

The Bible, Epidemiology, and Edenomics

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Abstract

Many evolutionists claim that science has disproved the Bible and they use this claim to discredit creationism. In this paper I view the Bible from an epidemiologic perspective and attempt to show that, contrary to being disproved by science, it can be considered a general guide to medical epidemiology. The concepts of health and disease, the Creation Health Model, and the critical dependence of human health on plant life are discussed and shown to be challenges to Darwinian evolution. Human nutrition and health are immensely complex on the molecular level. I introduce the term *edenomics* to describe the interactions between plant phytochemicals and human cellular biology. Edenomics suggests reductionist understanding of the molecular biology of chronic diseases may remain illusive and that lifestyle may be the most important determinant of health in developed nations. It is concluded that the science of epidemiology supports the Bible and is opposed to neodarwinism.

Introduction

Some claim that science has disproved the Bible and they use this claim to discredit creation. This paper examines the Bible from an epidemiologic perspective. The intent is to scan the Bible for epidemiologic principles and test these against extant, observational science. The paper begins with an overview of biblical epidemiology. This is followed by a discussion of three difficulties for Darwinian evolution: 1) Darwinian medicine, which is criticized as unable to explain health and disease in a compelling manner, 2) The Creation Health Model (CHM), which suggests that health and disease cannot be separated from the Creator and His initial design, and 3) The vital role of plants in human health.

The importance and complexity of plants leads to the concept of edenomics—defined as the intersection

of Genesis 1:27, 1:29, and molecular biology. This term signifies the potential intractable nature of plant-human molecular interactions and suggests a limitation in human understanding of the molecular mechanisms of health and disease. Along with the CHM, these two bi-directional positions argue design from scientific findings and, from design considerations, offer health suggestions consistent with modern science.

This paper is not intended to be a magic formula for health because the subjects of health, disease, suffering, and death are quite complex. Wide individual variations in personal susceptibilities and exposures exist, thus precluding a specific “one-size-fits-all” strategy. Nevertheless, some general epidemiologic advice can be found in Scripture. Starting with the Bible and examining it from an epidemiologic perspective, one is led to principles that have widespread applicability in health and disease. Interestingly, starting with an analysis of empiric science leads one back to the Bible’s creation story. The Bible’s epidemiology is scientifically sound.

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Accepted for publication: March 29, 2005

The Bible and Epidemiology

Epidemiology is the study of the distribution of the determinants of health and disease in populations (Gordis, 2000). It seeks to determine both the salutary and deleterious compounds, behaviors, and activities affecting the development of disease. An interesting question is whether or not a model of origins is important in such determinations. While no one would claim that the Bible is a science textbook, some general principles of health, disease, and epidemiology can be found in Scripture, as we shall see.

Animal diets were originally vegetarian, as described in Genesis 1:29-30 (Wieland, 2001; Emerson, 1996; Stambaugh, 1991). The creation record gives the Creator's initial conditions and plans for His creation. This was an ingenious design in which plants and animals could live in a blissful environment essentially existing by the exchange of waste products, such as carbon dioxide and oxygen from animals and plants, respectively. The peaceful, and assumedly painless, environment suggests a benevolent Creator of infinite intelligence. Recognition of the initial design—the disease-free state—is important because it presents a framework on which dietary recommendations can be constructed.

The Fall came next, after which sickness and death entered the world. The actual events that transpired at the time are, of course, unknown. It is reasonable, however, to speculate that a tendency toward the breakdown and decay of physiologic systems leading to disease was introduced. Some microorganisms became pathogenic. It was then necessary to contend with heretofore non-existent diseases, suffering, and death.

Genesis 3:17 and Romans 8:20-23 tell us that the whole creation (including our bodies) was drastically altered at the Fall and made subject to corruption and death. We cannot even guess what our physiology was like in Eden. We can recognize, however, that modern medicine and epidemiology show that a diet rich in balanced plant foods and reduced in meat levels is conducive to good health and longevity even now. This value of plant biochemicals in human nutrition—the connection to the Garden—fits with creation and is at odds with evolution.

Genesis 6:3 states that the maximum lifespan of man shall be 120 years. The maximum length of time one can theoretically live, lifespan, is distinct from life expectancy. Life expectancy is the average length of time one can be expected to live. Life expectancy can change; the maximum lifespan does not. In 2001, life expectancy was 77.2 years in the United States (NCHS, 2004). The Bible gives us a reasonable goal for a viable, maximum lifespan of 120 years. It may be anticipated that implementation of public health measures, disease prevention, modern medical

treatments, and agricultural advances, all working together, could ultimately result in people routinely attaining this 120-year goal.

Dietary instructions changed after the Flood

The Flood resulted in a change to the initial vegetarian diet. The post-Flood dietary instructions for the Israelites are delineated in Leviticus. The detailed directions are given as to which animals are allowable and which ones are not. Chewing the cud was important in the determination of edible animals. It suggests that if one cannot be a vegetarian, at least the meat used for food should derive from vegetarian animals. The narrow type of meat eating allowed was one step removed from the originally designed vegetarian diet. These Levitical dietary instructions were apparently based on the initial design and were as close as possible to vegetarianism while permitting some consumption of meat.

Leviticus 3:17 gives advice regarding the consumption of animal fat. It is clear from the context that the “lasting ordinance for generations to come” refers to animal fat and not vegetable fat. Animal fat has been implicated in human diseases such as many forms of cancer (Cohen, 2002) and heart disease. Humans need only the essential fats for optimum health and these can be obtained from vegetable sources (ADA, 2003).

