

W O R K B O O K



The  
**5**  
Forces  
*of*  
Wellness

**The Ultraprevention System  
for Living an Active, Age-  
Defying, Disease-Free Life**

**Mark Hyman, M.D.**

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Wellness

The Ultraprevention System for Living an Active,  
Age-Defying, Disease-Free Life  
An Instruction Manual for Your Body

**IMPORTANT:**

To begin — please save this workbook to your desktop or in another location.

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## WELCOME

Congratulations! *The 5 Forces of Wellness* is about to take you on a journey of self-discovery and, ultimately, better health. In this program you'll learn that it's not enough to wait until you're sick to get healthy or until you have a symptom to go to the doctor. This program will teach you how your body works.

Were you born with a little instruction book that told you how much you should eat? Or listed what kinds of food, vitamins, and exercise would suit your body best? No. Few of us know how to optimize this beautiful creation — our bodies.

That's what this program is about. It's about helping people thrive. It's about creating an environment in which you can feel fully healthy, fully engaged, fully alive, and not have to deal with chronic symptoms that so many think are inevitable parts of aging. This whole program is about learning how to take care of yourself and how to make your body function at its highest level.

For each session, do the following:

- Preview the section of the workbook that goes with the audio session.
- Listen to the audio session at least once.
- Complete the exercises and the ultraprevention questionnaire in this workbook.

By taking the time to preview the session before you listen, you are priming yourself to absorb the material. You'll be able to absorb the information faster — and you will see results faster.

In every session there are easy exercises to help you expand your thinking about health. In this workbook there are also five ultraprevention questionnaires that you can use as a self-diagnostic tool. At the end of the workbook you can compile the questionnaire answers to determine how you are managing the five forces of wellness. The powerful information in this workbook will get you started toward an active, age-defying, disease-free life.

In addition to the material in this program, Dr. Mark Hyman has created a web site, [www.drhyman.com](http://www.drhyman.com), that contains even more in-depth health information.

Let's begin.



## **SESSION 1: From Illness to Wellness**

We are living in very exciting time in medicine. It is a time of transformation. We are finally beginning to understand how the body works and how to use that information not only to treat illness, but to help people improve their health.

We do this by understanding the five basic forces of illness: malnutrition, inflammation, impaired metabolism, impaired detoxification, and oxidative stress. If you look at any condition — chronic conditions in particular — these forces are the root of the problem.

These five powerful forces can work for you or against you. They can create illness or they can create health. For the purposes of this program I will mostly refer to the illnesses caused by imbalances in these five forces. But remember, any force of illness can be turned into a force of wellness.

### **Modern Medicine**

In the past, human societies were plagued with infectious disease. These diseases were a major cause of human suffering and death. Then, in the late 1800s, Louis Pasteur discovered the microbe. Microbes, microorganisms that include bacteria or “germs,” are the microscopic invaders that were found to be the cause of many terrible diseases. For example, the tuberculosis microbe causes tuberculosis, and the pneumococcal bacteria causes pneumonia. After the discovery of the microbe, medicine focused heavily on the germ theory of disease.

When penicillin was discovered in the 1920s, doctors had a weapon to wield against microbes. Once a doctor diagnosed the disease, the cause was known and the disease could be eliminated with a single agent, a drug like an antibiotic. This “magic bullet” technique worked well for acute infections. But what if the illness is not caused by a germ? Many chronic illness fall into this category, and without a magic bullet, they are difficult for doctors to treat.

## Exercise One: What Do You Have?

How many of the following symptoms do you suffer from? Check all that apply:

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Fatigue          | <input type="checkbox"/> Muscle aches           | <input type="checkbox"/> Joint pain                   |
| <input type="checkbox"/> Sinus congestion | <input type="checkbox"/> Postnasal drip         | <input type="checkbox"/> Excessive congestion         |
| <input type="checkbox"/> Headaches        | <input type="checkbox"/> Bloating               | <input type="checkbox"/> Gas                          |
| <input type="checkbox"/> Constipation     | <input type="checkbox"/> Diarrhea               | <input type="checkbox"/> Heartburn                    |
| <input type="checkbox"/> Sleep problems   | <input type="checkbox"/> Problems concentrating | <input type="checkbox"/> Brain fog                    |
| <input type="checkbox"/> Food cravings    | <input type="checkbox"/> Fluid retention        | <input type="checkbox"/> Losing weight                |
| <input type="checkbox"/> Excess weight    | <input type="checkbox"/> Acne                   | <input type="checkbox"/> Pimples                      |
| <input type="checkbox"/> Eczema           | <input type="checkbox"/> Psoriasis              | <input type="checkbox"/> Arthritis                    |
| <input type="checkbox"/> Canker sores     | <input type="checkbox"/> Puffy eyes             | <input type="checkbox"/> Dark circles under your eyes |
| <input type="checkbox"/> Bad breath       | <input type="checkbox"/> PMS                    |   |

These are the kinds of chronic complaints for which magic bullet therapy has little to offer. The promise of ultraprevention is to treat these chronic problems in an entirely new way. Ultraprevention does not suppress symptoms, but helps the body to heal itself. It's about activating the body's own healing system to tackle the problem, rather than relying on a medication to mask the symptoms. When you have high blood pressure and you take a blood-pressure pill, your blood pressure goes down. But when you stop taking the pill, your blood pressure goes right back up. The pill didn't cure anything; it simply suppressed the high blood pressure. What ultraprevention seeks to do is to get rid of the causes of the high blood pressure and to help the body restore a normal balance so that the high blood pressure simply disappears. That's the key.

### There Is No Cure for Cancer

We're always looking for the cure for cancer, heart disease, diabetes, and Alzheimer's. But there is no cure. There is only prevention. These chronic, complex, multigenetic diseases have no single cause and no single cure. They are not like strep throat: a condition called by a microbe that is easily treated with penicillin.

Yet, too often medicine is still treating all illness using the single-drug-for-the-single-disease-for-the-single-outcome model. For chronic lifestyle illnesses, the magic bullet is the wrong philosophical road. It doesn't deal with the underlying causes of the illness.

## Exercise Two: What's Your Paradigm?

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What was your reaction when you read/heard that there is no cure for cancer or heart disease? Do you know anyone who has had those chronic illnesses? How would that person react if you told him or her that there is no cure?

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Your answer highlights your current attitudes about medicine and disease. If you found yourself not believing the statement “there is no cure,” then it means you are probably still enmeshed in the traditional lines of thinking. You are in good company, as millions of people are still looking for a magic bullet to cure chronic lifestyle diseases. There are more than 125 million Americans with chronic illness. As you continue with this program, your thinking will probably change. You’ll start to see that you have both the opportunity and the responsibility to make the changes in your lifestyle that can prevent many chronic illnesses.

### **But aren't we healthier than ever before?**

It's certainly true that in Europe and America our average life expectancy is longer than ever before. One hundred years ago an average man used to live to be 40 or 50. Now an average man lives into his 70s — an increase of almost 30 years. But the reason for this higher life expectancy is not curative medicine, acute-care medicine, or medications. The reason is improved public health, like greater access to clean drinking water and flush toilets, better hygiene, and better public-health education. Only 5 percent of our increased life expectancy has been the result of improved curative medicine.

Yet, illogically, 95 percent of our healthcare resources are focused on curative medicine — on giving the patient the right drug — rather than on disease prevention. It's a complete flip-flop from what we should be doing. And this isn't just a problem in America; it's global.

We're finding now that the rates of Western diseases — heart disease, cancer, diabetes, osteoporosis, Alzheimer's, etc. — are skyrocketing in all developing countries that have adopted the Western lifestyle. Worldwide, over 29 million deaths every year are caused by these chronic lifestyle diseases.

### **Myopic Medicine**

Medicine is a very young science compared with venerable chemistry and physics. Medical progress has often relied on trial and error, hit and miss. Medical researchers start down a path and then often have to change directions as new information becomes available.

Not long ago, medical doctors thought that hormone replacement therapy would protect women from heart disease. Yet after giving millions of prescriptions to millions of women, they found that hormones were not preventing heart disease but *causing* heart disease.

This happened because doctors haven't had a way of understanding how drugs or treatments work in the body. Drug trials may suggest that a treatment seems to create a benefit. A study shows that one treatment is effective, but then another study will seem to say the opposite. There are many researchers doing phenomenal studies, but the underlying problem is that they're examining little pieces of a much larger puzzle.

### **Vertical Versus Horizontal Medicine**

The National Institutes of Health has recognized that medicine is maturing and is now poised to break down the traditional barriers to understanding how the body works.

Some of these barriers are artificial. A byproduct of the germ theory of disease is the technique of treating everything with a drug. Another barrier is medicine's tradition of organizing doctors into rigid specialties. The cardiologist treats the heart, the neurologist treats the brain, the rheumatologist treats the joints, the gastroenterologist treats the stomach. The problem with this "-ologist" tradition is that it's an artifact from the history of medicine. And too often a doctor's knowledge is vertical rather than horizontal. Doctors understand their specialty vertically, deep down into the science, but they don't understand very much across all the other disciplines of medicine.

If you go to your gastroenterologist and say, "Gee, you know, doc, my stomach hurts, but I also have this rash, and my joints hurt." Your doctor may well say, "I'll take care of your stomach, but you should go see a dermatologist for your rash, and you should go see a rheumatologist for your joints." Unfortunately, this separate approach contradicts how the body works. As you will learn in this program, stomach problems can cause skin problems and joint problems. Unless you deal with all your symptoms together, you may not get to the root of the problem.

Elias A Zerhouni, M.D., the Director of the National Institutes of Health (NIH), has created a new initiative called the Roadmap Initiative. For the first time, money and effort are being put toward breaking down traditional subspecialty barriers by creating a new field of inquiry that seeks to understand health, rather than disease. The NIH has recognized that all biological components of the human body — from individual genes to entire organs — work *together* to sustain health.

The NIH goes on to say that this amazing feat of biological teamwork is made possible by an array of intricate and interconnected pathways that facilitate communication among genes, molecules, and cells. So, in a way, good health is good communication — good communication with your immune system and the rest of the world; with your intestinal system, nutrition, and the rest of your body; with your nervous system and the external world, even with external relationships: your spouse, your friends, your kids. Health is all about good communication at every level.

This communication must be harmonious, like a symphony in which every musician plays in perfect tune with his or her colleagues.

### Exercise Three: Communication and Relationships

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In what areas of your life do you think your communication or your relationships could be improved? Think about your relationships with your body, your food, your health habits, your friends, your family, your work, and your environment. What seems to be out of balance?

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It's quite incredible that the NIH has shaken off old habits and recognized that the body is not merely made up of subspecialty organ systems. The body is an intricate, interconnected network of systems and functions that work on a molecular, genetic, and biochemical level.

Some of these biological pathways have already been discovered. Many more remain to be investigated. Further research is needed to understand how these pathways are integrated, how disturbances in these pathways may lead to disease, and how to restore disturbed pathways so the body may return to a state of health.

This is a major revolution in medicine. It's the core of ultraprevention. It's the future of medicine.

Ultraprevention isn't alternative medicine; it isn't even integrative medicine. It is just the discovery of how the body works and using that information to create new ways of diagnosing and treating problems that work with the body rather than against the body. We call it "pro-medicine" as opposed to "anti-medicine." It supports the body rather than works against the body.

### Three Different Kinds of Medicine

There are three different kinds of medicine: mainstream medicine, downstream medicine, and upstream medicine. Most of us are familiar with **mainstream** medicine. This is the medicine of consequences. This is the medicine that most physicians practice. You get sick. You go to the doctor. You get diagnosed. You get a pill. Six-minute visit, it's all over. You go home to wait and see if the pill makes you feel any better.

If you go to your doctor and say, "You know, Doc, I feel great. What can you do for me? I want to stay healthy. I want to feel good forever. I don't have any symptoms, but can you help me figure out how to keep my body from breaking down later?" Your doctor is likely to say, "Eat right, exercise, don't smoke, and wear your seat belt." This is all good advice, but it doesn't go very deep.

In fact, you're lucky if your doctor even says that. Your doctor might say, "You know, I've got an office full of sick people. Why don't you come back when you're sick." That's not what we want.

Now, the next kind of medicine is **downstream** medicine. This is rescue medicine. It's waiting until someone's almost dead. This is where Western medicine excels. You know, we have a great bag of tricks. We can save people from heart attacks and from deaths from asthma. Downstream medicine can bring people back from the brink of death. Someone can come in with a kidney stone, writhing in pain; five minutes later that person is singing praises of happiness.

But we don't want to wait until we're in the emergency room. Nobody likes to be in the emergency room. It's not where we should end up.

This brings us to **upstream** medicine, which is a concept of walking upstream in the course of illness to find out what the cause is. This is the medicine of causes. The reality is that most illness that we see later in life are illnesses that start very young. The chronic diseases: heart disease, cancer, diabetes, arthritis, and Alzheimer's can be called pediatric illnesses with geriatric consequences. They're diseases that start when we're very young, in the womb sometimes. They begin to accumulate and accelerate over time, depending on our lifestyle habits, to create disease 30, 40, 50 years later.

By using upstream medicine, by understanding the origins of disease, by understanding genetics and biochemistry and molecular biology, we can do something about disease before it happens. We can catch diseases early and then prevent them later on.

#### Exercise Four: Three Kinds of Medicine

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Describe a time when you used mainstream medicine:

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Now describe a time when you used downstream medicine. Have you ever had a medical emergency?

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Finally, have you ever been involved with upstream medicine? Have you ever visited a nutritionist to find out what foods can prevent disease? Describe any experiences with upstream medicine here:

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## Two Questions

In a body, if any part of the various bodily systems is malfunctioning, we call that an imbalance. It is these imbalances that accumulate over a lifetime and lead to illness. In order to begin to discover these imbalances, you can ask two basic, simple questions. These two questions reveal the answers to almost every health problem.

**The first question is, Is something not agreeing you?** Is something not agreeing with you? Do you need to be rid of something that is toxic, allergic, infectious, or stressful. What is bugging you and throwing you out of balance?

**The second question is, Do you have an unmet need?** What is missing? Is there something that you need to thrive? What are you missing? Is there something that you're not getting in your life that's making you feel less than optimally healthy? Sometimes this takes a while to figure out.

## What Do You Need to Get Rid Of?

Now, let's look at the question of what's bugging you or what you need to get rid of to be healthy. There is a finite list of the things that bug people, so examining the list can be way of investigating this question. It's not random guessing. It's very scientific, and it's very deliberate.

There are things that bug you at different levels. There are things that cause imbalances or disturbances in each of the five forces of illness. In malnutrition there are things that make you malnourished. There are things that make you inflamed. There are things that make you toxic. There are things that make you full of rust or oxidative stress. There are things that disturb your metabolism. So what do you need to get rid of?

## Toxins

When asking the question, "What do I need to get rid of?" there are basically three possibilities: toxins, allergens and microbes. The first possibility is **toxins**. They can come from all different sources. The first toxin we will discuss is internal toxins. They can be chemicals that your body makes. For example estrogen is a toxin. It's listed by the National Cancer Institute as a carcinogen. Of course, estrogen is necessary. Without estrogen, you can't be a female, you can't menstruate, and you can't have a baby. But if your body can't get rid of estrogen, if your liver is not detoxifying it, if you can't excrete the estrogen that you're producing, it builds up in your system and becomes a cancer-causing agent.

There was a study published recently in the *Journal of the American Medical Association* that found that people who ate meat had more colon cancer because the meat produces toxins like putrescence and cadaverine. You can imagine what those things are like. These particular toxins get into your system via your digestive tract, and they cause a reaction that turns on certain genes that lead to cancer.

There are also elemental toxins, like mercury or lead or arsenic. It's critical to discover and eliminate their sources. We absorb mercury, lead, arsenic, aluminum, silver from our environment. A common source for elemental toxins is in our mouths, in our dental amalgams.

The fourth type of toxins are synthetic toxins. These are chemicals: pesticides, petrochemical, solvents, all things that we're exposed to all of the time. In fact, 100 percent of us have some of these toxins stored in our fat, whether it's DDT or PCBs or dioxin. How do we know? The National Fat Registry has been around since the 1970s, and they take biopsies of fat from surgery. If you have some tissue removed, it goes to the registry. The National Fat Registry analyzes the fat. They found that 100 percent of Americans, whose fat was tested, had pesticides or petrochemical toxins stored in their fat. Stored synthetic toxins can be a big issue for people. It can affect hormone balance, cancer risk, and many other things, including thyroid function.

### Exercise Five: Toxins

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What toxins have you been exposed to? Do you have mercury fillings in your teeth? Have you eaten nonorganic fruits and vegetables? List some of the toxins you know you've encountered:

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## Allergens

The second major thing we need to get rid of are **allergens**. Now there are many kinds of allergens. There are food allergens. Most physicians are fairly aware of the common food allergies: peanut, milk, or egg allergies. These are accepted. However, in addition to allergies, there are different types of reactions to food that can trigger different parts of your immune system and can create a lot of chronic illness.

In fact, one of the best therapeutic things is to remove foods that are not agreeing with you. There are foods which cause all kinds of subtle symptoms that aren't the same type of reactions that you go to your allergist for. There are more subtle things or delayed allergies that cause headaches or fatigue or digestive problems or post-nasal drip. They also cause skin rashes or all kinds of strange things that may not be obviously related to food. When you go on an elimination diet and you eliminate this trigger, you eliminate the irritant that's bugging you, and amazing things can happen.

Eating the foods that work for you, and not eating the foods that don't work for you, can make a huge difference. There may be different foods that work for different people.

The most powerful tool to make people feel better is changing their diets to foods that work with their body rather than foods that work against them.

Another type of allergen can be mold allergens. A lot of people are exposed to molds, and this can be hidden mold. Many of us have molds in our walls and in our bathrooms. These molds excrete toxins — allergens — that affect our immune system and create all kinds of chronic illnesses.

There are other kinds of allergens that people are aware of, like dust and animal products, pollens and various chemicals. Those are all things we're aware of. We have to make sure we try to reduce the load on our systems, because if we have multiple insults on our system, if we have multiple stresses on our system, then we can't recover. The key is to get those insults and find what they are and remove them.

## Exercise Six: Allergens

In this exercise, list your known allergens or allergies. What allergens are in your environment? What are you exposed to on a regular basis?

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### **Microbes**

The third major source of things that bug you are bugs. We call them **microbes**. They can be bacteria, yeast, parasites, or prions — as in mad cow disease. There are all kinds of these little critters around that affect us in a negative way.

Some of these are obvious. When you get an infection, you get a cold. Many of these are silent. We don't know we have them. They're hidden.

For example, you can have bacteria in your stomach called *H. pylori*, which is the cause of stomach ulcers. For some people though, it doesn't cause stomach ulcers. In some people it just causes stomach cancer because of inflammation which causes cancer. If you have a particular gene that makes you predisposed to this, and you get the bug, you might not have an ulcer, you might just get cancer.

You need to find the bugs that are bugging you. Again, that can sometimes be difficult. It's a process of discovery and inquiry and testing and searching. It's being a detective and looking deeply into the way the body works and discovering the true causes of your problems.

### **Exercise Seven: Microbes**

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Are you frequently exposed to infectious microbes? Which ones affect you the most?

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### What Do You Need to Get?

The second question is, What do you need to get? What are you missing that you need in order to feel great? What does your body need to function and thrive? Again, this is a very limited list.

Now, this may seem simplistic, and it is on the surface. However, after a very deep investigation of what people need, we're discovering that we're not all the same. Everybody has a different need. Everybody needs a different type of diet or different types of supplements or a different type of exercise or has different genetics that makes that person just a little different from somebody else.

Even though that's true, there are some basic things that we all have to get. Again they may be different for different people, but the basic categories are the same.

The first thing we need is food. The body is a biological organism; it's a living creature. There are basic rules of biology that we have to follow in order to function and thrive. This is true all across nature, and we're not exempt from these rules. If we don't follow these rules, the laws of nature, then we're going to become sick.

We need food that nourishes us, that tastes good, that we can savor and enjoy. We also need food that works with our biology. Now most of the food that we eat in our culture is highly processed, genetically engineered, and devoid of nutrients. In fact, the most common foods eaten by Americans — and this is from the United States Department of Agriculture statistics — is milk, processed cheese, white flour, white rolls, white sugar, Coca-Cola, and ground beef.

When you look at that list, there are very few nutrients — very few vitamins and minerals. In fact, our genetics are adapted to a totally different diet than we're eating now. We were adapted to a diet that was a wild diet. People say eat omega-3 fats, or fish oil. That's wild fat, but it's not just from fish. That's what our ancestors ate. They ate wild vegetables. Our ancestors ate organic, totally pure, unpolluted food. We don't eat that anymore. They ate wild food; they ate food that was all locally grown. They ate food that was full of phytonutrients, which are plant substances that help work with our biology.

There was a wonderful article in *Newsweek* called "Diet and Genes" about the science of our nutrition and genes. The article said that we've evolved in a way with food so that food works with our bodies. This can be called evolutionary symbiosis. It's food that works with our genes rather than against our genes. We want to use food that contains not just protein, fat, fiber, and carbohydrates, but we want food that contains all the plant chemicals we call phytonutrients. These are plant substances that work with the body to improve our gene function to create health, rather than foods which work with our gene function to create disease.

Let's talk about what some healthy foods can be. The basic components of food are proteins, fats, carbohydrates, and fiber.

### **Protein**

We want the right protein. If you eat animal protein, it has a different effect than vegetable protein. For example, if you eat meat, as in the study in the *Journal of the American Medical Association*, you may get more colon cancer than if your protein comes from beans or nuts or seeds. There's a whole different way of eating that uses proteins that work better with the body.

We certainly can eat animal food. Most of the animal food that we eat is usually raised commercially. It's full of hormones, antibiotics, and pesticides, and has much more saturated fat than wild animals. For example, even a cow that's been raised on grass has about 500 percent less saturated fat than a cow that's been raised in a feed lot.

The key is to eat animal proteins that are as wild as possible. Don't make animal protein a big part of your diet, but a smaller portion of your diet. Eat protein sources that have amino acids that are helpful in healing, for example, soy foods, beans, and nuts. These are all good sources of protein that are plant proteins.

### **Fat**

Most people think that fat is there just to hold up our pants. The reality is that fat is a critical part of our every cell. It creates the membrane of the surface of the baggie that holds in all the contents of our hundred trillion cells. If it's the wrong fat, we're going to have bad communication; we're going to create inflammation. We need to eat the right fats, which are basically olive oil, fish oils or omega-3 fats. They also come from flax seeds and walnuts. We need to eat oils that are helpful, which basically come from plant sources, as opposed to saturated fat, which is from animal fat, or trans- or hydrogenated fat, which is fake fat that's in most processed food. We need to be getting rid of the bad fats, trans fat and saturated fat, and eating more of the good fats like omega-3 fats and olive oil.

### **Carbohydrates**

We also need to look at carbohydrates. Now carbohydrates are getting a bad name. We need carbohydrates. They're basically the sugar that fuels our cells. Our cells run on glucose, which is from carbohydrates. The problem is how those get into our system. If you eat white flour and white sugar, which we call the white menace, you're going to end up with a very quick rise in your blood sugar. If your carbohydrates come from vegetables, beans, nuts, seeds, and fruits, the sugar is not going to rise so fast in your blood, and you're going to end up having a much better time with disease prevention than if you ate carbohydrates that raise your blood sugar quickly.

## **Fiber**

Last, you need fiber. It's also called roughage. Fiber is found in plants. If you're eating good quality plant-based food that's rich in fiber, you're going to be getting the fiber you need. The average American eats about 8 grams of fiber. We need about 50 grams of fiber, and our average hunter/gatherer ancestor got about 100 grams of fiber.

The reality is that we need to figure out how to eat a diet that supports our health and eat the foods that are nourishing and healing. We need foods that work with our biology rather than against our biology. The first thing we need to get that we might be missing is good food.

## **Vitamins**

The second thing we need to get are vitamins, minerals, and what we call accessory or conditionally essential nutrients. These are substances that are contained within food, for the most part. The problem is that we often eat food that doesn't have any of these. If we're eating all white flour and white sugar and processed food and canned vegetables, or vegetables that have been shipped across the country and been sitting in storage for months, we're getting very few vitamins and minerals.

Some of us have unique needs for higher levels of certain substances. We may need a lot of vitamin C, we may need more folic acid, and we may need more minerals like magnesium. It depends on our situation. We may need other special nutrients. We need to very carefully think about and test for what special vitamins and minerals we need.

## **And More Needs**

We need light. We all need sunlight. If we live in a dark room, we're going to have dysrhythmic living. Our cycles are dependent on light. Our biological rhythms, our circadian rhythms, our sleep cycle is governed by the input of sunlight. We need full-spectrum light. If you don't have that on a regular basis, your normal biological rhythms can't function. We also need clean water, which most of us are unfortunately not getting enough of. We need plenty of water so we're not dehydrated. Water keeps our cells functioning. We need clean air. If we're breathing air in a polluted city, we're going to have more asthma, more cancer, and more respiratory problems. We won't function at the rate that we should. We all need good air, water and light.

We also need love. Love is an essential ingredient that is sometimes hard to get but is a critical part of our health. In fact, a study on monkeys found that if they put a monkey in a cage with its mother and fed it a normal diet, and put another monkey in a cage by itself, even though it had the same diet, the same environment, except for the love, the monkey without the love didn't grow. It became shrunken, shriveled, sick, and it didn't thrive. None of us thrives without love.

A group of Italian immigrants moved to Rosetta PA. A study of this community showed remarkable findings. The Italians moved en masse and formed a community that was very tightly knit. They had all levels of economic status, but they were a very close community. They went to each other's birthdays, they went to each other's weddings, they celebrated together, they lived together, and they ate together. Although they adapted a lot of the American bad habits like smoking and fried food and McDonald's and hamburgers, they didn't get the same heart attack rates as everybody else. It was a real anomaly.

When the community broke down in the late '60s and '70s, researchers discovered that the community's death rates from heart attacks went up. They realized that the community — the love and support and connection — made a huge difference in whether they got sick, regardless of what they ate.

Another study showed that people who have more social networks and connections get fewer colds. Just having friends and having community can keep you healthy. If you belong to a bowling league, you're less likely to die than if you don't. If you're part of a church, you're less likely to die than if you don't. Community connection is a big part of thriving.

## SESSION 2: Medical Myths

As you learned in the previous session, we're embarking on a process of discovery of how the body works and how to create health and feel fabulous. In order to go into detail on how the body works and the new principles that form the future of medicine, we first have to look back and ask, What's wrong with medicine? Where does it break down? What are the myths that we've been following that get us into trouble? How do we get out of that kind of mythological thinking about how our body works and how medicine is organized?

### **Medical Myth #1: Doctor knows best.**

The first myth is your doctor knows best. You might say, "What are you talking about? My doctors are smart. They went to medical school. They've been highly trained. They're highly skilled. They're good people. They're trying to do the best they can." It's true. They are trained, they are skilled, and they do know what they're doing. The reality is that they've been trained to think in a way that doesn't necessarily follow the new discoveries in medicine. The educational system that we have, both in medical schools and post-graduate education or continuing medical education, is predominantly controlled and funded by the pharmaceutical industry. The system doesn't give doctors a new roadmap for understanding how the body works.

There are many obstacles facing physicians today. The new science of medicine and health is advancing so fast that it's very difficult for anybody to begin to take on a whole new way of thinking in his or her medical practice.

In fact, science changes very slowly. It often takes many decades for new discoveries to be implemented in medical practice.

Max Planck was a physicist who was very insightful about how scientific truths come into practice. He said, "A new scientific truth does not triumph by convincing its opponents and making them see the light. Rather, because its opponents eventually die and a new generation grows up that's familiar with it."

Doctors are treating all illnesses as if they were acute illnesses. Where were doctors trained? Doctors are trained in hospitals. Now who goes to hospitals? Sick people go to hospitals. In fact, these days, you have to be practically dying to get into a hospital. If you're still breathing after three days, they discharge you because they don't keep people in hospitals very long anymore.

