Diet, Health and Evolution

Jerry Bergman*

Abstract

Evidence is accumulating that food is critically important medicine and that the wrong diet is the major cause of death in the western world. This paper reviews the empirical research on nutrition. The conclusion is that a Biblical diet high in fruits, vegetables, grains, nuts and low in fat and red meat is critical for good health. Historically, physicians have tended to downgrade the importance of diet in health, an attitude which began changing with the discovery that vitamin C could cure scurvy and vitamin B_1 supplements could cure beriberi.

Nutrition is now seen as so critically important that it is often a major adjunct in the curing of disease and is recognized as critically important in the prevention of disease. The high level of compatibility between the food made by plants and the nutritional needs of humans is discussed from both the creationist's and evolutionist's standpoint. It is concluded that the creationists' explanation, that vegetables with grains and fruits and nuts were specifically designed for human consumption, fits the evidence better than the evolutionary assumption.

Introduction

Modern nutrition research supports the conclusions expressed by the cliche "You are what you eat." The major philosophy behind this conclusion is based primarily upon the foundations of creationism. The diet preference for "natural" food—that food without excess amounts of certain "artificial" additives especially fat, salt and destructive processing—implies that what is natural is often healthier (Guthrie and Picciano, 1995; Davis, 1954). Conversely, many assume that most human efforts to improve food by processing and adding various chemicals or altering the natural growing conditions of food are probably undesirable in the long run.

In short, it is believed that "nature knows best"—and even *with all of our knowledge*, we will more often than not in the long run hurt the situation until we fully understand the biochemistry of food and the body (Shepard, 1984; Commoner, 1971). The controversies over the use of hormones to cause cows to produce more milk and use of radiation to control food bacteria are excellent examples (Fox, 1992). Why is it commonly believed that "nature knows best," meaning what is natural is often better than highly processed food?

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A major impetus behind the modern nutrition movement that began in the middle 1800s was the Seventh-day Adventist Church (Bergman, 1995). The concern of the movement was to return to primitive Christianity, and in order to do so, its leaders embarked on a program of extensive Bible study. It was felt that the Scriptures provided a guide not only for moral conduct but also in other areas of life as well, especially in health matters. The scriptures, especially the Old Testament, were scoured for advice and wisdom relative to health and diet. This study revealed that God made certain vegetables, fruits, grains, and nuts for human consumption, and reluctantly permitted humans to eat meat—but this permission forbade the ingestion of fat (Lev 3: 17, 7: 23).

Toward this end, diets were developed which were semi-vegetarian, and avoided high consumption of meat, especially red meat, and stimulants such as caffeine, tobacco and alcohol. Groups such as the Seventh-day Adventists relied on this diet for years, and it was eventually determined that persons on these diets had disease rates that were much lower than the general population, especially for heart disease and many kinds of cancers.

Adventists were also deeply involved in medical training and founded numerous hospitals and medical colleges. It was natural that they would study their own health compared to that of others, and it soon became apparent that these diets had a dramatic effect on longevity, adding as much as 20 years, far more than could be accounted for by random factors.

This movement eventually spread to the secular health

*Jerry Bergman, Ph.D., Northwest State College, Archbold, OH 43502-9542

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field where it was empirically vindicated. It is now generally recognized by secular physicians that many major scientific dietary guidelines were first developed by religious movements founded in the 1800s. Medical science has largely vindicated many of the general principles that were outlined especially in the Old Testament. Almost 3,000 scientific studies have since demonstrated that a diet low in fat, red meat, alcohol, abstinence of smoking and high amounts of vegetables and fiber effectively helped to prevent cancer, heart disease, and numerous other diseases (Nestle, Housman and Hurley, 1989; Koop 1988). A basic guideline followed by these religious movements was that our Creator knew which diet was best and outlined it in the Old Testament for our benefit. Of course, the Old Testament also includes dietary provisions related to religious principles apart from health, and it requires some knowledge of the Scriptures in order to separate these (Bergman, 1995).