Nowhere in the Bible are contemporary people commanded or even strongly encouraged to become vegetarian or to minimize their consumption of meat. There are numerous Bible passages demonstrating that meat-eating occurred and was not condemned in early church history. One purpose of this paper is to show that human health is enhanced when people consume large and balanced amounts of plant material in their diets and minimize meat eating. It is interesting that while an Edenic diet is not commanded, it is seen to promote health and longevity.

The importance of spices and herbs is also illustrated in the Bible. Recommendations to eat meat with bitter herbs are given in the books of Exodus and Numbers, although the specific spices are not named (Exodus 12:18; Numbers 9:11). Several medicinal benefits of herbs and spices are known (Balch and Balch, 1997). Some are purported to have anti-inflammatory effects. Red meat can have proinflammatory effects leading to inflammatory arthritis (Pattison et al., 2004). Inflammation can play an important role in heart disease and in pathogenesis generally (Li et al., 2005). Consumption of meat with certain spices may have attenuating effects on inflammatory processes. The presence of small quantities of meat likewise adds flavor to vegetable dishes. These biblical dietary regulations were not presented as keys to healthful living. It is fascinating to

see, however, that modern research substantiates that they do promote good health.

The book of Daniel contains what may be the first epidemiologic study of vegetarianism (Daniel 1:1-14). Daniel and his colleagues preferred and requested a diet of vegetables and water as opposed to the king's royal food. After two weeks, they looked better than the king's men and they suffered no apparent ill effects. At least in the short term, vegetarianism was just as good as, and probably better, than the royal menu. For Daniel and his friends, a diet consistent with the initial creation and the initial dietary instructions served them well. We must suggest, however, that Daniel's vegetarian stand was taken in order to avoid meats prohibited by the Mosaic Law, and we are not told that these men remained vegetarian later in life (Daniel 10:3).

Isaiah tells us that the wolf and the lamb will feed together and the lion will eat straw (Isaiah 65:25). From vegetarianism the created world came, and apparently to vegetarianism it will return. We cannot suggest that the passages show our Creator would have all people become vegetarian right now. Scientific research does show, however, that it is prudent to eat more vegetables and less meat in this long time period after Eden and before Isaiah 65. It might be interesting to study the effects of increasing the amount of plant food in a lion's diet.

Cleanliness

The Bible is clear regarding the importance of cleanliness, washings, and avoidance of unclean things. The biblical advice predated microbiology by thousands of years. The book of Leviticus is filled with hygienic recommendations which focused on cleanliness, avoidance of contaminated carcasses, and personal hygiene. Wise (1994) has provided a succinct summary. These recommendations were ahead of their time.

Biblical morality is the epitome of primary disease prevention by the avoidance of causative agents of certain diseases. Tobacco-related, alcohol-related, and drug-related diseases are avoidable by not partaking in such activities. Responsible alcohol consumption in very minimal amounts, however, may not lead to diseases, illness, or accidents. Sexually transmitted diseases are also directly avoidable. Primary prevention of disease is the most cost effective strategy for disease avoidance and health maintenance from financial, emotional, and temporal standpoints.

From a public health perspective, good stewardship leads to policies that promote clean air, clean water, sanitation, and other public health measures, which are all part of a healthy environment. The benefits of a clean environment are obvious. Some biblical principles of epidemiology are summarized in Table 1.

Difficulties for Darwinian Evolution

Three difficulties for Darwinian evolution will be discussed: 1) The causes of illnesses, 2) The Creation Health Model, and 3) The human dependence on a plant-based diet for maximizing health and minimizing illness.

Darwinian medicine and the causes of illnesses

Health and disease are hard to define explicitly (Kovács, 1998). For this discussion, health will be defined as a state characterized by anatomical, physiological, and psychological integrity. It is the ability to perform personally valued family, work, and community roles. It is the ability to deal with physical, biological, psychological, and social stress, a feeling of well-being and a freedom from the risk of disease and untimely death (Last, 1988). This straightforward definition is relatively self-evident and avoids lengthy philosophical debate (Kovács, 1998).

Evolutionists face the problem that humans are very susceptible to a wide variety of maladies after having undergone billions of years of evolution. Reasoning suggests that the process of mutation and natural selection over the eons of time in which evolution acted would have led to robust, highly resilient beings without the many susceptibilities humans face. That obviously did not occur. With survival and reproduction as the driving force, evolution would have been expected to "create" humans less vulnerable to disease and more prolific reproductively. Herbert (1998) addresses the above question regarding human disease susceptibility,

The idea that evolution is progressive, leading to an ever more perfect organism immune to disease, is a residue of 18th and 19th century Enlightenment thought. It quite fails to take into account that many evolutionary lineages and more than 99.9% of all species that once lived are extinct or that brains and bodies of *Homo sapiens* have become smaller in the last 50,000 years: hardly criteria for progress. Nature is blind, random, and capricious; it has no purpose in mind except to select organisms to survive in order to reproduce. It does not strive for perfection, complexity, diversity, or greater size. In fact, size may be an impediment—some seeds may get smaller in order to reduce dispersal. All life forms are continually changing. Evolution consists of a change in variation, which may be slight or extreme. Each generation brings new nucleotide sequences (some which are "neutral"), information, and functions, which are continuously tried out in various combinations in an ever-changing environment. In each generation, natural selection refines adaptations. In fact, perfection immune to disease is impossible because, for example, viruses and bacteria co-evolve with and are even assisted in doing so by human beings.... Nature is pragmatic: what works, works, as long as the organism