When physicians are trained in that environment, they're extremely skilled at dealing with emergencies of acute illness, the end stage of most illnesses. They're not trained to deal with the early stage of illness, or they're not trained to deal with chronic illness. This global burden of chronic diseases is not being addressed by our medical schools and our residencies and our

training. Doctors are ill-equipped to deal with chronic illness. They're trying to treat chronic illness with acute-care medicine, and it's creating enormous harm.

If the only thing you have is a prescription pad, then everything needs to be treated with a medication. If all you have is a knife, everything needs to be treated with surgery. Now, drugs, radiation, and surgery are all necessary. They're all useful. They're all important at the right time for the right person for the right reason. But they're often applied to problems for which they're the worst solution. Drugs are not necessarily the right solution for chronic problems. This was brought out in some recent studies of our healthcare system.

When we ask the question, "Is the U.S. healthcare system the best in the world?" most of us would say yes. In fact, we spend \$5,000 a year for every person in this country on healthcare, \$1.6 trillion a year — that's trillion, not billion — or 14 percent of our gross national product. It's almost double the next country on the list. Yet, when you look at how we compare, it's pretty frightening. We are, out of 13 industrialized countries, 12th in 16 major health indicators: life expectancy, infant mortality, and so on. We're at the bottom of the barrel when it comes to how we stack up against other nations in the developed world in our healthcare. Yet, we spend far more than anybody else. We're not getting our money's worth. In fact, in life expectancy, we're 27th. Cuba is 28th. They don't spend \$5,000 a person. They spend \$186 a person, and most of that's on prevention.

*The Journal of the American Medical Association* conducted a meta-analysis — an analysis of other studies — to examining the impact of our healthcare system on our health. Was it or was it not helpful? What they found was that when you added up the number of deaths from our healthcare system, it exceeded every other known cause of death in this country. It exceeds heart disease, cancer, diabetes, Alzheimer's, and so on.

Our healthcare system has been estimated to be the number one cause of death in the country.

Let's go through the list.

- Hospital adverse drug reactions. These are drug reactions that happen in a hospital. They're not necessarily toxic overdoses, they're simply strange or atypical reactions that happen because of our widely varying genetics that make one drug helpful for some people but kill other people. This led to about 106,000 deaths a year. Or about \$12 billion in excess costs.
- Medical errors. A recent report found that 98,000 people die every year from medical errors, for a cost of \$2 billion.
- Bed sores, 115,000 deaths, which cost about \$55 billion to treat.
- Hospital infections. These kill 88,000 people a year, at the cost of \$5 billion.
- Malnutrition. Most people don't even think about it in hospitals and when they do, too often it's too late. That accounts for over 100,000 deaths.

- Outpatient drug reactions. Drug reactions to things that you get from your doctor's office account for almost 200,000 deaths a year, or \$77 billion in cost.
- Unnecessary procedures. This is when you don't need the procedure but you get it anyway, which counts for 37,000 deaths.
- Surgery related deaths: 32,000.

The total is 783,000 deaths and \$282 billion in excess cost. This is the result of applying a method of medicine that is good for dealing with acute problems to chronic illness that is predominantly lifestyle related. In fact, *The Journal of the American Medical Association* published an article about the actual causes of death in the United States. The actual causes of death were found to be smoking, 450,000, and obesity, 400,000. Obesity is overtaking smoking as a number one cause of death. Obesity comes from a poor diet and lack of exercise.

Smoking and obesity are preventable diseases that have their root in our lifestyle. The treatment isn't a medication; it's changing the way you live. It's living in harmony with your genes and not using foods and lifestyles that are working against you genetically.

Well, at least the quality of healthcare is good, right? Maybe we are applying an acute-care model to chronic illness, but at least the quality of the care that's delivered in conventional treatment is pretty good.

That's not the case. There are a certain number of indicators of quality healthcare. Of 439 indicators of good quality, in 30 chronic conditions, only 54% of the patients received the recommended care. This is not alternative medicine. This is not ultraprevention medicine, this is not integrative medicine, but this is just regular old medicine. Even the things that doctors all agree on are not necessarily being done, and the quality is less than it should be. This is partly because doctors are so pressured, have so little time, and are only able to deal with emergencies and they can't think about basic guidelines for good care.

If there are more doctors around, then that should be good, right? You have more doctors, you get better healthcare. The opposite is true. *The New England Journal* published an article about how more care isn't always better. In fact, in New York, they found that people spend about \$10,000 a year on healthcare, per person. In Oregon, it's about \$4,800 a year. In New York where there are more doctors and a higher-intensity practice pattern, this is associated with a lower-quality of care and worse outcomes than a more conservative practice pattern. If you want to know how many colonoscopies are done in a particular city, just count the number of gastroenterologists, and then you'll know. If you want to know how many hysterectomies are done in a particular city, ask how many gynecologists are there.

In America, 1 in 3 women have their uterus taken out. In Italy it's 1 in 18. We're not that genetically different. Something else is happening. Where there are more physicians, the practice of

medicine is often more invasive; it's more intense. There's more revenue generated, but it doesn't necessarily lead to a better quality of care.

Let's say we discover something in medicine. Are doctors applying what they know? The reality is, no. Most people know that if you have a heart attack, you're supposed to take aspirin for the rest of your life. Only 60 percent of patients got aspirin after they had a heart attack. Forty percent didn't.

This means that even conventionally accepted treatments, things that we all agree on or that are well-known, are often not applied. Even in conventional medicine, how less frequently are the things in this program being applied? How less frequently is nutrition being applied? We need to consider whether we are getting the best care for the problem that we have. There's a big gap between the science of medicine and the practice of medicine. We have to close that gap.

What about research? Most physicians say that there's no proof for alternative medicine or integrative medicine. First, there are a lot of studies out there that nobody's reading. There are between 6 million and 8 million studies at the National Library of Medicine. There are more than a million studies in the Office of Dietary Supplement database looking at nutritional supplements and herbs and health. There are a lot of studies on lifestyle that people are just not paying attention to.

Where the problem comes is that the types of studies that are getting published don't necessarily represent reality. This is due to two things. One is that the funding of studies is often through the pharmaceutical industry. In fact, a professor from Harvard said, "Look, I know that the prevention of heart disease and the treatment of heart disease should be through lifestyle changes, and that lifestyle change is much more effective than medications, and I can get \$150 million to study a medication. But I can't get \$5 to study changes in lifestyle." This is where the system breaks down. It's a financial, economic problem. Research is not being funded that's going to tell us what the best treatment is; it's going to tell us what the best drug is.

What happens is that the studies that get published are usually only the positive studies. When a drug company does research on a drug, they have to submit all the data to the Food and Drug Administration, but they don't have to publish it. If there's negative data, they hide it. They don't publish it. This gives a skewed view. If they don't publish the negative data, then when the doctor goes and reads all the research, it looks positive. It affects the conclusions of the trials.

In fact, a study showed that the treatment that was studied was the drug of choice 51% of the time. If the study was funded by a nonprofit, like the government, only 16% of the time was the drug the drug of choice. Recently, the major medical journals — *The New England Journal of Medicine*, *The Journal of the American Medical Association*, about 11 of the major journals — got together and decided not to publish any of the drug companies' research unless they post all the data online. We don't want a skewed perspective here. We don't want just what we call positive-publication bias, which means you only publish the studies that are positive. We want all the

data for people to look at. Most physicians don't know this. They think that everything is published about a drug.

The last reason that doctors don't know best is that doctors aren't happy. There are more doctors that are quitting medicine, that are going into business, that are shifting out of their practices, that are retiring, that are discouraging new medical students from going to medical school than ever before. Being a doctor used to be a wonderful thing, a noble thing. You were in charge of your own practice, you were able to make your own decisions, you could prescribe drugs, and nobody talked to you about what you did or didn't do. It was a much simpler system.

Medicine has changed. It pressures physicians. It makes them unhappy. It prevents them from keeping up with the literature because they're stuck in this cycle of patients and stress and discontent. There are a lot of challenges for physicians out there today, and that's preventing them from shifting over to this new conception of medicine that allows them to deal with chronic problems in an entirely new way.

Doctors want to do the right thing, but if they're using the wrong tools and have the wrong information, they may not be giving you the optimal treatment.

### Exercise 1: Does Your Doctor Know Best?

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In this exercise, describe a time when you assumed that your doctor "knew best" when he or she didn't. Perhaps your pediatrician wanted to run a test on your child, or your grandmother's physician wanted to prescribe a certain medication. Was there ever a time when you, or someone you know, deferred to the myth of "doctor knows best" when it turned out that the doctor was wrong? Describe that experience here:

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What did you do in that situation? Did you refuse the doctor's advice? Did you go along but regret it? What could you have done differently?

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**Medical Myth #2: If you have a diagnosis, you know what's wrong with you.**

Medical school is all about getting a physician trained to make the right diagnosis. There's nothing wrong with naming a disease; the problem is we confuse the name with the disease. We think the name *is* the disease. We think that asthma is the cause of asthma, or Alzheimer's is the cause of Alzheimer's, or hypertension is the cause of hypertension, or irritable bowel syndrome causes irritable bowel syndrome. That's not the cause; that's just the name of the problem. We want to treat the cause. We want to treat the reason that you got the diagnosis, not the name. Depression is not a Prozac deficiency. Menopause is not an estrogen deficiency. Hypertension is not a anti-hypertensive deficiency. These conditions require us to think in an entirely different way.

For most physicians, diagnosis is the last step. You make the diagnosis, boom, you're done; you know what drug to use, you know what treatment to use. It's all very well laid out. There's no real controversy when it comes to treatment. We have an agreed-upon set of rules that we use to treat problems once we make the diagnosis.

The problem is that you can have one disease and have 10 different causes. Or you can have one thing, one condition, or one factor that may cause 10 different diseases.

There are all kinds of problems that can be treated by simply removing the cause. The disease name doesn't tell us much about the cause, because it's often one condition that can show up in many different costumes, in many different ways. We have to think not in terms of the name of the problem, but the cause of the problem.

Now, let's take heart disease for example. We think heart disease is a disease of the heart. In reality, it's not. It's a disease of the immune system. It's a disease of your metabolism. It's related to inflammation. We've all been hearing that inflammation is at the root of heart disease. In fact, recently there was a study published in *The New England Journal of Medicine*, that turned this whole field on its head. We realized that inflammation is just as important if not more important than cholesterol. Everybody's trying to get rid of cholesterol, to lower cholesterol, to not eat cholesterol, but when they studied what happens when you lower inflammation, it was equal or more important than lowering cholesterol in preventing heart attacks.

There are many causes of the inflammation. In fact, one person with a heart attack may be eating too much sugar or white flour or white bread. He may have a problem we call insulin resistance or impaired metabolism, in which a person isn't processing his or her sugars properly. It's like pre-diabetes.

Another person might have a problem with a vitamin deficiency we call folate deficiency. He might have a problem with a vitamin that is necessary to protect the heart. If someone has a deficiency of folic acid, that person can't protect his or her arteries properly, and will show an increase in homocysteine levels in a blood test.

One person could have an impaired metabolism, somebody else can have malnutrition that's causing inflammation in the heart because of the lack of folic acid and too much homocysteine, and yet another person might have an infection that can cause inflammation, and that person may need antibiotics to treat that. Yet another person might have mercury toxicity and have heart disease from that. A study in *The New England Journal* showed that people who had higher levels of mercury had more heart attacks. There was another study in Italy in which people who had heart failure that wasn't from a known cause such as high blood pressure or infection were found to have 22,000 times the amount of mercury as somebody who had heart failure from a known cause like high blood pressure or a virus.

What about migraines? We have a lot of problems with migraine headaches in this country. It creates a lot of suffering, a lot of loss of work, a lot of disability, and yet, the treatments we use are either drugs that try to prevent migraines, often noneffectively, or drugs that try to stop migraines. We class all migraines pretty much the same. You have a migraine headache and that's the name of your problem. We give you the migraine drugs, and we give you the migraine treatment.

The problem is that migraines have many causes. They're just the name of a problem. For example, some migraines might be caused by diet. Migraines are often caused by allergies to gluten.

Another person might have a magnesium deficiency. Magnesium is the relaxation mineral. It's the mineral that helps our bodies relax in every way. It helps us sleep; it helps with all kinds of cramps and tightness and stress in our system. When we're under more stress, we lose more magnesium. We don't eat magnesium because it's found in beans and greens and things that are not typical parts of our American diet.

Even though two people have the same disease — migraines — the cause might be different. Maybe the migraine is caused by a hormonal problem. A lot of women get premenstrual migraines and that's because of an imbalance in their estrogen and progesterone. Women who take the pill may get more migraines. Women who take Premarin or estrogen can get more migraines. Estrogen can cause migraines when it's out of balance with progesterone. Getting the body back in balance helps to prevent migraines in these people.

As you can see, just because you have a diagnosis, you don't necessarily know what's wrong with you. Just because you have the name of a problem doesn't mean you know what to do to prevent it or cure it.

Ultraprevention and the science of staying healthy is about shifting out of the "blaming and naming" game into the "thinking and linking" game. This is when we begin thinking with the diagnosis and try to link that to every symptom a person has and all the issues that are connected and interwoven like a web.

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## Exercise Two: Name That Disease

What diseases have you been diagnosed with? Do you know the cause of the disease, or just the treatment?

Disease

Cause

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### Medical Myth #3: Drugs cure disease.

The third myth that we're going to talk about is drugs. Most of us think that drugs cure disease, but as we'll learn, that's often not the case. They simply help to relieve symptoms, which is not a bad thing, but certainly isn't where our goals should be. It should be to get to the root of the problem and treat the disease from its roots instead of simply covering over the symptoms.

Hippocrates was the father of modern medicine, and doctors in medical school take the Hippocratic oath when they graduate. He was quite a brilliant man, and he advised us many years ago to, "Leave your potions in the chemist's crucible if you can heal your patient with food." We can use food as medicine.

Food is the best drug because it works with the body, rather than against the body.

Recent studies showed that 81 percent of the population has taken at least one medication in the average week. Of people over 65, 12 percent took at least 10 medications, and 23 percent took at least 5 medications. Almost a quarter of 65-year-olds and older are taking at least five medications.

This is scary. In fact, we've never studied these combinations and concoctions of drugs before. We study one drug at a time and one particular problem. We've never added these all together.

A study a number of years ago found that 40 million Americans spent over \$2 billion in 1994 on anti-inflammatory medications. Which is fine, but it led to 107,000 admissions to the hospital and 16,500 deaths, which is as many people as die from cancer or asthma or AIDS. Now, 80 percent of those people had no symptoms. It's not like you get a stomach ache and have intestinal bleeding and go to the emergency room. We're in a situation where people were taking medications for inflammation leading to a lot of deaths, a lot of hospital admissions, without any symptoms.

Vioxx is an anti-inflammatory medication that was pulled off the market. Vioxx was developed to deal with the problem of bleeding. It did the opposite. It causes heart attacks and strokes. If we were to stop to think about what it does and how it works in the body, we would have known that it leads to clotting because it blocks the enzyme helps thin your blood. If you block the enzyme that thins your blood, you're going to clot.

### **“Pro” drugs versus “Anti” drugs**

We want to use things that help enhance and support the body's function rather than interfere with the body's healing system.

“Anti” drugs include anti-inflammatories, antibiotics, antihypertensives, antidepressants, beta blockers, calcium channel blockers, ace inhibitors, and serotonin reuptake inhibitors. We're blocking, inhibiting, and anti-ing everything. We're basically trying to stop something that's going on in the body as opposed to helping the body heal itself.

Most of the therapies we need to use to treat disease are “pro” drugs, “pro” substances. There was a fascinating study called the inter-heart study that looked at 30,000 people and their risk factors for heart disease. They found 8 of the 9 risk factors for heart disease are all influenced by diet. Dietary factors account for over 90 percent of all heart attacks and heart disease. The one non-dietary factor was smoking. What that tells us is that we are not addressing the problem if we use medications. Using drugs to treat or prevent heart disease is not necessarily supporting the body to normalize its function.

The study said that abnormal cholesterol, smoking, high blood pressure, diabetes, abdominal obesity, which is belly fat, psychosocial factors, namely stress, not enough consumption of fruits and vegetables and too much alcohol and lack of regular physical activity account for most of the risk for heart attacks worldwide in both sexes at all ages in all regions.

What this means is that we have the potential to prevent most cases of premature heart attacks. It's not drugs that are the answer. Drugs are not going to cure heart disease. It's going to come from lifestyle change, from changes in diet, and using things that support our body's functions. Diet, exercise, dealing with stress, supplements, nutritional supports, and even herbal medicine.

Everybody now thinks that we should be taking statins or cholesterol-lowering drugs to lower our cholesterol to prevent heart disease. These drugs are certainly a great advance in medicine, but they're not a panacea. They're not the magic bullet. They're not the cure-all for heart disease. In fact, they aren't as good as lifestyle treatments or as effective as a well-executed, comprehensive lifestyle plan.

A recent study by Dr. Jenkins from the University of Toronto found that comparing a diet change to cholesterol medication showed no difference. They were equally effective in lowering cholesterol. The diet had better results in lowering inflammation and lowering homocysteine, which is related to folic acid and malnutrition.

We've also heard of other pro substances, like glucosamine. Glucosamine used to be a supplement that was thought to be in the fringe of alternative medicine. Now glucosamine is used by regular rheumatologists and internists treating arthritis. It's one of the first things they try because it's very effective. Studies have shown that glucosamine is very effective for treating osteoarthritis or joint pain.

However, even though your symptoms may be relieved by a particular drug, the disease itself may be progressing at the same rate, or even at a faster rate, because you're not limited by pain anymore. Your joints, for example, can continue to be destroyed by activity that may not be ideal for you to be doing.

Researchers gave people glucosamine to compare it to an anti-inflammatory drug. They looked at both groups of people's joints through special X-rays. They found that with regular anti-inflammatory treatment, the joints got worse. There was a destruction of the joints. With glucosamine, the joints got better. There was an improvement in the joint, the cartilage got thicker, and this went along with the reduction in symptoms and feeling better. Glucosamine is a pro drug.

What is glucosamine? It's basically shellfish cartilage that's put in pills. It's basically the raw materials for building new cartilage in our joints, as opposed to a drug which blocks the pain but doesn't do anything to help repair and heal the joint function. This is an example of a pro drug as opposed to an anti-drug.

The reality is that supportive therapies are often more effective than conventional medications. Take diabetes, for example. A high-fiber diet is as effective in lowering blood sugar in diabetics as some of the conventional medication. Eating a diet that's full of fiber will lower your blood sugar as much as taking a drug, with a lot fewer side effects.

There was another recent study that found that eating a Mediterranean diet, which is a diet that's full of plant foods, olive oil, nuts, seeds, vegetables, fruits, beans, and fish, helps reduce inflammation and insulin resistance more than a regular diet.

We have to recognize that drugs themselves don't cure disease. They may help symptoms, they're there if we need them in an emergency, they can be life-saving sometimes. We shouldn't rely on them for chronic illness that doesn't have its root in a drug deficiency. Heart disease, cancer, diabetes, arthritis, osteoporosis, and Alzheimer's are not deficiencies of particular drugs. They're related to imbalances in the system that have to be addressed. If we don't address those, we can't correct the problem.

### Exercise Three: What Drugs Are You Taking?

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What medications have you taken in the last week? Include both prescription and nonprescription:

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Have you been thinking that these drugs are curing the disease? What are your thoughts now?

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### **Medical Myth #4: Genes determine fate.**

Most of you probably think that your genes determine your fate. What you got from your parents is what you're stuck with. You probably believe that there's nothing you can do about your genetic risks and if your father had a heart attack in his 50s, your mother had Alzheimer's in her 60s, your grandfather got diabetes, your sister got breast cancer, then you're stuck. You hope that you don't get what they got. But it's a roll of the dice, and there's nothing you can do about it.

The reality is much different. In fact, most of the genes you have don't code for traits, they code for function. We can't change our sex, we can't change the color of our hair, we can't change the color of our eyes, and we can't change whether we're 6'6" or 5'2". Those are physical characteristics that have a very fixed and immutable character.

Most of the genes we have are not coding for those fixed characteristics. Most of the genes we have are coding for our function every minute, for our biochemistry and biology.

We're in an era of genomics. We're in an era of understanding that we are predisposed to certain problems; we are predisposed to certain disease. We're not determined and fated to have those problems. The problem is mostly that we inherit our parents' habits as well as their genes. We inherit their lifestyle, their way of living, their way of thinking, which leads often to the same conditions.

We can change the way our genes are expressed. We can change which genes are turned on or off. We can turn up the volume on different genes. We can turn down the volume on different genes, which affects the aging process, which affects the disease process. This is where medicine is taking a huge about-face and is looking at genetics in an entirely different way.

We are in an era when we can influence the expression of our genes through our lifestyle, through diet, and that's what the cover of *Newsweek* was about, Diet and Genes:

How does food affect your genes? Our DNA is made up of a code of four letters. It's like a computer. The "1" and the "0" is the basis of all the computer programs. Our genetic code is made of four letters, so it has much more complexity. We have about 30,000 genes, which is not much different from an earthworm. So why do we have a different function and destiny than an earthworm? Because we have about a million and a half variations on those genes. We have an enormous complexity to our biological system that is unexplored. In the last 30 years we've discovered that our genes can be affected by the environment in a way that we never thought was possible before.

DNA is responsible for turning amino acids into proteins. That is all it does. It reads a code and it produces proteins from the amino acids that are the basic building blocks of protein in your diet. DNA creates structural proteins that build your body; it creates enzymes, it creates neurochemicals, messenger molecules, all kinds of things. DNA is the master control of everything that happens, from moment to moment, in your body.

Everything you do, everything you eat, everything you think, everything you feel from moment to moment is washing over your DNA and is causing an expression of genes that creates health or an expression of genes that creates disease. You have that very much under your control.

*The New England Journal of Medicine* printed a fascinating study of 44,000 twin pairs from the Swedish twin registry. The 44,000 sets of twins — 88,000 people — were analyzed to discover if genes or environment played a bigger role in cancer. What they found is that inherited genetic factors make up only a minor contribution to the susceptibility to most types of cancers. Environment has the principal role in causing cancer, not genes. Ninety-five percent of the cancers found in these twin pairs were not linked genetically.

**Environment has the principal role in causing cancer.**

This means that we have to think differently about the causation of disease. We can't say that it's just in our genes, or that it's fate. What you eat turns on or off different genes. If you, for example, eat broccoli or Brussels sprouts, it helps increase the activity of a gene that makes you detoxify better. In China they collected the urine of thousands of people, and they found that people who had high levels of broccoli in their urine had much lower rates of cancer. Broccoli increases an enzyme called glutathione S-transferase. We've evolved with this enzyme in our diet, we're used to it, and it helps our bodies work better. Broccoli improves the function of our bodies, improves the function of our biochemistry, and increases the activity of an enzyme that helps us get rid of toxins. It helps us detoxify. Food can very directly affect gene expression.

The problem is that for most of us, we're like polar bears living in the desert. You know, a polar bear is supposed to live in the Arctic. A polar bear in the desert isn't going to last very long. This is exactly what happened to the Pima Indians from Arizona. They lived for thousands of years in a very arid climate in the desert. If you've been down to Tucson, you'll know it's very dry; there's not much going on. Yet these Indians lived there. They thrived. They didn't eat very much; they didn't drink very much, they were very active, just going on trying to find food. They were well adapted to scarcity.

Most of us are pretty well adapted to scarcity because throughout our evolution we haven't had to deal with excess or abundance. We were hunters and gatherers. We foraged. Now most of us forage in our refrigerators. Before, it was a little harder work trying to get some food. The Pima Indians were well adapted to this scarcity environment.

Then suddenly we showed up in the '50s, and we provided them, very thoughtfully, with what we call the white menace, which is white flour, white sugar, and white fat — otherwise known as Crisco, or shortening.

After we came along, the Pima Indians from Arizona ate foods that were different from what they were adapted to. The expression of their genes totally changed. Within a short time, in a generation, they went from being healthy and fit and completely free of heart disease, diabetes, or obesity, to being the second most obese population in the world after the Samoans. Their life expectancy is 46. Thirty percent get adult-onset diabetes by the time they're 30. In fact, many of them get adult onset diabetes when they're children. We used to call it adult-onset diabetes. Now we call it Type II diabetes because little children are getting it. These Pima Indians were once extremely well adapted to a different environment, and their genes were too.

Compare this to the Pima Indians in Mexico. They are very different from their neighbors in Arizona. They're thin, they're fit, there's no obesity, heart disease, or diabetes because they eat a very different diet. The traditional Pima diet of whole grains, squash, melons, legumes, beans, and chiles is supplemented by gathered foods including mesquite, acorns, cacti, chia, herbs and fish. It is a diet of whole, unrefined, unprocessed foods. It's actually high in carbohydrates, but of the good type that are filled with slow-release soluble fibers, tannins, vitamins and minerals, dense with phytochemical nutrients and anti-oxidants, and low in energy density.

Our genes don't determine our fate. We can have a huge impact on our genes with the choices we make every day: by the type of food we eat, whether it's food we're adapted to or not, whether we're eating the right vitamins and minerals or not, whether we're exercising — which is what our bodies are adapted to — whether we're dealing with huge amounts of stress or not.

There is a wonderful book called *Why Zebras Don't Get Ulcers*, by Robert Sapolsky, who is a professor at Stanford. He said that zebras don't get ulcers because their stress is very short-lived. They're chewing their grass; they're eating away, and then all of a sudden the lion comes and they all take off and run. Then one of the zebras gets caught, the lion's eating, everybody stops running, and the zebras go back to eating their grass. They have an acute stress; they run and then they stop. The problem with us is we are stressed all the time, and we don't stop. We just keep going and running and running and running, and our bodies don't have a time to rest and repair and heal.

Stress causes genes to be increased that lead to inflammation, that affect your metabolism, that cause you to be more malnourished, that affect your weight. Many diseases are caused by or exacerbated by the effects of stress.

### Exercise Four: What Are Your Genes?

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In this exercise, list all the diseases you are genetically predisposed to. What did your parents have? Grandparents? Brothers, sisters, aunts, uncles, cousins? Are there certain diseases or conditions that run in your family?

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What lifestyle factors are also consistent in your family? Does everyone in the family eat a high-fat diet? Does grandma have a special fried-chicken recipe? Are there a lot of smokers? Is it a family tradition to sit and watch sports rather than playing sports? What factors other than genetics might be causing the diseases you listed above?

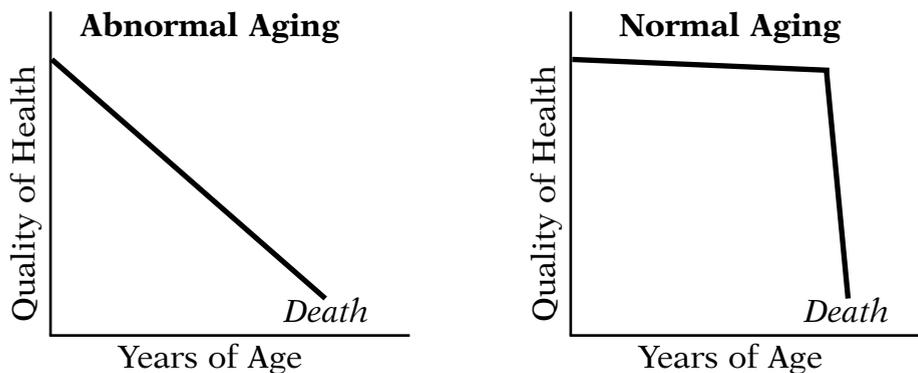
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## SESSION 3

### Medical Myth #5: Getting older means aging.

Most of us think that getting older means aging, or at least aging in the way we commonly see it in our society. Aging is having less function, becoming forgetful, incontinent, tired, not being able to tie your shoes anymore or cut your toenails. This is a misconception. Most of the aging we see in this country is abnormal aging. It's not normal aging. It's the result of the five forces of illness becoming active and causing breakdown long before it's necessary.