Specifically, Genesis 1:29-30 and 2: 16-17 gives humans permission to eat "all vegetarian bearing seeds...and every tree on which there is the fruit bearing seeds." This category includes cereals (Genesis 43: 31-32) vegetables (Genesis 25:34), fruits and nuts (Deuteronomy 8:8, Joel 1: 12, Haggai 2: 19, Genesis 43: 11, Jeremiah 1: 11, Isaiah 25:6), spices and honey (Matthew 23:23, 13:31; Luke 11:42) and various beverages (Isaiah 17: 18, John 2: 9-10). No evidence exists that humans ate any type of meat including that from pigs, cows or fowl until after the Flood (Genesis 9: 3-4). The primary diet in ancient Israel consisted of wheat, seeds, onions, melons, apples, barley, radishes, dates, honey, garlic, lentils, corn, buckwheat, millet, oats, rice, apricots, berries, cherries, currants, grapes, pears, oranges, pomegranates, cabbage, broccoli, kale, cauliflower, lettuce, spinach, turnips and other greens (Edmonds, 1992).

Much has been written about the Biblical reasons and history of eating meat. Usually the argument is that health had deteriorated so much because of the human fallen state that a proper amount of protein and nutrients could be obtained only by supplementing the diet with meat. Nonetheless, the common people ordinarily did not eat much meat and it was historically, at best, considered a condiment or a for special occasions by most people (Tannahill, 1973, p. 62, 71-72, 86). Throughout most of Asia and the Middle East, meat is still considered a condiment to be sprinkled on food to flavor it and not as a major part of the meal. In summary of the Biblical diet, Edmonds said:

> In Biblical times, people… had no microwave ovens, no canned foods, no frozen dinners, But… they survived—and thrived—on tasty, nourishing food. And they did it by following the dietary and health guidelines set down in the Bible itself! The first three chapters of the Book of Genesis outline a clear, timeless set of rules for eating, drinking and generally healthful living. Modern nutritionists are now finding to their astonishment that the Biblical prophets who recorded these rules were way ahead of their time. Today's scientists, for example, only recently began learning the extreme importance of low-fat eating. Studies in the past 20 years showed that the human physiology works best when fueled by lots of fiber and little fat. The way to get those ideal nutritional elements is to favor plant foods — fruits, vegetables and grains — over animal foods, such as meats, cheeses and other dairy products. During the 1980s, all the major health and medical organizations in the United States adopted low-fat, high-fiber dietary guidelines. But the Bible made those same recommendations some 4,000 years ago! (1992, pp. 2-3.)

The Evolutionary View

Evolutionary naturalism typically assumes that multi-millions of years of biological evolution will evolve (or develop) a structure that works to maximize an organism's *own* survival. The fittest of the population is most likely to survive each generation and thus can beget the next. The advantages that the survivors possess will tend to accumulate until the "most fit" organism evolves, the one which is best adapted to its surrounding environment. In this view, a "natural" vitamin may be better than an "artificial" one, because it is assumed a mixture of chemicals has evolved which maximizes the animals' survival to the end of their fertile age and also maximizes their offspring number.

The conclusions of nutrition research do not support evolutionary naturalism because natural selection will at best produce only that mixture and proportion of life chemicals which helps a specific plant or animal adapt to its own individual local environment.

In this view, the "natural" vitamin would meet the needs of the plant or animal that synthesizes it but not necessarily the needs of humans. Intelligence could produce a better compound than the random variations favored by natural selection. We have much to learn about the world around us. Even if we knew all there is to know, scientists could almost always produce at least evolution's equal, and most often a compound better than that produced by blind natural selection.

The conclusions of nutrition research do not support evolutionary naturalism because natural selection will at best produce *only* that mixture and proportion of life chemicals which helps a specific plant or animal adapt to its own individual *local* environment. Further, as the environment is always changing, what works now may not be effective in the future. Consequently, the compounds that would evolve would be best *only* for the biochemistry of the plant

that evolved it—not necessarily its predators such as humans. Evolution selects for that which is most beneficial for the animal itself, not other living things, and *only* that which facilitates *survival* to the end of the animal's reproductive stage of life (Bergman, 1993).

For this reason thousands of differences in the biochemistry of living things would have evolved to maximize the survival of each individual plant or animal. This, though, is not what is found. All living things without exception are based on one basic plan and design—about 20 amino acids, carbohydrates, fats, and a small amount of vitamins, and minerals. And the nutritional needs of all animals are remarkably similar.