Table 1: Some biblical epidemiologic principles

Bible verse	Interpretation	Epidemiologic principle	Comment
Genesis 1:29–30	Initial design called for vegetarian diet	Maximize plant-based foods as dietary components	Consistent with evidence
Genesis 3	Fall	Disease, decay, and death entered the world	Consistent with evidence
Genesis 6:3	Lifespan limited to 120 years	Established the standard of measurement	Attainable goal with combined strategy
Leviticus 3:17	Consumption of animal fat prohibited	Animal fat is unhealthy and associated with disease	Consistent with epidemiologic data
Leviticus Various verses	Cleanliness	Hygiene important in infectious disease prevention	Consistent with epidemiologic data
Numbers 9:10–12 and Exodus 12:8	Spices to be consumed with meat and unleavened bread	Natural spices and herbs retard growth of bacteria and molds	Data indicate spices (garlic) can have a favorable effect on serum lipids
Daniel 1:1–14	First epidemiologic study of vegetarianism	Vegetarianism is healthy, at least in the short term	Short-term vegetarian lifestyle can be therapeutic
Isaiah 65:25	Creation may return to vegetarianism	Maximize plant-based foods in diet	Consistent with epidemiologic data
New Testament 1 Cor 6:19	Biblical morality as a model of the primary disease prevention	Primary prevention is the most cost-effective strategy from economic, emotional, and temporal viewpoints	Consistent with epidemiologic data, especially economic. Vitaly important in a nation with high healthcare expenditures

reproduces. It makes no difference to Nature whether illness and disease occur after the organism has reproduced as fruitfully as possible... (p. 511).

Can the above statements be true if the evolutionary processes are primarily concerned with reproduction? Can evolution produce entities like humans from very simple natural resources? Do humans really reproduce as fruitfully as possible?

Evolutionary medicine (Nesse and Williams, 1995) is an attempt to explain health and disease within a neodarwinian framework. It suggests that disease results from a mismatch between the environment and the individual. Diarrhea from an intestinal pathogen, for example, is seen as beneficial to the microorganism in its struggle for survival. Pathogenic interactions and human symptomatology are understandable in the context of reproduction and survival of the infecting pathogen. Chronic diseases are explained as inadequate responses on an organism's part to a changing environment. Reproduction and selection pressures that drive the evolutionary process are believed by evolutionists to solve the susceptibility problems over time. Evolutionary

medicine oversimplifies disease as being nothing more than an environmental-fitness maladaptation in the struggle for reproduction and survival.

Whether or not evolutionary theory is even applicable to health and disease is debatable. Gammelgaard (2000) notes,

It is the primary aim of Darwinian medicine to view the causes of disease and health from a new perspective by proposing models of selection as explanations of the many symptoms of disease...the natural goals of evolutionary theory are hardly applicable to the field of medicine due to the potential incompatibility of the states which are deemed desirable from the perspective of medicine and those which are deemed desirable from the perspective of evolutionary theory (pp. 111,115).

Darwinian medicine is a relatively new and emerging field. Whether it will contribute anything substantive to human health is highly questionable. Its theoretical musings are built on the reproduction-survival-selection paradigm that lies at the foundation of evolutionary thinking. Evolutionists believe that structures, functions, and susceptibili-

ties exist because they were selected across evolutionary time. It is assumed that features which do not exist or no longer exist failed in the process of natural selection. But such tautological thinking explains nothing because it explains everything. Any hypothesis that is so plastic and malleable is immediately suspect. It is therefore anticipated that Darwinian medicine—although quite capable of evolutionary story telling—will contribute little or nothing to the field of medicine in the foreseeable future.

The Creation Health Model

A second problem for neodarwinism is that human health and disease cannot be readily separated from design, the Creator, His creation, and the Fall, as seen in the CHM (Schragin, 2004). The CHM suggests that the probability of developing a disease in a fallen world is an incremental probability function of the increasing deviation from the Creator’s initial plan for diet and lifestyle. Small deviations may be allowable if the benefits outweigh the risks. Large deviations present increasing probabilities of disease. Since the CHM is predicated on design, it recognizes creation and is purpose-filled (Romans 1:20). It is in direct opposition to the explanation of Darwinian medicine given above, which is blind and purposeless.

The logic of the model is represented by the following mathematical equation: $P(D(i)) = \alpha(i) + \beta(i) * (e_1 - e_2)$. The model is verbalized as the probability (P) of developing a given disease (D(i)) as a result of an intrinsic probability resulting from the Fall [$\alpha(i)$] and gene-environment interactions [$\beta(i) * (e_1 - e_2)$]. The first term, [$\alpha(i)$], represents the baseline probability of a disease resulting from the Fall-induced tendency of decay and breakdown. Regardless of exposures, healthful or harmful, this Fall-induced predisposition inevitably creates risk of disease. It is recognized that this term does not describe the mechanism or magnitude of the baseline risk nor does it offer interventions to reduce it. It is introduced into the model, however, to demonstrate the dependence of health not only on the Creation but also on the Fall, the latter of which leads to idiopathic diseases—those of unknown cause.

The second term, [$\beta(i) * (e_1 - e_2)$], represents gene-environment interactions. In addition to the baseline risk $\alpha(i)$, there are additional factors, both salutary and deleterious that affect health. The manner in which an individual of the genotype $\beta(i)$ handles those exposures is also conveyed in this equation. $\beta(i)$ is the genetic component

that modulates the exposures. e_1 stands for the deleterious exposures that increase the probability of disease. e_2 represents salutary exposures that promote health and decrease the risk of developing disease.