Many people can achieve a life span that is equal to their health span. What we're talking about is creating a period of your life in which you're healthy right up into the time you die. We call this the rectangularization of the survival curve. In other words, unless, rather than going slowly downhill for the last 20 or 30 years of your life, you go full steam right to the end, and then, boom, it's over.



James Fries from Stanford has written study after study on this subject. He said that if people exercised, stayed their ideal weight, and didn't smoke, they would live longer. Not only would they live longer, but they wouldn't be sick when they're older.

This is something that is achievable for most of us. Again, lifestyle determines the aging process. A lot of the things that we think of in terms of the aging process are not the results of sub-clinical disease, but, in truth, they are the five forces of illness being active. It's not surprising that we think that getting older is unattractive because when we look around, 85 percent of people over 65 have one or more degenerative illnesses.

Heart disease, diabetes, cancer, arthritis, osteoporosis, and high blood pressure are common things that result from the process of aging, but are not a direct result of aging. They're results

of abnormal aging. Now that we understand the process of aging, we can do something about it. There are many things that we can do to help correct these imbalances.

As we get older we lose resiliency. We lose our metabolic complexity. We lose the ability to bounce back from stresses and illnesses. When you're a little kid and you get a cold or the flu, boom, you're right back to playing in the playground in a few days. If you're 80 years old, it'll knock you down for three months. If you stay in bed with an illness for a week when you're young, you can recover pretty quickly. When you're older, you lose a lot of muscle very quickly. You can't function as you once did.

Dr. Bruce Ames from the University of California at Berkeley has studied diet and cancer, and now he's studying aging. He took a bunch of old rats that were just lying around the cage. They didn't like to get up in the treadmill anymore. They couldn't find the cheese in the maze. They couldn't remember where things were anymore. They couldn't swim very far and got tired easily. These are things we probably are familiar with as we're getting older.

Dr. Ames hypothesized that it wasn't just because they were older, it's because there was some metabolic problem and that their reserve was gone. They were less resilient and had less reserve, or what we call organ reserve.

He wondered if he gave a few little ingredients to these rats, would they act younger? In fact, that's exactly what happened. He gave them something called carnitine. Carnitine is an amino acid that helps transport fat into the part of the cell that makes energy, called the mitochondria. (We'll talk about this later.) Mitochondria require fats, as well as other things, to produce energy. If the fat can't get into the mitochondria because there's not enough carnitine, the cell may not be able to produce enough energy, hence the rats do not want to get on the treadmill, do not find the cheese, do not remembering things, and cannot swim very far.

He also gave the old rats something called lipoic acid, or alpha-lipoic acid. These are supplements you can buy in a health food store or at [www.drhyman.com](http://www.drhyman.com). These compounds are part of normal human biology. As we get older, our needs for these particular ingredients increase. It's not exactly a vitamin. It's a conditionally essential nutrient. It's only essential under certain conditions. We may need more vitamins as we get older. We don't absorb things as well; our digestion might not work as well. We need extra support.

Dr. Ames gave these two nutrients to the rats. Overnight, the old rats suddenly became like young rats. They jumped up on their treadmill, they started running by themselves, they could find the cheese faster, and they could swim further. He discovered that it's possible to give people a metabolic tune-up, to tune up these basic biological functions that seem to degrade with age.

One of the exciting things about aging research now is that we've discovered one thing that can extend your lifespan dramatically. There are thousands of starving rats in laboratories around

the world proving that by restricting your calorie intake, you can extend your lifespan. If you cut your calories by a third, you can live a third longer. Of course, you're going to be cranky and irritable and in a bad mood all the time, so that's not exactly the strategy that you should use. But what this data tells us is that there are certain things that get turned on or off depending on how much food you're eating, and that food relates to aging.

### **Rusting Inside and Out**

Oxidative stress, or rusting is the root cause of all age-related disease. This form of stress is the end result of all the insults on your system over years. We normally see this stress as wrinkles on the skin. This type of rusting comes from the radiation of the sun. If you look at a woman, for example, who's never been in the sun her whole life and another woman who's a sun-worshiper, and they're both 70 years old, one's going to look pretty good, and the other's going to be pretty wrinkled. This has a lot to do with the rusting process.

We don't just rust on the outside and get wrinkles, we also rust on the inside, and that's oxidative stress. It's common to almost all age-related diseases. When we rust in the brain, we get Alzheimer's. When we rust in the joints, we get arthritis. If we rust in the heart, we get heart disease. If we rust in our cells, we get cancer. Oxidative stress produces this rusting process, and it's common in aging.

When we eat a lot of calories, we produce a lot of rust. This is because we run the food we eat and the oxygen we breathe through the little factories in our cells that produce energy. These factories are called mitochondria. Mitochondria produce the energy that runs our body. As a byproduct, mitochondria also produce the carbon dioxide that we breathe out and the water that comes out as urine. Another byproduct is free radicals.

The more you eat, the more rust you make. If you're not eating in a way that's protecting you by eating fruits and vegetables that are very rich in antioxidants, then you are increasing the rusting in your body and the aging.

If we look at the research on diet restriction, it teaches us that we have to protect our mitochondria from the rusting. We can do that in many ways. We can do that by increasing the levels of these antioxidant nutrients inside the cells, like the carnitine and lipoic acid. We can eat less food but not necessarily restrict our calories. Most people eat too many calories and not enough nutrients. These excessive calories get burned and, as part of the burning process, they produce this rusting that leads to aging.

A recent large study in Europe looked at people who were 70 to 90 years old. These elderly people were able to reduce deaths by 70 percent by simply improving their diets, by eating a Mediterranean diet of fish, nuts, seeds, beans, vegetables, whole grains, fruits, and olive oil. Not a low-fat diet, not a low-carb diet, but a diet that's rich in real food.

**If it has a label, you probably shouldn't eat it.**

The foods that they were eating in this study were very simple, basic, healthy, Mediterranean foods, foods rich in omega-3 fats, fiber, and fresh fruits and vegetables. The study group also exercised by walking half an hour a day.

This 70 percent reduction in the death rate of the 70 to 90 year olds is pretty dramatic. If you apply that to a younger population, it's likely that you'll have an even greater reduction in suffering and death.

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**Change the Aging Process**

1. Achieve balance in your life.
  2. Eat a diet that supports your health rather than robs your health.
  3. Get some physical activity every day.
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**Exercise One:**

What are three things you will do today to begin to change the aging process? List what you will do and what time you will do it today:

Activity	Time
1. _____	_____
2. _____	_____
3. _____	_____

One study showed that simple walking reduced the risk of dementia and improved brain function in older men and women. All you have to do is go out and take a walk and your risk is dramatically reduced.

How inevitable are diseases of aging like dementia or heart disease? They're not inevitable. In the Alzheimer's area, we're learning that this is not something that happens willy-nilly, by accident, or because of genetics. There are a number of interlocking, competing forces that either rob your health or give you health. If you understand how to provide support for your brain function and take away the things that are hurting your brain, then your brain can age well.

The problem with a lot of the drugs we have for Alzheimer's is that they simply just extend the time before you enter a nursing home. They don't stop the disease. They don't cure anything.

They also have a lot of side effects, and they're not dealing with the irritants that are injuring the brain.

### **Sarcopenia**

As we age we lose muscle. It's a problem that affects almost everybody in this country. Physicians call it sarcopenia, which means muscle loss. *Sarco* is "muscle"; *penia* means "loss." We have loss of muscle. The word sarcopenia comes from the Greek "poverty of the flesh."

We lose about 10 ounces of muscle a year after age 40. That's about the size of a 10-ounce steak. We lose that amount of muscle every year. Muscle is what creates energy for us. It's what burns calories. It's what makes us be able to get up out of a chair, tie our shoes, etc. The reason most people end up in nursing homes is because they can't function. It's not necessarily because they have a particular disease.

Every disease is accelerated by this loss of muscle. It creates problems with your metabolism. It creates problems with your function in life. It creates more inflammation, it creates more oxidative stress, and it shifts your hormones into an altered state that contributes to rapid aging.

### **Everything that's going wrong in your body can be reversed by building more muscle.**

One of the key things we do wrong in our society is we sit. We don't exercise. We sit at the computer, we sit at work, we sit and watch television. We sit around watching the football game instead of playing football.

You need to exercise. You need to function and use your body the way it was designed. If you don't use your body the way it was designed, it's not going to work for you. It's that simple. If you abuse it, and you don't nourish your body and don't treat it as if it's something that was a gift, it's going to break down. It's that simple.

### **Exercise Two: Muscle Memory**

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Have you noticed any changes in your strength? Are you more or less physically fit than when you were younger? Describe your level of muscular strength now, as compared with your past:

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Do you know any older person who has become weak and frail as he or she aged? What was this person once like? What could the person have done differently as he or she aged?

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Think of someone you know personally or someone in the media who is a role model for healthy aging. What is this person's lifestyle like? What kinds of foods does this person eat? What kinds of exercise does he or she engage in? Write down whom you admire and what this person does to stay healthy:

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What we want to do is to compress morbidity. We want to shut down the years of disability and suffering into the very end of our life — maybe the last hour of our life. We want to add life to our years, not just years to our life. We want to bring energy into our world. We want to create vitality and wellness.

Aging is a physical phenomenon, but it's greatly influenced by our minds. One study that was performed a number of years ago on a group of Indians in Mexico called the Tarahumara Indians illustrates this. The belief in that society was that as you got older, you got to be a faster runner. This society was up in the mountains, and in order to go from village to village, they had to run. They were always running, and being a runner was part of the society. They believed that the 20-year-olds were good, the 40-year-olds were better, and the 60-year-olds were the best of all. This is contrary to our conventional belief in this country, which is that as you get older, you get to be a worse athlete.

A whole team of researchers went to Mexico and hooked up the Tarahumara Indians to many different contraptions that measured their respiratory rate, heart rate, fitness level, and metabolism. The researchers were shocked because they found that the Tarahumara Indians who were 20 were in great shape; the 40-year-olds were better. The best of all, physiologically, were the 60-

year-olds. How could that be? This proves that, number one, we have the capacity to stay healthy that long and be highly functional, but number two, that our beliefs and our attitudes play a huge role.

Ellen Langer from Harvard did a study in which she took a group of 75-year-old men into a sequestered camp for two weeks. She told them to pretend that they were 20 years younger. They put up pictures of Eisenhower and laid out newspapers from 20 or 30 years ago. She had them pretend to be younger.

After the two weeks was up, they did a series of measurements, like finger length, visual acuity, and hearing tests, as well as having people look at before-and-after pictures of the 75-year-old men and judge their ages. These physiologic measurements all improved. Even people who didn't know the men said they looked younger simply by believing they were younger. A lot of what happens to us is the result of our beliefs and attitudes.

### **Myth #6: Fat is bad.**

Most of us have spent our lives trying to avoid fat: eat less fat, have less fat on our bodies, get rid of fat. We have an aversion to the whole concept of fat. Even though most of us like to eat it, we're still trying to get rid of it. The reality is that fat is not just there to hold up your pants. It's critical. It's a vital, essential nutrient. Most of us are deficient in fat.

We're deficient in the omega-3 essential fatty acids that come from wild food, like wild fish and wild animals. We don't eat much wild food anymore. Wild fat is critical because it forms part of every cell; it forms the nerve coverings; it's what your brain is made up of. Sixty percent of our brain is fat.

The myths around fat are rampant. The myth is that if we eat more fat, we're going to get heart disease. The myth is that if we eat more fat, we're going to get fat. If we eat more fat, we're going to have all kinds of diseases.

### **Eating fat does not make you fat.**

One of the world's greatest researchers in nutrition from the Harvard School of Public Health, named Walter Willett, looked at all the research on dietary fat and how that relates to being overweight. He found that dietary fat was not a major determinant of body fat. This was published in the *American Journal of Medicine*. It's a brilliant review. He debunks the myth that fat is the cause of being fat.

There was a study that was done comparing the effect of different foods on your cholesterol. Obviously butter and shortening were not good, and certain oils, especially olive oil, were better. The study looked at the ratio of good to bad cholesterol. They looked at total cholesterol divided by the HDL, or the good cholesterol. You can remember which cholesterol is which by thinking that H stands for happy, so it's good cholesterol, and L, or LDL, stands for lousy, or the bad cho-

lesterol. If you take the total amount of cholesterol and you divide it by the HDL, that is probably the best cholesterol predictor for your risk of heart attacks.

It's important to understand how different foods affect cholesterol. Oils like olive oil are helpful because they reduce that ratio, whereas foods like shortening, butter, and margarine increase that ratio. The worst, by far, are carbohydrates. Specifically, refined carbohydrates like white flour and white sugar. If you're eating 150 pounds of sugar per year — like the average American — this is the major determinant of bad cholesterol, not the fat in our diet. And not only are carbohydrates in general bad, but certain carbohydrates are worse.

When we drink a lot of sodas, when we eat a lot of foods that are high in fructose and high-fructose corn syrup, we end up getting pre-diabetes, diabetes, and high blood pressure. We increase inflammation and our cholesterol numbers. It's not fat that's the problem.

A large study of over 117,000 people found that eating an egg a day had no impact on your risk of heart attack. Another study found that people who ate more nuts and nut butters dramatically reduced the risk of getting diabetes. Many people think, "Nuts are full of fat. They're fattening. I'm not going to eat nuts." So what do they eat? Pretzels. Or crackers, that are just white flour refined and put in different forms. If they eat nuts, their risk of heart attack goes down and their weight goes down. Another study found that people who ate almonds at an equivalent calorie level to refined carbohydrates lost more weight.

The fats don't do what we were expecting they'd do, which is make us fat. They don't raise cholesterol, and they don't lead to heart disease. They don't lead to diabetes. It's the opposite. Eating a low-fat diet can kill you.

In another study, Dr. Willett found that replacing saturated fat from animal fat, and trans fat — which is processed fat that comes from margarine and shortening — with olive oil, mono-unsaturated fat, and the omega-3 fats, was more effective in preventing heart disease than reducing the overall total fat intake. The problem is that this information is not getting down to the people. It's not getting to the government for policy change. It's not getting into the practices of physicians.

### Exercise Three: Fat Fallacies

What is your attitude toward dietary fat? Did you think that eating fat caused you to be fat? Describe your thoughts about dietary fat:

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What foods have you been avoiding because you thought they were bad for you? What foods can you re-integrate into your diet with the knowledge that eating good fat improves your health?

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### **Myth #7: You can get all the vitamins you need from food.**

Why would we need vitamins? Our ancestors certainly never took vitamins. There weren't vitamin shops and health food stores all over selling vitamins. You weren't seeing people on the Home Shopping Network selling vitamins. Why do we need vitamins? If we eat a good diet, why should we have to take vitamins?

If you eat a diet that's completely wild food, you eat only plants that come from the wild. You eat only animals that come from the wild. You drink completely clean water that has no pollutants. You breathe completely clean air. You have absolutely no stress and live a relaxed life. You exercise probably 15 hours a week. You eat about 100 grams of fiber a day. If you do this, then you probably don't need any vitamins. Most of us do need vitamins, and as we age, we need even more.

The Lewin Group was commissioned by Wyeth-Ayerst Consumer Group to study the role of vitamins in health. They found that by simply having people who are in the Medicare age group, over 65, take a multivitamin, Medicare could save \$4 billion in healthcare costs. This would be offset somewhat by the cost of the vitamins, but the actual reduction in healthcare expenditures

would be almost \$4 billion from reduction in colds and infections and in heart disease. It's very important economically to be able to nourish ourselves.

If you have a vitamin deficiency, then you're very sick. But this masks the bigger issue of long-latency deficiency diseases. These are diseases that don't occur overnight. We need to understand that if you have sub-optimal levels of nutrients, you can become sick and it may take decades before it develops. These are long-latency deficiency diseases.

Dr. Robert Heaney has been researching calcium and vitamin D for over 30 years. In a recent paper he brilliantly challenged the current vitamin recommendations. He postulated that the current recommendations, because they are based on the vitamin levels necessary to prevent deficiency diseases, are no longer biologically defensible. In other words, the government's recommended daily allowance is based only on the amount of vitamins you need to prevent a deficiency disease. How much vitamin C do you need to prevent scurvy? Not very much, just 60 milligrams. How much vitamin D do you need to prevent rickets? Not very much either. But the amount of vitamin D you need to prevent rickets may be much less than you need to create optimal health.

The need for nutrients has different roles. You might need a certain amount to prevent deficiency, you might need another amount to create optimal health, and you might need an even higher amount if you're using it therapeutically to treat a disease.

Dr. Heaney went on to say that the pre-agricultural human diet may well be a better starting point for policy. Rather than creating policy based on how to prevent deficiency diseases, the policy should be based on what should be our optimal intake, not our minimal intake. In addition, Dr. Heaney said that the burden of proof should fall on those who say that lower intakes are safe. He's saying that the recommended dietary allowance may not be the safe level at all.

Another review of 30 years of research in *The Journal of the American Medical Association* concluded that the inadequate intake of several vitamins has been linked to chronic diseases, including coronary heart disease, cancer, and osteoporosis.

It's not just a matter of taking the minimal amount of vitamins necessary to prevent deficiency. You might get that from a regular multivitamin you get in the drug store. But because of all the stresses and toxins and poor diet, some of us need a lot more vitamins to prevent these chronic diseases of aging.

One study found that simply providing folic acid and B<sub>12</sub> could save 440,000 people and \$2 billion in healthcare costs over 10 years by preventing heart attacks. Other studies have shown the same results with lung cancer. Smokers have atypical cells inside their lungs, and physicians can scoop them out with a bronchoscope — a little instrument that goes in the lungs and will gather a sample of the cells, like a pap test for your lungs. By giving very high doses, like 5 mil-

ligrams of folic acid and B<sub>12</sub>, they could *reverse*, not just prevent, but reverse these atypical changes that created precancerous cells.

Folic acid is a critical part of all kinds of biological steps that happen millions of times every minute. If you don't have enough folic acid, you can't repair your DNA. You end up with DNA damage; hence, cancer. By providing the basic raw materials for our life, by providing the basic nutrients that we need in order to thrive, we can not only prevent disease, but often treat illness.

The study of genetics has given us a whole new view on nutrition and vitamins. This field is called nutrigenomics, which describes the effect of nutrition on our genes. Dr. Bruce Ames discovered that by using certain nutrients in high doses, you can increase the activity of certain genes that will create health and decrease the activity of the genes that will create illness. This is revolutionary. He said that 50 human genetic diseases have been identified so far that are due to defective enzymes. Genes are involved in making enzymes.

He said these can be remediated or ameliorated by the administration of high doses of the vitamin component of the corresponding enzyme. If you have a particular weak enzyme, let's say one that requires folic acid, and you don't have enough folic acid, you're going to have problems. If you don't have enough folic acid and you have a weak enzyme, you're going to get heart disease and Alzheimer's and cancer. In Alzheimer's disease, if you have a low folic acid level or a high homocysteine, you have double the risk of getting Alzheimer's. There's a reason for that, it's genetic. You may have an increased risk and a unique need for something.

This is where individualized medicine comes in. We all require something individual. What's the right dose for one person is the wrong dose for another person.

The future of medicine is going to allow us to take a drop of blood, put it on a microchip, stick it in a machine, and read out your genetic code in such a way it will tell you what to eat, what vitamins you need, in what doses, what things to avoid, what things that you're sensitive to, what things that will make you toxic. It'll give us an instruction book.

Now we have to be careful because there are certain vitamins that can be toxic. If you take extra vitamin A, D, or K, these fat-soluble vitamins can have a toxic effect.

If you're doing higher-dose nutritional therapy, you should be working with a practitioner who can help guide you.

There are people dying from taking Tylenol and Advil every year. In fact, Tylenol is the number one cause of liver failure in this country. This is not because it's a bad drug, but because it depletes one of the key antioxidants in the liver. If you take Tylenol chronically, you'll deplete these antioxidants, and then if something happens, let's say you go out on a Friday night and drink too many beers, your liver gets overloaded. We have to be very careful with all medications, and we have to be careful of vitamins.

We need vitamins because they're part of the essential metabolic functioning of our body. Vitamins can be likened to the oil in your engine. You've got the gasoline, which is the main fuel, and then you've got the oil, which lubricates everything and keeps your metabolic engine going. In our bodies, food is the gasoline and vitamins are the oil. They lubricate the wheels of our metabolic engine. If we don't have the vitamins, we can't maintain a high level of function. We can't create enzymes and run biochemical processes at full speed.

Dr. Ames talks about this concept of a metabolic tune-up. It's not necessarily treating disease, it's creating metabolic harmony; it's preventing illness. He says that an optimum intake of micro-nutrients, which means vitamins and metabolites, which varies with age and genetic constitution, would tune up metabolism and give a marked increase in health, particularly for the poor and elderly, at very little cost. You can match your needs to your genetics. This is living in harmony with your genes, and it has phenomenal effects on people.

When choosing vitamin supplements, we have to be smart about it. We can't be indiscriminate in our nutritional supplement intake because it can cause problems. If you take too much magnesium, you'll get diarrhea. If you take too much vitamin C, it can upset your stomach. You have to be sensible. Follow certain principles and guidelines when selecting nutrients, because there are certain basic ground rules. Doctors are correctly cautious when advising people about supplements, because there are no government regulations that govern the quality of supplements. You can have one vitamin that has 100 milligrams of something and it says 100 milligrams on the label, and another vitamin that says 100 milligrams but contains 10 milligrams or 1,000 milligrams. It's absolutely unregulated.

Remember that this new field of nutrigenomics, this new field of ultraprevention, is a new field of understanding the basic cause of illness. In personalized medicine physicians can't apply one prescription for everybody. One size does not fit all. Poison for one person may be medicine for somebody else. We have to be very cautious and careful. We have to remember that these nutrients are vital for life. They are called vitamins because they're vital.

### **Finding Quality Supplements**

Finding the best products to support health can be difficult. The lack of adequate government regulations, the dizzying number of products on the market, and the large variations in quality all create a minefield for anyone trying to find the right vitamin or herb.

Fortunately, in a sea of poor quality and lowered standards, there are a few companies that stand out and have stepped up to the responsibility of producing safe and effective products. In general, supplements by Metagenics, Prothera, and Emerson Ecologics meet my specific criteria for quality and effectiveness. I have examined these companies and their products, but I cannot verify all claims about every product offered. Each person must critically evaluate every supplement for themselves. I do not officially endorse or have any consulting or employee relationship with any supplement companies

Here are four basic criteria I use to evaluate a supplement:

1. Look for GMP drug or supplements standards from an outside certifying body.
2. Try to verify third-party analysis for active ingredients and contaminants.
3. Use products that have some basis in basic science, clinical trials, or have a long history of use.
4. Choose products that are free of fillers, binders, excipients, flow agents, shellacs, coloring agents, gluten, and lactose.

Many supplements are designed for therapeutic use by physicians, nutritionists and other health care practitioners and are unavailable to the average consumer. After much personal internal debate, I have decided to offer them for sale on [www.drhyman.com](http://www.drhyman.com). A percentage of the proceeds from the [www.drhyman.com](http://www.drhyman.com) sale of supplements will be donated to non-profit institutions dedicated to promoting research, education, and public service in the fields of wellness, lifestyle, and nutritional and integrative medicine.

If you choose to order supplements from [www.drhyman.com](http://www.drhyman.com), please click on the blue “Supplements” bar at the top of the home page. This will take you to the “Supplement Shop.”

If you choose to call the manufacturers and distributors directly, please be sure to mention that Dr. Mark Hyman referred you. Here are the phone numbers of the three companies I mentioned earlier:

Metagenics, (800) 692-9400.

Prothera, (888) 488-2488.

Emerson Ecologics, (800) 654-4432.

## SESSION 4: Malnutrition

Now that you've had a chance to hear about the seven myths, you realize that many of the things that we've believed for many years are not true. By believing in these myths, we're only building obstacles that prevent us from accessing the vital health we all deserve.

Medicine is on the verge of a radical revolution. It's a revolution that's based on, for the first time, understanding how the body works. It's a revolution that takes us away from and beyond the germ theory of disease to an understanding of the interconnected web of imbalances and forces that cause illness. We call these factors the five forces of illness. These are the five things that are common to almost every known chronic illness. If we can restore and repair the imbalances caused by these forces, we can achieve good health.

These forces are not something that were manufactured by some scientist. These are the basic principles of human life. These are the basic operational guidelines for how to have a healthy, optimum, functioning system.

These are organizing principles, theories, and concepts that are useful in filtering information. They're like a new pair of glasses that we can put on to look at different problems in a new way. Doctors have the old glasses. We want to take those glasses off and put on the new glasses to understand illness in a completely different way.

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### **The Five Forces of Illness**

Malnutrition, or sludge  
Impaired metabolism, or burnout  
Inflammation, or heat  
Impaired detoxification, or waste  
Oxidative stress, or rusting

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These basic forces are common to most chronic diseases that affect Americans and people in the developing and developed world. There are many things that we can do to identify these forces and then do something about them.

Most of us never heard about the five forces before. Most of our physicians don't know how to diagnose problems based on these new concepts or apply these concepts in practice. But understanding the five forces is the future of medicine. These forces are the basic laws of nature, and if we don't follow the laws of nature, we become ill. We can overcome some illnesses with drugs. But there's no magic pill we can take to prevent the illnesses that we will face us as we

age: heart disease, cancer, diabetes, arthritis, Alzheimer's, and so on. These are diseases that are only treatable through understanding the five forces of illness.

In the next few sections of this program we're going to cover the five forces of illness: how each force creates unique imbalances, how to test and diagnose problems, and lastly, how to restore balance to correct these problems. If we understand how to diagnose imbalances, and know the restorative therapies, then, regardless of the problem, the body can re-establish balance. It can be restored to its natural equilibrium and health. That's the goal of ultraprevention.

This program is designed to empower you to take back your healthcare from the healthcare system. To be your own healthcare provider. Not to be your own doctor, but to take responsibility for the choices you make and how they affect your health. Unless you have this information, unless you have the instruction book for your body, it's going to be very difficult to make good choices. You're going to be walking in the dark.

### Ultraprevention Questionnaire, Part 1: Malnutrition

This is part one of a five-part health questionnaire.

Answer the following questions:

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1. I have less than 3 servings of fruits and vegetables a day. (serving = 1/2 cup)  yes  no
  2. I eat more than 1-2 servings of white flour starches and grain products. (breads, cereals, bagels, pastas, etc.)  yes  no
  3. I eat something sweet every day.  yes  no
  4. I eat no fish.  yes  no
  5. I eat no beans or nuts.  yes  no
  6. I eat junk food at least once a day or foods containing artificial sweeteners or colorings or additives.  yes  no
  7. I eat fast food or fried food at least once a week.  yes  no
  8. I eat animal protein more than 4 times a week.  yes  no
  9. I rarely eat breakfast or I eat most of my daily food intake at dinner and in the evening.  yes  no
  10. I don't drink 6 glasses of water a day.  yes  no
  11. I drink more than 1 cup of coffee a day.  yes  no
  12. I have more than 3 alcoholic drinks a week. (a drink = 1 oz liquor, 5 oz wine, 12 oz beer)  yes  no
  13. I have dry, flaky, or scaly skin, and/or brittle, soft or cracking nails, or dandruff.  yes  no
  14. I have chicken skin. (tiny bumps on the backs of arms or on the trunk)  yes  no
  15. I don't take a daily multivitamin with at least 800 mcg of folic acid.  yes  no

- 16. I suffer from any of the following symptoms of magnesium deficiency: muscle twitching, leg or hand cramps, restless leg syndrome, heart flutters, skipped beats or palpitations, frequent headaches or migraines, insomnia or trouble falling asleep, fatigue, constipation.  yes  no
- 17. I frequently (more than twice a week) suffer from digestive symptoms such as excessive gas, bloating, constipation, diarrhea, heartburn or reflux.  yes  no
- 18. I have taken antibiotics more than 3 times in my life.  yes  no
- 19. I regularly take NSAIDs or aspirin or acid-blocking drugs.  yes  no
- 20. I have symptoms of yeast overgrowth, including abdominal bloating, vaginal, or rectal itching. I have athlete's foot, toenail or fingernail fungus, or "jock itch."  yes  no

Your TOTAL of "yes" responses is \_\_\_\_\_

Your total of "yes" responses is your malnutrition score for the ultraprevention questionnaire, part 1.