Further, evolution's driving force promotes a higher level of reproduction and survival *only* as they relate to reproduction rates and not to health, freedom from pain, physical enjoyment of activities, or longevity far beyond the reproductive years. In many societies, humans often live 40 or 50 years beyond their fertile life stage. Only creationism can explain these facts. Evolution theorists have attempted to deal with this problem by arguing that humans have coevolved with plants and animals, a view that deals poorly with the above concern. The major objection to coevolution is that, although clear evidence for diet changes exists, no evidence exists for the macroevolution of food biochemistry—it is the same today as it has been throughout history as verified by studies of insects sealed in amber and animals frozen at the poles (Tannahill, 1973).

The Creation Perspective

The health food movement often concludes that anything "natural," especially related to food, is generally better because of the implied belief that, even though produced by the plant, it is *designed* to be consumed by humans and is for this reason best for our health (Brennan, 1975). The "nature knows best" conclusion implies that we can *attempt* to improve on nature, but our knowledge is presently, and may always be, inferior to that of nature's Designer (see Commoner, 1971). Any attempt to improve on nature often results in causing more harm than good until the complex biochemistry involved is understood.

Creationists conclude that natural foods are better because they are *designed* to be food for humans. The balance and type of nutrients and the specific chemical formations in them are likely *better* for us than that which we ourselves manufacture. This may even be true for some compounds for which a difference exists between natural and artificial, such as many "natural" and "artificial" vitamins. The man-made compound is, at best, a copy of the original; and the genius is in the design of the original, not in its copy. Some people fear that certain artificial vitamins may *not* be identical to those produced naturally; even with a successful copy, a natural compound's chemical formula may have a different 3-D structure, called a isomer or isoform of the compound.

Many people prefer not to take the risk and would rather rely on natural foods. Fresh fruits and vegetables contain large amounts of vitamins A, C and E and other antioxidants, but artificial vitamins may cause health damage by releasing free-radicals in the body. Free radical damage has been implicated in cancer, strokes, heart attacks and "normal" aging (Koop, 1988). Reducing free radical damage could, at the least, ameliorate these health problems. Consequently, foods can do much to fight aging and can reduce enormously the likelihood of cancer, heart attacks, and strokes (Koop, 1988; Merchand et al., 1989).

Plant chemicals that may fight cancer include compounds called *functional components*, part of a large class of naturally-produced plant compounds called *phytochemicals*. These include *flavonoids* in beans, *indoles* and *isothiocyanates* in broccoli, and *genistein* in soybeans (Schardt, 1994). Also important are *monoterpenes* in citrus fruits, and *saponines* in many vegetables and herbs (Napier, 1995, p. 12). Many scientists believe that most of our modern health problems are largely a result of our unnatural unbalanced diet and lifestyle (McNutt, 1995; Russell, 1980). The empirical research has repeatedly demonstrated that a diet high in fruits and vegetables significantly lowers the risk of cancer, heart disease and numerous other diseases (Williamson, 1996).

Although the vast majority of prepackaged and processed foods come from plants and animals, some are more a product of chemical laboratories than natural plant processes. An example is the trans-fatty acids formed in the manufacture of margarine from plant oils—the oils are polyunsaturated but the process of making margarine reverses this advantage somewhat. Even our attempts to supplement our diet with vitamin and mineral pills have sometimes proven ineffective, and at times harmful.

The very word "natural" on a food is now a major advertising slogan. Unfortunately, the health food movement includes many charlatans and uninformed but well-intentioned persons. Some stray too far from the empirical research and advocate unproven megavitamin or esoteric food supplements. These persons are not advocating a "natural" diet, but a human diet based on less than full knowledge of the biochemistry of the body and food. The best scientific recommendation is to eat real food instead of relying on supplements. If you just take supplements, you simply don't get all of the compounds in foods we're still learning about. We don't know yet if we should combine an indole with an isoflavone, or folic acid with selenium. Right now, only nature knows best (Napier, 1995, p. 12).

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This belief in relying on food for health is also common in the ecology movement which teaches that human disruptions of the environment may cause much harm (Shepard, 1984). Experience has repeatedly proven the validity of this conclusion. Since God originally created the universe and everything in it as a unified and balanced system, He knows what is best for each part. Humans do not know what is best because they do not know nearly as much as the Creator does (Russell, 1980). Commoner, a leading environmental crusader, developed and researched what he calls the ecosystem's four laws of ecology. The first law states that everything is in some way related to everything else within the system (1971, p. 33). A pollutant, although it initially may enter just the air, eventually contaminates the water, soil, and animals as it slowly diffuses throughout the entire system.