The CHM is a framework to understand the relationship of disease and design. It is not a mechanistic explanation of pathogenesis. To some extent, it avoids reductionism, although it could become reductionistic in the better sense of that term if the probabilities and exposures could be correlated to molecular pathways. The CHM is a higher-level model that suggests behaviors because complete reductionist explanations to health and chronic disease may be elusive. Omnipotent pharmacologic interventions might prove difficult to develop and implement because the interrelated, pathogenic pathways involved in chronic diseases are so numerous and incompletely understood. Consequently, the model emphasizes the importance of primary prevention and lifestyle in health and disease by strongly suggesting that the responsibility for health rests with individuals. The underlying design itself determines the preferred approaches to maximizing health. The CHM is a concise statement summing up the probability of disease as the risk resulting from the Fall and gene-environment interactions. If the CHM is correct, then Darwinian evolution has one more problem that it does not adequately explain: *health and disease are inexorably linked to Creation, to human purposeful behavior, and to the Fall.*

The critical importance of plants

The third problem for neodarwinism is the importance of the plant-based, garden-like diet in human health (see

Table 2: Plant food examples and representative phytochemicals

Family	Vegetable	Representative phytochemicals
Brassicaceae	Broccoli Cauliflower Brussel sprouts Cabbage Kale Kohlrabi	Isothiocyanates, selenium Vitamins A, C, K Vitamins A, C α and β carotene, lutein β carotene, zeaxanthin Vitamins A, C, β carotene
Lily	Onions Garlic Leeks Shallots Chives	Vitamin C, folate, lutein Various sulfides Vitamins A, β carotene, lutein Vitamin A Vitamin K, β carotene, lutein
Other	Blueberries Raspberries Apples	Resveratrol, anthocyanidins Anthocyanidins, carotenoids Flavonoids

From USDA, 2004.

Table 2 for a brief list). An extensive number of other vital fruits, vegetables, grains, legumes, nuts & seeds, and herbs & spices could be immediately added to the table. The vital phytochemicals for each type of food could also be expanded based on extant knowledge because the average fruit or vegetable has many more nutrients. Not all the vital chemicals available in the varieties of plant-based foods are presently known (Balentine, 1999). The number of critical phytochemicals in plants will grow larger with further research.

Dietary studies continually report new salutary components in plant foods. Recent examples include walnuts, whole wheat, green tea, and blueberries. Walnuts may improve the lipid profile in type 2 diabetes due to their omega-3 acids and antioxidants (Tapsell et al., 2004). Whole wheat contains a complex phytochemical and antioxidant profile (Adom et al., 2003). Green tea may reduce the risk of hypertension (Yang et al., 2004). It contains other important compounds including the flavonoid EGCG (epigallocatechin-3-gallate) (Beecher, 2003). Blueberries contain resveratrol, an antioxidant which may also function as an anticancer compound (Schultz, 2004). Epidemiology literature is replete with many more examples.

Sometimes it is not always clear what is a medicine and what is a food, and we are reminded of what Hippocrates said, "Let your food be your medicine and your medicine be your food." To a healthy person vitamin C is considered a food, but in the pathologic condition scurvy vitamin C is a medicine. At least 30% of modern medicines are plant derived (Winslow and Kroll, 1998) and many more are modeled after plant components. There are many phytochemicals, such as EGCG and quercetin, that do not have a recommended dietary intake (RDI). But they are nevertheless considered important in human health. It is reasonable to speculate that numerous other medicinal aspects of plants are yet to be discovered. It is an unarguable, inescapable conclusion that optimal human health is critically dependent on plants as foods and medicines. What is merely a phytochemical today may be tomorrow's nutrient with an RDI and someday it may be a pharmaceutical with dispensing and dosing instructions. In His creation, the Creator provided a wide variety of plant foods, suitable for a large variation in individual tastes and preferences with potential medicinal qualities.

Major health organizations now recommend an increase in the amount of dietary plant-based foods. This presents a major difficulty for a Darwinian explanation because the theory of plant evolution is currently problematic. There are unanswered questions, missing fossils, and inadequate support for plant evolution (Comminellis, 2001). Consequently, evolution cannot explain the development of the vast

number of varieties of nutritious foods. The Brassicaceae family, for example, includes broccoli, cauliflower, brussels sprouts, cabbage, kale, and kohlrabi. The ultimate origin of this family is unknown. Evolutionists speculate that millions of years ago a common ancestor led to the development of this family. The evolutionary forces are believed to have been the dynamic duo of mutation and natural selection operating under reproductive pressures.

However they originated, Brassicaceae contain phytochemicals that are very important for human health (Liu et al., 2002). Specifically, broccoli contains isothiocyanates (Thornalley, 2002) and many other important nutrients that have an RDI. The story can be repeated for another vegetable family. The lily group includes such plants as onions, garlic, leeks, shallots, and chives. Somewhere in evolutionary time and space, the lily family and members all derived from a common plant ancestor. Whenever it happened and whatever actually happened, the lily family members contain phytochemicals important for human health.

Many fruits contain vital phytochemicals (Sun et al., 2002) and the origins of fruits are not known. Therefore, the vague evolutionary claims are repeated for fruit-bearing plant families, each breaking off from the so-called evolutionary tree at different points in space and time. The same unlikely theme must continue for other fruits, vegetables, grains, legumes, nuts & seeds, and herbs & spices. Each contains phytochemicals important for human health. The fact that humans can alter the composition by breeding does not lessen the problem of how people came to depend on them in the first place and why this dependence existed prior to domestication of plants. Table 2 gives a mere starting point delineating a very small number of plant foods and some of their nutrients.

Prior to domestication and human plant breeding, a very large, theoretical, evolutionary tree with a multitude of branch points must be constructed. Each branch must come with molecules vital in human health but not essential for plant reproduction (Bergman, 1998). In some unexplained manner, evolution had to cause a vast array of plant-foods to develop. The struggle for mere survival is the driving mechanism of evolution, but these plant-foods contain phytochemicals critical to human health and not for plant reproduction (Lumsden, 1993). We are asked to believe that evolution repeatedly "just happened" to develop all these compounds essential for human life. The process had to yield hundreds of branch points in the speculative history of plant evolution—a highly unrealistic scenario.

