

Introduction

This is a sample from the ebook “The DNA Diet, Boost your Metabolism, Smart and Easy”. It is a brand new approach to health and diet. Based on the latest available scientific publications on Nutrition and Human Genetics, it elucidates the mechanisms involved in regulating your metabolism by easily modifying your diet and lifestyle. You will find here big chunks of the actual ebook. The topics selected, cover a quite representative range of the subjects in the ebook and give a very good feel of the writing style and depth of analysis. In some cases, shortened versions of the actual parts have been included. The purpose here is to offer a substantial portion of knowledge, so even if you do not decide to buy the complete product, you still get the chance to keep some valuable information related to your health.

The complete ebook is divided in two parts. In the first part all the nutrients specific information, molecular mechanisms and background you need is available. The contents of the present book come from this first part only. In the second part you can get access to detailed planned meal samples & easy recipes to follow, comprehensive lists of foods with high nutritional value, guide to supplements, exercise guidelines and an introduction to powerful detoxification processes. In the final ebook you can find a complete list of references (books, scientific publications) for most of the topics covered. The complete list of topics of the original ebook are as follows:

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Finally we would very much appreciate your feedback. Do you like the content? Would you prefer to have more or less information on a specific subject? Are there any related topics you would like to be included? In order to collect in a systematic and responsible way your comments, we have set up a survey site, where you can give us your personal opinion. We value and respect your opinion; this effort is well intended to support and enhance the lives' of real people.

Primal Health

1. Urban Legends

Our diet behavior and mental attitude is heavily controlled by urban legends. Food and pharmaceutical industries have massively influenced the landscaping of our lives the last 50 years. In thousands of cases, paid articles, scientific papers and scientists themselves have been recruited to reinforce the mental attitude of people so that it better serves the sales and financial interests of the largest of companies. Billions are spent each year to market and advertise their products.

Mass production technology has provided the tools to cheaply produce processed food. Preservatives have also made long term storage a convenience (extended shelf life) which is not available for natural fresh produce. Conventional medicine has been fully integrating the guidelines received by major food and pharmaceutical companies which have been and are still funding a very big amount of the research conducted. The result is that a shuttering percentage of doctors, of all ages, ignore basic aspects of health and how it correlates with the food consumed and the drugs taken. Nutritional training is rarely combined with medical experience, leading to an attitude that really tries to heal the symptoms rather than the reasons behind the lack of health.

There are numerous cases of powerful simple nutrients and/or plants with medicinal properties which have been hidden from public recognition in order for expensive, full of side effects, drugs to be up sold. Even now as we speak, there are absolutely magnificent remedies available to literally everyone, which are simply unknown to the vast majority of people. A very small list of drugs and the profit margins for the companies who sell them is available in the following table. This is to show only how massive this industry is and how insane the profit margins are. Obviously the list could be amazingly long but this is not the point here.

Comparison of ingredients cost and final price for commonly prescribed drugs

Drug	Treatment for	Price per 100 tablets	Ingredients' cost	Percentage of profit
Xanax 1mg	Anxiety disorders, panic attacks	\$136.79	\$0.024	569.958%
Prozac 20 mg	Depression	\$ 247.47	\$0.11	224.973%
Norvasec 10 mg	Hypertension	\$ 188.29	\$0.14	134.493%
Tenormin 50 mg	Hypertension, Arrhythmias, Coronary heart disease	\$104.47	\$0.13	80.362%

As with every area, there are a handful of great people and doctors who are on the leading edge and have fully realized the above and give literally a fight to re-educate people on healthy choices in food and medicines they can and should be using. The point to keep is that profit is the one and only priority of most industries.

Environment, human body and genes are working together.

The human body rapidly adapts to various external and internal conditions: diet, intense emotions, psychological stress, exercise, pregnancy, climate, pollution, length of the day. It is a powerful and highly interactive “machine” we were gifted with. Given the correct signals it will work perfectly and will sustain - repair every major or minor problem.

Our genes are adapted to receive signals from the food that is digested. Literally our food contains valuable information to be processed by our genes. Food is not just calories. It is a highly sophisticated source of specific instructions to be carried out by our DNA.

For thousands of years, man has been consuming raw and fresh produce. Natural occurring fruits, plants and seeds, along with wild fish and animal meat were the main sources of physical survival for our primal ancestors. It's not only the quality of these foods that was superior, but they were also packed with powerful nutrients, vitamins and minerals, which really made the difference when it comes to DNA interactions and metabolism regulation. There is an evolutionary history of thousands of years that has implemented and reinforced these loops of interactions so that premium health is achieved given the dominant environmental conditions. Naturally, the kind of diet signals our genes are adapted to are coming from another era really.

Our nutrition habits have changed massively in the last 100 years with the advent of agriculture and the mass production technology. Processed and refined foods, preservatives, synthetic hormones and pesticides have completely changed the quality of the food consumed. All these "new" substances that are widely used are completely alien to our genome. They do not resemble anything the genes have learned to interact with so far. These new kinds of food are depleted of the necessary nutrients that the raw produce was filled with, as a result of the refinement processes and the addition of conservatives used to extend the availability of the product. Hundreds of thousands of years of co – evolution between human DNA and natural occurring foods, provide no useful background as to how these new "species of foods" should be processed and what kind of environmental conditions they represent. The outcome is an abnormal response of our genes to these "genetically unfamiliar" foods, gradually causing chronic inflammatory reactions that trigger many more secondary conditions. Many diseases today are heavily correlated with severe nutritional imbalances and/or deficiencies.

A new scientific area was born a few years ago and has gradually become more and more popular. **Nutrigenomics** is the science that studies the exact interaction between food / nutrients and our genes. This field has elucidated many aspects of the mechanisms that play a major role in human metabolism and the publications that keep on coming go gradually even further. Another new field that has massively facilitated the application of the findings of Nutrigenomics to the actual treatment of patients is **Functional Medicine**. A handful of enlightened doctors around the world have consistently observed and studied what science has started to discover; that behind most major illnesses there is a severe nutritional imbalance that must be recalibrated in order for the patient to heal. Doctors following the guidelines of this new fascinating field look for the real reasons of any given case and do not treat the symptoms, like most conventional doctors do, but address the underlying cause. Therefore their treatments may range from simple vitamin and mineral supplements to prescribing simple antibiotics to treat systemic infections that go undetected causing all sorts of contradicting symptoms. Food allergies have been identified as a very common cause of major health

problems. By simply eliminating the allergen, these people received massive relief from all their symptoms and got rid of many drugs, conventional doctors prescribed while trying to treat their symptoms but not the causing agent of their condition.

In order to lose weight and be fit, it's not just that the amount of calories needs to be reduced (up to a certain point), but the remaining calories consumed must come from the right type of foods in order for the fat burning genes to be activated, triggering higher metabolic rates, fat loss and health. **Functionality** is the missing element from our diet right now. This means that our food is no longer serving us, as it is meant to be. By that, it is implied that produce is commonly depleted from important nutrients by the time it reaches our plates. It is not just calories that will determine our physical condition but the different vitamins, minerals, protein and healthy fats that will give proper signals to our genes to maintain optimal health. Nutrient dense foods are one of the major missing links between our genes and health this moment. Also, the amount of food consumed has grown so much that there is a huge excess of calories available per day for the average person. In fact it has been shown that calorie restriction itself can protect against many age-related degenerative diseases, balance blood sugar and result in more vitality and energy. Massive portions of food result in obesity and chronic inflammation.

Interactions of food with DNA – molecular mechanisms

The range of the various responses a body can physically handle are determined by the genes contained in the DNA inherited by our parents. Therefore a given person can adapt / respond genetically to a predetermined range of external and internal conditions. Naturally, any genetic profile allows for a thousand times more physiological flexibility than the one needed for a normal person. Genes and environment interact to produce the physical vehicle for this life, our body.

Digested food induces certain molecular responses in the body. Specific enzymes are produced in response to the presence of food macronutrients in the gastrointestinal tract. Food is broken down to very simple molecules (micronutrients) that reach the tissues through the blood stream, interact with the cells and eventually with the nucleus, where the DNA resides. Also a micronutrient can cause the release of a hormone in the blood. This is the case of sugar for example. Glucose occurs when carbohydrates are broken down in the gut. The presence of glucose in the blood triggers the release of the hormone insulin. This hormone interacts with cells and gives them the signal to take in glucose from the blood. Cells have very sophisticated receptors in their membranes so that they can accept and process this kind of messages. When a molecule from the blood (ligand) hits the appropriate

receptor in the cellular membrane, a structural change in the receptor/ligand complex takes place. This change is the starting point of a cascade of molecular events in the interior of the cell which produce a signal either towards the cytoplasm or the nucleus. This signal might be the production of new protein or the degradation of an existing one. It also could turn on or off a gene or a whole set of genes that regulate a specific path in our metabolism. This is exactly the way our food interacts with our DNA / genes.