Commoner's third law (1971, p. 41) is "nature knows best," and everything that humans do to the environment must be compensated for in some way. Alluding to Paley, Commoner (1971, p. 421) summarizes this law with, "the watchmaker knows best." As Shepard (1984, p. 380) stresses, it is "not nice to fool mother nature"—and actually impossible to do so because the global ecosystem is a connected whole in which nothing can be gained or lost, even if overall local improvement results, without affecting other parts. Anything extracted from it must be compensated for or replaced. Payment of this price cannot be avoided—only postponed (Commoner, 1971, p. 46). A major source of evolution is change—an altering of the ecological balance—a process which is at first often more destructive than constructive to life. Relative to this law, Shepard states, that,

> While humans are busy 'improving' on nature, they are creating some hazardous side effects. We know, for example, that modern fertilizers increase crop yields, but also sometimes contaminate nearby water systems. Also, some areas of the world are turning into deserts as a result of over-cultivation. Each year an estimated 2 million acres of land is lost to cultivation in Africa, resulting in mass starvation (1984, p. 380).

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The Food Mothers Provide Their Young

The best example of the superiority of natural food is the diet naturally provided for plant embryos in fruit and seeds, as well as the milk and the other food that mothers provide for their young. Extensive research has found that the proper balance of nutrients, including the nine essential amino acids, carbohydrates, essential fatty acids, vitamins and minerals are all present in the appropriate proportions in human breast milk (Russell, 1995). Human breast milk also contains hundreds of other less well understood food factors, many of which are turning out to have critical roles in the infant's health (Newman, 1995).

Also in milk are antibodies that protect against pathogens and protein factors that can evidently stimulate antibody production to boost the baby's immune system (Riar, Carter, and Smith, 1995; Newman, 1995; Homer, 1994; Day et al., 1992). One study found that an iron-building protein in mother's milk called *lactoferrin* may play a major role in the infant's defense against infections and tumors. NYU biology professor Philip Furmanski showed that lactoferrin signals the immune system cells to become activated by entering them in order to activate their DNA (Koprowski and Gwynne, 1995, p. 13).

The intimate contact between the mother and child during nursing also allows the infant's antigens to pass into the mother, which in turn causes the mother to produce antibodies and immunoglobulins which in turn are passed on to the baby at later feedings. In this way, the mother's immune system works with the infant's to help insure maximum health for the baby. A study by Cunningham comparing breast-fed to bottle-fed infants found that breast-fed infants have less than *half* the number of ear infections, one fifth fewer respiratory illnesses, less than half of the diarrhea and vomiting problems, one third lower hospital admissions, and less than half the number of all illnesses (1977, pp. 721-729).

Interestingly, the composition of mother's milk changes both according to the infant's needs and according to the baby's developmental stage. Research has found that the milk types produced are so different that each is given a separate name. The early milk is termed *colostrum*, which is suited for the baby's first week outside of the womb. The transitional milk lasts from one to four weeks, and then the mature milk, which also changes in harmony with the baby's developmental needs, is produced. Other research has found that the milk concentrations change even between the early and late daily feedings (Russell, 1995).

Compounds also exist in breast milk to increase the bioavailability of the vitamins and minerals it contains. If the mother does not breast feed her child, many of these benefits are not available to the infant, or must be obtained from dietary supplements. Iron, zinc, and folic acid are examples of common supplements which must be added to the bottle-fed baby's diet because they are found in insufficient quantities in cow's milk.

The infant has a comparatively large caloric need due to the rapid growth that occurs from infancy into early childhood. Whole milk is an economical source of calories for infants and young children, but is not an ideal adult food because fifty percent of milk's caloric content is from lipids

(fat). Rapidly developing children need a high fat diet, but adults do not. Lipids contain about nine kilocalories per gram, but carbohydrates and proteins only four kilocalories per gram. This allows the infant to achieve its proper calorie intake in less than *half* the feeding time that would be required if its calories came from other sources.