Thousands of years before the advent of microbiology, the Bible's recommendations concerning hygiene were correct. Its initial dietary instructions should also be con-

sidered carefully. The plant-based diet as initially designed may contain complex, and possibly unexplainable, phytochemical interactions and synergisms necessary for disease prevention. But we cannot speak with certainty because we are not absolutely sure that the pre-Fall conditions would be applicable to our post-Fall existence. Phytochemical synergisms have become a major focus of research (McCarty, 2001; Liu, 2003; Jacobs and Steffen, 2003). There may be interactions and/or synergisms between known and yet-to-be discovered phytochemicals that are critical to optimum cell function and to health in general (Finley, 2003; Eastwood, 2001). We may be passing from genomics—the study of genes, to proteomics—the analysis of proteins for their identity, quantity, and function (Peng and Gygi, 2001), to nutrigenomics—the study of nutrients and their effect on cellular/genetic processes (Kaput and Rodriguez, 2004). Combinations of foods may play a greater role in health than individual foods, and consequently, another column could be added to Table 2 describing phytochemical-by-phytochemical interactions, the complexity of which is staggering. All of this will present new problems for neodarwinism. A question for evolutionists was: “Why does one plant-derived compound support human health?” That may change to: “Why do many different foods from diverse plant species have compounds that act *synergistically* on the intricate workings of the cell, the cell-cycle, and DNA to promote human health?” One can fully anticipate that Darwinian evolution will be unable to explain phytochemical synergisms in a satisfactory manner.

The two competing views are that the garden-designed, plant-based diet was made by an omnipotent Creator or that it all arose by evolution. But evolutionary theory is short on specifics and long on speculations. Neodarwinism does not offer compelling explanations for the dietary and medicinal importance of so many plants. Ultimately it comes down to a question of which origin’s view is more credible. I think that an objective assessment of the available facts strongly suggests purposeful design.

Edenomics and Design

I devised the term “edenomics”, defined as the intersection of Genesis 1:27, 1:29, and molecular biology, to designate the idea that the Creator-designed molecular interactions and synergisms between human health and the phytochemicals found in plants and humans are so complex that a complete reductionist understanding may not be possible. A review of the biochemistry of only one herb, garlic (Bannerjee et al., 2003), gives an example of the complexity. Edenomics is a logical conclusion to the genomics-proteomics-nutrigenomics sequence and signifies

the potentially unexplainable combinations and permutations of phytochemical-human molecular interactions. It suggests that comprehensive pharmaceutical solutions may not be forthcoming for complex, multifactorial, chronic diseases. Edenomics may represent a limit on human understanding of human-plant interactions.

The CHM and edenomics are bi-directional positions. Starting with science, they argue for design and starting with design, they offer health suggestions. Based on expanding epidemiologic knowledge, they recognize the Creator’s work. This is the single most important aspect of edenomics and the CHM. Their support for the Creator is at their essence. From the design perspective, they offer suggestions for improving health that are not readily apparent from the neodarwinian viewpoint. Other important aspects of edenomics are the anticipation that many more vital nutrients will be identified and they will come from plant life; that the current understanding of plant-human molecular interactions is rudimentary and complete reductionist understanding will remain elusive; that molecular biology, i.e. genomics-proteomics-nutrigenomics, etc. will probably be unable to completely explain the interactions; that chemoprevention and dietary supplementation will be limited in their effectiveness as natural foods have the correct balance of nutrients; and that a diet with a maximum amount of a very wide variety of natural, plant-based foods is preferred for optimizing health regardless of meat consumption. Table 3 delineates the principles of edenomics.

Table 3: Principles of edenomics

Recognition of the Creator’s infinite intelligence and initial creation; science points toward design, design suggests health models
Many more vital nutrients will be identified and they will come from plant life
Current understanding of plant-human molecular interactions is rudimentary and complete reductionist understanding will remain elusive
Molecular biology; i.e., genomics-proteomics-nutrigenomics, etc. will probably be unable to completely explain the interactions
Chemoprevention and dietary supplementation will be limited in their effectiveness as natural foods have the correct balance of nutrients
A diet with a maximum amount of a very wide variety of natural, plant-based foods is preferred for optimizing health regardless of meat consumption

Edenomics suggests a change in health strategy from reductionism with resultant molecular targeting of chronic diseases to a higher-level lifestyle approach rooted in primary prevention. This leads directly to the CHM with its higher-level approach to optimal health such as behavioral and dietary choices.

Creation, Health, and Diet

Having established the Bible as a source of epidemiologic information, we now ask what recommendations can be gleaned for our society which has passed through the epidemiologic transition. This transition occurs when a developed country or society passes from acute infectious diseases to chronic diseases as the major source of morbidity and mortality (Omran, 1971). This has occurred in most developed nations such as the United States. The key difference is that infectious etiologies usually involve one individual infectious agent while chronic disease etiologies are multifactorial and chronic diseases are generally much more complex pathologically. Infectious etiologies generally lend themselves to a pathogen-treatment analysis while the pathogenesis of chronic disease is more complex. Consequently, lifestyle becomes very important in disease etiology. In persons without unhealthy habits, diet is probably the most important modifiable factor.

Profound changes occurred at the Fall. The state of the world before and during the Fall, as well as pre-Flood plants, are not known. There is no treatise comparing and contrasting human anatomy and physiology pre-Fall and post-Flood. Consequently, the unidentified transitions at the time of the Fall and Flood lead to theoretical considerations regarding health and disease.