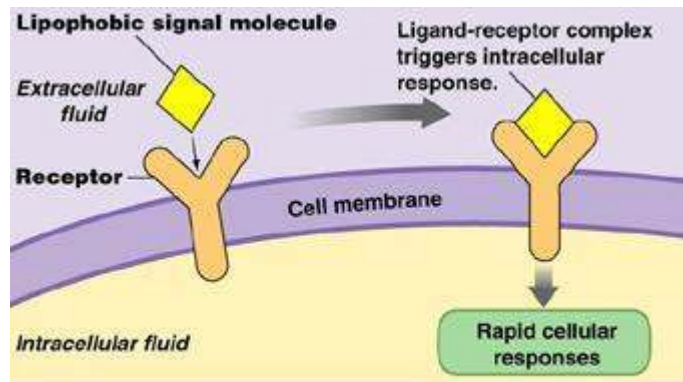


Fig. 6-4

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Receptor Example. A signaling molecule (ligand) outside the cell, binds to the appropriate receptor. This action causes the receptor/ ligand complex triggers a second signal inside the cell. The secondary signal will be transferred to the nucleus or other parts of the cell, thus inducing a cellular response to the original signal.

<http://www.colorado.edu/intphys/Class/IPHY3430-200/004communication.htm>

Most foods we consume act as initial signaling molecules that will interact with the right receptors to trigger a cellular response. Depending on the type of food consumed, different sets of signaling pathways are activated giving rise to different molecular responses / molecules and subsequently alternative sets of genes are turned on or off.

→The bottom line is that: **Food = energy for the body + information for the DNA & the cell**

The molecular mechanism of disease and aging

Mutations

Mutations are naturally occurring molecular events that happen quite often in our cells. This can be either because of environmental toxins (poisons, radiation etc) directly affecting the nucleus or it also might be a random error during the cell replication. In any case, mutations are and will be a common molecular event. The important thing is that the cells can repair these mutations easily as they have all the necessary molecular mechanisms to detect and tackle such errors. All we need is to provide our cells with the necessary nutrients so that the highly specialized enzymes involved in these reactions are

100% active and functional. Failure to do so results in accumulation of mutations which will inevitably result, sooner or later, in cell abnormalities, leading to cancer or other systemic diseases. Therefore there are nutrients that enhance DNA repair and we must try and incorporate them in our diet. The most powerful nutrients of this category are the B group vitamins. Especially B3, B6, B12, folic acid (folate), play a crucial role in maintaining the cell repair mechanisms fully functional. Deficiencies in the above vitamins are very common. From a physiological and genetic point of view, these deficiencies are responsible for genetic instability, chromosomal damage and breaks and a high rate of random mutations during the cell cycle, as the enzymes cannot reach their full potential.

Also, when we consume toxins and poisons with our food, or even inhale them, the enzymes which are responsible for the detoxification processes in our body are severely compromised. Pesticides, synthetic hormones, herbicides and antibiotics are all neutralized in the liver. There are powerful enzymic systems in our liver, which can literally modify most of the above toxins to non toxic equivalents and get rid of them. When our food is loaded with massive amount of toxins, the detoxification mechanisms have to work overtime in order to protect our cells from these poisons. Accumulation of toxic elements in vital organs of the body, such as the liver and the brain, can subsequently lead to elevated rate of mutations and disease.

Obviously not all mutations lead to diseases, but the more mutations are accumulated in our DNA, the more likely it becomes for a deregulating mutation to establish itself and destroy the cell balance. We must also bear in mind that there are very important food groups that contain powerful nutrients which actually protect DNA from damage. These valuable nutrients protect DNA from potent harmful agents that interact directly with DNA. These nutrients are called antioxidants. They are so important that some of them can be found in most cells. As with the detoxifying enzymes, the cellular stocks can be exhausted easily. They deactivate free radicals, which are indeed very dangerous should they reach the nucleus or other parts of the cell. Free radicals are produced naturally during the cell metabolism and the cells have indeed very efficient ways to tackle this. Antioxidants also switch on special genes which protect DNA and have been found to regulate the cell cycle too.

Antioxidant	Activity Level	Sources
SOD	Highest	Supplements Sprouts, wheatgrass
Catalase	Exceptional	Supplements Sprouts, wheatgrass
Glutathione Peroxidase (Gpx)	Exceptional	Synthesized in the body from proteins (meat, dairy, fish)

Glutathione, CoQ10	Very Strong	Synthesized in the body from proteins (meat, dairy, fish)
Carotenoids	Strong	Carrots, sweet potatoes, kale, oranges, tomatoes, collard green, spinach
Vitamin E, A	Strong	Dairy: milk, butter, cheese Fish: mackerel, trout, herring, salmon Raw Nuts Mangoes, blackberries Avocados, water cress, spinach
Vitamin C	Strong	Strawberries, kiwi, steamed broccoli, orange, mangoes
Flavonoids	strong	Onion, lettuce, basil, cranberry, garlic, cabbage, kale, asparagus, kidney bean
<u>Minerals</u>	Moderate	
Selenium		Raw Brazil nuts, fish, turkey, pork, shrimps, oyster
Magnesium		Black beans, broccoli, halibut, peanuts, seeds, spinach, whole grain cereal

Aging

Cellular aging has been heavily associated with a process which results in the shortening of the ends of the chromosomes after each cell division. In the ends of the human chromosomes, there are protective tips called telomeres. So far scientists believe that they serve as caps, in order to protect the loss of chromosomal material during the cell cycle events. It has been observed that as we age, the telomeres become shorter and shorter after each cell division until they eventually disappear. Cell division cannot proceed after that and cell death follows. This process is believed to result in the aging of the cells in the first place and the whole body eventually. It is considered to be an irreversible and unavoidable event. The length of telomeres is an indicator of overall health; the longer they are, the healthier the body and cells are. Short telomeres have been associated with weak immune system, low

cognitive and physical performance and of course cancer. Research shows though that it can be slowed down considerably by certain nutrients, which have a protective effect on the chromosomal material. Specifically omega 3 oils have been proved to considerably slow down the shortening of the telomeres, adding years of healthy living. Except for the anti-aging effect on DNA, omega 3s are very good for the heart too and they balance out the metabolism. Indeed it is a natural fat that you do not want to miss out on in your diet.

Good sources of omega 3 oils

High - fat cold water fresh fish (3-4 times per week)

- Salmon
- Mackerel
- Sardines
- Swordfish
- Albacore tuna
- Lake trout

- Herring

- Krill oil

Raw nuts and seeds

- Flax seeds and flaxseed oil
- Brazil nuts
- Walnuts
- Almonds
- Hemp seeds
- Pumpkin seeds

Macronutrients and how they are processed in the body

There is such a confusion about the good and bad types of sugars, carbohydrates and fats, that most people find it really difficult to distinguish between the different groups and focus on the ones that are truly good for them. Below we break it down, starting from the basics so that we all have a solid understanding of what we are talking about. Also we compiled a table where we describe each group of good and bad fats and another one for the carbohydrates.

There are 3 major types of macronutrients: FAT – PROTEIN – CARBOHYDRATES (CARBS). Carbs are the source of sugars → carb = polymerized sugars / many sugar molecules attached to each other forming a long chain. During digestion, carbohydrates are broken down to simple sugars. Proteins are converted to single or double amino acids. These simple molecules can be absorbed by the intestinal tract. The fats present a challenge when it comes to digestion and absorption. The problem is that fats are hydrophobic, meaning that they prefer not to come in contact with water molecules. Instead, many fat molecules gather together to form a bigger mass of fat. In this way, the action of intestinal enzymes

responsible for breaking down the fats to simpler and absorbable molecules becomes almost impossible as they do not have access to the greatest part of the fat mass. This is why the liver produces bile. Bile contains salts which exhibit a double character, half of them are hydrophobic and the other half is hydrophilic. Bile salts isolate small groups of fat and make them almost soluble to the water based environment of the intestines. They break down the big fat masses into tiny droplets which are not touching each other anymore, allowing for the peptic enzymes to do their job.