Mother's milk also contains high lipase levels which break down the lipids so they are more bioavailable to the infant. Because lipases are enzymes, and as enzymes they tend to deteriorate quickly, the milk must be fresh—a clear advantage of breast feeding over bottled milk (Russell, 1995). Many other benefits of breast feeding for the mother have been well documented, including the psychosocial benefits of bonding, as well as some protection from breast cancer which is proportional to the amount of time that the mother breast feeds (Newcomb, et al., 1994, p. 81)

The Evolutionary Theory of Mother's Milk

Evolutionists try to explain the above by concluding that infants of mothers with milk compounds which confer health protections upon them would be more likely to survive to pass these traits on to their offspring. The problem with this explanation is that mother's milk would not confer an advantage *until* the entire process was perfected to the degree that the infant was more likely to survive. Also, the advantage of mother's milk compared to modern formula usually does not affect the child's ability to survive, but will help the child to avoid many of the long list of so called childhood illnesses.

Many of the advantages of using breast milk do not affect the *quantity*, but the *quality* of life. Secondly, all other factors being equal, evolution would select for organisms that gave birth to 20 children during a life time and lost 10, as opposed to an organism that gave birth to 14 children and lost two. Evolution selects for *offspring number* that can sire more offspring, and consequently the average number of offspring will be larger for superior animals that do not control their reproduction rate as do humans.

In other words, evolution theory would predict that the number of offspring would become greater and greater because the more fertile animals give birth to more offspring to pass on the trait that causes greater fertility. With billions of years of evolution selecting for offspring number, it is difficult to explain the fact that many modern mammals, such as pandas and others, give birth to only one offspring a season or less, and as few as one or two offspring during a reproductive lifetime.

Secondly, given the evolutionary assumption that humans evolved from a primate ancestor, this selection would not have applied to humans because humans have historically often controlled their number of offspring by both birth control and abortion (Noonan, 1970). Even in the Greco-Roman world abortion was common, and parents were free to commit infanticide or abandonment of their children until Christianity dominated the empire (Noonan, 1970, p. 6) This practice largely negates the effect of many natural factors that tend to increase the offspring number.

Evolutionists can only speculate about an organism possessing some trait because of its survival advantage. Plants contain many anti-carcinogenic compounds. At present no confirmed evidence exists that they are of any benefit to the plant. This would be difficult to explain by natural selection if it is proven true. Plants are not susceptible to most cancers, hence these anti-carcinogenic agents appear to be beneficial only for humans and other organisms that utilize these compounds. Of course, it is quite possible that these anti-carcinogenic compounds will be found to have some benefit to the plants, but so far this does not seem to be the case.

The evolutionary hypothesis is clearly deficient because if evolution is a blind process, driven only by chance survival factors which are highly situational, no clearly "best" structure would exist. What would be produced are only organisms that can more successfully compete for a limited time—and never forever. An animal at best may function better than other organisms in a certain local specific environment, but only if conditions do not change beyond a certain point. Consequently, the unique set of chemical combinations found in fruit may be effective for that fruit at a given time in evolution, but are not necessarily the "best" food for humans—or even for the animals that thrive where the fruit grows. They would probably not contain the proper nutrients for any other living organisms—not even for humans, but may often be undigestible or even poisonous. In short, according to evolution, citrus fruit evolved vitamin C only to enable the plant itself to survive, and not to be nutritious for other organisms such as humans and guinea pigs.

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The health food movement, though, stresses that *most* natural foods, vitamins, etc. are good for *all* living things, but often only so long as they are "natural." Natural foods—fruits, vegetables, nuts and spices—were made by God for human consumption, and for this reason are to be preferred. God's words in Genesis convey this: "of every fruit in the garden you may eat." (Genesis 2:16). The evolutionary hypothesis allows that what is natural would be healthy for humans only by chance. On the other hand, the creationist orientation concludes that a balanced diet of natural food is almost always (or always) the most healthful for humans (a condition evolution theory would contradict).

The evolutionary orientation implies that intelligent human direction could drastically improve what is natural. Humans can certainly improve on the products of a blind, brutal survival of the fittest process propelled by chance, fortunate events, and the flow of natural law. Even the improvement of plants by breeding does not contradict this

because the plants still provide natural food, and are bred to *optimize* that which is natural. Nor does the fact that some plants produce poisons cause a problem in some situations because this fact can be fully explained by a creationist's world view (Bergman, 1995a).