In the next sessions you will complete four more ultraprevention questionnaires. At the end of this workbook you will score your questionnaire results to determine the overall state of your health.

## Force #1: Malnutrition

The first force of illness is malnutrition. You're probably thinking, "What is he talking about? We're not malnourished!" It's true that America looks pretty overnourished. Sixty percent of us are overweight. So how can we be malnourished? We think of malnutrition as something that happens in Africa or in places where there's starvation, not in a place like America, where we're eating hundreds more calories a day than we did 20 years ago.

Typical Americans are being overfed and undernourished — eating too many calories and not enough nutrients. We have impaired digestion, which prevents absorption of the nutrients. Sometimes this is caused by taking medications that diminish our digestive system's functioning or by the imbalances that result from this malnutrition.

Our diet has radically changed in the last 100 years. A hundred years ago most of us in America were living on farms. We were working hard, and we were eating foods that were pretty much all organic. We had clean water to drink. We ate a lot less sugar. We ate different types of fats. There was no such thing as shortening or margarine or hydrogenated fats. There was no such thing as high-fructose corn syrup or aspartame. There was no such thing as a lot of the preservatives and chemicals that are in our food these days. Suddenly we've been plunged in a different environment. The government is a little bit responsible by creating the food pyramid, which tells us to eat six to 11 servings of bread, cereal, rice, and pasta. These are all low-fat foods. At the top of the food pyramid it says to use fats and oils sparingly. It also says that we should be eating more meat and poultry and fish and so forth.

This pyramid was created by a U.S. Department of Agriculture committee that comprised, in part, industry experts who don't necessarily represent objective science. They've recently changed the recommendations to represent a better philosophy: Eat less meat, sugar, salt, refined breads and pastas, and eat more fruits, vegetables, nuts, beans, and whole grains.

Unfortunately we listened and ate according to the original food pyramid, and we've become very malnourished as a result. Most of our foods consist of white flour and white bread and refined sugar and processed cheese and milk. This has led to tremendous obesity in America. We've seen the rates of obesity double in the last generation. We've seen obesity rates in children triple in the last generation. Recently the head of the Robert Wood Johnson Foundation, Risa Lavizzo-Mourey said, "If we don't do something to reverse these trends, we're going to raise the first generation of Americans to live sicker and die younger than their parents."

It's a sobering thought that we're leaving a legacy of disease, obesity, and malnutrition to our children. Is that what we want to do?

If we were to mention diet and nutrition and healthy eating to our children every meal, every day, every year, there is no way we could come close to the 10,000 advertisements for junk food that they see in an average year on television. There's no way parents can compete. It's a very difficult environment. We have to change the way we think about food from simply a quick, convenient source of energy to the main ingredient that determines our health.

### Exercise One: What Are You Eating?

If you have kids, take a good look at what kinds of foods they are eating. List some typical foods that your children eat for breakfast, lunch, dinner and snacks. What are they drinking? If you don't have kids, list what you regularly eat.

Breakfast	Lunch	Dinner	Snacks/Desserts	Beverages
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

How many of these items contain the "white menace" (white sugar, white flour)? \_\_\_\_\_

How many of these items contain trans fats?\* \_\_\_\_\_

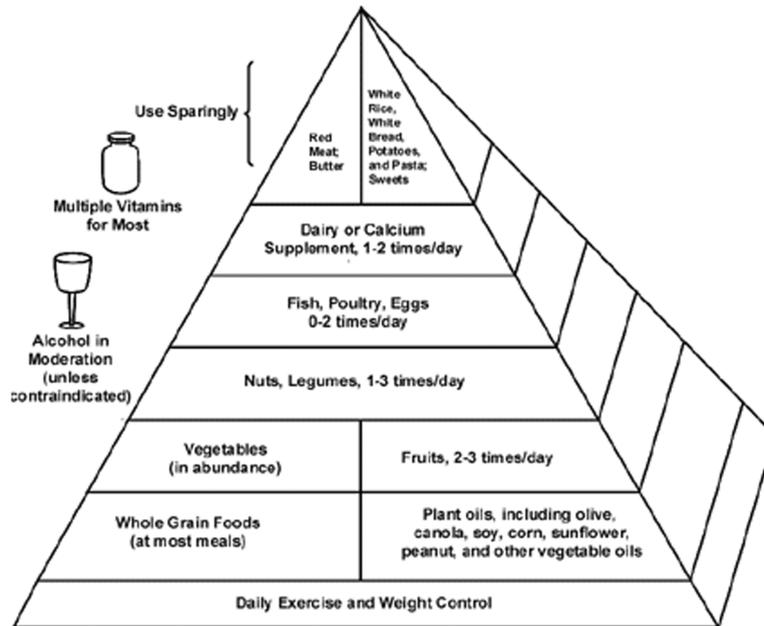
How many of these items contain high-fructose corn syrup?\* \_\_\_\_\_

\*Trans fats and high-fructose corn syrup are found in processed foods. Read the nutrition facts and the list of ingredients on the package label to find out what's in your food.

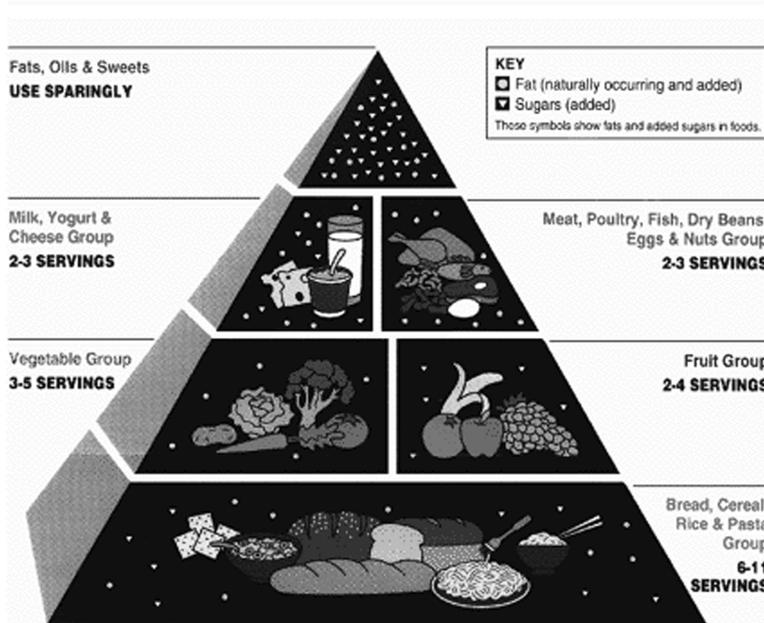
Are you surprised at these results? What kind of legacy are you leaving your children? Whose responsibility is it to feed your children (and yourself) correctly? It's your responsibility.

**Challenge Action Step:** Go right now to your cabinets and refrigerator and throw away any foods containing high-fructose corn syrup and hydrogenated or trans fat.

Dr. Walter Willett has talked about redesigning the food pyramid. He said that we should not put fats and oils at the top of the food pyramid; we should be put them at the base of the pyramid. We should be eating healthy oils like the omega-3 oils and olive oil. We should be eating whole grains. We do not need 11 servings of bread, cereal, rice, and pasta. We need a variety of colorful fruits and vegetables. We should eat beans and nuts. We should eat fresh fish and eggs and poultry. At the top of the food pyramid there should be a little bit of dairy, a little bit of meat, and a little bit of refined carbohydrates — maybe some pasta and potatoes if we want to have them once in a while.



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USDA and the US Department of Health and Human Services

## **The Two Food Pyramids Compared**

Dr. Willett's food pyramid, on the top, is a fundamentally different food pyramid from the one created by our government. The government's food pyramid is the basis of the school lunch program. We've taken away exercise and physical education, and we've given our children lunch programs that are based on a highly refined carbohydrate diet.

Dr. Willett goes on to say that there's an optimal diet for heart-disease prevention. This is the heart-disease prevention we should be employing in our government policies but we're not. This new science and nutrition is not getting translated into public policy because there are lobbyists for the pharmaceutical industry, for the insurance industry, and for medical organizations like The American Medical Association. There are no lobbyists representing the scientists to give our policymakers accurate and up-to date nutritional advice for creating health.

The scientists who know what's going on, the people who are publishing in the major medical journals, are not being asked to translate the data into effective treatments. We need to listen to these leaders of science who are creating a new pathway to health.

## **Folic Acid**

Another nutritional deficiency, besides fat deficiency, that's rampant in America, is the deficiency of a nutrient that if you don't have enough it, that can lead to dementia, colon cancer, cervical cancer, breast cancer, depression, heart attacks, strokes, birth defects, Down syndrome, even osteoporosis. It's something that we should have in plentiful amounts in our diet, but it's deficient in most of our diets. Luckily, it's easy to get from a supplement. This important nutrient is called folic acid, or folate. Folic acid is part of the basic biochemical activity of every cell of our body. Without it, our system breaks down, and that leads to all kinds of chronic illnesses.

Thirty years ago, Dr. Kilmer McCully — a boy-wonder pathologist at Harvard — discovered that there was a group of children with a genetic disease that required them to have mega doses of folic acid. These children were only 10 years old but were getting heart attacks and strokes. When Dr. McCully looked at their arteries under the microscope, he found that their arteries were the same as much older people who had heart attacks.

Dr. McCully hypothesized that somehow folic acid was involved in heart disease. He thought that maybe if we give people more folic acid, there will be a reduction in heart attacks because we will lower a substance called homocysteine. At the time Dr. McCully was ridiculed for saying that a vitamin deficiency can cause heart disease. He was kicked out of Harvard because the reigning hypothesis was that fat was the enemy, that cholesterol was the killer, that if we didn't lower our fat intake and reduce our cholesterol, we would die of heart disease. They thought vitamins had nothing to do with it. Dr. McCully was relegated to a small Veterans Administration hospital in Rhode Island, where he spent the next 30 years proving them wrong.

*The New York Times* recently wrote, “These are distinctly better days for McCully, who is now 63. His lifetime study of a little-understood trigger for heart disease is suddenly at the forefront of cardiac research. His theory holds that homocysteine and amino acid in the blood damages artery walls and causes heart attacks. In most cases homocysteine can easily be lowered to safe levels by taking certain common vitamins, namely folic acid, B<sub>12</sub> and B<sub>6</sub>, which are entirely safe, water-soluble, and nontoxic. It’s something that all of us should be taking.”

### **As folic acid goes up, dangerous homocysteine goes down.**

Where does folic acid come from? To remember, think of foliage, or leaves. Leafy greens are a great source of folic acid and so are beans. How many of our diets include a daily dose of greens and beans? Probably few. Most of us find it hard to eat greens and beans on a daily basis. Most people have to take a folic acid supplement.

*The New England Journal* found that people who had a high homocysteine level had a 56 percent increase in their risk of Alzheimer’s. Simply taking a vitamin can lower your risk of Alzheimer’s by 50 percent. People who had high homocysteine levels had more osteoporosis, heart attacks, cervical cancer, and colon cancer. Simply taking a multivitamin with folic acid can correct this imbalance and prevent problems.

It’s important to test for your homocysteine level. Just taking a multivitamin might not be enough to lower your homocysteine. Some people have very high homocysteine levels, which requires them to take more folic acid than the average person. In addition, there’s a particular gene that is common in about 30 percent of the population. If you have this gene, it may dramatically increase your need for folic acid. One person might need 400 micrograms of folic acid, and another person might need 4,000 micrograms. There’s no way of knowing what you need without testing.

### **Other Nutrient Deficiencies**

There are many, many other nutrients that we’re deficient in. For example, 70 percent of the population is deficient in zinc. This affects our infection rate. We all know that zinc deficiency can lead to more frequent respiratory infections and colds. Simply by taking zinc on a regular basis, you can prevent this. Zinc is important for detoxifying heavy metals. It’s important for thyroid function.

We’re learning more about vitamin D. We used to think that vitamin D was just there for having healthy bones, but we’re finding that it can prevent cancer. People who are dark skinned have a higher risk of certain cancers because they can’t produce as much vitamin D. People who live in the north have a greater risk for multiple sclerosis, immune disorders, and cancers because they don’t have enough vitamin D. Vitamin D deficiency certainly leads to osteoporosis, and it can lead to a lot of other conditions as well.

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## Lab Tests for Malnutrition

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Here is a list of tests you can ask your doctor to perform. If your doctor is reluctant, you can locate one who understands the new revolution in medicine by visiting [www.drhyman.com](http://www.drhyman.com).

❑ **URINARY AMINO ACIDS AND PLASMA AMINO ACIDS**

To identify protein nutritional status. Deficiencies can occur from inadequate intake of protein, maldigestion, malabsorption, or overutilization of amino acids, often in times of stress, such as mercury toxicity.

❑ **RBC MINERALS**

An analysis of your mineral levels.

❑ **URINARY ORGANIC ACIDS**

A complex panel of tests that measure fatty acid, carbohydrate, energy metabolism, as well as B-vitamin status, oxidative stress, detoxification, and digestion function.

❑ **METHYLATION**

To diagnose B<sub>6</sub>, B<sub>12</sub> and folate insufficiencies.

❑ **COMPLETE BLOOD COUNT**

To check if you have oversized red blood cells or anemia. If the mean corpuscular volume (the size of the red blood cells) is greater than 95, you might have a methylation problem.

❑ **HOMOCYSTEINE**

This is one of the most important tests you can ask for. The normal level is less than 13, but the ideal level is likely between 6 and 8.

❑ **SERUM OR URINARY METHYLMALONIC ACID**

This test is more specific for B<sub>12</sub> insufficiency and may be elevated in the face of a normal serum B<sub>12</sub> level or even homocysteine.

❑ **SPECIFIC URINARY AMINO ACIDS**

To look for unusual metabolism disorders involving B<sub>6</sub>, folate, or B<sub>12</sub> that may not show up just by checking methylmalonic acid or homocysteine.

❑ **ESSENTIAL FATTY ACID TESTING**

To identify essential fatty acid deficiencies as well as excesses of inflammatory and trans fats.

#### ❑ MAGNESIUM TESTING

- Serum magnesium testing is most often used, but rarely helpful. Levels less than 2.0 can be significant.
- Red blood cell magnesium testing is more accurate, but still not ideal.
- Urinary amino acids or organic acids tests can identify a poorly functioning metabolic pathway dependent of magnesium.
- Magnesium loading tests are complicated but accurate in assessing total body magnesium depletion. This requires intravenous magnesium and a 24-hour collection.

#### ❑ ZINC TESTING

The zinc taste test using liquid zinc sulfate can be very accurate in picking up marginal zinc deficiency. Simply swish about 2 tablespoons in your mouth for a minute or two. It should taste horrible. If you immediately taste something bad, metallic, or bitter, then you are OK. If you taste nothing or have a delayed taste, then you are likely zinc deficient. You can swallow or spit it out when you are done.

- WBC or RBC zinc test can also be useful.
- Alkaline phosphatase is a common blood test looking for liver or bone disease. It is an enzyme that depends on zinc, and if it is low, it indicates zinc deficiency. Most doctors only pay attention to high numbers, but if it is low (less than 70), you likely need more zinc.

#### ❑ 25-OH VITAMIN D

Low vitamin D levels are a very good clue to poor nutrition, risk of osteoporosis, multiple sclerosis, seasonal affective disorder, and more.

### **How to Reverse Malnutrition**

How do we correct the widespread over-fed, under-nourished, too-many-calories, not-enough-nutrients epidemic that's sweeping America? The first thing is to avoid anti-nutrients. Anti-nutrients are things that block your nutrition in some way. These include, for example, trans fats, refined sugar, high-fructose corn syrup, added salt, preservatives, and additives. These are things that have no place in our diet.

Approximately 15 percent of our gross national product is based on the fast food and junk food industry. It was a huge step when Tommy Thompson of the Health and Human Services Department required that foods list the amount of trans fat they contain. This law was written in the summer of 2003 but will not be implemented until 2006.

### **To Reverse Malnutrition, Step #1: Eliminate Anti-Nutrients.**

- **Eliminate Trans Fat:** Why is trans fat so bad? It enters your body and pretends to be a regular fat. It is incorporated into your cells. It gets into your brain. It makes you fat. In the nucleus of your cells it binds and blocks the receptor that controls your metabolism. It makes you insensitive to insulin so your sugar balance is adversely affected. Eating these trans fats causes diabetes. It causes weight gain. It causes inflammation. It causes cancer.

Larry King once asked Dr. Andrew Weil, “What, in your opinion, is the one thing Americans can do to improve their diet?” Dr. Weil said, “Eliminate trans fat, because with one fell swoop you get rid of junk food and processed food and you have pretty much eliminated anything that comes in a box or a package.”

- **Eliminate High-Fructose Corn Syrup:** High-fructose corn syrup is a super-bad sugar; just like trans fats is a super-bad fat. To find high-fructose corn syrup, you need to read the labels on the processed foods you eat.

The two most important things you can do to improve your diet are, number one, to get rid of trans fats, and, number two, to eliminate high-fructose corn syrup. If everybody in America did that, we’d probably reduce our death rate and our illness rate dramatically. We’d cut obesity probably in half and have a huge impact on our long-term health. It sounds easy, but it’s hard to do because trans fat and high-fructose corn syrup are all around us. We just have to become aware of what’s in our food.

### **To Reverse Malnutrition, Step #2: Increase Your Intake of Omega-3 Fats.**

These are the fats you’re probably deficient in, and they play a huge role in the health of our brains, the health of our cells. They lower inflammation, they thin the blood, they lower blood pressure, they lower cholesterol and triglycerides, improve hormonal balance, help your skin, help your nails, help your mood. If you want healthy hair, nails, and skin, if you want healthy cells and a healthy brain, you need to increase your intake of these omega-3 fats.

Unfortunately, the fish sources of omega-3 fats in our society are mostly contaminated with mercury. Herring and sardines are safe choices, but they aren’t a big item of pleasure for most people outside Sweden or Finland or Portugal. Nuts are also good sources. Ground flax seeds are an excellent source of omega-3 fats but the body can’t convert the oil in nuts and flax seeds effectively into the DHA and EPA, which are the fish fats.

You may consider taking fatty-acid supplements. Of course you have to be careful because you don’t want to be taking tuna oil that’s been merely extracted and put in a capsule. The fish oil has to be filtered, distilled, and purified to remove the heavy metals and pesticides. You don’t want to end up with mercury poisoning.

**To Reverse Malnutrition, Step #3: Make Olive Oil Your Main Oil.**

We all need an oil change. Olive oil should be the main oil you use for all your food and cooking. Olive oil is very healthy, has anti-inflammatory and anti-cancer properties, helps lower your cholesterol, and is tasty as well. Try to use extra virgin organic olive oil, if possible.

**To Reverse Malnutrition, Step #4: Eat Fruits and Vegetables.**

The next most important item is to eat eight to 10 servings of colorful fruits and vegetables a day. These plant foods are the basic source of the vitamins, minerals, antioxidants and phytonutrients that help create and preserve health. Nobody can argue with eating fruits and vegetables. It's the one thing that scientists all agree on to create longevity and health.

The reason is that fruits and vegetables contain compounds that, besides being good sources of fiber, vitamins, and minerals, contain a whole array of compounds that most people haven't heard about called phytonutrients. Phytonutrients are plant-based compounds that don't have any nutritional value in the sense that they're not necessary for life, like vitamins and minerals or proteins, fats, and carbohydrates, but they're compounds that help your body work optimally. The phytonutrient cytokine, found in green tea, decreases inflammation, increases metabolism, helps lower cholesterol, and controls cancer risk. Green tea can help get rid of heavy metals like mercury because the tannins, along with other compounds, help to bind mercury.

Phytonutrients have all kinds of long names like cytokines and isothiocyanates and isoflavones. These substances are found in all the fruits and vegetables and we haven't even discovered half of what they do yet. What we're finding is that we've evolved over centuries to have these foods not only for their nutritional value, but also to provide us with the basic tools to tune up our system, to get rid of toxins, to improve our metabolism, to reduce inflammation, and to get rid of oxidative stress. "Eat your vegetables" is good advice from your grandmother. It's essential for life.

**To Reverse Malnutrition, Step #5: Take a Multivitamin.**

This last step is easy. Take a multivitamin and mineral supplement with 800 micrograms of folic acid. Unless you're eating a perfect diet, exercising regularly, and living in a stress-free, unpolluted world, you probably need extra support. Most of us need these basic nutrients in adequate amounts to keep our biochemical steps working properly.

For example, if you're deficient in selenium, you increase your risk of thyroid disease because you need selenium to make your thyroid gland work properly. If you don't have selenium, you increase your risk of heart attacks because you are not able to create the antioxidant enzyme called glutathione peroxidase. This antioxidant enzyme is low in people who have heart attacks. Selenium will increase the activity of glutathione and reduce your risk of heart attacks. Selenium can prevent cancers, across the board. This is from a recent study in *The Journal of*

*the American Medical Association*, which says that selenium can help reduce cancer, improve your thyroid function, and prevent heart attacks. This is just one mineral.

One of the most important minerals that we're deficient in is magnesium. Most of us don't realize how deficient we are in magnesium. Yet it's so easy to diagnose.

What are the symptoms of magnesium deficiency? Anything that twitches or cramps or spasms is magnesium deficiency. Muscle cramps, for example, muscle twitching, leg cramps, insomnia (which is part of this form of irritability), anxiety, irritability, palpitations, menstrual cramps, headaches, constipation. All these things are potentially related to magnesium deficiency. What causes magnesium deficiency? Stress.

In fact, in a study in Kosovo they found that people who were under chronic stress from the war had depleted levels of magnesium. Chronic stress causes magnesium deficiency. Also diet. If you drink a lot of caffeine, or a lot of alcohol, you become depleted in magnesium. If you eat a diet that's not full of beans, nuts, and greens, you become deficient in magnesium. Again, beans, nuts, and greens should be a staple of our diet, and yet most Americans eat very little of these foods.

Over time we become deficient, and so we have headaches and go to the headache doctor; we have constipation and go to the digestion doctor; we have muscle twitches and go to the muscle doctor, the rheumatologist. We have insomnia, so we go to the psychiatrist. We have menstrual cramps, so we go to the gynecologist. Each doctor gives us a different drug to mask the symptoms, when the real problem is that we're magnesium deficient.

We need more of the basic raw materials for life. We need more of the basic nutrients that are critical for a healthier and happier life.

### Exercise Three: Watch Your Diet.

For the next week, focus on what you are eating through the “new lens.” Could you be malnourished?

Listed below are the top nine foods eaten by Americans, according to the U.S. Department of Agriculture. **How much of these nutrient-poor foods do you consume?**

1. Cow’s milk, whole
2. Cow’s milk, 2%
3. Processed American cheese
4. White bread
5. White flour
6. White rolls
7. Refined sugars
8. Colas
9. Ground beef

#### **Bonus questions:**

10. Are you eating trans fat?
11. Are you eating hydrogenated oils?
12. Are you eating high-fructose corn syrup?
13. How many fruits and vegetables are you eating each day?
14. Do you eat “beans and greens” every day?
15. List items you will eliminate from your diet, starting today:

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## SESSION 5

### Ultraprevention Questionnaire, Part 2: Inflammation

Answer the following questions:

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1. I have seasonal or environmental allergies.  yes  no
2. I have food allergies or I don't feel well after eating, with sluggishness, headaches, confusion, etc.  yes  no
3. I work in an environment with poor lighting, chemicals, poor ventilation.  yes  no
4. I am exposed to pesticides, toxic chemicals, loud noise, heavy metals, and toxic bosses and co-workers.  yes  no
5. I get frequent colds and infections.  yes  no
6. I have a history of chronic infections such as hepatitis, skin infections, canker sores, cold sores.  yes  no
7. I have sinusitis and allergies.  yes  no
8. I have bronchitis or asthma.  yes  no
9. I have dermatitis (eczema, acne, rashes).  yes  no
10. I suffer from arthritis (osteoarthritis/degenerative - wear and tear).  yes  no
11. I have an autoimmune diseases (rheumatoid arthritis, lupus, etc.).  yes  no
12. I have colitis or inflammatory bowel disease.  yes  no
13. I have irritable bowel syndrome (spastic colon).  yes  no
14. I have neuritis (problems like ADHD, autism, mood and behavior problems).  yes  no
15. I have heart disease or have had a heart attack.  yes  no
16. I have diabetes or am overweight (BMI greater than 25).  yes  no
17. I have Parkinson's or have a family history of Alzheimer's.  yes  no
18. I have a stressful life.  yes  no
19. I drink more than 3 glasses of alcohol a week.  yes  no
20. I exercise less than 30 minutes, 3 times a week.  yes  no

TOTAL number of "yes" responses: \_\_\_\_\_

Your total of "yes" responses is your inflammation score for the ultraprevention questionnaire, part 2.

## Force #2: Inflammation

Inflammation is the second force of illness. The study of inflammation and how it affects health is one of the most important fields of research in medicine today. Inflammation is the cause of everything. It's the cause of heart disease, Alzheimer's, cancer, diabetes, osteoporosis, arthritis, and all the other diseases of aging. As you age, you become more inflamed. You get more "-itises." You get arthritis and neuritis and gingivitis and colitis and every kind of "-itise" you can imagine. This is what we describe as inflammation.

This is not the typical inflammation that most of us know. It's the hidden, secret inflammation. If you have a swollen joint, you know you're inflamed. If you have swollen gums, you know you have gum disease. If you have a cut, you get redness, soreness, heat, and pain. That's the sign of inflammation on the outside. But when the inflammation's on the inside, you don't necessarily feel it. You don't know it's there, but it's causing a fire that's burning you up inside.

Recently there was a conference in collaboration with scientists from all over the world at Tufts School of Human Nutrition and Aging. It was called Nutrition, Genetics, and Inflammation, and it was about the intersection of our food and our diet with our genes and how that inflames or cools off inflammation. The power of our diet over inflammation is significant.

### Heart disease is not a plumbing problem. It's an immune problem.

Peter Libby, the chief of cardiovascular medicine at Harvard, wrote an article in *Scientific American* called "The Fire Within" that said the fire of inflammation in the arteries is more significant than the cholesterol. Heart disease is not a plumbing problem. It's an immune problem. It's a disease of inflammation in the arteries.

Researchers speculate that if you take Advil or an anti-inflammatory, you might lower the risk of getting Alzheimer's disease. It's the brain on fire — the inflammation — that leads to Alzheimer's. Unfortunately, the side effects of anti-inflammatory medications could be significant.

### The Causes of Inflammation

How do we identify the the real causes of inflammation? It's easy to take an aspirin, it's easy to take Advil, it's easy to take a prescription anti-inflammatory, but that doesn't deal with the cause. Drugs can cool the inflammation, but they don't address the root of the problem. We must ask, "Where does the inflammation come from? Why do you have the inflammation?"

The first and biggest cause of inflammation is our diet. Inflammatory fats and inflammatory sugars play a major role in heart disease, diabetes, cancer, and Alzheimer's.

The next cause of chronic inflammatory problems are food reactions. They may not be typical food allergies, such as if you eat a strawberry, you end up in the emergency room, or, if you eat

a peanut, your throat closes up. Food allergies can be delayed, slow, and insidious reactions that can cause all kinds of chronic symptoms.

The next major cause for inflammation is stress, because it releases something called cortisol. Cortisol is generally found in the body when there's stress, and this leads to a change in your body composition. It leads to fat deposition around the middle, which increases inflammation. Stress releases a flood of inflammatory molecules in the body. These biochemical changes trigger the inflammatory response.