Type of nutrient	Where is it found	What is it made of	Different types	Caloric density
PROTEIN	Meat, poultry, eggs, dairy, fish, beans, seeds and nuts	Amino acids attached together. Animal proteins use only 20 amino acids. There many more available in nature.	9 Essential = cannot be synthesized in the body, must be taken in by food.	4 calories/gram
			Non essential = our body can synthesize them.	
FAT	Plant and animal types.	Long chains of fatty acids	Saturated	9 calories/gram
			Unsaturated (mono- or poly-unsaturated)	
CARBOHYDRATES (Carbs)	Everything related to plants	Sugar molecules attached to each other	Complex = naturally occurring in grains, beans, fruit	4 calories/gram
			Refined = processed white sugar, pasta, white flour	

There are different types of fats and carbohydrates. Certain types of fat can actually make you lose weight and fast. The same goes for carbs. Good types of fats and carbs promote health, vitality and fat loss whereas bad types of fat and carbs result in inflammation, obesity and heart disease. This is how food indeed interacts with our genes...

Fats

Notorious fats

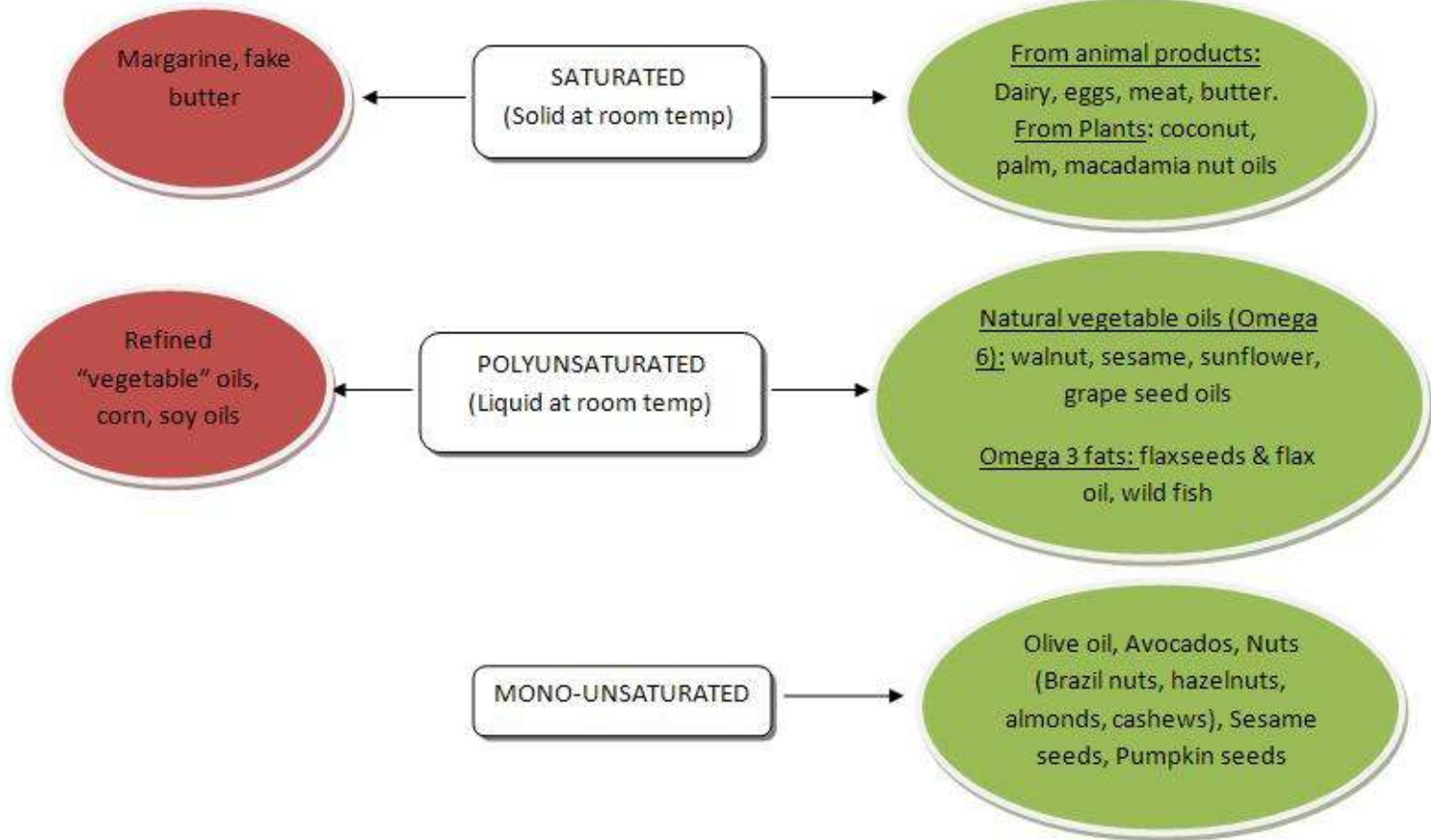
Fats are a very misunderstood group of macronutrients. Nutritionists in the 80s claimed that animal fats were responsible for high cholesterol and cardiovascular diseases. Anything of animal origin was demonized and considered a source of disease. These claims were heavily influenced by the cholesterol theory and the scientific / pharmaceutical approach to the subject as explained in the first part of the book. Obviously this story has little to do with the truth behind arteriosclerosis and cardiovascular disease. Also, the animal products that were extremely popular in the 80s were basically factory meat, coming from unhealthy animals fed an unnatural diet just like the mass produced meat products are today. Research has shown that products coming from grass fed and naturally bred animals have a completely different nutrients profile and composition of fats, do not promote any artery disease and are a very healthy choice.

On the contrary, during the 80s, plant based fats were considered the absolute solution to the cholesterol problem. Research had shown that low cholesterol was associated with the consumption of plants and plant based products. Highly refined and processed vegetable oils and fake butters became very popular and widely accepted as they were supposed to be the healthiest solution nature had to offer. This was heavily advertised and supported by the media so it influenced massively the evolution of diet and people's nutritional choices. In fact these oils are highly toxic due to the chemical solvents and high temperatures that are used during the refining process. They are anything but healthy and can cause severe metabolic imbalances, increase the risk of cardiovascular disease and cancer.

All the different categories of fats and their properties are analyzed in the next section. There has been so much misinformation about this subject that it is time to clarify things once and for all.

Refined & Heavily Processed
Very Unhealthy

Natural Fats
Healthy



Types of fats

Each group (saturated, polyunsaturated and mono-unsaturated) consists of several kinds of different molecules which share some common structural and chemical properties. The problem with fats is that most labels will describe a product as “vegetable oil”, which is as vague as it can get, thus masking the true nature of the product you are about to buy. Always keep in mind that the closer a produce is to its natural condition the healthier it is. Therefore all heavily processed and refined oils and butters are automatically out of the healthy picture.

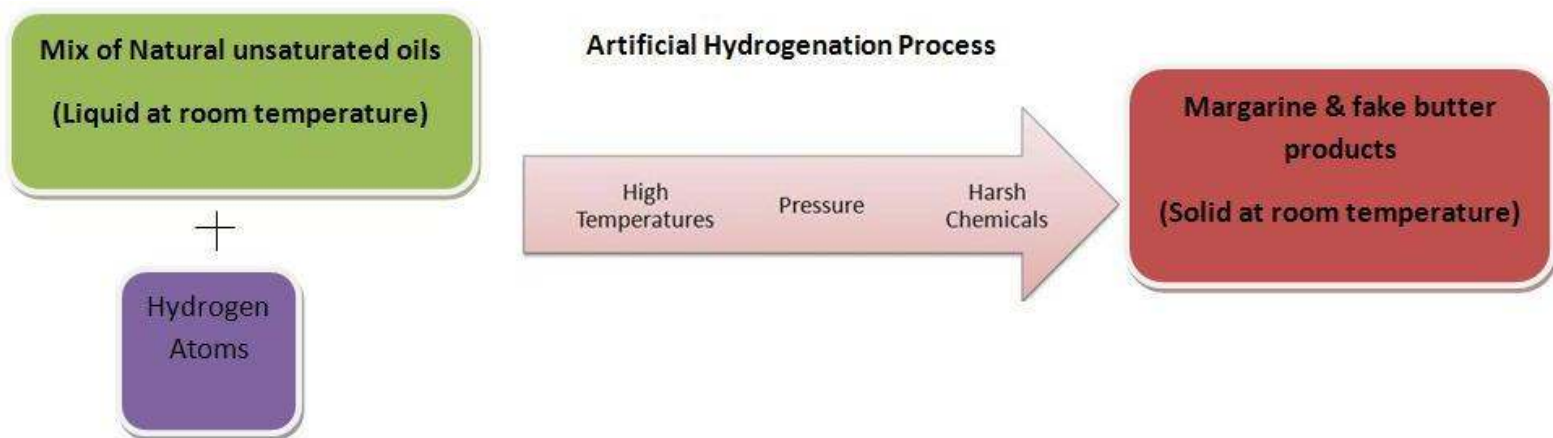
Let’s take a closer look at polyunsaturated “vegetable oils” for a start. These products are usually heavily refined soybean, cotton seed, corn, grape seed oils. They are processed at high heat, under great pressure and mixed with industrial solvents (like hexane – found in gasoline) to blend and get the texture and color the producing company is after. A small percentage of the chemical solutions used for the refinement process remains in the final product.