The assumption that our bodies are "designed" a certain way, and therefore have certain needs which natural food is specifically designed to meet, provides the basis for such statements as:

> Foods, by the grace of God and nature, have power to give you freedom from goiter, bronchitis or hay fever. Out of the kitchen can come meals to help you put an end—permanently—to stomach trouble, gall bladder complaints or liver disturbances. In foods, your doctor can find complex chemicals which will help you recover from [many diseases]...medicine capable of curing anemia within a few short weeks actually grows in the farmer's fields. In your vegetable dealer's bins are medicinal substances which, together with sunshine, will heal the softened bones of a baby with rickets. Milkmen bring you magic fluid which will help keep your children from developing pigeon chests, knock-knees, bowed legs and other such deformities...foods are medicines in the real and best sense of the word—true specifics (Lindlahr, 1972, p. 15-16).

The health food movement also stresses that many foods are medicines, which implies that our bodies are designed to grow up healthy and stay healthy only *if* the proper foods are consumed—those which are selected in the proper balance because they were *designed* to maximize our bodies' potential (Dobelis, 1986; Clark, 1965). Although not necessary, knowledge of their chemistry helps us to understand *why* these foods are helpful or necessary to human health. We must also discover *which* foods and *how much* of each are ideal to maximize our health potential (Lucas, 1992). Because a food is natural does not guarantee that it is healthful, but because relatively few plants are poisonous, most all plants are at least not harmful (Levy and Primack, 1984).

The medical profession is now far more accepting of the claims of the mainstream health food movement than just a decade ago (Nittler, 1972). Many doctors agree that food is in the long run the best healer and that all disease can at least partly be aggravated by a poor diet (Ginness, 1993). This field has exploded recently and is called the study of *nutraceuticals*. The nutraceutical movement and the trend to require doctors to complete course work in nutrition are both evidence of this. In the words of Weil:

> In my four years at Harvard Medical School and one year of internship, I received a total of 30 minutes of nutritional instruction, grudgingly allocated to a dietitian to tell us about the special diets we could order for hospitalized patients. ...When I was in school, medical doctors were quick to brand as a quack anyone who argued that diet could be a risk factor for cancer. It is now generally accepted that high-fat, low-fiber diets, especially those high in meat and low in vegetables, predispose people to cancer of the colon, breast, uterus, and prostate. Those who argued that vitamins had any benefits other than preventing deficiency diseases in "recommended daily allowances" also risked the charge of quackery, but we now find that beta-carotene, a precursor of vitamin A, has strong cancer-inhibiting effects, especially against lung and cervical cancer (1993, p. 12-13).

Over 3,000 major scientific studies have verified this conclusion. Note Napier's conclusion that "There's more to food than vitamins, minerals, fiber, calories, and protein ..." He adds that we are discovering a plethora of bioactive substances and that:

> A previously hidden world of natural chemicals in edible plants is unfolding, and the more researchers learn, the more certain they are that mom was right: we should eat our vegetables, and lots of them. "There's an explosion of compelling and consistent data associating diets rich in fruits and vegetables with a lower cancer risk…." One analysis of data from 23 epidemiologic studies found that a diet rich in vegetables and grains slashed colon cancer risk by 40%.... All in all, at least 200 epidemiologic studies from around the world have found a link between a plant-rich diet and a lower risk for many types of tumors (1995, pp. 9-10).

These findings have inspired scientists to analyze fruits and vegetables in order to find out what they contain that may fight cancer. Many well known anti-cancer nutrients, including folic acid, selenium, and lycopene, which imparts a red color to fruits and tomatoes, have functions that include an ability to fight cancer and prevent strokes (Selhub et al., 1995). Lycopene is especially effective in fighting prostate cancer and cancers of the digestive tract. These compounds seem to "interact with every step in the cancer process, mostly slowing, stopping, or reversing them…." (Napier, 1995, p. 10) Most of these functional components appear to boost the production or activity of enzymes that act as *blocking agents*, detoxifying carcinogens or keeping them from reaching or penetrating cells.

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Some function as *suppressing agents*, restraining malignant changes in cells that have previously been exposed to carcinogens. This evidence demonstrates that plants were designed not only to nourish us but also to heal us and help us stay healthy and free of disease (Watanabe et al., 1995; Fraser, 1994). Some of the many compounds which we now know to be anticarcinogenic and that are found in food, mostly vegetables and fruits, include the following.