Theories of health, disease, and human diet are still being developed. A large amount of uncertainty exists. There are many claims purporting dietary solutions to health problems or the most favorable diet. Science is just beginning to appreciate the complexity of nutrient-gene-environment

interactions ingeniously designed by the Creator. Extant knowledge of nutrient-gene-environment interactions is too rudimentary to know the optimal diet. Consequently, any discussion of the best possible diet for health at this point in time is somewhat speculative. What is not theoretical, however, is the retained dependence upon plant life for human health. There exists to this day, despite the Fall, a strong connection to the garden-like diet. (It is understood that plants have experienced changes resulting from the Fall and Flood. Extant plant life, however, is what we have to work with.)

Vegetarian diets can achieve complete nutrition (ADA, 2003; McDougall, 2002). However, a wide variety of plant-based foods is necessary. Not all vegetarian diets are nutritionally equivalent. The prefixes ovo, lacto, and pescio are used to differentiate the types of vegetarianism with respect to the consumption of eggs, milk, and fish, respectively. The variety of plant-based foods, however, is not generally specified. I use prefixes that describe distributional dispersions from mathematical statistics to introduce the terms platyvegoid (a wide variety of plant-based foods), mesovegoid (a lesser variety of plant-based foods), and leptovegoid (a small variety of plant-based foods).

Carnivorism can be classified as minimal, moderate, or maximal meat consumption. The vegoid nomenclature discussed above can be extended to carnivores. The terms platyvegoid carnivores, mesovegoid carnivores, and leptovegoid carnivores can be used to describe the breadth and depth of plant-based foods in a meat eater's diet.

Table 4 delineates a cross table of 21 possible diets. This is condensed for discussion purposes by not allowing combinations such as lacto-ovo, etc. The bottom row is considered least healthy, regardless of column, because the breadth of plants in the diet of leptovegoids is too narrow. The top row is considered the healthiest due to the wide breadth of plants in the platyvegoid diet. The proper column is not known with certainty. The middle row is intermediate except the maximum carnivorism cell. It is possible for a

Table 4: Dietary types

	Vegan	Lacto	Ovo	Pescio	Minimal carnivore	Moderate carnivore	Maximal carnivore
Playty-vegoid	H*	H	H	H	H	I	L
Meso-vegoid	I	I	I	I	I	I	L
Lepto-vegoid	L	L	L	L	L	L	L

L-least healthy; H-healthy, *-requires diligence; I-intermediate. Table is simplified by not allowing combination categories; e.g., lacto-ovo-mesovegoid.

platyvegoid carnivore to be healthier than a lepto or meso vegetarian. The reason is sometimes attributed to the meat, eggs or fish (Key et al., 1999), when in actuality it may be that the consumption of a wide variety of plant foods is the overriding factor. The CHM and edenomics suggest the top row and no more than minimal meat consumption. A wide variety of plant-based foods is important (Tucker, 2001).

The Bible does not mandate vegetarianism nor does it recommend amounts of meats or vegetables. To the first approximation, caloric intake is a zero-sum game since there are only so many calories a person can consume. In zero-sum caloric intake, moderate or heavy meat consumption occurs at the expense of the more salutary, Creator-designed and initially-intended plant foods for which we have retained a post-Fall dependency. The preferred dietary cell in Table 4 has not been determined; it may not be possible to make such a determination. The biblical account and the garden-like diet as initially designed by the Creator may be a reasonable point of reference. If so, then the CHM may be expected to yield a slight J-point mortality curve with no more than minimal meat intake and maximal plant consumption leading to the trough. The platyvegoid minimal carnivorism cell or something very close to it may represent the closest approximation to the preferred diet.

The Creator has provided, through the garden design, elements for health in plants. Results from epidemiologic studies strongly suggest that, regardless of the events surrounding the Fall and the Flood and the current state of the world, the initially designed dietary plan *cannot be disregarded* even in the fallen world full of disease. The studies suggest a *wide* variety of natural, unprocessed, plant-based foods; i.e., platyvegoid plant consumption regardless of meat intake, to reduce the incidence and prevalence of chronic diseases. The complexity of an individual's genetic makeup, including Fall-induced mutations, and the large diversity among people, makes it nearly impossible to develop a single approach to dietary disease prevention. The edenomic strategy involving primary prevention with the CHM and without dependence on pharmaceuticals, however, may provide the basis for individual health programs involving therapeutic plant phytochemicals. Edenomics and the CHM are predicated on design rather than on neodarwinism—glorifying the Creator (Romans 1:20) rather than the creature.

Summary

It is sometimes claimed that science refutes the Bible. This is used as support for neodarwinian evolution and to discredit the creation position. An examination of biblical epidemiology is, however, problematic for Darwinian

evolution. Starting with the creation story, the Bible is full of practical advice regarding disease prevention that defies an evolutionary explanation. These recommendations include hygiene, primary prevention of disease, and dietary strategies based on the initial design, and are consistent with modern medicine.

The problem of how and why people develop illnesses in the first place remains. Science may never elucidate the complete picture for avoiding multifactorial, chronic diseases, and the molecular pathways for the complete characterization of the complex pathogenic processes may remain elusive. Therefore, the higher-level strategy suggested by edenomics is necessary. The CHM is such a program and can be instrumental in disease prevention and control. It focuses on primary prevention rather than pharmaceutical-based treatments for chronic diseases.

Although both CHM and Darwinian medicine shun reductionism, the reasons are very different. Darwinian medicine suggests that the understanding of ill health must not be based on the linear anatomical-genetic dysfunction model (Herbert, 1998). But it may not be possible to rationalize this change to a multi-factorial approach on the basis of the Darwinian concept of struggle for survival. Edenomics and the CHM, however, quite naturally support a holistic and preventive model of medicine. In the quest for greater average life expectancy that will reach maximum life span, edenomics and the CHM have more to offer than evolutionary theory.