The next big cause of inflammation is lack of exercise. Historically, humans probably exercised 25 hours a week as they hunted and gathered food. We were very active. Now many of us exercise less than 25 minutes a week.

Infections are another major cause of hidden inflammation. This can be different from the infection that leads to a cold. This is can be a hidden infection. It can be a digestive infection, such as *H. pylori*, a cause of stomach ulcers. It can be viruses. It can be bacteria. It can be yeast. These infections are silent, except for creating a low-grade inflammation. Toxins like heavy metals, mercury, lead, arsenic could cause inflammation. And so can toxins like petrochemicals, pesticides, and other substances that are in our food, in our environment, in our water.

### Exercise One: Are You Inflamed?

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In this exercise, rate yourself on a scale from 1-10 on how you think you are doing with the causes of inflammation. A score of 1 means you don't think that this factor is a source of inflammation for you, and a score of 10 means you absolutely know that it is a factor.

Diet \_\_\_\_\_  
Food Reactions \_\_\_\_\_  
Stress \_\_\_\_\_  
Lack of Exercise \_\_\_\_\_  
Infections \_\_\_\_\_

### Belly Fat

We've been learning something quite astounding. Belly fat is not just fat. It's completely filled with white blood cells and immune cells. Those immune cells are very active, and they're producing all kinds of inflammatory molecules that are affecting you throughout your body. The fat you have in your belly is producing dangerous molecules that are coursing through your blood stream, affecting every cell in your body and triggering responses that lead to more rapid aging, even more rapid acceleration of heart disease, cancer, Alzheimer's, and more.

In fact, if you have a condition we call metabolic syndrome or insulin resistance — which is when you're not able to deal with the sugar in your diet very well and you have rises in insulin and rises in blood sugar that are greater than average — you end up with inflammation all over. We've recently found that metabolic syndrome slows your mental functioning. It leads to early dementia. People who are diabetics have four times the risk of getting dementia as everybody else. Even if you don't get dementia, you'll have a cognitive decline. You'll have impaired brain function and brain fog and all kinds of things that are related to a declining mental function.

The major way we test for metabolic syndrome by looking for something called C-reactive protein. This simple blood test tells you whether or not you have inflammation. In recent studies, they've found that this is equal to or more important than LDL cholesterol in predicting whether or not you're going to have a heart attack. When we look at the medical literature, it's abundant with examples of how this C-reactive protein, as a marker of hidden inflammation, relates to all kinds of illness.

For example, if you have a high level, you have a 1,700 percent increased risk of getting diabetes because of the metabolic syndrome in diabetes. We found that high blood pressure is an inflammatory disease, that if you have high C-reactive protein levels, you have a higher risk of having high blood pressure. We found that everybody who's overweight, pretty much, has elevated C-reactive proteins. We found that, if you have a higher C-reactive protein, you'll have a higher risk of colon cancer. You have a higher risk of macular degeneration, the blindness that's so common with aging. High C-reactive protein levels can indicate risk of colon cancer, blindness, heart attacks, Alzheimer's, and all kinds of things that we had no idea related to inflammation until just recently.

### **Food Allergies**

Now let's talk about something we call food allergy. This is a very complex topic. It's a topic that conventional doctors typically don't pay much attention to. Dealing with food allergies is probably the most important factor in reversing a lot of chronic and low-grade symptoms that people have — everything from digestive complaints, to headaches, to post-nasal drip, to fatigue, to sleep problems, to skin rashes, to acne, and so on. These are the chronic, low-grade problems that are abundant in our society but have very little therapy in conventional medicine.

A recent research paper came out in the medical journal called *Gut*, which explored for the first time the link between measurable food allergies in the blood and digestive symptoms. The title of the article was "Food Elimination Based on IgG Antibodies in Irritable Bowel Syndrome: A Randomized Controlled Trial." The results were fascinating. By taking somebody's blood and looking for certain antibodies to food, researchers determined what foods people should eliminate. This, in turn, had a tremendous effect on their digestive tract. When people who had chronic irritable bowel syndrome got off the foods that they were sensitive to, they had a resolution of their symptoms.

Most conventional doctors don't believe in IgG testing. This is a specific type of response by your immune system. Your immune system can create different kinds of responses. You can have an immune system response that's very immediate and quick, which we call the IGE response, and that's what you get when you get stung by a bee or when you eat a peanut. There is also a delayed response that might happen 12, 24, 72 hours after you eat the food. The delay makes it very hard to know what food caused the reaction. But this is critical information, not because the delayed response sent you to the emergency room, but because the response will cause chronic poor health.

Why does something you eat cause sinus congestion or headaches or fatigue or sleep problems or arthritis or skin rashes or pimples or hormonal imbalances or irritable bowel syndrome? The reason is that about 60 percent of your immune system lies right below the surface of your intestinal tract. It's waiting there for some external invader.

Now normally there's a barrier, like your skin. If you take bacteria and you pour it over your skin, you're not going to get an infection. But if you take bacteria and you pour it over an open cut, you will get an infection. The same thing is true with your digestive tract. There's a skin in your digestive tract. It's a barrier and it's not permeable. It doesn't let anything in that shouldn't get in, because there are all kinds of garbage in there. There are bacteria, undigested food, and all kinds of weird, strange, and toxic materials that you don't want in your blood. The barrier keeps those things separate. Unfortunately, in our society, there are many things that disrupt that barrier, and that leads to digestive problems, and that leads to immune problems throughout the body, and that creates all kinds of diffuse symptoms that puzzle most doctors.

About 30 percent of people have irritable bowel syndrome. The bestselling drugs out there are the drugs that reduce stomach acid. Now let's face it. We weren't designed with a fundamental flaw that requires special drugs to suppress our stomach acid. We need stomach acid. It's what helps break down protein. It helps us absorb minerals. It helps us digest our food. When we take these powerful drugs, we're suppressing our normal digestive function. We're stopping a basic process in the body.

There's a whole ecosystem in the digestive tract that needs to be in balance, like in the rain forest. When it's out of balance, nothing works properly and we end up with all kinds of problems like irritable bowel syndrome, bloating after meals, heartburn, or reflux. We get inflammatory bowel disease, maldigestion, malabsorption. We get bacteria and yeast and parasites growing where they shouldn't be growing.

In the small bowel, where you absorb foods, your digestive tract has the same surface area as a tennis court. That tennis court surface needs to be functioning, it needs to have the right barrier, and it needs to have the little cells all working properly. When the cells break down, that surface becomes leaky. It lets in things that shouldn't get in.

When you eat a piece of chicken, you don't become a chicken, because it breaks down into its component parts, its amino acids, and that's what gets absorbed. When you eat any type of food, it breaks down into its basic elements, and it gets absorbed. When your digestive forces are impaired, like when you're taking drugs that block stomach acid, you're not able to digest properly. Then what happens is that foods leak in and irritate the lining underneath the immune system. That lining underneath the gut is full of immune cells.

All of a sudden, your immune system goes, "Ah, what's that? That's not normal. That's not something that should be here." It creates an immune response that is not just local to the gut, it goes throughout the body. That's why an out-of-balance digestive tract can cause arthritis, skin rashes, fatigue or even headaches. It can cause systemic inflammation that leads to aging.

What are the types of things that lead to digestive tract imbalances? One obvious cause is infections. Most of the time your body takes care of an infection. You simply get over it. But sometimes digestive tract imbalances become chronic.

Another cause of digestive tract problems is stress. Any kind of stress. It can be stress caused by toxins: food toxins, bacterial toxins, yeast toxins, heavy metals, mercury. The digestive tract is very sensitive to toxins. Medications are a big cause of stress. Taking aspirin can upset the stomach. Taking drugs like anti-inflammatories, such as Advil, can also impair digestion. The common side effects of acid-blocking drugs like Prilosec, Prevacid, Aciphex, and Nexium are abdominal bloating, diarrhea, and gas. You don't get heartburn anymore, but you get all kinds of other problems because you're not digesting your food.

You need acid to digest your food. That's how your digestive enzymes get switched on. That's how protein gets broken down. That's how you create the correct pH in the small intestine so that everything works properly. When you disrupt the acid, you disrupt the entire system. People with serious reflux problems need those drugs, to lower the risk of cancer of the esophagus. Acid-blocking drugs are not without their uses, but they're overused.

The next major cause of digestive tract problems is food allergies. These can be allergies that you're genetically sensitive to like dairy or gluten. About 1 percent of people have gluten allergies. Unfortunately food allergies can be a vicious cycle. You get food allergies because your intestinal tract's inflamed, and you get inflamed intestinal tract because you have food allergies. It can go back and forth in both directions.

Also, certain habits can harm digestion. Drinking alcohol can create a leaky gut. Alcohol, if drunk to excess, can cause increased permeability of the gut. A drink or two probably doesn't do anything, but when you drink heavily — more than two or three glasses a night — it can cause inflammation throughout the body. The disruption of the normal gut barrier caused by alcohol is well documented.

Genetics may also predispose some of us to gut dysfunction. Some people are just more sensitive. So how do we fix the gut?

**To Fix the Digestive Tract, Step #1: Remove the common food allergies.**

The first thing we need to do is to remove the foods that trigger food allergies and remove all unnecessary medications, like aspirin and Advil, that can disturb the gut.

**Common foods that can trigger food allergies include:**

- Gluten (in barley, rye, wheat, oats, spelt, and kamut)
- Dairy foods
- Eggs
- Corn
- Peanuts
- Citrus fruits
- Tomatoes
- Peppers
- Eggplants
- Potatoes

Eliminate these foods from your diet for five days to determine if you have hidden food allergies. Or you can do a two-week simple detox diet. A detox diet is eating very basic foods like vegetables, rice, beans, and fish. (Eat small fish, like sole or haddock, that are less likely to be contaminated with mercury.) If you have food allergies, you'll see profound changes in your health. Things that you've not imagined you could be free of, like migraines, sinus problems, and digestive problems, might simply disappear.

**To Fix the Digestive Tract, Step #2: Add probiotics.**

Probiotics include healthy bacterias like acidophilus, bifidus, and lactobacillus. These are the opposite of antibiotics. More and more research has shown that probiotics are powerful agents. One study showed a 50 percent decrease in the rate of eczema, asthma, and allergies in infants by simply giving the pregnant mothers acidophilus and then giving a little bit of acidophilus to the babies once they were born.

That's a dramatic result. By simply eating a healthy bacteria, they got rid of eczema, a skin problem, and asthma, a lung problem, and sinusitis and rhinitis, which are nose problems. This happened because the gut is the source of the inflammation. If we improve the digestive system, a variety of symptoms either disappear, get less, or improve.

**To Fix the Digestive Tract, Step #3: Provide materials for repair and healing.**

These include essential fatty acids, like those found in flax seed oil, borage oil, and fish oil. These oils include vitamins like zinc and vitamin A, and the B vitamins to help repair the digestive tract. We need certain amino acids, like glutamine. Our bodies are fueled by glucose, sugar, but the intestinal cells live on glutamine. Glutamine is an amino acid that comes from our diet and from the digestion of bacteria and the breakdown of proteins. But sometimes we don't get enough of it and we need a little extra.

**To Fix the Digestive Tract, Step #4: Get enough fiber.**

Fiber forms the raw materials for the good bacteria to live. Fiber is the food for the bacteria. If you don't have enough fiber, then the bacteria can't thrive, and you end up with chronic digestive complaints. Fiber is critical. You want a mixture of soluble and insoluble. Soluble fiber is fiber you get when you eat vegetables, beans, nuts, and seeds. Cilia is soluble fiber. Insoluble fiber, like the sort found in wheat bran, is harder, so you don't digest it. But that's good too. Insoluble fiber acts like a wire brush to sweep clean your digestive tract. You need to take extra fiber so you can move your bowels regularly. The average person should have a bowel movement two or three times a day. It shouldn't be painful. It should be easy to pass. It should be floating, believe it or not, because that indicates there's enough fiber. When it doesn't, it means your digestive tract is not healthy. If you don't digest your food and you don't properly excrete the waste and toxins, then it's very likely you're going to become sick.

**Illnesses are related to diet.**

Your diet can help or harm you. The right foods can help restore balance in the immune system by being anti-inflammatory. The wrong foods can trigger immune responses, and cause inflammation and the subsequent age-related illness. Food can trigger allergies.

The standard American diet, or the "SAD" diet, is killing us. Food allergies aside, the SAD diet creates a general inflammatory condition in the body. This leads to heart disease, dementia, cancer, diabetes, and arthritis. Physicians know that irritable bowel syndrome, inflammatory bowel, and reflux are all related to problems with the gut, but we don't realize that things like skin problems, eczema, psoriasis, acne, hair loss, and even vitiligo, are also related. Vitiligo is depigmentation of the skin that causes strange white patches. Folks with vitiligo cannot sun tan.

Other common chronic illness that are affected by diet are the respiratory disorders including chronic postnasal drip, congestion, rhinitis, and sinusitis. Asthma is often caused by food allergies, such as sensitivity to dairy and gluten. If you get rid of the trigger, often the asthma disappears.

Most of us think there's no relationship between our gut and our brain, but they are intimately connected. In a recent article in *Landmark Paper*, a new theory was described of how irritable bowel syndrome works and how the digestive tract is the second brain. When there are imbal-

ances in the ecosystem — imbalances in the growth of bacteria in the small intestine — it triggers activity in the nervous system of the gut. We call that the enteric nervous system, or the “gut brain,” as opposed to your “head brain.” When your gut brain is not working properly, your head brain is not working properly either. In fact, there are more neurotransmitters in the digestive tract than there are in the brain.

There’s a common perception among doctors that people with irritable bowel syndrome have psychological problems, that they’re anxious or depressed. The *Landmark Paper* article completely dispelled that concept. It said that the gut brain speaks to the head brain. And when the gut brain’s not working, when there’s inflammation in the gut brain, when the bacteria is out of balance, when the whole system is not functioning the way it should, it triggers a nervous system imbalance that goes throughout the body. Your guts affect your brain, and your brain affects your emotions, feelings, and thoughts.

So if people have any chronic symptoms, whether it’s acne or headaches or even multiple sclerosis, what happens to the rest of their symptoms when their guts are out of balance? Do their other symptoms get better or do they get worse? They get worse.

Headaches are very much related to food allergies. Not every headache, and not for everybody, but for many people, food allergies trigger headaches.

Dementia can be related to digestive imbalances, because if your guts are inflamed, your body’s inflamed. If your body’s inflamed, your brain’s inflamed, and that can increase your risk of dementia. This is because of something called hepatic encephalopathy, which happens to alcoholics or people with cirrhosis. In these people, their livers lose the ability to break down toxins. The symptom is that they get delirious. They get crazy. They get psychotic. They get demented. Their whole brain goes haywire. The treatment, believe it or not, is antibiotics that clean out the intestinal tract. The digestive tract is sterilized with antibiotics. Now that’s a bizarre treatment. Why would we sterilize the digestive tract to fix delirium and psychosis? Because those toxins in the gut, those things that can’t be broken down by the liver, get into the brain and cause craziness.

Immune disorders, allergic and inflammatory diseases, are also related to the digestive tract. That’s because 60 percent of the immune system lies right below the lining in the digestive tract. Things like rheumatoid arthritis, lupus, osteoarthritis, kidney inflammation, or inflammation in any part of the immune system is often related to digestive imbalances.

Thyroid diseases and hormonal diseases are often related to food. Thirty percent of people with hypothyroidism, or low thyroid function — which can cause fatigue, dry skin, hair falling out, loss of eyebrows, cracked, thinning nails, fluid retention, constipation, menstrual irregularities, infertility, low libido, depression, memory loss — have antibodies to gluten. These can trigger immune disorders. There are other things that can interfere with thyroid function too, such as environmental pesticides and mercury, but often the problem is food allergies.

Type I diabetes is a disease we're all familiar with. This is the juvenile-onset diabetes, and most of us don't realize that there is a cause. They think it's genetic or just a fluke. But a certain portion of people have a reaction to milk antigens, the proteins found in milk, and that creates an autoimmune response against the pancreas that leads to diabetes.

### **Food Sensitivity**

Our bodies react to food in many different ways. There is food sensitivity. There is the true food allergy, the severe reaction that sends the unknowing snacker to the emergency room. There is also the food delayed allergy, which is called an IgG allergy.

Food sensitivities are when you have a bad reaction that is not an immune reaction. Perhaps you feel badly after eating a meal laced with MSG? You are experiencing the famous Chinese restaurant syndrome, a food sensitivity to MSG. Some people have bad reactions to aspartame. Tartrazine, a common yellow dye, can cause asthma and allergies. Tartrazine is found in all kinds of things, including foods, prescription medication, and over-the-counter pills. Other folks are sensitive to sulfites, the preservatives that are often found in wine, dried fruit, and salad bar offerings. Another common food sensitivity is lactose intolerance.

### **Food Allergies**

There are two types of food allergies. The first type is IgE, or Type I, immediate hypersensitivity. It's obvious. A man eats a peanut, he can't breathe, his throat swells up, his tongue swells up, and he's rushed to the hospital. Even if he just gets a bad case of hives, there is little question about the cause. Doctors test IgE allergies with skin-prick tests and blood tests. Doctors treat IgE allergies with allergy shots.

The less well-known allergy is the IgG, Type III, delayed immune complex disease. This is the delayed allergy. Its symptoms might not show up until 12, 24, or even 72 hours after you ate the food. You may not even know that the symptoms are connected to what you ate.

### **The Causes of Delayed Allergy**

What are the causes of delayed allergy? Some people say it's our modern diet. Ten thousand years ago, we were still hunting and gathering our food. Our genetics have changed very little since then. They change about 0.2 percent every 20,000 years. So 10,000 years ago, the genes of our hunter-gatherer ancestors were almost identical to the genes we have today.

When we're eating food, our genes expect to encounter the food that our hunter-gatherer ancestors ate. But we don't eat that kind of food anymore. We're eating a lot more grains. We just started growing grains about 10,000 years ago. A lot of us are not well adapted to grains, and that's why 30 percent of us have the gene for a reaction to gluten. One percent of us have severe disease caused by eating gluten.

Another cause is our SAD, our standard American diet, which is overconsumptive malnutrition: too many calories, not enough nutrients. We eat processed food. We eat junk food. We eat trans fats. We eat high-fructose corn syrup. We eat too much salt. We eat too many preservatives, too much junk. We also have a monotonous diet. We eat the same thing all the time. We get in a certain rut in our diet, and we typically eat the same few foods all the time. Our diet used to be very diverse. We had tremendous variety of plant foods, nuts, berries, seeds, and animal foods. We never ate the same thing twice. A hunter-gatherer could not go to the supermarket and buy the same thing over and over again.

We don't eat plant-based diets anymore. Most of our diets are animal-based. We eat dairy products, meat, and animal fats.

Eighty-five percent of Americans are deficient in one or more nutrients according to the paltry minimal daily requirements. Even the minimal amounts needed to prevent deficiency diseases are not eaten by 85 percent of the population. To prevent scurvy, you need 60 milligrams of vitamin C. That's not very much. Yet 10 percent of Americans are not getting enough vitamin C to prevent scurvy. Seventy-five percent are not getting enough zinc; 99.9 percent are not getting the omega-3 fats. Across the board, by conventional scientific studies, we are nutrient deficient.

We also don't eat foods that have healthy bacteria. You've heard about those mountain men that eat yogurt and live to be 120. Part of the reason they live to be 120 is that they're not very good at counting, but the other reason is that they eat yogurt, which is full of healthy bacteria. One of the most important things you can do to stay healthy is keep your gut bacteria healthy. If they're healthy, you're healthy.

Another reason we might be having more allergy diseases, more autoimmune diseases, more inflammatory diseases is because we're too clean. This is the hygiene hypothesis for increasing allergy. It's still a hypothesis, but it's a good one. We used to get out there and play in the dirt. Now nobody wants to get dirty. We have too much hygiene. Everybody's washing his or her hands. Everybody's a clean freak because we're worried about getting AIDS or hepatitis. There's certainly a role for hand-washing in preventing common colds and infections, but when we're children, if we don't go out and play in the dirt, then we're not exposing our immune systems to the things it needs to create a normal balance.

So what is going on here? We're consuming allergic foods. We're consuming too much alcohol. We're using antibiotics too much. The antibiotics kill off all the healthy bacteria, and we don't put them back afterwards. (In Europe, when the doctor prescribes an antibiotic, she also prescribes a probiotic to restore the normal healthy bacteria in the gut.) We use too many anti-inflammatories and steroids. We use too many anti-inflammatory, non-steroidals drugs, like Advil and Aleve, which promote a breakdown of the intestinal tract. We use too many proton pump inhibitors, like Prevacid, or acid-blocking drugs that block the normal function of the gut.

These drugs change the pH and prevent proper digestion. The patient then has fermentation, bloating, and all kinds of bad things happening in the small intestine.

We eat too much sugar. And where there's sugar, there's yeast. If a plastic bottle of apple cider is left in the fridge too long, the container will inflate. This happens because the yeast in the apple cider fermented the sugar and exhaled gasses that, if trapped, will push out the walls of the container. Do you want that happening in your guts? That's exactly what happens in your digestive tract.

We are getting parasites from our water and our food. A raspberry, picked in the morning in Costa Rica, can be flown to New York and end up on our dinner table before sunset. But what was in the river water used to irrigate that raspberry plant?

### **Common Allergens**

Dairy is being promoted as nature's perfect food. After a recent inquiry, the Federal Trade Commission asked the United States Department of Agriculture to put together a group of scientists to evaluate the claims that were in the "Got Milk," ads. The scientists asked, "Got proof?" and the answer was no. They found that a lot of the claims that were made weren't substantiated in the medical literature, and that there were certain risks associated with milk. Obviously lactose intolerance is a big factor for many people. There are studies that show that lactose intolerance is linked to Type I diabetes. Milk is the number one cause of constipation in children. Milk is the number one cause of blood loss in the gut.

If you give milk to a baby, it can cause the baby's intestinal tract to bleed and lead to iron-deficiency anemia. Milk consumption may be linked to diseases like autism and ADD. It may even be linked to osteoporosis. The Nurses' Health Study, which was an observational study, not a control trial, found that women who have more milk in their diet still showed a 50 percent increase in risk of hip fracture. There are also antibiotics and hormones in dairy products that may be linked to hormonal disorders, menstrual problems, and other diseases.

Gluten sensitivity is very common, and it can be linked to many diseases, including depression, obesity, liver dysfunction, nerve problems, osteoporosis, and thyroid cancer. The conditions affecting children can include asthma, autism, ADD, bed-wetting, chronic diarrhea, eczema, headaches, and iron deficiency. In adults, gluten sensitivity can lead to irritable bowel syndrome, chronic pain, autoimmunity, dermatitis, and other skin problems, inflamed bladder, arthritis, respiratory illnesses, and kidney problems. If you have any of these conditions, you should be tested for gluten sensitivity.

Now how do you do the testing? The best way to find out if you have a problem, the gold standard, is to get rid of dairy and gluten in your diet for five days to two weeks. If you are sensitive, you'll know it because of how you feel. Then you reintroduce the suspect foods, one at a time, three days apart, to find out which foods causes the negative reactions. If you are getting

migraines from eating gluten and you stop eating gluten, your migraines will go away. And if the migraines return when you reintroduce gluten to your diet, then you have your answer.

Besides the elimination and then rechallenging your body with food, there are a number of blood tests and other tests that can be done to identify imbalances in your gut and to identify food allergies. Here is a list of the tests and what they do:

### Lab Tests for Inflammation

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#### ❑ C-REACTIVE PROTEIN

This blood test is the most powerful predictor of heart disease. We believe it should be measured in all adults over 30. It was originally used to diagnosis pneumonia, but now is being used to tell if you have generalized inflammation from many causes, including obesity, diabetes, chronic hidden infections, bad teeth, lack of exercise, or an inflammatory diet. It is the best screening test at this time for inflammation.

#### ❑ CYTOKINES (IL-6, IL-1, TNF-alpha, etc.)

Cytokines are a class of proteins that are the language of your immune system, much in the way neurotransmitters are the language of the nervous system and hormones are the language of the endocrine, or hormone-secreting, glands. They can either promote or reduce inflammation. Newer tests can identify the balance of these compounds. IL-6 and TNF-alpha are particularly important inflammatory molecules, implicated in many diseases.

#### ❑ MYELOPEROXIDASE

Myeloperoxidase (MPO) is an abundant enzyme secreted from white blood cells. This forms free radicals and creates inflammation. It has been found to be associated with heart disease.

### FOOD ALLERGY TESTING

The current status of testing for the existence of food allergens is less than ideal, but with some cautions, and using specific tests, insight can be gained into the potential and specific triggers for any one person with chronic inflammation. Here is a brief summary of some of the most useful tests.

#### ❑ ELIMINATION/PROVOCATION

This is the most useful test. Remove the foods, see if your symptoms resolve, and then eat the food again. If you get sick, you have your answer. The problem occurs if you don't eliminate ALL the foods you are allergic to, because even if you have removed some, you might not get completely better. This is why we recommend a general elimination diet for two weeks. It is a good way to see if food is part of your problem. It is best to reintroduce foods or food groups one at a time after the initial two weeks.

#### ❑ ELISA/RAST IgE

This is a very well accepted way to check for IgE, or acute food allergies. If you eat a peanut or a strawberry, are you going to get hives or end up in the emergency room? If this is severe, most of the time you already know this. On the other hand, subtle IgE allergies may not always be obvious. This blood test helps to identify the problem.

#### ❑ IgG FOOD ANTIBODY TESTS

There are many labs that perform this, and some are better than others. This checks less obvious allergies or reactions from food. Many of the positive results may not be truly positive, but generally a two-week elimination and challenge with those foods can pick out the truly reactive foods.

#### ❑ GLUTEN ALLERGY (For celiac disease.)

- IgA anti gliadin antibodies (gluten)
- IgG anti gliadin antibodies (gluten)
- IgA anti endomysial antibodies (gluten)
- Tissue transglutaminase antibodies (gluten)
- Celiac gene testing

These tests can identify those who have a genetic gluten or wheat allergy. This occurs in about 1 in 120 people and is seriously underdiagnosed. It is known as celiac disease and can manifest in many different forms, from digestive complaints to acne to canker sores to thyroid disease and even to many autoimmune diseases. If you have a chronic inflammatory condition, it is critical to identify this common inherited gluten allergy.

#### ❑ COMMON AUTOIMMUNE INDICATORS

- Thyroid peroxidase antibodies
- Anti-thyroglobulin antibodies
- Anti-nuclear antibodies
- Other autoantibodies

These are among the most common indicators of autoimmune antibodies. They give clues about autoimmunity and inflammation, even in the absence of other symptoms. Many environmental toxins or xenobiotics interfere with thyroid function and can cause an autoimmune reaction to the thyroid in which the body begins to attack its own thyroid gland, even in the absence of other abnormal thyroid tests.

### ASSESSMENT FOR CHRONIC INFECTIONS

#### ❑ ANTIBODY TESTING FOR CHRONIC INFECTIONS

Testing for hidden chronic infections is difficult. There are numerous potential culprits, and not everything that you find may be causing symptoms, or even illness. In fact sometimes we live quite harmoniously with a whole host of bugs. When the balance is tipped, however,

problems can occur. Some autoimmune diseases are now linked to infections, including chlamydia and Epstein-Barr virus being possible cause of multiple sclerosis. Other bugs have been linked to heart diseases, including chlamydia (a cause of bronchitis and pneumonia), *Helicobacter pylori* (which can also cause stomach ulcers and stomach cancer), herpes simplex 1 (cold sores), and cytomegalovirus (a virus often causing no symptoms).

Antibodies (the infection fighters made by your white blood cells against these organisms) can be found in the blood, but often it is hard to tell if this is from an active or previous infection. Newer tests can help us with this problem. (See PCR testing below) Consultation with a knowledgeable doctor can be helpful in this detective hunt.