1) *Indoles* and *isothiocyanates* are found in high levels in broccoli—and this is a reason for the high dietary level of broccoli recommendation. They fight cancer primarily by preventing cancer causing substances from reaching their

cellular targets, and they may also suppress tumor growth (Caragay, 1992; Conning, 1991; Wattenberg, 1990; Marchand et al., 1989).

2) *Saponin* family—a large group of glycosylated steroids found in many vegetables and herbs. They not only have anti-cancer activity but also help to lower the blood levels of certain lipids and help to recycle red blood cells (Yoshiki and Okubu, 1995; Amarowicz, Shimoyamada, and Okubo, 1994; Potter et al., 1993).

3) *Flavonoids* found in many fruits and vegetables function as antioxidants and block carcinogens from entering cells, to help suppress malignant changes in cells, and also to fight cancer by interfering with the binding of certain hormones to cells (Foti, Piatelli, Baratta, and Ruberto, 1996; Williamson, 1996; Summan, 1996).

4) *Isoflavones* act as antioxidants, carcinogen blockers and tumor suppressors (Foti et al., 1996). Studies have found that people with high levels of isoflavones, commonly found in soy beans, have a markedly lower level of breast and prostate cancer and oxidative damage (Wiseman, 1996). Some of the forms if isoflavones include genistein, biochanina, and daidcein.

The health food movement has attracted a wide variety of persons and has also expounded many extremes, fads, and foolish ideas, but some of its core ideas are based on the Scriptures and have proven correct.

5) *Lignans* are common in sesame and flax seeds, thus are found in linseed oils. They function as antioxidants and may block or suppress cancerous changes (Herman et al., 1995). Flax seeds are also high in omega-3 fatty acids which may protect against colon cancer and heart disease by acting to reduce the likelihood of excessive blood clotting. The tendency for blood to clot inappropriately comes from blood pooling for long periods of time in inactive persons or from cigarette smoke. The later causes platelets to be sticky, facilitating clotting and causing many health problems. These include pulmonary embolisms, myocardial infarction (commonly called a heart attack), and cerebral ischemia (commonly termed a stroke).

6) *Monoterpenes* may act to interfere with the action of carcinogens and occurs naturally in citrus fruits and caraway seeds (Caragay, 1992).

7) *Organosulfur* compounds may act as cancer blocking or suppressing agents and are found in garlic, onions, leeks, and shallots (Caragay, 1992).

8) *Carotenoids* are potent cancer fighters and include a large number of compounds including beta-carotene (Herman et al., 1995; Caragay, 1992). They also may enhance normal communication among cells, which can help to prevent cancer cell development. Beta carotene is also evidently transformed into *retinoic acid*, which can help control the proto-oncogenes that are important in cancer development. Carotenoids are commonly found in fruits and vegetables, especially the red and yellow pigmented plants.

9) *Folate* or folic acid is a B vitamin important in fighting and preventing colon cancer and precancerous colon polyps. It is also important for normal tissue formation and maintaining the integrity of DNA. Critical for the formation of cell division, folic acid is one of the few recommended supplements for pregnant and lactating women. Deficiency of either folate or vitamin B-12 causes diseases that include megaloblastic anemia. Another critical function of folic acid is to reduce the level of homocystine in the blood, important in reducing the likelihood of strokes and heart attacks (Marchand et al., 1989).

As noted, evolution cannot explain why plants manufacture many of these phytochemicals because many are evidently not needed for the plant, but are essential for the health of humans. This is also true of many medicines—over half of which have their source in plants. The latest example is Taxol, an anticancer compound and is the only known compound effective in treating certain types of cancer such as ovarian cancer. Taxol was obtained from the bark of the slow growing Pacific Yew tree until an artificial source was developed recently. The bark from about 4,000 trees was needed to produce a mere kilogram of Taxol, and the trees, although once common, are now rare. These facts were strong motivators to develop genetic or artificial sources. They are also evidence of design and a life system that is highly interdependent, as ecological research has now eloquently demonstrated.