So they are of vegetable origin for sure but they have lost a big chunk of their original identity. Natural polyunsaturated oils are sensitive to heat and light. At high heat and/or light they become oxidized, releasing free radicals. Chemically processed vegetable oils have inflammatory properties as they have already been subjected to such conditions. They are toxic to begin with. If used for cooking at high temperatures they become even more oxidized. Free radicals can cause acute cellular damage to the area they are released in. Natural unsaturated oils are more stable and safe. Omega 3 and 6 (in nuts or seeds), for example, will never behave in this way in the body because they are in their natural condition. When nuts or seeds are roasted they lose a big part of their healthy oils. Therefore polyunsaturated oils fall within one of the following categories:

- 1) Natural Polyunsaturated oils: as long as they remain in their natural form they are healthy and very nutritious
- 2) Processed polyunsaturated oils or “vegetable oils”: toxic and inflammatory from the very start

A product's natural state is always the most stable one. Water will always be liquid at room temperature because this is the most stable energy condition for its molecules. If the external conditions change, i.e. with heating, it will transform to gas because under these new circumstances (high temperature) the most energetically favorable state it can be in is gas. Having said that, let's see how margarine and fake butter are produced. The oils used for these products are polyunsaturated or mono-unsaturated to begin with. In order for these oils to become solid spreads they must go through a process called artificial hydrogenation. This means that unsaturated molecules take in hydrogen atoms. Monounsaturated fats take into each molecule one hydrogen atom, whereas polyunsaturated fats many. Hydrogenation is not a gentle process. It requires high temperatures and sometimes pressure and chemical agents to be used in order for the oil to absorb the maximum amount of hydrogen. When a molecule has absorbed as many hydrogen atoms as it can, it becomes saturated. As you can see from the diagram below, saturated fats are solid in room temperature.



Therefore by subjecting a liquid vegetable oil to artificial hydrogenation (introduction of hydrogen molecules) it becomes a product like margarine or fake butter. These products are highly toxic and very unhealthy. They are completely artificial and even though they might be coming from healthier oils, the refinement process results in them having inflammatory properties.

The bottom-line of the above information is first of all, the distinction of oils that are healthy and unhealthy and second, which ones are best to eat raw and the ones that are best for cooking. Saturated fats are the most stable fats you can get. They can withstand high temperatures without any modification of their chemical structure. Therefore they are very healthy for cooking, even at high

temperatures. Believe it or not, butter and coconut oil (both solid in room temperature) are your best shots for healthy cooking. In fact when butter is made from milk produced by grass fed animals it is healthy, as long as it consumed in moderation due to its high caloric density. Real butter is packed with minerals and vitamins, has more Vitamin A than carrots (!) and also has Selenium and Vitamin E, which have very strong antioxidant properties. In fact a very recent study found a direct connection between margarine and heart attacks but the exact opposite was discovered for butter! Coconut oil is also a natural product with antimicrobial and anti-inflammatory properties. Olive oil is monounsaturated and therefore slightly prone to hydrogenation at high temperatures. Therefore it can be used either in low temperature cooking or raw. Under these circumstances it is extremely healthy.

Coconut oil and butter deliver a great amount of saturated oils to our body which are very important to have in our diet. As seen in the Atherosclerosis chapter, saturated fats are very essential and have many benefits. In the same category as the butter and coconut oil fall palm oil, lard and animal fat from bacon etc. As long as the products are coming from grass fed animals you do your body a favor to eat them. The only consideration is the quantities as fat is calorie dense and can easily give you loads of calories with small quantities.

- ➔ Cooking oils: virgin coconut oil, virgin palm oil, real butter, lard, virgin olive oil (low temperatures)
- ➔ Oils to eat raw: virgin olive oil, nuts, seeds, avocado

Recent studies have proved the above in the most dramatic way. In 3 of the most interesting ones, the following conclusions were drawn (see references):

- Consistent margarine consumption by children is highly associated with lower IQs by the time they are aged 3.5 and less than optimal weight by the time they are 7.
- As margarine consumption increased, heart attacks went up. The exact opposite was observed for the group of men consuming butter instead of margarine.

Love your digestive system – the Leaky Gut Syndrome

The digestive system comprises of a long tube which basically extends from the mouth to the anus. It keeps the food and drinks we consume separate from the rest of the body. It has a special area to initially process and temporarily store (the stomach) and a specialized area to completely break down food particles and absorb the valuable nutrients that come from them (the intestine). It assimilates the useful elements and protects the body from getting in touch with the harmful ones. Therefore the **gastrointestinal tract (GI)** is an extremely important part of our overall health and we must strive to keep it balanced. 70% of our immune system is focused around our GI and the reason is because many bacteria, toxins and all sorts of pathogens could enter our system with our food or drinks. There are bacteria, naturally living in the GI tract, which keep a balanced pH environment, act competitively against other bacteria that could cause severe disruptions if successfully established, but they also produce vitamin K2 as a by-product of their metabolism. There is a symbiosis established among the human gut and these bacteria, meaning that both sides are gaining from this co-existence. There are more than 1200 species of bacteria, yeast and other organisms comprising this “intestinal flora”, an approximate number of 100 trillion of them residing in our gut. Vitamins K2 and K1 (provided by food) are heavily involved in the clotting mechanism of the blood, protecting from abnormal bleeding. Deficiencies in K2 are usually correlated with intestinal problems. Also K2 maintains bone density, preventing osteoporosis and fractures. GI has many amazing ways to regulate the absorption of nutrients, especially at a cellular level. There are specialized receptors in the cellular membrane of the inner intestinal surface that facilitate or completely undertake the transfer of specific nutrients to the cells so that they can enter the blood stream from then on. The whole absorption process is highly selective and only molecules like water or a few ions can permeate the gut cells relatively more easily.

Below you will find information about a very common syndrome that many people are affected by, but which goes undetected in most cases by mainstream medicine. The Leaky Gut Syndrome (LGS) is defined as an increased permeability of the gut. Instead of selectively absorbing the useful nutrients only via the specialized cell pathways, big gaps between the gut cells develop and literally massive amounts of toxins, partially digested food and bacteria can enter the bloodstream. Gut suffering from this syndrome is usually severely inflamed and definitely out of balance. There are several reasons/conditions that are considered to cause/facilitate LGS; primarily, insufficient digestion of food provides the opportunity to bacteria to feed on these remnants and multiply beyond any control, leading to chronic infections and inflammation. This condition is caused / deteriorated by the following factors:

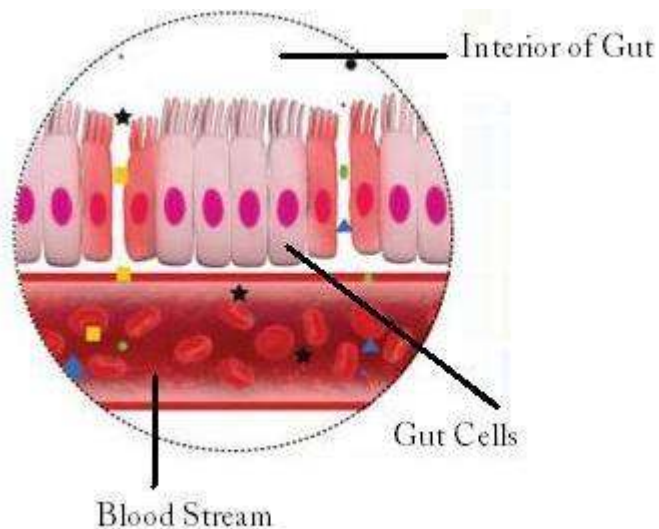
- Insufficient quantities of digestive enzymes produced by the body
- Bacterial imbalance as a direct result of the use of broad spectrum antibiotics. Yeast or other bacterial overgrowth results in loss of bacterial balance and establishment of additional harmful strains causing chronic inflammation.
- Excessive caffeine and alcohol irritate the gut lining, leading to further inflammation.
- Consumption of toxins, contaminants.
- Diet based on highly refined carbs.
- Drugs: Ibuprofen, aspirin, non steroidal anti inflammatory drugs (NSAIDs), antacids.
- Stress – causes hormonal imbalances that eventually affect the GI, causing inflammatory conditions.