#### ❑ PCR TESTING FOR CHRONIC INFECTIONS

PCR, or polymerase chain reaction, is a relatively new technology that can help to identify the actual DNA particle from virus, bacteria, or yeasts in any body fluid or tissue sample (this is how they can diagnosis anthrax from the skin). It is useful in people with difficult-to-solve problems, including chronic fatigue and autoimmune conditions.

#### ❑ ASSESSMENT OF YEAST OVERGROWTH

While the concept of yeast overgrowth is far from accepted in conventional medical circles, we have found it to be a real and very treatable problem for many with chronic illness. There are many ways to identify problems with yeast - antibodies, PCR testing, cultures, metabolites. While none is perfect, combining these can give us a clear picture of the load of yeast in your system and its potential for metabolic and inflammatory damage.

The useful tests include:

- Candida and other fungal antibodies
- PCR testing for various fungal organisms
- Stool cultures
- Vaginal cultures
- Vaginal KOH (potassium hydroxide) smears (done in a doctor's office)
- Urinary organic acids for yeast metabolites, including arabinitol, citramalate, beta-ketoglutarate (all analogue inhibitors of metabolic function, or imitators of our own molecules that can cause interference with our own metabolism)

#### ASSESSMENT OF GUT SOURCES OF INFLAMMATION/INFECTION

The gut-immune connection is well established, yet few physicians think to look at the gut as a source of systemic inflammation. Trying to identify the problem bugs can be difficult, but when these tests are used with good clinical judgment, those problems can be identified and treated. The goal is to find imbalances in the ecosystem of the gut and correct them so that the cycle of inflammation is stopped.

Here is what we have found to be the most useful tests for identifying problems in the gut ecosystem.

#### ❑ URINE ORGANIC ACIDS FOR DYSBIOSIS

Organic acids are metabolites in the urine that can give clues to nutritional status, but the test is often used to look at unusual chemicals that come from the gut bacteria, yeasts, or parasites.

#### ❑ STOOL ANALYSIS FOR DYSBIOSIS

Many chemical markers can be analyzed in the stool to give a picture of the ecosystem. Markers for digestion, absorption, inflammation, acid-alkaline balance, as well as cultures of the various bacteria, yeasts, or parasites can often pinpoint the source of inflammation and be linked to many diseases

#### ❑ HYDROGEN BREATH TESTING FOR SMALL-BOWEL BACTERIAL OVERGROWTH

One of the best tests for identifying bacteria growing in the small intestine (where there should be none) is the hydrogen breath test. After drinking a special sugar drink, your breath is collected. If there is a lot of gas or hydrogen, then it means that the bacteria or other organisms in your small intestine are fermenting the sugars, like a little brewery. This problem is often linked to autoimmune conditions and irritable bowel syndrome.

### HEAVY METAL TESTING (MERCURY, LEAD, AND OTHERS)

#### ❑ HAIR ANALYSIS FOR HEAVY METALS

While there has been controversy over hair analysis, it is a well-accepted and scientifically accurate method for assessing the burden of heavy metals like lead, mercury, arsenic, cadmium, etc. Heavy metals have been shown to cause autoimmune and inflammatory reactions.

#### ❑ URINE PROVOCATION TEST FOR HEAVY METALS

This is the most accurate way to assess your total body load of heavy metals. Other tests may show what is being excreted in the hair from fish consumption, or temporarily in the blood, but the urine provocation test can best tell you your lifelong exposure. The test is done by taking an oral dose of either DMPS 10mg/kg or DMSA 30mg/kg followed by a six-hour urine collection.

#### ❑ TESTING FOR PARASITES

This is one of the most problematic areas in medicine. The correct diagnosis depends on experienced lab technicians, correct collection, and sometimes multiple specimens. Many labs now specialize in the unique methods needed for proper detection. Still, multiple specimens are needed, and often you must take a laxative to get those critters to let go of the bowel wall, where they like to hang on. Be sure to check to make sure you have rid yourself of these with at least three specimens at least two weeks after your treatment is over.

#### ❑ TESTING FOR THE GUT MICRO ECOLOGY IMBALANCES

The following tests have already been reviewed elsewhere:

- Comprehensive digestive stool analysis (see “stool analysis for dysbiosis,” page 78)
- Specialty Parasitology Labs (see “testing for parasites,” page 78)
- Hydrogen breath testing for small-bowel bacterial overgrowth (see page 78)
- Urine organic acids for dysbiosis (see page 78)
- Intestinal permeability (lactulose/mannitol challenge, below)

#### OTHER TESTS FOR GUT FUNCTION

##### ❑ LACTULOSE/MANNITOL CHALLENGE FOR INTESTINAL PERMEABILITY

Checking for a “leaky gut” can tell you if you are keeping out unwanted food particles or antigens and bugs or not. This test is very good for looking at whether or not your gut is keeping out the bad stuff and letting in the good stuff. A leaky gut is a common feature of most inflammatory conditions.

#### COMPLETE BLOOD COUNT

This common test can give many clues to underlying infection. It shows the different types of white blood cells and their responses to different organisms. Here’s what to look for:

##### ❑ ANEMIA OR LARGE RED BLOOD CELLS

This can be sign of B<sub>12</sub> or folate deficiency. B<sub>12</sub> is absorbed in the small intestine, and if there is chronic inflammation, bacterial overgrowth, or a parasite, it is often poorly absorbed, leading to large red blood cells that show up as an elevated MCV (or mean corpuscular volume). Anything over 95 should get you thinking about B<sub>12</sub> malabsorption or folate deficiency.

##### ❑ A LOW NEUTROPHIL AND HIGH LYMPHOCYTE COUNT

This can be a sign of chronic yeast or viral infections. Neutrophils and lymphocytes are types of white blood cells. A low total white blood cell count can also be a sign of stress to the immune system

##### ❑ EOSINOPHILS

These are specialized white blood cells that fight parasites or deal with allergens and may indicate either or both. Further testing for parasites or allergies should be done if eosinophils are elevated.

##### ❑ HOMOCYSTEINE AND METHYLMALONIC ACID

These can help pick up B<sub>12</sub> or folate deficiency.

##### ❑ 25-OH VITAMIN D

Low vitamin D levels are a very good clue to malabsorption, poor nutrition, risk of osteoporosis, multiple sclerosis, seasonal affective disorder, and more.

### Treating Food Allergies

How do we deal with this problem of food allergy? It's very simple. It follows the basic principles of ultraprevention, which is to remove the offending agents, to repair the problem, and to recharge the system. Start by removing the common food allergens and the bacteria, yeast, or parasites. Next, replace the things that are missing, the probiotics, and repair the gut with essential fatty acids and the natural anti-inflammatories like ginger and curcumin. Add vitamins like zinc, vitamin C, B6, vitamin A, and magnesium. Add glutamines. All these things can be combined, along with special fibers. By very carefully working with a physician or on your own and using supplements that you can get in a health food store, you may find that your chronic allergy problems go away. By simply changing your diet, getting rid of food allergens and the inflammatory foods, you can have a vital and healthy life.

There are many foods you can include in your diet to reduce inflammation besides the Mediterranean diet and the omega-3 fats. Add wild fish, flax seeds, nuts and seeds. Add anti-inflammatory herbs like ginger, rosemary, curry, or turmeric. Vitamin C and antioxidants are all powerful anti-inflammatories. In fact, a multivitamin can lower your C-reactive protein and inflammation as much as any other drug on the market.

### Exercise Two: What to Take Out, What to Take In

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Identify two unhealthy foods from the "SAD" diet you will remove from your diet this week.

1. \_\_\_\_\_ 2. \_\_\_\_\_

Now, identify two anti-inflammatory items to add in to your diet this week:

1. \_\_\_\_\_ 2. \_\_\_\_\_

## **Stress**

How does stress play a role in inflammation? Stress creates many of hormonal alterations that change the levels of cytokines in the body. Cytokines are the messenger molecules of your immune system. They trigger the messages to start the fire or to cool off the fire. We want cytokines or molecules of inflammation that are cooling, not inflammatory.

All kinds of diseases are related to stress: inflammatory bowel disease, psoriasis, cancer, and multiple sclerosis. Dr. Herbert Benson from Harvard said that 95 percent of all diseases are either caused by or made worse by stress.

What's fascinating is that, when scientists studied a way of intervening to reduce stress, they found dramatic reductions in inflammatory diseases.

One study published in *The Journal of the American Medical Association* asked people to write about stressful experiences for just 20 minutes a day, four days a week, for six months. Another group was asked to write about the weather or something fairly benign for the same period of time. The group that wrote about stressful subjects had a dramatic reduction in their symptoms of asthma and rheumatoid arthritis by both subjective and objective measures. How could just writing for four days reduce symptoms for six months? By reducing stress, you can dramatically reduce inflammation.

## **Exercise Three: Journal**

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Commit to writing in a journal 15 minutes a day, every day, for the next week. Your journal doesn't need to be a fancy leather-bound volume. A simple spiral notebook will do. Just write down what is stressing you out.

## SESSION 6

### Ultraprevention Questionnaire, Part 3: Impaired Metabolism:

Answer the following questions:

- 
1. I exercise less than 30 minutes each, three times a week.  yes  no
  2. I suffer from chronic or prolonged fatigue.  yes  no
  3. I have regular muscle-aching pain or discomfort or weakness.  yes  no
  4. I crave sweets. When I eat them, I get a temporary boost of energy and mood, and then later I crash.  yes  no
  5. I have a family history of diabetes, hypoglycemia.  yes  no
  6. If I eat a carbohydrate breakfast (muffin, bagel, cereal, pancakes, etc.) I can't seem to control my eating for the rest of the day.  yes  no
  7. I have extra weight around the middle (My weight to hip ratio is greater than 0.8 – measure around the belly button and then around the bony prominence at the front of the top of the hip).  yes  no
  8. I have dry skin, hair thinning or loss, or coarse hair, and my nails seem brittle and crack easily.  yes  no
  9. I get cold easily and have cold hands and feet.  yes  no
  10. I have a low pulse (under 60) and a low blood pressure (under 100/70).  yes  no
  11. I have fluid retention (swelling of hands and feet).  yes  no
  12. I have trouble with memory and concentration.  yes  no
  13. I have trouble getting out of bed in the morning.  yes  no
  14. I have loss of or thinning of the outer third of my eyebrow.  yes  no
  15. I have trouble losing weight or have recently gained weight without significantly changing my diet or exercise patterns.  yes  no
  16. I have sleep problems - either falling asleep or staying asleep.  yes  no
  17. I often feel stressed or have that tired but wired feeling.  yes  no
  18. I have heart palpitations, panic attacks, or am easily startled.  yes  no
  19. [For women only] I have PMS, abnormal menstrual cycles, or lots of menopausal symptoms (hot flashes, sleep problems, mood or memory problems).  yes  no
  20. [For men only] I have a lowered sex drive, trouble maintaining or getting erections, loss of muscle, and increased abdominal fat.  yes  no

TOTAL number of "yes" responses: \_\_\_\_\_

Your total of "yes" responses is your impaired metabolism score for the ultraprevention questionnaire.

### **Force #3: Impaired Metabolism**

The next force of illness is impaired metabolism. Most of us know we have this problem. We can just look down and see our bellies and know that our metabolism isn't working properly. America is an obese nation. Sixty-five percent of us are overweight; 30 percent are obese. Children are becoming obese at an alarming rate. In fact, we're now seeing adult-onset diabetes in little children. There's a huge problem with our metabolism. For this reason, my next book *Ultrametabolism: The New Science of Weight Loss* will focus solely on metabolism. Go to [www.drhyman.com](http://www.drhyman.com) for more information.

In America, we each consume about 175 pounds of sugar every year. That leads to a condition we call metabolic syndrome or insulin-resistant syndrome or pre-diabetes. It's all the same thing, and it probably affects, conservatively, 50 million, but likely over 100 million, Americans.

We're going to spend a lot of time in this session talking about how to fix this problem because it's the key to everything. If you have insulin resistance, you have inflammation. You have oxidative stress. Your liver gets fatty and you have impaired detoxification. It's likely that you're malnourished and your immune system is superinflamed. The biggest cause of inflammation in our society is the belly fat. We have to take this seriously as individuals and as a society. If we don't, the consequences economically and for our health over the next generation or two are going to be staggering.

Most of us have a problem with energy. We don't have enough of it. We're tired. We're fatigued. This is because our little energy factories, the mitochondria, don't work properly. We need to get our mitochondria firing, functioning, and burning fuel at a faster rate.

In addition to problems with our metabolism, insulin resistance, and metabolic syndrome, we also have to look at our hormones. These form a symphony of molecules that control our health or disease. There are many other hormones that need attention, but we are going to focus mostly on the adrenal glands and the thyroid gland. These two cause most of the chronic symptoms we have related to hormonal imbalance.

The science of weight loss and the science of healthy metabolism is based on dispelling seven key myths that keep us fat and following several key new principles that keep our metabolism functioning at full speed.

#### **High-fat diets don't work.**

The first myth that most of us believe is that if we eat less and exercise more, we'll lose weight. Americans spend \$50 billion a year on weight loss, yet only 2 percent of those attempts at weight loss are successful. Ninety-eight percent are not successful. Yet we follow one diet after the other. We have Atkins; Dean Ornish's Eat Less, Weigh More; The Zone; The Paleo Diet; South Beach diet. All of them have their points and their benefits, but the reality is that they're

all high-fad diets. We need to get away from being on a diet. There is no diet that's going to be the perfect diet for everybody.

The recent study in *The Journal of the American Medical Association* comparing all these diets found that people lost weight short term, but they didn't sustain the weight loss. The article talked about a new philosophy that's based on what we call nutrigenomics, which is the science of adapting your diet to your genes. You have to live in harmony with your genetics if you want to maintain a healthy weight and metabolism.

So what is the problem with obesity in this country? Have we mutated? Have we suddenly undergone a genetic aberration that's led us to be obese? Obviously we don't mutate in one generation, so the problem is something in the environment. What is it? Is it calories? Is it the type of calories? Is it fat? Is it carbohydrates? The answer is yes, it's all of the above. It's the quality of the food we eat. It's the amount of calories we eat. It's the type of calories and where they come from. It's the type of fat. It's the type of carbohydrates. It's all of that.

### **All calories are not created equal.**

Calories are a unit of energy. They're an energy measurement used in laboratories. They should be the same no matter what the source. But in your body, that's not the case. It's a revolutionary thought.

### **What you eat makes a difference.**

The composition of the diet plays a big role in metabolism. The balance of fat, protein, and carbohydrates; the type of fat, protein, and carbohydrates; the quality of fat, protein, and carbohydrates all play a huge role in your metabolism. The amount of fiber in your diet plays a role. The type of phytonutrients, or plant chemicals, besides the calories, regulates your genes. The vitamins and minerals in your diet also play a role.

Besides the actual food itself, the timing of the meal is critical, whether you eat it in the morning or at night, how many meals you eat a day, whether they're small or large, the volume of any particular meal. The volume of any particular meal is a significant determinant of what happens to your metabolism. The stress that you eat under plays a big role in your metabolism. If you eat under stress, your body shuts down. When you're running from a saber-tooth tiger, you don't want to be digesting your food, so your body shuts down your digestion under stress. All the blood goes to your muscles, to your brain, to your heart, to your lungs, so you can run or fight, not digest.

### **Eating under stress shuts down your digestion.**

Food contains information that affects genes and metabolism. Food is not just energy. Food is energy plus information. Food communicates with your genes. It turns on or off genetic messages that regulate your metabolism. It turns on or off the fat gene. It turns on or off the thin

gene so that, by simply changing the composition of your food, by changing the foods in your diet, by changing the way you eat, you can turn on or off different genes that regulate your metabolism and your weight.

This concept that food contains information that affects our genes and metabolism is critical to changing our diet. We can change our diet in such a way as to create messages that promote healthy weight metabolism, or we can stay on diets that shut off our metabolism. This is the field of nutrigenomics.

The biology of hunger and our feeding behavior involves a complex set of signals that involve neurotransmitters, genetics, and psychological and cultural factors. In order to have a healthy weight metabolism, we have to have these complex signals working together. Our genetics, our psychology, our culture, our hormonal and our neurotransmitter or brain function must all communicate in harmony and work together to maintain a healthy weight.

### Exercise One: Your Metabolism

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How is your metabolism? Do you have a weight problem? Do you have enough energy to get through the day? How do you think your metabolism is affected by the principles mentioned above? Write your answers here:

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There are six basic concepts that you need to understand so you can reset your metabolism. These seven ideas are not part of a diet, a fad, or a quick fix, but they will radically change your health forever and keep your weight healthy.

### **Get your hormones in balance and your neuroendocrine system controlled.**

There are many signals that are involved in controlling your weight. The signals involve brain messenger chemicals, called neurotransmitters, hormones, and the immune system. These signals all have to be working in concert. There are many things we do to disrupt those signals, but if we get them working properly, we're a long way toward fixing our health.

### **Get insulin under control.**

Insulin is the master commander. Insulin is produced when you eat sugar. When insulin is produced in excess, it makes you hungry, it makes you gain weight, it creates inflammation, and it disturbs your metabolism in dramatic ways.

### **Subdue stress.**

If you don't subdue stress, you'll have more belly fat. If you have more belly fat, you'll have more inflammation. If you have more inflammation, you'll have more obesity.

### **Maximize your major metabolism hormone.**

Your major metabolism hormone is your thyroid hormone. There are many things we do to disrupt its function. But there also ways to supercharge your mitochondria and burn calories faster. If you can burn more calories per minute, then you're gong to have longer and more sustained weight loss.

### **Cool off the inflammation.**

Not only is inflammation caused by obesity, but inflammation itself could be the cause of obesity. It works both ways. By cooling off inflammation, you can reduce your weight and keep a healthy metabolism for life.

### **Love your liver and get rid of toxic fat.**

If your liver is not working, then the rest of your metabolism is not going to be working. The liver controls your sugar level and your metabolism. If you have a fatty liver, then you're going to have a hard time losing weight. The biggest cause of a fatty liver in our country is sugar and insulin resistance. Other sources of a toxic liver include environmental pesticides, chemicals, heavy metals, and mercury. Love your liver by learning how to detoxify your liver and detoxify your life.

### **What are we eating?**

The National Health and Nutrition Examination Survey looked at about 6,000 men and about 7,000 women from 1971 to 2000, and they found that men increased their calories from 2,400 to 2,600 calories, and women, from 1,500 to 1,800. Men's consumption went up about 200 calories, women's went up about 300 calories a day. The carbohydrate calories increased from 42 percent to 49 percent in men, and 45 percent to 51 percent in women. Carbohydrate calorie intake made a big jump. Fat calories decreased from 36 percent to 32 percent in men, and 36 percent to 32 percent in women. Carbohydrate intake increased, fat intake decreased, but we became more obese. The source of the increased calories was predominantly from soft drinks, salty snacks, pizza, and larger-portion sizes.

Now let's look at some diet factoids. Obesity rates have increased 75 percent from 1991 to 2000. Diabetes has increased 60 percent from 1990 to 2001, and type II diabetes in children — this is adult-onset diabetes in children — has increased 1,000 percent from 1984 to 1992.

Americans spend \$117 billion on obesity-linked diseases, and \$50 billion on weight loss. Chronic diseases are responsible for 75 percent of our healthcare costs, and many of those are related to obesity. In fact, obesity is overtaking smoking as the number one cause of preventable death. Of the \$1.5 trillion we spend on healthcare, less than 2 percent is spent on prevention, and yet 75 percent of our healthcare costs are from chronic diseases that are related to totally preventable conditions.

Half of all overweight adults have high blood pressure. That the average teen gets 15 percent of his or her calories from soda. That the average child sees 10,000 TV ads for junk food every year at a cost of \$13 billion to the food industry. In 1957, a hamburger weighed 1 ounce, with 210 calories, and in 2004, a hamburger weighs 6 ounces, with 618 calories.

Twenty-five percent of all vegetables eaten in America are french fries. Since Reagan decided that ketchup was a vegetable, it's now the second most common fruit/vegetable eaten in America. French fries and ketchup comprise most of the common vegetables in America. The effect of this is the expanding waistline of our population.

These are some sobering facts. We're faced with a crisis that's unprecedented in our healthcare, and it's not being addressed. We're spending billions of dollars researching drug treatments for diseases that have their cure in lifestyle. We need to do something about this now.

### Five Myths That Make You Fat

The starvation myth  
 The sumo wrestler myth  
 The calorie myth  
 The French paradox  
 The fat myth

#### Myths That Make You Fat #1: The Starvation Myth

Now why is starvation considered to be the treatment for diet and weight problems? We try to restrict calories. We try to reduce calories. We try to limit the number of calories people eat. This is a fundamentally flawed concept. We can't restrict calories and expect to maintain healthy long-term weight loss and healthy long-term metabolism. It's just physiologically impossible. All our protective mechanisms kick into gear, and we counteract any attempt at weight loss when we restrict calories.

What's considered a starvation diet by the World Health Organization? Most people would probably say it's 1,000 to 800 calories. In fact, the starvation diet is considered to be 2,100 calories or less for the average male and probably about 1,800 calories or less for the average female. If you eat less than 2,100 calories if you're a man or 1,800 calories if you're a woman, you're considered to be starving.

Now how do you figure out how many calories you need? You take your weight in pounds and you multiply by 10. On top of that, you have to add about 30 percent for the activities of daily life, and you have to add another few hundred calories, depending on how much you exercise. That's what you need in order to maintain your weight.

#### Exercise Two: Crunch the Numbers

Do this simplified version of the math to figure out how many calories you need each day to maintain your current weight, assuming you are not burning extra calories by exercising:

Line A: Your current weight \_\_\_\_\_ x 10 = \_\_\_\_\_

Line B: Your current weight \_\_\_\_\_ x 0.30 = \_\_\_\_\_

Add the totals from line A and B \_\_\_\_\_

If you eat less than your resting metabolic rate, your body will think you're starving, and you will begin to kick into gear all kinds of starvation protection mechanisms, because historically and genetically we're not adapted to abundance. We're not adapted to excess. We're not adapted to refrigerators and restaurants and McDonald's and junk food. We're adapted to starvation. We're very good at dealing with times of scarcity, but not with abundance.

The survival of our human species depends on something called the "limbic brain." This is the survival brain. This is the part of our brain that's the old brain. Someone called it a lizard brain because it controls the reactions that a lizard has. The limbic brain governs basic survival functions. In medical school we call these functions the four F's. The first F is the flight response, the second F is the fight response, and the third F is the feed response. The fourth F we refer to as sex.

The fight or flight responses are something you absolutely have no control over. We can't have conscious control over the flood of hormones and chemicals that make us go into an alarm state. It's automatic.

These survival functions are critical in determining our feeding behavior, because feeding behavior determines our survival. If we don't get food, we will die. Our body perceives any restriction of calories as alarm, as danger. But what do people typically do? They don't have breakfast. They're on a diet. They have a light lunch, maybe a salad, and then what happens? They get home and raid the refrigerator.

The reason is not because they're stupid, not because they need psychotherapy and behavioral therapy to control their relationship with food. The reason is that if we've been starving, we are all hardwired to overeat when we get the food.

If you restrict your calories all day, when you do eat, you will eat more. Researchers took two groups of people. One group was fed breakfast, lunch, and dinner. For dinner they could eat whatever they wanted. Another group was fed just dinner, whatever they wanted. The group that only had dinner ate more calories and more food in one day than the people who had three meals. The timing of your food, how much you eat, when you eat all have a big impact on your weight.

Restricting calories over the long term is not going to lead to successful weight loss. We can't be on a calorie-restricted diet and expect to lose weight and keep it off for the long term. In fact, the average person gains about five pounds for every diet they go on, and that's not the bad news. The bad news is that when you lose weight, you lose muscle and fat. When you gain weight, you gain just fat. Muscle burns 70 times more calories than fat. People often say to me, "I've lost and gained weight many times, but now I'm not eating that much and I still can't lose weight." This happens because their muscle has been replaced by fat and they are burning 70 times fewer calories in those fat cells than they did in their muscle cells. They need fewer calories to maintain the same weight.

There's another part about feeding behavior we should understand, and that's the role hormones play in food. If we eat certain foods at certain times, we're going to trigger hormonal responses that drive our feeding behavior. You have to eat in a way that prevents you from being starved. You have to eat in a way that spaces your food throughout the day and prevents your sugar and insulin from rising too quickly.

### **Myths That Make You Fat #2: The Sumo Wrestler Myth**

How do sumo wrestlers get so big? Are they genetically different? Are they from a different tribe of Japanese people? How can little Japanese people become giant? The answer is very simple. What they do is they wake up in the morning and they do a little exercise, and then they eat a huge meal, and then they take a nap. They get up again, a little exercise, huge meal, go to sleep. They're constantly digesting while they're asleep. If you eat right before you sleep, you're going to gain weight.

Most people in America eat the sumo wrestler way. They eat most of their calories at the end of the day, and they go to bed generally with a pretty full stomach. That prevents you from normally digesting and metabolizing your food. When you're awake during the day, your system is turned on. When you're asleep, you're in the healing, repair, storage and rebuilding mode. And you will store and rebuild mostly around your stomach.

You don't want to eat most of your calories at the end of the day. You want to space them out throughout the day. Otherwise you'll end up looking like a sumo wrestler.

### **Myths That Make You Fat #3: The Calorie Myth**

This myth is a difficult one to dispel. Our belief in medicine is that all calories are created equal. What is a calorie anyway? It's a unit of energy. If you take one liter of water and apply heat to raise the temperature one degree centigrade, the amount of heat energy used equals one calorie.

A fantastic study, by Dr. David Ludwig from Harvard and his colleagues was called "Effects of a Low-Glycemic Load Diet on Resting Energy Expenditure and Heart Disease Risk Factors During Weight Loss." What they did was they took two groups of people. One group ate a low-fat diet, and the other group ate a low-carb diet. After two years both groups lost the same amount of weight. However, the low-carb group, the low-sugar, low-refined flour diet, had a higher metabolism. They had lower levels of inflammation. They had lower cholesterol. They had lower blood pressure.

Even though they both lost weight, the group that had the low-carbohydrate or low-glycemic-load diet had better metabolism and lower risk of heart disease than the group that had the low-fat diet. This is turning science on its head, because in a situation in which you have the same number of calories, how do you have totally different effects on metabolism and on your biochemistry and on your heart disease risk factors? The only way is if calories are not

created equal. The only way is if there's information in the calories that changes your biochemistry, that changes your genetics, that alters your metabolism.

Eat a low-glycemic-load diet, which means a diet that doesn't raise your blood sugar quickly. This is a diet that's full of whole grains, beans, nuts, seeds, whole fruits and vegetables, and lean animal protein. It's a diet full of good oils, like olive oil and fish oil. This type of diet is a low-glycemic-load diet as opposed to a diet that's high in refined sugars, flours, and processed food. Even if the calories are exactly the same, you will feel dramatically different. This is a revolution in thinking.

### **What is a "low carb" diet?**

Low-carb may mean different things to different people. Low-carb may mean no vegetables, no fruit, no grains, no beans. That's not what I mean by low carb. What I mean by low carb is a low-refined-carbohydrate diet. A diet that's low in sugars, refined flours, and refined grains that enter your blood stream and quickly raise your blood sugar and insulin level. That's what causes the problem. In a number of studies, they found that a low-carb diet works better than a low-fat diet to treat obesity and cholesterol.

David Ludwig at Harvard Medical School did a phenomenal study showing that all calories are not created equal. He took three groups of overweight young men, and he fed them three different diets that were all exactly the same number of calories. The first diet was instant oatmeal, the second was steel-cut oats, and the third was a vegetable omelet. Now what do you think happened to these young men?

The researchers took blood samples from the men every half hour. They also put the men in a room in the afternoon and said, "Eat whatever you want. Just push the button whenever you're hungry." The young men loved the study. They got as much food as they wanted. The men who ate the oatmeal, even though it was exactly the same calories for breakfast and lunch, consumed 80 percent more food later in the day. They were hungrier. When you eat a starchy breakfast, when you eat a bagel or a muffin or instant oatmeal, you're going to be hungrier sooner than if you have a protein breakfast like an omelet.