Summary

A modern understanding of nutritional science has revealed that plants are designed specifically for human consumption and that health is best maintained on a balanced diet consisting of a wide variety of plant foods. Even many toxic plants have an important use (Bergman, 1995). The Biblical diet outline is an excellent starting point to begin to understand life's complex biochemical needs and to ensure that the approximately 50 nutrients now known to be necessary for health are consumed in the proper amounts. We also now realize that many past attempts to "improve" our diet or food enjoyment have failed or caused problems, not the least of which is the addition of huge amounts of salt and fat so typical of western diets today. For this reason, diet is the leading cause of death in Western nations (Koop, 1988).

A complex of lipids is also necessary for a good diet. Although olive oil was a recommended staple of the Israelites, never before in history has the diet of a large number of people been so high in fat as in the western world today, especially saturated fat (olive oil is a monounsaturated fat, the best kind). The health food movement has attracted a wide variety of persons and has also expounded many extremes, fads, and foolish ideas, but some of its core ideas are based on the Scriptures and have proven correct. The U.S. Sur-

geon General's report reviewed about 3,000 major scientific studies and concluded the following: The best recommendation is 55 percent of calories should be from complex carbohydrates (grains and starches such as from potatoes), and each adult should consume an average of five to nine servings of fruits and vegetables daily. Avoid red meat and eat chicken or lean pork no more than once a week, and fish twice a week. Ideally, it should be a condiment and not a major part of the meal. Also, avoid processed foods because most are extremely high in fat, salt, and calories. For adults fat should be no more than 30 percent of all food calories, and many argue that the percentage of fat calories in our diet should be closer to 10 percent. It is now over 37 percent for the average American. A high fat diet is a major cause of many cancers, heart attacks, and strokes. Last, eat a diet high in fiber, low in sodium and sugar, do not smoke, maintain desirable weight and drink alcoholic beverages in moderation (Koop, 1988).

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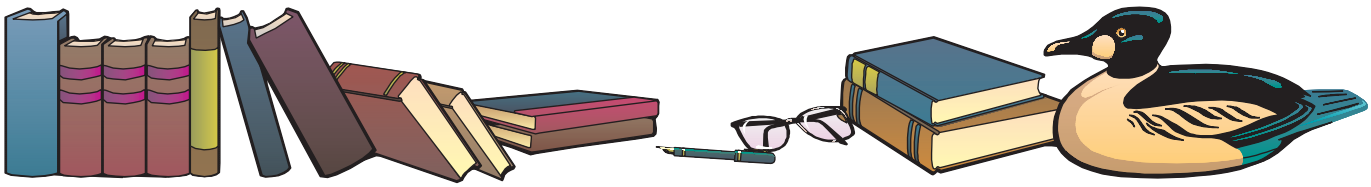

Book Review

Noah's Ark: A Feasibility Study by John Woodmorappe
Institute for Creation Research, Santee, CA. 1996. 306 pages. $21.95.
Reviewed by Eugene F. Chaffin*

Various anti-creationists, compromising evangelicals, and other critics attempt to discredit the Biblical account of Noah's Ark. John Woodmorappe does an admirable job of discussing the scientific issues often raised in these discussions: the manpower needed for the care of the animals aboard the Ark, space required for the proper environment and feedstuffs, decisions apropos for gathering and selecting the best specimens, criteria selected for codifying which kinds needed to be on the ark, and a wealth of other arguments needed for answering the critics. Readers should include persons seriously desiring to understand the scientific considerations behind the historical account of God's care of the Ark animals, utilizing Noah and family for many of the essential details. The book is directed at a high scientific level. The chapters on genetics are not written at an introductory level, but are directed towards persons who have mastered elementary biochemistry and genetics.

*715 Tazewell Ave., Bluefield, VA 24605

The plan of attack chosen by the author is largely reactionary, in the following sense. The author repeatedly informs the reader of points made by critics who did not believe in the historicity of the story of the Ark, who did not believe that the Genesis Flood was worldwide, or who did not subscribe to other details of the Scriptural account. These critics often resort to ridicule, attempting to make believers appear foolish. Woodmorappe, however, invariably finds credible evidence which rather causes the critics to appear foolish. One begins to wonder whether the author should forget the critics and follow a plan of attack directed toward criteria for the management of the Ark. There is no point in discussing many of the ludicrous arguments of these parrots for the evolutionary establishment. However, another approach would be the subject of a future volume. In the present volume, Woodmorappe has pushed the level of discussion to a new height, and future critics will need to do better to retain their credibility.