The critical dependence of human health on plant life is not adequately explained within a neodarwinian framework. An evolutionary basis for the development of plant life involved a struggle for survival as the primary driving force of evolution. But mutation, selection, and struggle for survival make it very unlikely that plants would evolve numerous molecules not critical for their own reproductive success but highly essential for human health (Bergman, 1998). It is likewise unreasonable to assume that this balanced "garden" evolved from a primordial mixture of chemicals. A more logical conclusion is that it was designed by an intelligent Creator (Gillen 2001; Gillen et al., 2001). We are fearfully and wonderfully made (Psalm 139) and it follows directly that the Creator would provide for His creation. Health and disease cannot be separated from the Creator, the Fall, and the Creator's word. While not a science textbook, the Bible is consistent with epidemiologic principles and empirical science. Our glorious Creator has provided a wealth of natural foods for our enjoyment and these foods meet complex nutritional requirements. They work at the molecular level to prevent disease and maintain health. Finally, the Bible passages that bear upon epidemiology are accurate and insightful.

Acknowledgment

I would like to thank George Howe for many helpful suggestions on an earlier draft of this paper.

References

CRSQ – *Creation Research Society Quarterly*

JAFAC – *Journal of Agricultural and Food Chemistry*

Adom, K.K., M.E. Sorrells, and R.H. Liu. 2003. Phytochemical profiles and antioxidant activity of wheat varieties. *JAFAC* 51(26):7825–7834.

ADA. 2003. American Dietetic Association. Dietitians of Canada. *Journal of the American Dietetic Association* 103(6): 748–765.

Balch, J.F. and P.A. Balch. 1997. Prescription for nutritional healing (2nd edition). Avery, Garden City Park, NY.

Balentine, D.A., M.C. Albano, and G. Muraleedharan. 1999. Role of medicinal plants, herbs, and spices in protecting human health. *Nutrition Reviews* 57(9,(II)):S41–S45.

Bannerjee, S. K., P. K. Mukherjee, and S. K. Maulik. 2003. Garlic as an antioxidant: the good, the bad and the ugly. *Phytotherapy Research* 17:97–106.

Beecher, G.R. 2003. Overview of dietary flavonoids: Nomenclature, occurrence, and intake. *Journal of Nutrition* 133:4238S–3254S.

Bergman, J. 1998. Diet, health and evolution. *CRSQ* 34:209–217.

Cohen, L.A. 2002. Nutrition and prostate cancer: a review. *Annals of the New York Academy of Sciences* 963:148–155.

Cominellis, N. 2001. *Creative Defense*. Master Books, Green Forest, AR.

Eastwood, M.A. 2001. A molecular biological basis for the nutritional and pharmacological benefits of dietary plants. *Quarterly Journal of Medicine* 94:45–48.

Emerson, P. 1996. Eating out of Eden. *Creation* 18(2):10–13.

Finley, J.W. 2003. The antioxidant responsive elements (ARE) may explain the protective effects of cruciferous vegetables on cancer. *Nutrition Reviews* 61(7):250–254.

Gammelgaard, A. Evolutionary biology and the concept of disease. *Medicine, Health Care and Philosophy* 3:109–116.

Gillen, A.L. 2001. *Body by Design*. Master Books, Green Forest, AR.

Gillen, A.L., F.J. Sherwin III, and A.C. Knowles. 2001. *The human body: intelligent design*. Creation Research Society Books, St. Joseph, MO.

Gordis, L. 2000. *Epidemiology* (2nd edition). W.B. Saunders, Philadelphia.

Herbert, W. 1998. Notes on evolutionary medicine. *Psychosomatic Medicine* 60(4):510–520.

Jacobs, D.R. and L.M. Steffen. 2003. Nutrients, foods, and dietary patterns as exposures in research: a framework for

food synergy. *American Journal of Clinical Nutrition* 78(3 Suppl):504S–523S.

Kaput, J. and R.L. Rodriguez. 2004. Nutritional genomics: the next frontier in the postgenomic era. *Physiologic Genomics* 16:166–177.

Key, T.J., G.E. Fraser, M. Thorogood, et al. 1999. Mortality in vegetarians and nonvegetarians: detailed findings from a collaborative analysis of 5 prospective studies. *American Journal of Clinical Nutrition* 70(3 Suppl):516S–524S.

Kovács, J. 1998. The concept of health and disease. *Medicine, Health Care and Philosophy* 1:31–39.

Last, J.M. 1988. *A Dictionary of Epidemiology*. Oxford University Press, New York, NY.

Li, J.J., C.H. Fang, and R.T. Hui. 2005. Is hypertension an inflammatory disease? *Medical Hypothesis* 64(2):236–240.

Liu, M., X.Q. Li, C. Weber, C.Y. Lee, J. Brown, and R.H. Liu. 2002. Antioxidant and antiproliferative activities of raspberries. *JAFAC* 50(10):2926–2930.

Liu, R.H. 2003. Health benefits of fruits and vegetables are from additive and synergistic combinations of phytochemicals. *American Journal of Clinical Nutrition* 2003:78(suppl):517S–520S.

Lumsden, R. D. 1993. Sources and applications of botanical alkaloids offer evidence of creative purpose and design. *CRSQ* 30(3):132–140.

McCarty, M.F. 2001. Current prospects for controlling cancer growth with non-cytotoxic agents—nutrients, phytochemicals, herbal extracts, and available drugs. *Medical Hypothesis* 56(2):137–154.

McDougall, J. 2002. Plant foods have complete amino acid composition. *Circulation* 105(25):197–198.

NCHS 2004. National Center for Health Statistics. <http://www.cdc.gov/nchs/faststats/lifexp.htm> (accessible as of December 22, 2004).