The study found that not only did the starchy-breakfast group eat more, but that their blood was different. In the morning after they ate the starchy breakfast, although it was exactly the same number of calories, the young men had a higher glycemic-index- or glycemic-load meal. The oatmeal group had higher levels of insulin, sugar, and fats in their blood. And they had higher levels of adrenaline. Eating something that's quickly turned to sugar in your body is like an adrenaline rush. We get a little buzz when we eat sugar. It's like a drug, and many of us are addicted to sugar for that reason. It creates a little energy boost, but then we dip, and our energy level goes even lower than it was before. This creates a vicious cycle of carbohydrate cravings and increased food intake and more cravings and so on. It's an addiction cycle.

Another fascinating study done by Penelope Green at Walter Willett's group at Harvard was a 12-week study of three groups of people. One group got an 1,800-calorie, low-carb diet, another group got an 1,800-calorie, low-fat diet, and the third group got a 2,100 calorie, low-carb diet. That's two low-carbs group, one more calories than the other, and one low-fat group. This was a strictly controlled study, and all the groups were limited to the same amount of activity. After 12 weeks the researchers found that the 1,800-calorie, low-carb group lost 23 pounds. The low-fat group, even though they had exactly the same calorie intake, lost 17 pounds.

What was more astounding was that the group who had the higher number of calories, the 2,100 calories, lost more weight than the low-fat group. How could that happen? The higher-calorie group consumed 25,000 more calories over the course of the study. That should have been equivalent to about 7 pounds, because there are about 3,500 calories in pound. So even though they had 25,000 more calories, they lost 20 pounds compared with 17 pounds for the low-fat group. How could it happen that two groups that ate the same amount of food lose different amounts of weight. And how could a group that ate more, lose more weight? This seems to violate the laws of thermodynamics.

The answer lies in the fact that it's not just the number of calories you eat, it's also the type of calories, where they come from, how fast they raise your blood sugar, and what information the food contains. There is more to food than calories.

What conclusions can we make from all this? First, all diets cause weight loss in the short term, but no "diets" work in the long term. We need to get away from fad diets and calorie-restricted diets. Second, we have to realize that all calories are not created equal. Third, that low-fat, low-fiber diets have not been proven effective in long-term weight loss. Fourth, the different types of macronutrients, in other words, fats, proteins and carbohydrates, the different glycemic loads, and the different qualities of carbohydrates elicit different responses in the body based on our genes, our hormones, and our neurotransmitters. All these aspects of food affect our weight and metabolism.

Even fiber plays a role in weight and metabolism. For many of my patients, PGX fiber capsules help to lower blood sugar and cholesterol and help with weight loss. The fiber is taken just before a meal, and it helps absorb the fats and the sugars. It's not a magic pill, but it helps significantly.

We have to realize that the change in the type of calories that we've eaten over the last 100 years has had a significant impact on our health and the rise in degenerative illnesses. Sugar consumption has dramatically increased over the last 100 years, from about 50 to about 175 pounds per person per year. Consumption of high-fructose corn syrup has increased 250 percent in the last 20 years.

There's also been a significant reduction in our physical activity and an increase in our stress. This has led to the metabolic syndrome, or insulin-resistant syndrome, which is the major cause of obesity, heart disease, cancer, dementia and every age-related disease.

#### **Myths That Make You Fat #4: The French Paradox**

Why are the French so thin, when French cuisine is famous for its high fat food? What's going on there? It's not because they drink wine; it's because they eat real food. They don't eat much junk food. And when they do eat junk food, they eat it slowly. They did a study at McDonald's in France, and they found that it took them a lot longer to eat a Big Mac than the average American.

#### **Myths That Make You Fat #5: The Fat Myth**

The next major myth is the belief that fat makes you fat. As we've discussed before, fat is not a major determinant of body fat. In a study of other studies by Dr. Walter Willett, he said that diets high in fat do not appear to be the primary cause of the high prevalence of excess body fat in our society and reductions in fat will not be a solution. Cutting out fat doesn't necessarily make you lose weight.

Let's review what we've learned about the myths. The first is we should eat a low-glycemic-index and low-glycemic-load diet. We should be eating foods that don't raise our blood sugar quickly.

### **Glycemic Indexes and Glycemic Loads for Common Foods**

This table shows Glycemic Index (GI) and Glycemic Load (GL) values for a few common foods. GIs of 55 or below are considered low, and 70 or above are considered high. GLs of 10 or below are considered low, and 20 or above are considered high.

The Glycemic Index is a numerical index that ranks carbohydrates based on their rate of glycemic response (i.e. their conversion to glucose within the human body). Glycemic Index uses a scale of 0 to 100, with higher values given to foods that cause the most rapid rise in blood sugar. Pure glucose serves as a reference point and is given a Glycemic Index (GI) of 100.

<b>Food</b>	<b>GI</b>	<b>Serving Size</b>	<b>Net Carbs</b>	<b>GL</b>
Peanuts	14	4 oz (113g)	15	2
Bean sprouts	25	1 cup (104g)	4	1
Grapefruit	25	1/2 large (166g)	11	3
Pizza	30	2 slices (260g)	42	13
Lowfat yogurt	33	1 cup (245g)	47	16
Apples	38	1 medium (138g)	16	6
Spaghetti	42	1 cup (140g)	38	16
Carrots	47	1 large (72g)	5	2
Oranges	48	1 medium (131g)	12	6
Bananas	52	1 large (136g)	27	14
Potato chips	54	4 oz (114g)	55	30
Snickers Bar	55	1 bar (113g)	64	35
Brown rice	55	1 cup (195g)	42	23
Honey	55	1 tbsp (21g)	17	9
Oatmeal	58	1 cup (234g)	21	12
Ice cream	61	1 cup (72g)	16	10
Macaroni and cheese	64	1 serving (166g)	47	30
Raisins	64	1 small box (43g)	32	20
White rice	64	1 cup (186g)	52	33
Sugar (sucrose)	68	1 tbsp (12g)	12	8
White bread	70	1 slice (30g)	14	10
Watermelon	72	1 cup (154g)	11	8
Popcorn	72	2 cups (16g)	10	7
Baked potato	85	1 medium (173g)	33	28
Glucose	100	50g	50	50

Source: [www.nutritiondata.com](http://www.nutritiondata.com). Additional information and values for Glycemic Index and Glycemic Load can be found at [www.glycemicindex.com](http://www.glycemicindex.com)

## HEALTHY EATING GUIDE

### Try to eat more:

- Fiber
- Omega-3 fats
- Healthy fats
  
- Vegetables
  
- Fruits
- Plant proteins
- Lean animal protein
- Whole grains

### Sources include/notes:

Whole beans, whole grains, bran, nuts, seeds, vegetables, fruit

Wild fish, nuts, seeds, especially flax seeds

Organic extra virgin olive oils, nut oils, moderate amounts of coconut oils and cocobutter (See [www.drhyman.com](http://www.drhyman.com) for information about the only types of chocolate that contain the full spectrum of healing properties and healthy fats found in cocoa.)

Cruciferous vegetables: cabbage, broccoli, cauliflower, brussels sprouts, kohlrabi  
Leafy vegetables: collards, spinach, Swiss chard, beet greens  
Colorful vegetables: peppers, squashes, green beans, snow peas, corn, eggplant, beets, sea weeds, onions, carrots, sweet potatoes

Berries, apples, pears, kiwis, mangos, apricots, citrus, plums

Lentils, split peas, beans, soy foods and tofu

Eggs, nonfat yogurt, lean poultry, wild game, wild fish

Brown rice, millet, buckwheat, steel cut oats, rye, barley, wild rice, quinoa, spelt, amaranth, whole-grain breads and pastas

### Try to eat less:

- Refined flours
- Sugars
- Artificial sweeteners
- Unhealthy fats
  
- Starchy vegetables
- Caffeine
- Junk food

### Sources include/notes:

White bread, white buns, cereals

High-fructose corn syrup, cane sugar, molasses, barley malt

Sucralose (Splenda), Aspartame (Nutrisweet, Equal), Saccharin

Trans fats or partially hydrogenated oils, margarine, shortening  
Polyunsaturated oils: corn, sunflower, safflower  
Saturated animal fats: fatty cuts of beef, pork, lamb, chicken  
Full fat dairy products: butter, whole milk, cream, cheese

Potatoes, turnips, rutabagas, parsnips

Coffee, colas

Fried foods, fast foods, snack chips, crackers and cookies

**Healthy eating rule 1:** Combine protein, fat, and carbohydrate in every meal to reduce the glycemic load and moderate your blood sugar. If you eat a bagel alone, it will raise your blood sugar. If you put some almond butter or other nut butter on it or have an egg with it, the protein changes the glycemic load of that meal. That's not to say it's a good idea to eat bagels on a regular basis, but you can change the load of the meal by eating carbohydrates with protein. If you want a cracker, put some nut butter on it. If you want a piece of bread, put some protein on it. If you eat an apple, have some nuts with it.

**Healthy eating rule 2:** Increase meal frequency and decrease meal quantity. Eat smaller, more frequent meals. You don't want to eat a huge meal. Has anybody had the experience of having a large meal and then, an hour later, being hungry again? Why would you want to eat more, usually something sweet, after you've just had a big meal? It's because any large meal, regardless of what it is, triggers a big load of insulin in your system. When you have that high level of insulin, it causes hunger, regardless of whether you're full of food or not.

**Healthy eating rule 3:** Eat breakfast. The National Weight Registry found that people who kept lost weight off, of 50 pounds or more for three or more years, had two things in common. One, they exercised, and, two, they ate breakfast. Breakfast was also found to be one of the key features related to longevity. In a study of longevity and aging, people who ate breakfast also lived longer.

**Healthy eating rule 4:** Eat earlier in the day, not later in the day. Avoid the sumo wrestler diet. Eat two or three hours at least before bed. If you go to bed with a full stomach, you're going to gain weight.

**Healthy eating rule 5:** Take supplements. Everyone needs a good multivitamin and mineral supplement; a calcium, magnesium, and vitamin D supplement; and an omega-3 fatty acid supplement from fish oil. See the basic nutritional support box on the next page.

Ninety percent of good metabolism is diet and exercise, but supplements can assist with the final 10 percent. In order to improve your metabolism, you need a high-quality multivitamin with good levels of magnesium, zinc, and the B vitamins. You need good levels of antioxidants. There are some special nutrients for controlling metabolism, like lipoic acid, that can help with your blood sugar, and N-acetyl cysteine, that helps to reduce free radicals and rusting.

You need essential fatty acids found in an omega-3 fat fish oil supplement. A good-quality fish oil can make a big difference in turning on the genes that increase your metabolism. The right fats go into your cells. They switch on the genes that make you burn more fat. You also need support for the mitochondrial energy factories that are burning the calories in your cells. This includes supplements like coQ10 and carnitine and more. There are also some plant foods, plant herbs, and nutrients that can help control weight and metabolism.

These five rules are key to regulating your weight. Just making these few simple changes, you will notice a radical change in how you feel, your energy, your mood, and your metabolism.

### **Basic Nutritional Support**

Nearly all people need the basic three supplements to create and maintain good health

#### **1. A high-quality multivitamin and mineral supplement** containing the following:

Mixed carotenoids (alpha, beta, cryptoxanthin, zeaxanthin, and lutein), 15,000-25,000 U a day

Vitamin A, 1000-2000 U preformed retinol

Vitamin D3, 400 U-800 U a day

Mixed tocopherols (vitamin E, including d-alpha, gamma, and delta), 400 U

Vitamin C (as mixed mineral ascorbates), 500-1000 mg

Vitamin K1, 30 mcg

B1 Thiamine, 25-50 mg

B2 Riboflavin, 25-50 mg

B3 Niacin, 50-100 mg

B6 Pyridoxine, 25-50 mg

Folic acid (ideally as mixed folic acid 5-methyltetrahydrofolate), 800 mcg

B12, 100-500 mcg

Biotin, 150 mcg to 1000 mcg

Pantothenic acid, 100-500 mg

Iodine, 25-75 mcg

Zinc (as amino acid chelate), 10-30 mg

Selenium, 100-200 mcg

Copper, 1 mg

Manganese, 5 mg

Chromium (ideally as chromium polynicotinate), 100-200 mcg

Molybdenum, 25-75 mcg

Potassium, 50-100 mg

Boron, 1 mg

Vanadium, 50mcg

Inositol, 25-50 mg

(This usually requires the intake of 2-6 capsules or tablets a day to obtain adequate amounts.

Some people may have unique needs for much higher doses that need to be prescribed by a trained nutritional or functional medicine physician.)

#### **2. Balanced Absorbable Calcium, Magnesium and Vitamin D Supplement**

Calcium citrate, 800-1200mg/day

Magnesium amino acid chelate (aspartate, glycinate, ascorbate or citrate), 400-600mg/day

Vitamin D3, 400-800 U a day

#### **3. Omega 3 Fatty Acid Supplement**

EPA/DHA 400/200 ratio per capsule, 1-4 capsules a day

(This must be from a reputable company that certifies purity from heavy metals and pesticides.)

See [www.drhyman.com](http://www.drhyman.com) for more information.

**Additional Nutritional Support****Enhanced Mitochondrial and Antioxidant Support**

(May be needed in special occasions for fatigue, weight management, cardiovascular, neurodegenerative disease, diabetes and cancer. These should generally be used under the supervision of a trained practitioner)

Reduced Glutathione, 300-600 mg a day

N-acetylcysteine (or NAC), 500-2000 mg a day

Acetyl – L – Carnitine, 50-2000 mg a day

Alpha Lipoic acid, 100-600 mg a day

Coenzyme Q10 50-200 mg a day

NADH, 5 to 10 mg a day

Creatine, 1-2 grams a day

Please refer to page 47-48 for information about how and where to get quality supplements or go to [www.drhyman.com](http://www.drhyman.com)

## Stress Management

The next major way we can help control our metabolism is by reducing stress, because besides food, exercise, and nutritional deficiencies, stress plays a large role. We need to find ways to help shut off the stress response, and we do that very actively. Most of us think that we're relaxing by watching television and eating potato chips. But that doesn't relax us. That's just another type of stress. It's an active process. We know we have to change our diet. We know we have to exercise, but most of us don't realize that we have to actively relax. If you're just sitting there stressed out, even though you're quiet, it's a problem. Most of us are just stewing in our own stress juices. If you're in a traffic jam and you're stressed out when someone cuts you off, the stress hormones are coursing through your body.

Now normally we're supposed to do one of two things during a crisis. We're supposed to either run like hell or fight like hell, and we usually do neither. We just sit there and we stew in our own stress juices, and that makes us overweight. It turns on hormones that make us gain weight and increase inflammation. To relax, we have to engage in certain activities, things like yoga, massage, relaxation tapes, meditation, or deep-breathing exercises. We have to engage what we call the relaxation response. This is a specific and very well-described response that the body has when it is relaxed.

When you're stressed, you have all the stress hormones. When you're relaxed, you have all the relaxation hormones. The body is wired so that when you're stressed, you become more insulin resistant. You slow down your metabolism. You gain weight. When you relax, you turn on your metabolism. You decrease weight. You improve your ability to control your blood sugar. Relaxing is a weight-loss strategy.

Sleep is also important to reduce stress. Most of us don't sleep enough. There is a book called *Lights Out*, which describes the advent of the light bulb with the onset of our degenerative illnesses, obesity, high blood pressure, and heart disease. The author says, "When we started living out of rhythm, when we started staying up late at night, when we started not sleeping enough, it changed our entire system." This has been studied. They found that in animal studies, when they deprived animals of sleep, they ate more. When you don't sleep enough, you eat more. This is not just a subjective thing. This is a real biological phenomenon because when you're sleep deprived, you're looking for energy and your body switches on different hormones. Sleep is a great antidote for gaining weight.

Lastly, for reducing stress, you can use herbs, things like ginseng, which help to reduce the stress response. It's very important.



How often do I eat? \_\_\_\_\_

Is this enough? What can I do to make sure that I eat often enough?

---

What do I currently do to relax?

---

Is this healthy? Is there a healthier way that I can actively practice relaxation? Write some ideas here:

---

How many hours of sleep do I get now? \_\_\_\_\_

What can I change to increase that amount?

---

How much do I exercise? How many hours per week? \_\_\_\_\_

Here are some things I can do to increase the amount of time I have available to exercise:

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## Lab Tests for Impaired Metabolism

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### TESTING FOR MITOCHONDRIAL DYSFUNCTION

#### ❑ ORGANIC ACIDS

The body produces many byproducts of metabolism. We can measure these in the urine after they are excreted by the body. They can identify metabolic weak spots or deficiencies. They are a great way to look at the function of mitochondria. We can see how fats and carbohydrates are processed through the mitochondria, and even how well the mitochondria make energy. If there are steps that are not functioning properly, we can identify the step and the exact nutrient or cofactor or amino acid necessary to correct the problem. For example, if you have trouble getting fats into your cells for energy, we know you may need more carnitine, an amino acid that transports fats into the cells. This is an overnight urine test.

#### ❑ CARDIOMETABOLIC STRESS TESTING: VO2MAX

This is a cardiac stress test in which oxygen consumption and carbon dioxide excretion is measured, giving a very good indicator of your fitness level and mitochondrial function. The more oxygen you can consume, the more fit you are, the more calories you burn per minute, and the longer your life expectancy.

#### ❑ MUSCLE BIOPSY

Rarely used except in severe diseases

### TESTING FOR INSULIN RESISTANCE

#### ❑ TESTING BLOOD SUGAR IMBALANCE

- Lipid profile (total cholesterol, LDL, HDL, triglycerides)
- Fasting and 1- and 2-hour post-75 gram glucose-load insulin and glucose levels
- Hemoglobin A1c (HbA1c)
- Fibrinogen
- Uric acid
- High-sensitivity C-reactive protein
- Ferritin
- Liver function tests
- Blood sugar imbalance symptoms questionnaire

**TESTING FOR THYROID FUNCTION**

- TSH
- Free T4
- Free T3
- Thyroid peroxidase antibodies
- Antithyroglobulin antibodies
- Reverse T3
- TRH stimulation test
- Thyroxine binding globulin
- Thyroid-stimulating immunoglobulins
- Basal body temperature
- Thyroid symptoms questionnaire

**TESTING FOR ADRENAL FUNCTION**

- Cortisol blood levels, 8am and/or 4pm
- DHEA and DHEAS
- VMA and/or metanephrins
- 24-hour urinary free cortisol
- Adrenal stress index - saliva at 4 times of the time
- ACTH stimulation tests (Cortrosyn)
- Adrenal fatigue questionnaire

**TESTING FOR HORMONAL FUNCTION**

- Men: total and free testosterone and unconjugated DHEA, IGF-1
- Women: FSH, LH, prolactin, unconjugated DHEA, estradiol, progesterone, free testosterone, IGF-1

Now we've learned all this science, we've learned how to get your metabolism going, we've learned some of the principles that keep us healthy and some of the myths that keep us fat. How can we summarize these basic concepts and give you a guidebook for your body's owner's manual? Here are 20 principles, and if you follow them, you'll not only have a healthy weight metabolism, you'll not only reduce inflammation and oxidative stress and improve your detoxification and improve your nutrition, but you will lead a healthy, full, and vital life.

## **THE BASIC INSTRUCTION MANUAL FOR YOUR BODY**

Excerpted from "Ultrametabolism: The New Science of Weight Loss" by Mark Hyman, M.D.,  
Published by Simon & Schuster.

1. Eat more vegetables and fruit
2. Have more fiber
3. Eat omega-3 fats daily
4. Eat breakfast daily
5. Eat protein and fat with every meal (especially breakfast)
6. Eat healthy, quality protein
7. Eat anti-inflammatory foods
8. Eat detoxifying foods
9. Eat food you love and that nourishes you
10. Drink 6-8 glasses of filtered water a day
11. Eat something every 4 hours
12. Finish your last meal at least 2-3 hours before bed
13. Eliminate high-fructose corn syrup
14. Eliminate trans or hydrogenated fats
15. Eat low-glycemic index foods and low-glycemic load meals
16. Eat real, organic food
17. Take a multivitamin and other nutrients as needed
18. Exercise regularly
19. Breathe deeply when you eat
20. Activate the relaxation response daily

## SESSION 7

### Ultraprevention Questionnaire, Part 4: Impaired Detoxification:

Answer the following questions:

---

1. I have hard, difficult-to-pass movements every day or every other day.  yes  no
2. I am constipated and only go every other day or less often.  yes  no
3. I urinate small amounts of dark, strong-smelling urine only a few times a day.  yes  no
4. I almost never break a real sweat.  yes  no
5. I have one or more of the following symptoms: fatigue, muscle aches, headaches, concentration and memory problems.  yes  no
6. I have fibromyalgia or chronic fatigue syndrome.  yes  no
7. I drink tap or well water.  yes  no
8. I dry-clean my clothes.  yes  no
9. I work or live in a "tight" building with poor ventilation or windows that don't open.  yes  no
10. I live in a large urban or industrial area.  yes  no
11. I use household or lawn garden chemicals or get my house or apartment treated for bugs by an exterminator.  yes  no
12. I have more than 1-2 mercury amalgams.  yes  no
13. I eat large fish (swordfish, tuna, shark, tilefish) more than once a week.  yes  no
14. I am bothered by one or more of the following: gasoline or diesel fumes, perfumes, new car smells, fabric stores, dry cleaning, hair spray, or other strong odors, soaps, detergents, tobacco smoke, chlorinated water.  yes  no
15. I have a negative reaction when I consume foods containing MSG, sulfites (wine, salad bars, dried fruit), sodium benzoate (preservative), red wine, cheese, bananas, or chocolate, even a small amount of alcohol, food with garlic and onions.  yes  no
16. When I drink coffee or caffeine-containing substances I feel wired up, an increase in joint and muscle aching, or have hypoglycemic symptoms (anxiety, palpitations, sweating, dizziness).  yes  no

17. I regularly consume any of the following substances or medications: acetaminophen (Tylenol), acid blocking drugs (Tagamet, Zantac, Pepcid, Prilosec, Prevacid, Nexium, Aciphex), hormone-modulating medications in pills, patches, or creams (the Pill, estrogen, progesterone, prostate medication), ibuprofen or naproxen, medications for colitis or Crohn's disease, recurrent headaches, allergy symptoms, nausea, diarrhea, or indigestion.  yes  no
18. I have had jaundice (turning yellow) for any reason or I have been told I have Gilbert's syndrome (an elevation of a liver test called bilirubin).  yes  no
19. I have a history of any of the following conditions: breast cancer, smoking induced lung cancer, another type of cancer, prostate problems, food allergies, sensitivities, or intolerances.  yes  no
20. I have a family history of Parkinson's, Alzheimer's, ALS (amyotrophic lateral sclerosis), or other motor neuron diseases, or multiple sclerosis.  yes  no

Your TOTAL of "yes" responses is \_\_\_\_\_

Your total of "yes" responses is your impaired detoxification score for the ultraprevention questionnaire.

The next force of illness we're going to talk about is detoxification. This is a science of rejuvenation and healing. Many of you probably have a lot of signs of chronic toxicity that you don't label as being toxic. Here is a list, and if any of these sound familiar, just keep in mind that detoxifying might be critical for you to get healthy and feel good again.

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Fatigue               | <input type="checkbox"/> Muscle aches        | <input type="checkbox"/> Joint pain                     |
| <input type="checkbox"/> Sinus congestion      | <input type="checkbox"/> Postnasal drip      | <input type="checkbox"/> Bad breath                     |
| <input type="checkbox"/> Headaches             | <input type="checkbox"/> Bloating            | <input type="checkbox"/> Gas                            |
| <input type="checkbox"/> Constipation          | <input type="checkbox"/> Diarrhea            | <input type="checkbox"/> Foul-smelling stools           |
| <input type="checkbox"/> Heartburn             | <input type="checkbox"/> Sleep problems      | <input type="checkbox"/> Difficulty concentrating       |
| <input type="checkbox"/> Food cravings         | <input type="checkbox"/> Water retention     | <input type="checkbox"/> Trouble losing weight          |
| <input type="checkbox"/> Rashes                | <input type="checkbox"/> Skin problems       | <input type="checkbox"/> Eczema                         |
| <input type="checkbox"/> Psoriasis             | <input type="checkbox"/> Canker sores        | <input type="checkbox"/> Acne                           |
| <input type="checkbox"/> Premenstrual syndrome | <input type="checkbox"/> Menstrual disorders | <input type="checkbox"/> Puffy, dark circles under eyes |

Now when you hear the word “detox,” you might think drug detox or alcohol detox or wheat-grass enemas. That’s not what we’re talking about here. We’re talking about the science of how our bodies get rid of waste. If waste builds up, we get sick. The key is to figure out how to enhance our body’s capacity to detoxify and get rid of waste, while minimizing our exposure to toxins. Why is this important? It’s because many diseases of our society are related to toxicity. Here are some of the diseases that are linked to toxicity:

- Parkinson’s
- Alzheimer’s
- Dementia
- Heart disease
- Chronic fatigue syndrome
- Fibromyalgia syndrome
- Cancers
- Autoimmune diseases
- Food allergies
- Arthritis
- Crohn’s disease
- Ulcers
- Colitis
- Inflammatory bowel
- Menstrual problems, like heavy bleeding, cramps, PMS, menopausal symptoms, mood changes, and hot flashes
- Menopausal symptoms, like mood changes, sleep problems, hot flashes, and headaches, are all often related to liver toxicity, because you can’t eliminate the hormones you’re producing.

Impaired detoxification is one of the roots of illness. It’s one of the five forces that contribute to chronic disease, to ill health and to not feeling well. If you’re not feeling well, it’s likely you’re toxic.

## Exercise One: How Toxic Are You?

---

Rate each of the following symptoms based upon your health profile for the past 30 days

### POINT SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

### DIGESTIVE TRACT

---

Nausea or vomiting

Diarrhea,

Constipation

Bloating feeling

Belching, or passing gas

Heartburn

Intestinal/Stomach pain

Total

### EARS

---

Itchy ears

Earaches, ear infections

Drainage from ear

Ringing in ears, hearing loss

Total

### EMOTIONS

---

Mood swings

Anxiety, fear or nervousness

Anger, irritability, or aggressiveness

Depression

Total

### ENERGY/ACTIVITY

---

Fatigue, sluggishness

Apathy, lethargy

Hyperactivity

Restlessness

Total

### EYES

---

Watery or itchy eyes

Swollen, reddened, or sticky eyelids

Bags or dark circles under eyes

Blurred or tunnel vision (does not include near- or far-sightedness)

Total

**HEAD**

---

- Headaches
- Faintness
- Dizziness
- Insomnia

Total

**HEART**

---

- Irregular or skipped heartbeat
- Rapid or pounding heartbeat
- Chest pain

Total

**JOINTS/MUSCLES**

---

- Pain or aches in joints
- Arthritis
- Stiffness or limitation of movement
- Pain or aches in muscles
- Feeling of weakness or tiredness

Total

**LUNGS**

---

- Chest congestion
- Asthma, bronchitis
- Shortness of breath
- Difficult breathing

Total

**MIND**

---

- Poor memory
- Confusion, poor comprehension
- Poor concentration
- Poor physical coordination
- Difficulty in making decisions
- Stuttering or stammering
- Slurred speech
- Learning disabilities

Total

**MOUTH/THROAT**

---

- Chronic coughing
- Gagging, frequent need to clear throat
- Sore throat, hoarseness, loss of voice
- Swollen or discolored tongue, gum, lips
- Canker sores

Total

**NOSE**

---

- Stuffy nose
- Sinus problems
- Hay fever
- Sneezing attacks
- Excessive mucus formation

Total

**SKIN**

- Acne  
 Hives, rashes, or dry skin  
 Hair loss  
 Flushing or hot flashes  
 Excessive sweating

Total

**WEIGHT**

- Binge eating/drinking  
 Craving certain foods  
 Excessive weight  
 Compulsive eating  
 Water retention  
 Underweight

Total

**OTHER**

- Frequent illness  
 Frequent or urgent urination  
 Genital itch or discharge

Total

Now that you have rated all the symptoms, add the individual scores to total each group.