All the above play a crucial role in the development and establishment of the Leaky Gut Syndrome.

The Leaky Gut Syndrome has been associated with many pathological conditions. A basic list of them is found below:

- Abdominal pain (chronic)
- Insomnia
- Bloating
- Gluten intolerance (celiac disease)
- Hemorrhoids
- Heartburn
- Migraines
- Multiple chemical sensitivities
- Mood swings
- Poor exercise tolerance
- Poor immunity
- Recurrent bladder infections
- Recurrent vaginal infections
- Swollen lymph glands
- Food allergies
- Constipation
- Diarrhea
- Liver dysfunction
- Brain fatigue
- Depression
- Chronic fatigue

LGS triggers a general alarm signal in the immune system and sets the body on fire.



<http://www.globalhealingcenter.com/leaky-gut-syndrome.html>

Dr Bieler is a pioneer doctor who wrote a very important book back in 1965 – Food is your Best Medicine. By that time he had already practiced medicine for 50 years which gave him extensive experience and a solid background on which he established his “maverick” opinions. This man came to realize that the wrong types or combinations of food can cause from mild to severe cases of diseases. He pointed out that **food and nutrition is not the same thing**. “Man is nourished not by the food that he eats but only in proportion to what he is able to digest and assimilate”. Each person has a certain digestive capacity. Many people are able to eat massive amounts of food and completely digest and assimilate it. Others though, have weaker digestive systems or digestive enzymes of lower strength and do not tolerate big portions of food or even certain types of food. The problem is that as we grow old, the quantities of digestive enzymes produced by our body reduces significantly. By the time we are in our 20s, the ability to produce sufficient amount of enzymes drops 13% every 10 years. Therefore our ability to process and assimilate food is gradually reduced. The moment one exceeds his/her digestive capacity (overeating or eating food not tolerated), the body cannot properly digest the amount of food consumed. The result of this is partial digestion. The undigested material is used by the bacteria in the gut. This leads to bacterial overgrowth and eventually to inflammation, disrupting the integrity of the gut lining. Undigested food particles, toxins or byproducts of the bacterial metabolism find their way to the blood causing from mild to severe toxemia, meaning toxins in the blood. Obviously, these toxins can be transferred anywhere in the body through the blood and cause pathological conditions in areas completely irrelevant to the gut or the

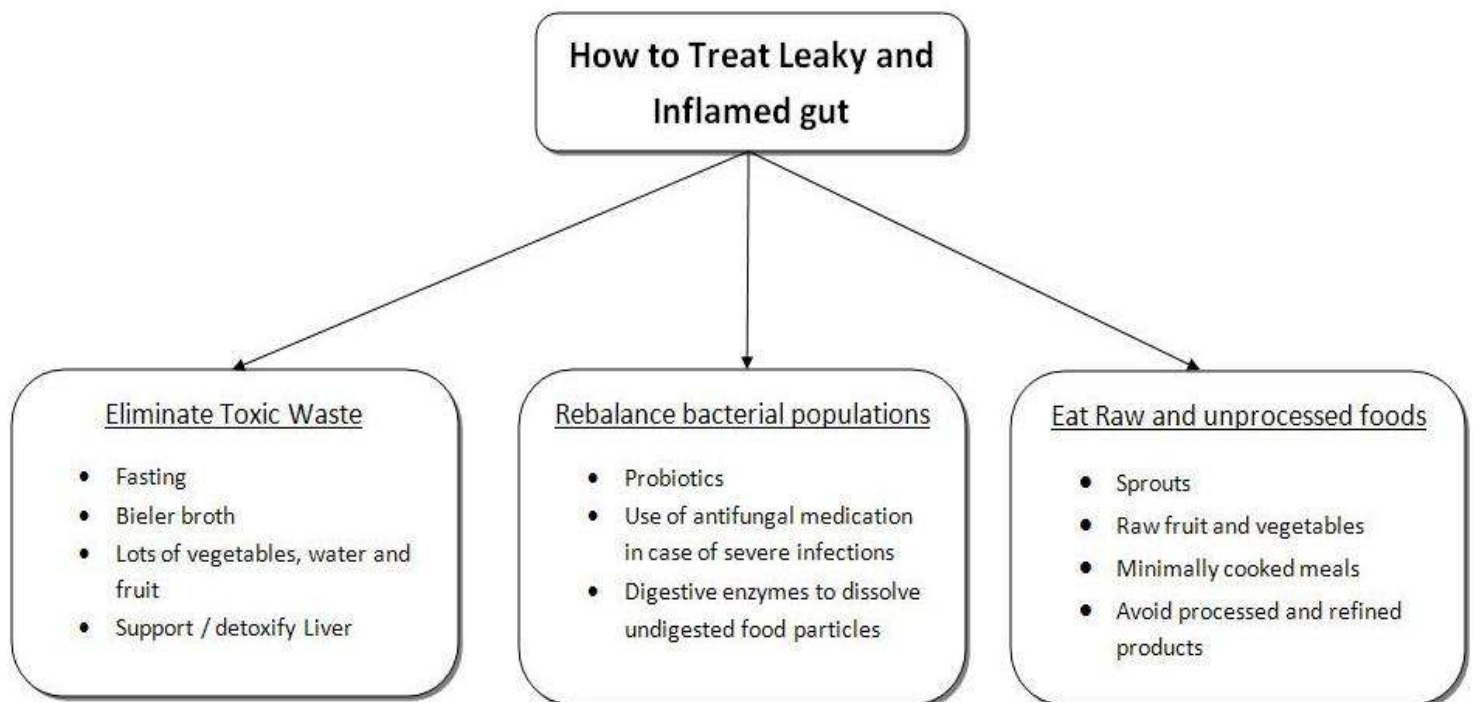
digestive tract in general. According to Dr Bieler, **“the gut is the first line of the body’s defense against harmful foods and toxins”**.

Having introduced the notion of digestive capacity and partial digestion, we can now talk about the power of naturally found enzymes. Raw foods have considerable amounts of living and activated digestive enzymes but they are sensitive to heat and therefore destroyed while cooking. Having most of our food cooked in some way deprives us of valuable enzymes that could contribute to our own digestion. Receiving some “external” help in order to digest from raw foods alleviates the body from having to produce massive amounts of endogenous digestive enzymes in order to process the foods taken in. As with every system, our body has a certain capacity to produce digestive enzymes so when it is forced to come up with big quantities of them, its ability to do so is reduced as time goes by. It is very likely for adults to experience the results of partial indigestion because it is a natural consequence of a lifetime of eating processed and refined foods with no digestive value. Also if you take into account the habit of overeating, you can realize what a devastating effect our lifestyle and diet can have on our gut and digestive health in general. Less raw food consumed results in extra “work” for our own enzyme producing mechanisms. Highly refined and processed foods as well as heavily cooked meals simply create a disruption of the balance between our bodies and our diet.

The liver is considered by Dr Bieler to be the **“second line of defense against disease”**. It is responsible for most of the detoxification processes in the human body, so increased quantities of toxins of any kind in the blood stress the liver out a lot. When LGS develops and toxins are released in the blood, the liver is the next organ to handle this situation. This is because there is a large vein (portal vein) connecting the gut with the liver so literally everything that passes through the intestinal wall (good or bad) goes straight to the liver for filtering. When the liver is overloaded with toxins, toxic conglomerates are formed which are eventually transferred in the gall bladder. At any moment, these “stones” can block any of the ducts that connect the bladder with the gut resulting in acute pain and inflammatory condition. Also toxic overload compromises most of the liver functions, such as cholesterol and bile synthesis, production of urea from the catabolism of the proteins, production of clotting factors, storing of glycogen and many other important ones. Given that LGS is usually a chronic disease that most of the times goes undetected, it is obvious that the whole body is facing a very challenging situation and is indeed getting weaker and weaker. Keep in mind that an inflamed gut not only results in a leak of toxins directly into the blood stream, but also cannot properly absorb the vitamins and nutrients it is supposed to. Therefore a diet might be well balanced or even supplemented with vitamins, but severe nutritional deficiencies can be present causing further problems. Finally, inflammation has been highly correlated with obesity. The reason is because, during inflammation, there are specific molecules produced by the inflamed cells which turn on the fat producing and storing genes.

