glycoprotein) coating does in fact transiently cover cell membranes after high fat meals, it probably hides insulin receptor sites, glucose transport proteins, and tumor antigen sites as well, thus explaining both the high incidence of Type II diabetes and metastatic cancer in obese patients.

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Multiple studies\textsuperscript{36,37} have demonstrated increased urine calcium loss on high protein diets, or diets supplemented with sulfur containing amino acids,\textsuperscript{38} which release sulfate into the urine. Animal food is high in protein and the protein is high in sulfur amino acids.\textsuperscript{39}

Methionine is the limiting essential amino acid in the vegan diet. Cysteine and cystine (a double cysteine), both derived from methionine,\textsuperscript{40} are the source of urinary sulfate.\textsuperscript{41} Inorganic sulfates (sodium, potassium, magnesium, ammonium and calcium) comprise 85-95\% of urinary sulfate.

### Sulfur Amino Acids

in 2000 Calories of Various Foods

<table>
<thead>
<tr>
<th>Food Category (Avg'd 100 Gm Portions)</th>
<th>Milligrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>0-3000</td>
</tr>
<tr>
<td>RDA</td>
<td>3000-6000</td>
</tr>
<tr>
<td>Bread</td>
<td>6000-9000</td>
</tr>
<tr>
<td>Nuts</td>
<td>9000-12000</td>
</tr>
<tr>
<td>Grain</td>
<td>12000</td>
</tr>
<tr>
<td>Veg's</td>
<td>0-3000</td>
</tr>
<tr>
<td>Dairy</td>
<td>3000-6000</td>
</tr>
<tr>
<td>Meat</td>
<td>6000-9000</td>
</tr>
<tr>
<td>Poultry</td>
<td>9000-12000</td>
</tr>
<tr>
<td>Eggs</td>
<td>12000</td>
</tr>
<tr>
<td>Fish</td>
<td>0-3000</td>
</tr>
</tbody>
</table>

\textcolor{green}{\textbf{Methionine}} \quad \textcolor{blue}{\textbf{Cystine}}


\textsuperscript{39}See note 52. Nutritionist III, v4.5.

\textsuperscript{40}See note 2. Harper's 1990. p 269.

\textsuperscript{41}ibid., p 309.
High dietary sulfur aminos are associated with high losses of calcium in the urine,\textsuperscript{42} probably because urinary sulfate must be neutralized by calcium filtered from the blood,\textsuperscript{43} which in turn must be replaced by calcium from bone. This may contribute to osteoporosis, a condition that is reflected in the incidence of hip fracture in the elderly:\textsuperscript{44}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{image}
\caption{Osteoporosis vs Animal Protein Consumption}
\end{figure}

\textsuperscript{42}See note 182. Zemel. pp 545-52.


The dairy industry states that milk calcium builds strong bones. "Animal calcium" translates to dairy products since they are the major source of calcium in the omnivorous diet. The following graph fails to confirm a protective value in dairy products:

![Osteoporosis Graph](image)

World Health Organization data suggest that animal protein may not be helpful in musculo-skeletal problems either (next page):

The statistics reflect the "disease or injury that initiated the train of morbid events leading directly to death." Included in the category of musculoskeletal disease are many autoimmune diseases. Some of them, along with the affected tissues, are: rheumatoid arthritis (joints), lupus erythematosus (virtually all DNA), and scleroderma (collagen). These syndromes can be fatal and therefore likely to appear on the death certificates collected by the WHO. Once again there is a negative correlation with plant food consumption.

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45 *ibid.* and note 49, FAO.

46 See note 148, WHO.

47 See note 75, Robbins, pp 163-237.
The WHO keeps tabs on mortality from nephritis, kidney infection and "other genitourinary diseases," that occur downstream from the glomerulus, the likely site of the initial insult.

Nephritis is generally due to an antigen-antibody (ag-ab) reaction in the filtering membrane of the kidney glomerulus. The membrane becomes thickened and less permeable. As the microscopic filtering "pores" (about 4-8 nm dia.) become fewer, they lose the negative electrical charge that previously prevented the leakage of negatively charged proteins such as albumin. The result is protein loss, edema, a change in urine output, chemical imbalances, and uremia.