Nesse, R. M. and G.C. Williams. 1995. *Why We Get Sick: The New Science of Darwinian Medicine*. Vintage Books, New York, NY.

Omran, A.R. 1971. The epidemiologic transition: A theory of the epidemiology of population change. *Milbank Memorial Fund Quarterly* 49(4):509–538.

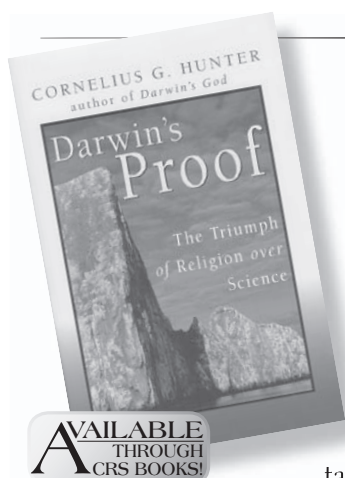
Pattison, D.J., D.P.M. Symmons, M. Lunt, A. Welch, R. Luben, S.A. Bingham, K. Khaw, N.E. Day, and A.J. Silman. 2004. Dietary risk factors for the development of inflammatory polyarthritis: Evidence for a role of high level of red meat consumption. *Arthritis and Rheumatology* 50(12):3804–3812.

Peng, J. and S.P. Gygi. 2001. Proteomics: the move to mixtures. *Journal of Mass Spectrometry* 36:1083–1091.

Schragin, J.G. 2004. Epidemiology and the Creation Health Model. *CRSQ* 41(3):185–194.

Schultz, J. 2004. Resveratrol may be a powerful cancer-fighting ally. *Journal of the National Cancer Institute* 96(20):1497–1498.

- Stambaugh, J. 1991. Creation's original diet and the changes at the Fall. *Creation Ex-Nihilo Technical Journal* 5(2):130-138.
- Sun, J., Y-F Chu, X Wu, and R.H. Lui. 2002. Antioxidant and antiproliferative activities of common fruits. *JAF* 50:7449-7454.
- Tapsell, L.C., L.J. Gillen, C.S. Patch, M. Batterham, A. Owen, M. Bare, and M. Kennedy. 2004. Including walnuts in a low-fat/modified-fat improved HDL cholesterol-to-total cholesterol ratio in patients with type 2 diabetes. *Diabetes Care* 27:2777-2783.
- Thornalley, P.J. 2002. Isothiocyanates: mechanisms of cancer chemopreventive action. *Anti-Cancer Drugs* 13:331-338.
- Tucker, K.L. 2001. Eat a variety of healthful foods: old advice with new support. *Nutrition Reviews* 59(5):156-158.
- USDA. 2004. United States Department of Agriculture: Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference, Release 17. <http://www.nal.usda.gov/fnic/foodcomp/Data/SR17/reports/sr17page.htm> verified accessible December 19, 2004.
- Wieland, C. 2001. Living (and eating) like a caveman? *Creation* 23(3):6.
- Winslow, L.C. and D.J. Kroll. 1998. Herbs as Medicines. *Archives of Internal Medicine* 158(20):2192-2199.
- Wise, D. A. 1994. Modern medicine? It's not so modern! *Creation ex nihilo* 17(1):46-49.
- Yang, Yi-Ching, Feng-Hwa Lu, Jin-Shang Wu, Chih-Hsing Wu, and Chih-Jen Chang. 2004. The Protective Effect of Habitual Tea Consumption on Hypertension. *Archives of Internal Medicine* 164:1534-1540.



Book Review

Darwin's Proof: The Triumph of Religion over Science by Cornelius G. Hunter

Brazos Press (Baker Book House), Grand Rapids, 168 pages, \$18.00.

In this book author Hunter argues that Darwinism is wrong on several levels. Chapters 2 and 3 contain a detailed sampling of the evidences of complexity in biology that defy naturalistic explanations. Hunter claims that since it is possible to contrive naturalistic explanations for the things we observe in biology, the plausibility of the explanations becomes critical. Mr. Hunter concludes that the Darwinist account is long on speculation and short on compelling explanations.

Chapters 4 and 5 argue against Darwinism on a second level. They show that even the positive evidence does not support evolution. Chapter 6 shows how Darwinism fails on yet another level: it is self-contradictory. Finally, Chapter 7 argues against Darwinism on the theological level. Chapters 8 and 9 argue that the biblical account is the only one that makes sense. Chapters 10 and 11 suggest that Christians conduct scientific research within the intelligent design (ID) framework. The book ends with an Appendix titled "Faulty Arguments for and against Evolution."

The unique feature of this book is Chapter 7. Hunter believes that Darwinism is inherently religious because it is based on the false notion that God either could not or would not have created the biological world biologists

have discovered. Therefore Darwin was forced to conclude that life in all its forms must have evolved by chance. This explains the subtitle. Darwin's proof or reason for putting forth his theory of evolution is not found in his study of nature but rather in his non-biblical view of God. Hunter maintains that this reasoning is still the case today. While this idea is intellectually sound it is not easily and quickly communicated or followed. The general belief that science is public and objective while religion is private and subjective, coupled with the notion of the separation of church and state, makes me doubt that it will be of much help in winning the hearts and minds of the general public. I hope I am wrong.

I found Hunter's defense in the belief in *ex nihilo* and *de novo* creation refreshing. Often Christian biologists try to explain the world of living things in theistic, gradualistic, evolutionary processes. He shows that this is not necessary. The appendix of this book is as valuable as the book itself. A close study will help people recognize the false arguments made in support of evolution. It may also prevent many people from making weak or false arguments when discussing the merits of evolution.

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