In order for the gut to regain balance we must help it flush away all the toxins that it has accumulated over the years. Dr Bieler developed a wonderful fasting broth, made of simple vegetables, which is suggested as a way to help detoxify the gut. The famous Bieler broth can work miracles for people with intestines overloaded with “toxic waste” or it can be used as a cleansing regime for a few days. It is the first line of the body’s defense and it must be taken care of properly. A clear and balanced gut is like a powerful firewall in your computer system; nothing harmful can penetrate it as it is your body’s guardian. Bieler broth also restores the alkaline environment necessary for the gut tissues, liver and kidneys to function in an optimal way.

The leaky gut syndrome requires action towards three directions; first eliminating toxic waste, second restoring the bacterial balance in the gut and third incorporating raw foods in your diet that will provide a portion of activated digestive enzymes for your body. All must be done in order for the intestines to rebalance and regain their functionality. In many cases, the bacterial growth is restored as a result of the cleansing process but some help is usually necessary, especially if there is a considerable amount of “toxic waste” to be eliminated, which will take some time. The best method to detoxify yourself is the Bieler broth or any fasting regime involving large amounts of water and vegetables for a few days. In the healing plan section of the book you will find more information and powerful strategies on detoxification.



It is of utmost importance to provide extra help for digestion to our gut. Raw foods can give a considerable amount of activated enzymes, alleviating and contributing to the digestion process and elimination of accumulated toxic waste. A truly magical food that must be mentioned here are **sprouts**. Sprouted beans and seeds have 10 -100 times more enzymes and nutrients than raw fruit and plants. For example, a sprouted mung bean has:

- The carbohydrate content of a melon
- The amount of vitamin A of lemon
- The amount of vitamin B1 of an avocado
- The amount of vitamin B2 of a dry apple
- The amount of vitamin B3 of a banana
- The amount of vitamin C of a loganberry



The physiological processes that are activated during sprouting activate a large amount of dormant enzymes in order to facilitate the growing plant's embryo's development. All the nutrients stored in the seed destined to nourish the plant embryo are now released and biochemically processed to become active. The biochemical reactions involved take place within the first 3-5 days of sprouting only and indeed the peak enzymatic activity of sprouts is recorded during this limited window of time. Before trying to supplement your body with products containing digestive enzymes, it is of massive importance to give your body a natural source of extra help for digestion, by incorporating raw sprouts and fruit into your diet. The most highly recommended sprouts are the following:

- Mung beans
- Rye
- Wheat
- Alfa alfa
- Lentils

Supplementation with digestive enzymes has remarkable anti-inflammatory results and contributes to intestinal balance, especially when there are big amount of “toxic, undigested waste” to be dissolved. Enzymes eliminate undigested food, opening the way towards a healthier gut and a controlled bacterial population. Although this is a big subject on its own, the most widely used enzymes are papain & bromelain and a good mix of proteases, which break down proteins, lipases, which break down fats and amylase, used for carbs. This combination will work miracles for your gut. Digestive enzyme supplementation is also used as an alternative cancer therapy by alternative doctors with amazing results. This regime has been used to treat even terminal patients and in many cases outperformed chemotherapy. These simple enzymes allow for a crystal clear gut and balanced digestion.

Highly anti-inflammatory are the omega-3 fats, as well as fats found in cocoa (really dark, good quality chocolate or raw chocolate nibs). Except for cocoa, all the plant based, raw foods that are rich in phytonutrients provide with valuable molecules against inflammation. Finally, green tea, ginger, capsaicin (in cayenne pepper) and turmeric are excellent herb choices to fight off inflammation.

Resources

<http://www.sproutnet.com/>

<http://www.living-foods.com/>

<http://www.alkalizeforhealth.net/sprouts.htm>

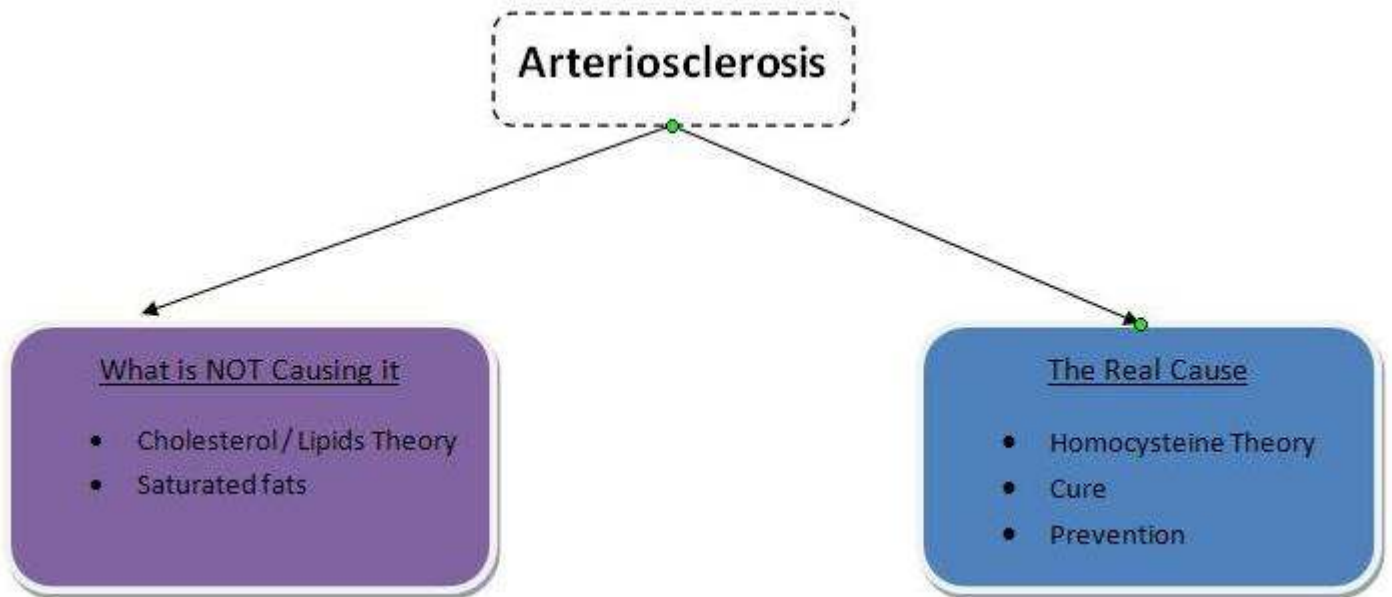
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Atherosclerosis

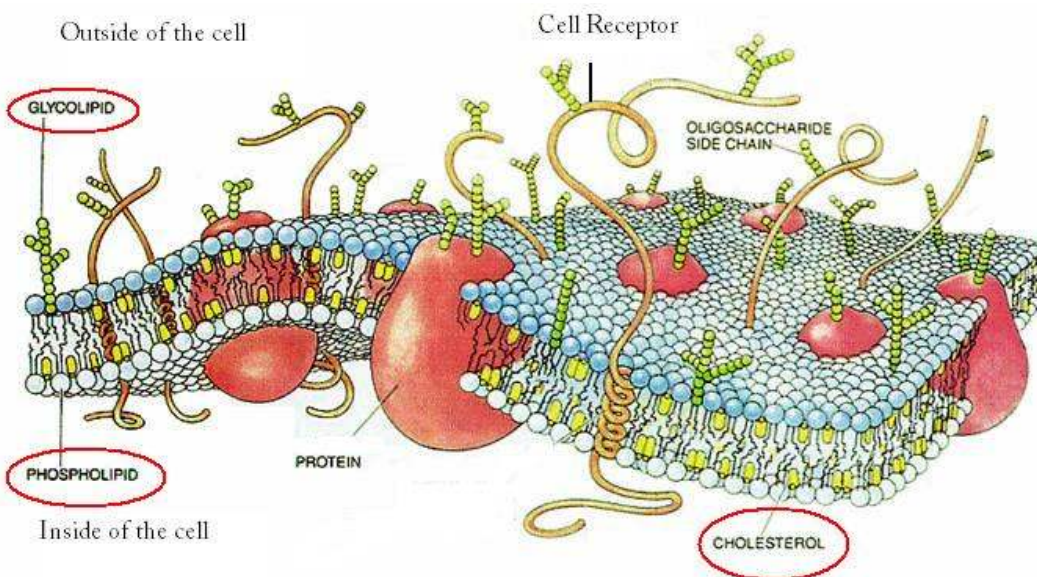
Summary

In this chapter we will analyze the case of atherosclerosis and its association with cholesterol. The information provided is beyond the conventional and incomplete theory followed by mainstream science. This is the result of a long and strenuous research and the results are very impressive indeed. We believe that this can be a life changing chapter for many of you. Literature and publications are provided at the end of the chapter. The topics covered are summarized in the diagram below.