One type of nephritis, due to IgA immuno-globulins, is aggravated by cow's milk but classically, glomerulonephritis follows about ten days after streptococcal infection. In this case the ag-ab reaction is a response to the strep antigens. Strep cultures best in lab media containing blood agar so the graph may reflect in part that omnivores are feeding not only themselves but some of their major pathogens. However, only a fraction of reported nephritis can be traced to strep infection.

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52 See note 193. Baron. p 93.
Egypt has the highest incidence of genitourinary (GU) disease recorded by the WHO\textsuperscript{53} but its "outlier" position reflects schistosomiasis, a parasitic blood fluke transmitted by fresh water snails and associated with bladder cancer. The Nile formerly flooded annually and wiped out the snails but the Aswan High Dam was completed in 1970 and the snail is now common in irrigation ditches.\textsuperscript{54} This is not diet-related so we can remove Egypt from the data and get the graph below:

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53See note 148. WHO.

The cause of renal failure is often not established but the current dietary regime for this condition is a low protein diet. Since protein is being lost in the urine, whatever protein is allowed is supposed to of "high biological value." But if renal failure is the end stage of an autoimmune reaction triggered by the amino acid sequence of animal protein, this is the equivalent of trying to put out a fire by throwing gasoline on it. Barsotti has shown that in at least one type of renal disease (nephrosis), a vegan diet maintains serum proteins adequately and improves kidney function. The gold standard for protein is egg protein but WHO data suggest that eggs have an even more adverse effect on nephritis and pyelonephritis (kidney infection) than does animal protein in general:

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57 See note 49. FAO.

58 See note 148. WHO.
The American Heart Association reported $88 billion for heart disease\textsuperscript{59} in 1988 which was price indexed in the following analysis for a 1991 figure of $94.79 billion.

Cancer costs run about $103 billion/yr.\textsuperscript{60} Costs for each type of cancer shown in the graphs were estimated by the formula: Cost = type/total x $103 billion using American Cancer Society figures.\textsuperscript{61}

Musculo-skeletal disease costs were approximated from figures of the Arthritis Foundation,\textsuperscript{62} which includes gout as a common type of arthritis. Gout is related to consumption of high-purine organ meats.

Genito-urinary disease costs are based on figures from the Public Health Service.\textsuperscript{63}

The American Diabetes Association quoted $85 billion for their disease.\textsuperscript{64}

Medical costs of osteoporosis are put between $7-10 billion/year.\textsuperscript{65}

Multiple regression analysis would include other risk factors such as inactivity, smoking, and genetic risk, but the necessary data could not be found. Therefore, the total costs were multiplied by R\textsuperscript{2} which is roughly that part of each disease figure that can be attributed to the dietary risk.\textsuperscript{66}

The figure $123 billion (21% of the medical budget actually going for patient care and about 2% of the GNP), is probably a very conservative estimate since the U.S. Surgeon General's Report on Nutrition and Health\textsuperscript{67} indicates that about 69% of U.S. mortality is diet-related.

The $123 billion medical cost of animal food consumption can be compared with the American Lung Association's estimate for the cost of tobacco use\textsuperscript{68} ($65 billion) and the Center for Science in the Public Interest's estimates for the cost of alcohol consumption\textsuperscript{69} ($100 billion).


\textsuperscript{69}Jacobson M. \textit{Grappling with Alcohol Abuse: When Will We Take a Stand?} in: Nutrition Action. Center for Science in the Public Interest. 1981, October:6-7 CSPI.
The $123 billion estimate does not include several other food-related problems. For instance, obesity correlates with animal fat consumption but is not included in the estimate. Although it may account for 20% of annual mortality\cite{hoiberg1991} it does so by predisposing to many diseases, including the ones already shown. Ovarian cancer has been linked to galactose (milk sugar) consumption\cite{cramer1989} but the WHO does not keep statistics on incidence rates so it is omitted from the estimate. Childhood otitis media is linked to cow milk allergy\cite{nsouli2003} and although it affects ten million children with an estimated $2 billion/year cost, it also is omitted for lack of WHO incidence data.

This analysis will be attacked on the grounds of spurious correlation, e.g. the cause of all these diseases is not animal source food but the sedentary lifestyles, longer life expectancies, or perhaps some unexpected factor such as television access of the populations in the developed countries. Critics will also argue that medical diagnoses are less accurate in the under-developed countries. However, the figures were already age-adjusted by the reporting authors, and while correlation does not prove causality, each graph was referenced to sources that confirm and illuminate the suggested causality.

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\cite{nsouli2003} See note 203. Nsouli.