About cholesterol

A few things on cholesterol first, as this is a very important molecule for our body and absolutely essential for life. Cholesterol is a basic structural component of the cellular membranes in every cell, of every organ in the body. It regulates the fluidity and permeability of the membrane, directly affecting the way a cell interacts with its environment.



http://en.wikivisual.com/index.php/Cell_membrane The typical cellular membrane is full of cholesterol and many more complex molecules containing different types & portions of lipids.

Also cholesterol provides lubrication in the lining of the arteries. It is a healing molecule that protects arteries, keeps them elastic and flexible in order to withstand the highs and lows of blood flow. This was very obvious for Dr Henry Bieler, who published his pioneering work back in 1965. Especially in the brain, it is found in massive quantities covering the neural fibers of some neural cells, insulating them, so that the electric stimuli are processed safely. Cholesterol is necessary for the production of steroid hormones (adrenal gland hormones and sex hormones: testosterone, progesterone, estrogens). Liver is responsible for the cholesterol metabolism. Recycling and partial (20-25%) synthesis of cholesterol takes place there. Cholesterol is incorporated in bile salts (found in bile) and stored in the gall bladder. During digestion, bile is released in the digestive tract helping to solubilize fats and eventually facilitating their absorption along with the fat – soluble vitamins (A,D,E,K). Cholesterol cannot circulate in the blood stream on its own. There are special carriers, called lipoproteins; the most famous ones are the Low Density Lipoprotein (LDL) and the High Density Lipoprotein (HDL). Basically they are large protein complexes which are combined in the liver with the cholesterol fraction to produce the complete complex. As long as dietary cholesterol is sufficient for the

body's needs, the liver will not synthesize extra cholesterol. When the dietary intake of cholesterol drops below a certain point, then the liver synthesizes the extra amount that is necessary.

The Cholesterol Myth

It is a surprising fact indeed but there is no relationship between blood cholesterol and the degree of atherosclerosis in the vessels. If the cholesterol theory was correct and cholesterol caused atherosclerosis then it would be very obvious that people with high cholesterol would be way more atherosclerotic than people with low levels. A substantial number of studies have NOT been able to confirm this hypothesis.

In fact, people with low cholesterol are equally atherosclerotic as people with high levels of blood cholesterol. The first publication on this issue was published in 1936 and showed no correlation between the two. Dr Paterson performed a study, following 800 war veterans for many years and regularly analyzed blood samples. They did NOT find any correlation between cholesterol level and degree of atherosclerosis. Similar studies have taken place in India, Poland, Guatemala and USA.

A few studies found a correlation though. One of them is based on data collected during the famous Framingham study in Massachusetts. The correlation factor is a statistical measure scientists use when they try to measure how well or bad two factors are correlated. This factor ranges from 0 to 1, with 1 being 100% correlation and 0 no correlation at all. From a statistical point of view, a bare minimum of 0.5 is necessary to prove a possible correlation. The above study found a correlation coefficient of 0.36 between the level of cholesterol and atherosclerosis. Statistically speaking, this is totally unacceptable or at least would be so if this study was dealing with any other subject. It is very strange indeed that a study like that even managed to create a certain degree of controversy. Except for the statistics, there have been many more negative remarks following this specific study and the Framingham study as well, reducing their reliability and impact. The scientists conducting them were so passionate (and biased) to prove a positive correlation between cholesterol and atherosclerosis that literally used every possible mean to achieve it. Below you will find a representative list of studies which prove that cholesterol consumption and atherosclerosis are irrelevant (taken from "The truth about Saturated Fats" by Mary Enig PhD and Sally Fallon).

The Framingham Heart Study is often cited as proof of the lipid hypothesis. This study began in 1948 and involved some 6,000 people from the town of Framingham, Massachusetts.

Two groups were compared at five-year intervals—those who consumed little cholesterol and saturated fat and those who consumed large amounts. After 40 years, the director of this study had to admit: "In Framingham, Mass, the more saturated fat one ate, the more cholesterol one ate, the more calories one ate, the lower the person's serum cholesterol . . . we found that the people who ate the most cholesterol, ate the most saturated fat, ate the most calories, weighed the least and were the most physically active." The study did show that those who weighed more and had abnormally high blood cholesterol levels were slightly more at risk for future heart disease; but weight gain and cholesterol levels had an inverse correlation with fat and cholesterol intake in the diet.

In a multi-year British study involving several thousand men, half were asked to reduce saturated fat and cholesterol in their diets, to stop smoking and to increase the amounts of unsaturated oils such as margarine and vegetable oils. After one year, those on the "good" diet had 100% more deaths than those on the "bad" diet, in spite of the fact that those men on the "bad" diet continued to smoke! But in describing the study, the author ignored these results in favor of the politically correct conclusion: "The implication for public health policy in the U.K. is that a preventive programme such as we evaluated in this trial is probably effective. . . ."

A survey of 1700 patients with hardening of the arteries, conducted by the famous heart surgeon Michael DeBakey, found no relationship between the level of cholesterol in the blood and the incidence of atherosclerosis. A survey of South Carolina adults found no correlation of blood cholesterol levels with "bad" dietary habits, such as use of red meat, animal fats, fried foods, butter, eggs, whole milk, bacon, sausage and cheese. A Medical Research Council survey showed that men eating butter ran half the risk of developing heart disease as those using margarine.

Mother's milk provides a higher proportion of cholesterol than almost any other food. It also contains over 50% of its calories as fat, much of it saturated fat. Both cholesterol and saturated fat are essential for growth in babies and children, especially the development of the brain. Yet, the American Heart Association is now recommending a low-cholesterol, lowfat diet for children! Commercial formulas are low in saturated fats and soy formulas are devoid of cholesterol. A recent study linked low fat diets with failure to thrive in children.

The Masai and kindred tribes of Africa subsist largely on milk, blood and beef. They are free from coronary heart disease and have excellent blood cholesterol levels. Eskimos eat liberally of animal fats from fish and marine animals. On their native diet they are free of disease and exceptionally hardy. An extensive study of diet and disease patterns in China found that the region in which the populace consumes large amounts of whole milk had half the rate of heart disease as several districts in which only small amounts of animal products are consumed. Several Mediterranean societies have low rates of heart disease even though fat—including highly saturated fat from lamb, sausage and goat cheese—comprises up to 70% of

their caloric intake. The inhabitants of Crete (Greece), for example, are remarkable for their good health and longevity.

How to combine smart exercise with an even smarter diet – train your body to burn fat.

The cardio myth

According to conventional training, in order for substantial loss of fat to be achieved, one must invest a considerable amount of time and effort in cardio sessions i.e. 30-60 mins of low to moderate intensity work outs. This turns out to be harmful for the general cardiovascular health. In fact, it is debilitating and it also stimulates the fat storage mechanisms in the body, turning the endless cardio sessions into necessity rather than a tool for fat loss.

Long distance running has been praised as the most effective tool to strengthen your heart and keep fit. It is no accident that many marathon or long distance runners die of heart attack at the peak of their careers.

From an evolutionary point of view, durational exercise does not serve any purpose. Real life almost never involves a continuous activity like the one simulated by long distance running. On the contrary, the norm is a sudden need to lift something or run towards a target for a very brief period of time and then rest. These sudden demanding events that may come your way require a heart and lung condition that can handle such short bursts of energy. The cardiovascular system needs to be able to respond to real life demands. Durational exercise trains the heart for a continuous repeated movement which is definitely neither natural nor functional. Long distance running forces the body to work non-stop, for long distances, against low resistance and at a relatively low speed. The body eventually adapts to this type of training by establishing physiological changes that serve this regime. In order for a body to withstand such long and low resistance training, it has to minimize the output so that the energy and stamina stocks last for the whole duration of the regime. The body learns and adapts to these conditions by downsizing the lungs, blood vessels and the heart. The body learns to work on an energy saving mode, reducing output, fuel consumption, speed and performance. It has to because this is the way to efficiently handle this type of training, in the long run. Heart strength and functional state are seriously compromised by durational exercise as these elements are exchanged for efficiency at continuous duration. A well conditioned long distance athlete will have an excellent capability to run for many hours without rest, but when it comes to real life, (s)he will be completely unprepared. This might involve sprinting to catch the bus or a child on

the road, lifting a few heavy boxes during moving house or just an intense experience in bed.

In order for a body to handle such real life conditions, the heart and the vessels must be able to accommodate large amounts of blood for short periods of time. This is what is scientifically called the heart's **reverse capacity**. A downsized cardiovascular system fails to handle sudden increases in cardiac demand because, sooner or later, will force the heart to work beyond its capacity. This is the reason why so many marathon and long distance runners such as Jack Kelly, Jim Fixx suddenly died of heart attacks, usually while running. The heart, vessels and lungs need to be conditioned in the exact opposite way; providing big and fast cardiac output, immediately available when circumstances demand it. Studies have revealed that long distance runners have a whole set of not normal physiological parameters; elevated LDL and cholesterol, elevated oxidized cholesterol, reduced bone density, elevated clotting and inflammation factors and a higher risk of coronary disease. Also, a study at Loughborough University (Leicestershire, UK) between long distance runners and sprinters revealed, among others, that sprinters have three times more growth hormone than endurance athletes. Natural growth hormone (produced by the body itself) stimulates cell growth and regeneration and it has been associated with stamina and physical health. Therefore, the point to take home is that long distance cardio sessions do not serve your heart's strength but seriously compromise it and, in general, can harm body health at many levels.

Another fact to consider is the type of fuel consumption during exercise and the recovery after the training session. Your body can select from several fuel sources while working out. It can burn fat, carbohydrates, like glycogen, or it can get energy from breaking down protein, usually muscle. Glycogen is stored in the muscles or liver, while fat can be found in several areas of the body. After training the body will strive to refill the fuel that has been mostly used during the training session. This is why the post workout meal is of utmost importance.

When you eat carbohydrates, they are broken down in your system and contribute to your blood sugar level. Sugars can be converted to either fat or glycogen, according to the body's needs. Both glycogen and fat are considered to be storage of readily available energy from the body's perspective. When broken down, both release big amounts of energy which are used as fuel for the training. Slow release of sugar in the blood, as happens with low GI carbs, will provide a long and stable supply of primary sources for the body to refill the energy storage. The pancreas secretes insulin to remove the excess sugar from your blood and deposit it wherever energy material has been used. If your muscle and liver glycogen stores are already full, the excess blood sugar will be stored as fat. If your muscle glycogen stores are depleted as happens after an intense workout, insulin secreted in response to a high carbohydrate meal will push the excess blood sugar into your muscle cells, refilling the glycogen stores. Below you will find a table showing what type of fuel the body prefers to burn depending on the intensity of activity.

Fuel of choice depending on intensity of activity			
Activity level	Protein	Carbs	Fat
Resting	1-5 %	35%	60%
Low intensity	5-8%	70%	15%
Moderate intensity	2-5%	40%	55%
High intensity	2%	95%	3%

For the first couple of minutes, your body uses something called ATP – the most readily available source of energy. But your supplies of ATP are limited. After 2 to 3 minutes, your body switches to carbs stored in muscle tissue. This lasts for 15 to 20 minutes before it switches to fat.

From reviewing the table, you can see, that at low intensity activity, your body derives most of its energy from carbohydrate and only 15% from fat. But when you step up your activity level to moderate, you increase the percentage of the energy burned from fat to 55% of the total. Now notice that if you increase your activity to high intensity you dramatically reduce your dependency on fat and derive nearly all your energy from carbs. This relationship has led many to advise that you should exercise at moderate intensity because that's how you burn the most fat. Although this seems logical, it turns out to be completely the wrong advice for getting lean.

During a moderate intensity workout the body selectively uses fat as fuel; this is a result of the intensity of the activity. Once the body has got used to this type of exercise, it adapts itself by storing fat during the resting periods. Since fat is customarily used during exercise, the body is led to believe that the stores of fat must be replenished before the next training session and this is exactly what it does. Obviously after a moderate intensity workout, the fat storage will be more or less reduced, so the carbohydrates from the post workout meal will selectively and urgently replenish the fat that was burnt during the cardio session. The body becomes efficient at building and preserving fat necessary for long mid-level cardiovascular sessions in preparation for the next endurance workout. It basically puts you in a vicious circle where you burn fat, but your body selectively replaces it after the workout. Therefore, it is obvious that this is not the most efficient or quick way to get lean.

The smartest way to lose weight is to combine short bursts of high intensity exercise with recovery periods in between. It doesn't have to be long, it can't be either, as, basically, during these short periods you need to reach a pretty high level of cardiac activity. This type of training will use muscle and possibly liver glycogen as the fuel of choice. After the training, the

carbs from the post workout meal will selectively restore the glycogen storage because this is what has been used and exhausted. The body learns that carbs are what it needs to have readily available for the next training session and it won't fail in having the glycogen stores full and ready to go for the next time. So after the training two things happen; first the glycogen used is restored and second the body burns fat while resting. Since fat is not used for the workouts, it becomes the fuel of choice during the resting periods, as it is indicated in the table. Up to 60% of the calories used after workout will come from burning fat alone. The body will happily burn what seems to be unnecessary and it will keep on doing so for many hours after the end of the session. This type of training is called **Interval Training** and studies have shown that it results in burning 9 times more fat than conventional cardio sessions.

Also Interval training builds up your heart and lung capacity very fast. It is the exact opposite of durational training. It builds a very strong heart and vessels that can handle big amounts of blood when challenged. Lungs too are conditioned to be very efficient in oxygen input, allowing for maximum performance whenever necessary. This type of training boosts your metabolism, makes the body lean and strong and ensures cardiovascular health. So in summary, Interval training has the following results.

- Trains the body to use glycogen while working out
- Fat is used as fuel of choice in the resting periods
- In total, results in loss of 9 times more fat than conventional cardio
- Only small duration sessions are necessary -15 mins max
- Builds up a strong heart and vessels
- Maximizes cardiac output
- Strengthens lungs and maximizes oxygen input
- Boosts up metabolism
- Creates a lean and strong body

The final point here is the post workout meal. The importance of providing carbohydrates after the training so that the body can restore the muscle glycogen is explained above. The best shot is to go for carbs with low GI that provide a slow release of sugars in the blood stream. Of course a meal cannot possibly contain just carbs but the combinations made here will make a huge difference in the outcome. By combining healthy fats and good quality protein in your post workout meal, you lower the overall GI of the meal, ensure slow release of sugars in the blood and the healthy fats and carbs will give the right molecular signals to your DNA to turn on fat burning genes and fight inflammation.

Muscle is a very important tissue in the body. It is made of pure protein. Except for the obvious reasons, it is a major player when it comes to the regulation of the metabolism. This is because muscle has a very high metabolic rate by nature; it burns many calories even while in resting periods. It can be compared with brain and cardiac tissue in terms of metabolic activity. Since we do not have much control over the amount of brain and heart tissue, a very smart way

to elevate the metabolism level (the number of calories burnt at rest) is to strive for extra muscle. Muscle develops faster when some kind of weight training is involved. This type of exercise promotes muscle development, helps build very strong bones and stimulates the immune system.

Exercise induces muscle damage. Micro injuries occur along the muscle fibers while the muscle itself contracts in order to keep up with the workout. Small mechanical disruptions are the norm and the condition is associated with mild inflammation and soreness. This is a normal and expected result. The muscle will recover during the rest period between trainings and this is how muscles grow bigger and stronger. The recovery phase is of major importance because the muscles need to have repaired themselves before the next training. The protein in the post workout meal will help the muscles to recover and develop themselves by providing the raw materials and amino acids to make more muscle fibers. Also large doses of certain free form amino acids and quickly digested proteins such as whey protein can also trigger an insulin response promoting two things at the same time: restoration of muscle glycogen (absorption of sugars) and recovery of the muscle fibers (absorption of amino acids). Therefore whey protein drinks are a necessary part of a successful post workout meal. Ideally we would like a whey protein shake combined with a small portion of healthy carbs and fats. This would provide a low GI meal, slow sugar release (resulting in the gradual replenishing of muscle glycogen) and raw material for new muscle tissue for fast recovery.

Combining all the above, the ideal exercise / diet plan involves the following elements

- Interval Training for 15-20 mins max → burns fat
- Moderate short sessions of weight training → builds muscle
- Post workout meal: whey protein shake + healthy carbs + healthy fat → restore muscle glycogen and induce fast recovery of the muscle
- Proper resting periods to allow for muscle recovery → muscle development

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3. The Exercise Myth by Henry A. Solomon, M.D.
4. PACE– Rediscover your Native Fitness, by Dr Al Sears.
<http://www.alsearsmd.com/shop.php?Clk=3603785>