Then add up each of the group scores to calculate a grand total.

**GRAND TOTAL**

**SCORING:**

- Less than 10: Optimal  
 10 to 50: Mild toxicity  
 50 to 100: Moderate toxicity  
 over 100: Severe toxicity

Part of the problem that leads us away from understanding the true cause of illness is that the pharmaceutical industry. The pharmaceutical industry plays a big role in shaping doctors' education. In the British journal *Lancet*, they said that the medical-industrial complex attempts to influence the judgment of doctors. The medical-industrial complex is composed of a loose association of related organizations that conspire willingly or unwillingly, or consciously or unconsciously, to make our health worse, and this includes the pharmaceutical industry, the insurance industry, and the food industry.

One of the concepts that's critical to understanding toxicity is the concept of total load. This is a total amount of stressors on your system at any one time. It's like a glass filling over with water. It takes a certain amount to fill the glass, and then, after a certain point, if you put more in the glass, it will overflow. When our detoxification system is overwhelmed, is overloaded, that's when we start getting symptoms. We get sick. But it may be many years of accumulated stress and toxins that lead us to that point. The total load includes the load of toxins like heavy metals, mercury, lead, petrochemicals, residues, pesticides, and fertilizers. It includes food allergies, environmental allergies, molds, and toxins from molds. It includes stress. It includes a bad diet. It includes all the list of things that bug your system that we've been talking about and this creates the total-load phenomenon. There are many toxins we have to think about. There's the mental, emotional, and spiritual toxins that affect us: the isolation, the loneliness, the anger, the jealousy, and the hostility. All of this translates into toxins in our system.

Our mind is the most powerful pharmacy we have. When we create negative feelings and emotions in our body, they're translated into biochemical responses that can harm us if sustained over time. Everybody gets upset. Everybody gets angry. Everybody gets stress. Sustained negative emotions create harmful consequences in the body.

Then there are toxic foods. Certainly we've been talking about them in this program: sugar, trans fat, and all the anti-nutrients. Medications can sometimes be toxins. Often we need medications, but the reality is that most of us are overmedicated and use medications when better solutions exist. We need to try to minimize unnecessary medications. Heavy metals toxins are a big problem in our society, and they are underdiagnosed by conventional medicine.

Then there are internal toxins, things like bacteria, fungus, and yeast. And there are hormonal and metabolic toxins too.

Lastly, in addition to mental, emotional, spiritual toxins, toxic foods, medications, heavy metals, and internal toxins, there are the obvious chemical toxins: pesticides, herbicides, industrial chemicals, and household chemicals. These toxins even can be in the water supply.

There's a wonderful book called *Living Downstream* by Sandra Steingraber. She is an author, biologist, and environmentalist. She wrote, "I had bladder cancer when I was young. If I tell people this fact, they usually shake their heads thinking, she's from one of those cancer fami-

lies.” When I go on to mention that cancer runs in my family, they usually start to nod. Then I add that I’m adopted.”

She comes from a cancer family, but she’s adopted. What’s the message here? The message is that she’s living downstream from a whole series of toxins in the Midwest that affected her and her whole family, even though she was adopted. It’s not necessarily just what’s in our genes. It’s also what’s in the environment.

In studies of twins, researchers have found that we don’t see the same rates of cancers in twins. So the risk must be environmental rather than genetic. We see the same thing with Parkinson’s disease. In major studies on twins and Parkinson’s disease, there’s very little relationship between genetics and the onset of typical Parkinson’s disease. It’s more related, for example, to environmental pesticides. We know that Parkinson’s disease is clearly linked to environmental toxins. The most dangerous occupation in this country is farming. Farmers wear gas masks to lessen exposure to pesticides, and yet they die at higher rates from toxic-related diseases like Parkinson’s.

Certain parts of our genetics are responsible for detoxification. We know that some women who smoke give birth to small babies. We also know that some women who smoke give birth to normal-weight babies. What’s the difference? The difference is the women who give birth to small babies have a problem detoxifying the 4,000 toxic compounds found in cigarette smoke, particularly the polycyclic aromatic hydrocarbons and the nitrosamines. If a woman can’t detoxify these compounds, her baby is going to be affected. The differences in birth weight are related to the differences in the mother’s ability to detoxify.

Let’s talk about toxic foods. We’ve been mentioning anti-nutrients but there’s been an explosion in the consumption of toxic nutrients in our diet. In 1970, we spent \$6 billion on fast food, in 2001, \$110 billion. That was more money than we spent on higher education, computers, or new cars put together. We spent \$8 billion on advertising, \$50 million on Twinkies, and \$800 million on Lay’s Potato Chips.

The average American eats 175 pounds of sugar a year, 55 pounds of fats and oil, 300 cans of soda, 200 sticks of gum, 18 pounds of candies, 5 pounds of potato chips, dozens of donuts, and 20 gallons of ice cream every year. This has an effect on our health. We eat too many anti-nutrients: sugar, trans fat, caffeine, salt, alcohol, genetically modified foods, plastics, pathogens, hormones, antibiotics. The list is endless.

Now what about toxic metals? We’ve talked about toxic foods. Let’s talk about toxic metals. Mercury is the first one on the list, and where does it come from? Fish, water, paint, dental amalgams, or silver fillings as we call them, cement plants, and toxic pollution from medical incinerators. Coal burning is probably the biggest source of mercury poisoning.

In a recent study in the *Journal of the American Medical Association*, 8 percent of women were found to have toxic levels of mercury in their blood. These are women of child-bearing age who are giving birth to children. We found, for example, that in Alzheimer's, there may be a certain gene that prevents a person from getting rid of mercury. We call this apoE4. If you have this gene and you're exposed to mercury, you can't clear the mercury from your brain. It might, then, increase your risk of getting mercury toxicity and dementia.

Another study, in the *New England Journal of Medicine*, showed that the level of mercury in your toenail was directly associated with the risk of heart attacks and that the level of fish oil in your fat was inversely associated with the risk. This means the more mercury you had in your toenails, the higher your risk, and the more good fat you had in your tissues, the lower your risk. Eating good fats is good for you, and having mercury is bad for you. Another fascinating study in *The Journal of the American College of Cardiology*, in 1999, showed that patients with enlarged hearts had 22,000 times the level of mercury when there wasn't some other obvious cause, like hypertension or a virus.

One of the most disturbing things in recent history is the dramatic increase in autism in this country and the dramatic increase in attention-deficit disorder. Twenty years ago there was maybe one problem kid in the class. Now half the kids in most schools are on stimulant drugs or antidepressants. There are reasons for this. We're not completely clear yet, but there have been some interesting studies. For example, there's been a study looking at autism and mercury, in which the kids were given a drug to help pull mercury out of their systems. They found that compared with an average kid, kids with autism had three times the level of mercury in their urine after this challenge. In another study, researchers found that removing the amalgams and other metals in the mouth may alleviate systems and improve the quality of life in patients with chronic illness. This was published in Sweden. Very little of this data comes from the United States.

Another study, published in *The New England Journal of Medicine*, showed that high levels of lead can cause kidney failure. Chelating or binding the lead with a chelating agent prevented kidney failure. This technique was able to reduce the onset of problems and prevent people from needing dialysis, thus saving billions of dollars. Chelation therapy may improve renal function and slow the progression of renal disease. Now we're not talking about the kind of chelation therapy that's used to treat heart disease. That's still being studied by the NIH. We don't have a clear idea of whether it works or not.

In *The Journal of the American Medical Association*, there was a fascinating review and an editorial based on an article that examined the effect of environment chemicals on Parkinson's. The author said that the risk factors for Parkinson's include pesticide use, living in a rural environment, consumption of well water, exposure to herbicides, and the proximity of residents to industrial plants, printing plants, or quarries.

The author said was that medical and surgical approaches are largely directed toward symptom management and eventually must give way to the identification of the environmental hazards that can be eliminated. We have to eliminate the toxins. We have to remove the triggers. Or, he said, use chemopreventive strategies that can be administered to minimally symptomatic individuals. We need to find ways that we can support and enhance the body's function and prevent problems. This can be administered to people before they have symptoms if they are at risk, or if they have early symptoms, this often creates improvement in their outcome.

He goes on to say is that the therapeutic nihilism, traditionally implied in the term “degenerative” — meaning you're stuck with it, there's not much anybody can do — is giving way to the dissection of the sequence of molecular events that lead from the initial triggers to cellular extinction. It means we're finally understanding the way to get to the root of the problems.

Lead toxicity is something we're all familiar with, and that includes lead toxicity in children. We now have found that lead is toxic even at very low doses. We find that safe levels of lead have been constantly altered to adapt to changing research that shows that lower and lower levels are toxic.

We find that high levels of lead found in postmenopausal women are linked to high blood pressure. How does this happen? Lead is stored in the bones, among other tissues. When women go through menopause, their bones break down at a faster rate, and they liberate lead into their blood stream, causing a toxic effect, such as high blood pressure. Blood lead level is positively associated with both systolic and diastolic blood pressure. It means that very low lead levels, even below the levels that are thought to be safe, are associated with high blood pressure in postmenopausal women. That's a sobering thought.

One of the most alarming recent studies of hospital patients showed that in one year 106,000 patients died from serious adverse drug reactions, and 2.2 million people were hospitalized as a result of serious adverse drug reactions. This was not because of medical errors. This was not the wrong drug given to the wrong patient at the wrong time at the wrong dose for the wrong reason. This was the right drug for the right person, the right dose, given by a trained nurse, prescribed by a trained doctor. How could this happen? It happened because what may be therapeutic for one may be poison for another.

We are all different in our capacity to detoxify. This is why drug companies have developed the field of pharmacogenomics, which is the study of how drugs are detoxified and how different people have different capacities for getting rid of different drugs. What may be easily eliminated by one person may become toxic in another person.

This is common even in outpatient care, not in just hospitalized patients. Twenty-five percent of people who get drugs in an outpatient setting have adverse side effects. That's one in four people.

In another study in *The New England Journal*, they found that Tylenol toxicity or acetaminophen toxicity was very common and was the most frequent cause of liver failure in patients in a large Texas hospital. Even low doses, only those slightly above or even occasionally within the therapeutic range, were associated with severe liver damage. That's because we have a total load on our system and our bodies cannot cope with the overload.

And what about antibiotics in our food? The Union of Concerned Scientists estimated that, each year, 24 million pounds of antibiotics are given to animals for nontherapeutic purposes. This means that healthy animals were given antibiotics to prevent the diseases often caused by factors like overcrowding. Only 2 million pounds were given for therapy. In contrast, 3 million pounds were given to humans. Two million pounds were given to animals for therapy, 3 million pounds were given to humans for therapy, and 24 million pounds were given to animals for prevention.

They found antibiotic-resistant bacteria in humans that originated from animal sources. Now we have transpecies, chicken to human, resistance of bacteria. This means if you give a chicken cipro in its water and it gets antibiotic-resistant bacteria growing in it, and you eat that chicken, you can get that species of bacteria transferred to you. And then, when you need antibiotics, they won't work. We have to be very careful about our food supply.

And what about our water supply? Another scary study showed that there are drugs, hormones, and other contaminants in our waste water and that organic waste water contaminants were prevalent in 80 percent of streams being sampled. The most frequently detected compounds were steroids, caffeine, antimicrobial disinfectants, fire retardants, and detergents. As many as 38 of these contaminants were found in a given water sample.

How about environmental chemicals? There are many out there, and we're at high risk because of the PCBs, DDTs, and pesticides in our environment. The Environmental Protection Agency has been monitoring human exposure to toxic environmental chemicals since 1972. They studied various levels of toxins in the fat tissue from cadavers and elective surgeries, and they found that five of the most toxic chemicals known to humans were found in 100 percent of the samples. Animal products were the most concentrated sources of these toxins. A hundred percent of beef is contaminated with DDT. Ninety-three percent of processed cheese, hot dogs, bologna, turkey, and ice cream are contaminated with DDT. DDT has been banned for decades, and yet it's still in our supply of food and water.

Exposure to home pesticides may also be a problem. For example, Parkinson's disease may be linked to the use of home pesticides. If children are exposed to pesticides in utero, they have a poor outcome in terms of cognitive function.

What do we do about all this toxicity? There are real steps we can take to optimal detoxification and greater vitality and wellness and that you don't have to simply sit around and hope you

don't become toxic. There are things you can do to maximize your detoxification system, to help remove and eliminate the toxins that are found in our environment.

There are five steps to getting rid of toxins. They can be found in the "Detox Box" on [www.drhyman.com](http://www.drhyman.com), but we will describe them here. The five steps for optimal detoxification teach you how to get rid of the things that bug you, repair the things that are broken, and help your system remove, repair, recharge and heal.

### **Step One: Identify and Get Rid of Toxins.**

How do we identify and get rid of toxins? Let's just have a quick review. First, get rid of anti-nutrients. This means eliminate the hydrogenated or trans fats. Second, eliminate processed foods. Third, eliminate the white menace, white flour and sugar. Eat less salt. Have less caffeine. Avoid charbroiled meats, which have polycyclic aromatic hydrocarbons that are often quite toxic for people. Have no more than three to five drinks of alcohol per week. More than that sometimes creates a toxic load on the liver. Fourth, identify and eliminate common food allergens, the gluten, dairy, eggs, and so forth. Get yourself tested, find out what's there, do an elimination challenge, but get rid of those food allergens. Next, minimize unnecessary medications, all the chronic over-the-counter medications we take, Tylenol, Advil. The average person pops a pill at least every week, so we need to try to minimize that and decrease the stress on our systems.

Clean your water. A simple water filter can have a significant impact. Try to eat organic food when you can. You obviously can't do that every day all the time, but try to minimize non-organic food.

Clean your air. If you have mold, get rid of it. Use filters such as HEPA filters ULPA filters. Get plants. Plants can help your air detoxify. Eliminate the sources of environmental toxins in your home, such as garden chemicals, household cleaners, dry-cleaning solvent, and secondhand smoke. Don't use plastic containers or Saran Wrap to cover food in the microwave because the compounds in the plastic are liberated with the microwaving.

We have to be careful of toxic molds in our basements and our bathrooms. Obviously, also be careful of radiation from the ultraviolet rays in sunlight. Sunscreen and eyeglasses can help protect you from that. Think about sick-building syndrome. If you are chronically ill, you might be working in a sick building with poor ventilation.

Get rid of the heavy metals, like mercury, lead, and aluminum. Mercury can be found in the large predatory fish. If the fish eat other fish, you're probably in trouble. My simple rule for fish is, if you can put it in your pan, you can probably eat it. Filter your water, because mercury might be in the water supply. Mercury can be in older latex paints because it was once used as a fungicide. It's in some vaccines, like the flu vaccine, although it's been removed from most of

the childhood vaccines. It can be in contact lens solutions or nasal sprays. Look for the word *thimerisol*. That's an important mercury-containing preservative that should not be in your life.

Get rid of lead. Is there old paint on the walls? Are you eating from ceramic plates that are full of lead glazes? These are dishes that come from nations that do not have restrictions about lead glazes. Do you have lead blinds? What about canned food? Be careful of sources of lead. How about aluminum? How many of you are using underarm deodorants or antacids or baking powder that contain aluminum? Just be aware of this and try to minimize your exposure.

Once you've gotten rid of toxic foods, heavy metals, and cleaned your air and water, next, think about hidden infections like chronic fungal infections, dental infections, intestinal imbalances, hidden viruses, *H. pylori*, and so forth.

Next, we need to look into your own mind. Look at your relationships. Which ones support you? Which ones drain you? Look at your beliefs and attitudes, all the shoulds, wouldn'ts, can'ts, won'ts, fears, and limitations. How do these make you sick? How about examining your life for toxic behaviors, such as not listening to your body, even if you don't like what it's saying? Maybe you're not sleeping enough, not resting enough, doing 10 things at once.

You need to look at how you are treating your body. Do you eat when you're not hungry? Do you eat when you are hungry? Listen to your body.

### Exercise Two: What Toxins Can You Get Rid Of?

---

List five toxins you can get rid of:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What toxic behaviors do you have?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

**Step Two: Fix the Gut.**

After you've removed the toxins, you need to fix the gut. Again, this is removing the common food allergens and medications, giving your gut a rest with a two weeks' simple detox diet of vegetables, rice, beans, and fish, putting back healthy bacteria with probiotics, giving yourself the nutrients you need and the herbs to help repair your gut and make sure you move your bowels by getting enough fiber and magnesium. The gut is the main excretory route for most toxins.

**Exercise Three: Did You Detox?**

Did you do the detox diet mentioned in Session 5? If not, set a date to do it now. \_\_\_\_\_

**Step Three: Get Moving.**

The next step to help your detoxification is to move your blood and lymph circulation. Aerobic exercise — which could be just walking, jogging, running, riding your bike, or jumping on a trampoline — is quite good for increasing circulation and lymphatic flow. Yoga helps increase the circulation to your organs. It helps increase your blood and lymphatic flow. The inverted poses help to release all the toxins flushing out of your extremities into your central circulation and then out into your liver for detoxification. It helps to calm the nervous system. It helps to reset the adrenal glands and reset the automatic or autonomic nervous system by engaging the relaxation response.

Another important way to detoxify is sauna and heat therapy. Saunas, steam baths, hot baths, and infrared saunas are a powerful way to increase circulation, to mobilize toxins, and to feel better.

**Exercise Four: Get Moving**

Do you exercise? List five exercises you will do this month that will help your body detox. Next to the exercise, state the day and time you will do it:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

#### **Step Four: Get Your Liver and Detox System Working.**

The fourth step in the detoxification process is to enhance your body's detoxification system. This includes a very sophisticated and very metabolically extensive waste-elimination system, including your liver, your kidneys, your stool, your breath, your skin, your sweat, everything that is involved in detoxification. If this system isn't working, if you're not sweating, if you're not digesting your food and eliminating it properly, if you're not drinking enough water and diluting your urine and urinating frequently enough, and if you're not supporting your liver with the right nutrients, foods, and herbs to help improve detoxification, you may be headed toward toxic overload.

How do you improve your liver function and detoxification system? By providing the basic raw materials for your detox system to work. Nutrients, amino acids, and herbs help to enhance the liver's function. A multivitamin is critical. Vitamin C is very important. Mineral supplements also are critical. Liver herbs like milk thistle, the garlic family, lemon peel, green tea, and watercress can be helpful. Don't forget the omega-3 fats. There are also special nutrients like extra selenium or lipoic acid that help to enhance the liver's detoxification system. Working together as a team, these help your body bind, excrete, and, finally, eliminate the toxins.

We also encourage you to increase your urine flow by drinking six to eight glasses a day of clean water. Sweating and skin brushing or scrubbing detoxifies your skin. Deep breathing and yoga help your lungs purify and oxygenate.

Let's look more closely at some of the materials I've just listed. One of the best tools we have to increase our liver detoxification system is our diet. The broccoli family, which includes Brussels sprouts, cabbage, collards, kale, cauliflower, and kohlrabi, contains isothiocyanates or glucosynolates. These have been shown to increase the activity of the liver enzymes that get rid of toxins such as glutathione transferase. These compounds might explain the associations between the intake of these vegetables and decreased risk of cancer.

What about vitamins? The higher levels of vitamin C you have in your blood, the lower level of lead. *The Journal of the American Medical Association* said that data suggest that high serum levels of ascorbic acid are independently associated with a decreased prevalence of elevated lead levels. This means that higher levels of vitamin C in your blood are associated with a lower level of lead. If these associations are related causally, then vitamin C intake may have public health implications for the control of lead toxicity.

Another nutrient for detoxification is called N-acetyl cysteine, which is a supplement that you can buy in the health food store. In the major medical journals, scientists have demonstrated that this supplement can help prevent kidney failure after angiograms. They found is that when people who have mild kidney problems get a dye for an X-ray, they can go into kidney failure. By simply giving this special nutrient, we can increase the activity of detoxification in the body and prevent kidney failure.

Once you've removed the toxins, fixed your gut, increased your blood and lymph circulation, and boosted your own detoxification system by increasing your liver function, increasing urine flow, sweating, skin detoxification, and deep breathing, what's next?

### Exercise Five: Review: Detox Your Liver

---

List five things you can do to detoxify your liver:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

### Step Five: Detox the Mind, Heart and Spirit.

Pay attention to unconscious behaviors. Become more attentive to how you care for your body. Look at your living space. Is it cluttered and chaotic? Does that reflect what's happening on the inside? Try writing in a journal and exploring your thoughts and feelings. This can have a dramatic impact on stress. Practice relaxation. You have to actively practice stress reduction and relaxation, things like yoga, tai chi, chi-jung. Get a massage. How about taking a news holiday? Every day we hear tragedy on the news over and over, and this affects us. We go to sleep with this washing over our minds. Take a holiday from the melodramatic media. Try a computer or TV holiday for a few weeks. See how you feel. Try to sleep well and practice good sleep hygiene.

### Exercise Six: Your Zen Mind

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What is toxic in your mind? What toxic thoughts do you have? What are five mental detoxification techniques you can employ?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

## The 10 Principles of Healthy Detoxification

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1. Drink plenty of clean water; at least eight to 10 glasses of filtered water a day.
2. Keep your bowels moving, at least once or twice a day. If you can't get going, then you need some help, and this can include taking two tablespoons of ground flax seeds, taking acidophilus and extra magnesium capsules in the form of magnesium citrate. If you have any chronic diseases or problems, you have to be careful about taking supplements; you should work with your doctor. Go to [www.drhyman.com](http://www.drhyman.com) to find a nutritional or functional medicine doctor.
3. Eat organic produce and animal products to eliminate the toxins in your food.
4. Eat 8-10 servings of colorful fruits and vegetables and specifically include, every day, the family of the cruciferous vegetables, broccoli, collards, kale, cabbage, Brussels sprouts, and kohlrabi, as well as the garlic family, garlic and onions, which help increase sulfur in the body and help detoxification.
5. Avoid stimulants, sedatives, and drugs, such as caffeine and nicotine, and try to reduce alcohol intake.
6. Exercise five days a week with focus on conditioning of your cardiovascular system, strengthening exercises, and stretching exercises.
7. Get rid of the white menace: white flour and white sugar.
8. Sweat profusely at least three times a week, using a sauna, steam, or a detox bath.
9. Take a high-quality multivitamin and mineral. Visit [www.drhyman.com](http://www.drhyman.com) for more information about finding good-quality supplements.
10. Relax deeply every day, to get your nervous system in a state of calm, rest, and relaxation.

What if we follow these five steps to optimal detoxification or these 10 principles of healthy and optimal detoxification and we're still feeling badly? What can we do? There are some tests that can help identify hidden problems. Or you may need help from your physician.

By following these guidelines, by looking for these hidden problems, by working with your practitioner, you can do a lot to overcome chronic and debilitating health problems and lead a more healthy and vigorous and energetic life, and hopefully prevent a lot of the chronic, degenerative diseases that are associated with toxicity.

## Lab Tests for Impaired Detoxification

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Specific tests may be useful for those who score high in the detoxification section of the questionnaire, or those with a history of cancer, neurological diseases, chronic fatigue, fibromyalgia, and autoimmune and hormonal disorders. They can also be used as screening tools that can identify hidden weaknesses in our capacity to handle toxic burden.

### ❑ DETOXIFICATION CHALLENGE TEST FOR PHASE 1 AND PHASE 2 PATHWAYS

This innovative test acts like a stress test for the liver. After taking a dose of caffeine, aspirin, and/or acetaminophen, saliva, urine and blood samples are collected to measure how your liver processes these chemicals. They go through specific Phase 1 and Phase 2 detoxification pathways. If there is a problem, it will likely be picked up, and specific nutrients, foods, or herbs that promote the healthy functioning of those pathways can be prescribed. This needs to be done by a physician experienced in environmental or functional medicine.

### ❑ MEASUREMENT OF DETOXIFICATION ENZYMES AND CHEMICALS

- **Glutathione:** Glutathione is the main final detoxifier and antioxidant in the body. A lack of this critical compound that is generally produced in the body from the amino acids glycine, glutamine, and cysteine can cause liver failure from taking as little as four grams (eight 500mg pills) of Tylenol in a 24-hour period, especially if you have had a few alcoholic drinks. Alcohol and Tylenol both deplete glutathione, while vitamin C increases it. This can be measured in the blood.
- **Glutathione peroxidase**  
This critical enzyme necessary for recycling of our glutathione is dependent on selenium. This is why selenium has been shown to prevent cancer. It aids in our detoxification system.
- **SOD (superoxide dismutase)**  
This is a critical enzyme necessary for neutralization of superoxide anion, a potent free radical. Low levels of this enzyme have been found in ALS and Down syndrome and account for an inability to protect us from toxins and oxidative stress. This enzyme requires zinc, copper, and manganese for proper functioning. Deficiencies in any of these nutrients can lead to problems with this critical enzyme.

❑ HEAVY METALS

- Hair analysis: Hair analysis can identify heavy metals quite accurately. Hair samples have shown that Andrew Jackson had toxic levels of lead from buckshot and mercury from a 19th century remedy called calomel and that Napoleon had arsenic toxicity from chronically poisoned wine.
- Chelation challenge: Chelation challenge can often better identify the level of heavy metals. A chemical chelation agent (FDA approved) called DMPS or DMSA can be used to mobilize the metals that are then found in a 6- to 24-hour urine sample that is collected and sent to the lab.

❑ URINARY ORGANIC ACIDS

Specific compounds can be measured, including sulfates, pyroglutamate, glucarate, orotate and others that can give clues to problems with detoxification pathways.

❑ CHEMICAL ANTIBODIES

Measurement of antibodies to various toxins and metals can occasionally be useful.

❑ ORGANOPHOSPHATES

These can be identified through a 24-hour urine collection.

❑ ORGANOCHLORINE RESIDUES

These can be identified through a fat biopsy. This is used mostly for research purposes, but certain labs process clinical specimens.

❑ URINARY PORPHYRINS

These are byproducts of damaged hemoglobin and can be clues to damage done by chemical or heavy metal toxins.

❑ URINARY D-GLUCARATE

This can be used to assess exposure to industrial toxins.

❑ URINARY TRIMELLITIC ANHYDRIDES (TMA)

These can be used to assess exposure to volatile organic compounds (VOCs)

## SESSION 8

### Ultraprevention Questionnaire, Part 5: Oxidative Stress:

Answer the following questions:

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1. I am fatigued on a regular basis.  yes  no
2. I get less than 8 hours sleep a night.  yes  no
3. I don't exercise regularly, or I exercise more than 15 hours a week.  yes  no
4. I am sensitive to perfume, smoke, or other chemicals or fumes.  yes  no
5. I regularly experience deep muscle or joint pain.  yes  no
6. I am exposed to a significant level of environmental toxins (pollutants, chemicals, etc.) at home or at work.  yes  no
7. I smoke cigarettes or cigars (or anything else).  yes  no
8. I am regularly exposed to secondhand smoke.  yes  no
9. I drink more than 3 alcoholic beverages a week.  yes  no
10. I don't use sun block, or I like to bake in the sun or go to tanning booths.  yes  no
11. I take prescription, over-the-counter and/or recreational drugs.  yes  no
12. I would rate my life as very stressful.  yes  no
13. I eat fried foods, margarine, or a lot of animal fat (meat, cheese, etc.).  yes  no
14. I eat white flour and sugar more than twice a week.  yes  no
15. I eat less than 5 servings of deeply colored vegetables and fruits a day.  yes  no
16. I have chronic colds and infections (cold sores, canker sores, etc.)  yes  no
17. I don't take an antioxidant-containing multivitamin.  yes  no
18. I am overweight (BMI greater than 25).  yes  no
19. I have diabetes or heart disease.  yes  no
20. I have arthritis or allergies.  yes  no

Your TOTAL of "yes" responses is \_\_\_\_\_

Your total of "yes" responses is your oxidative stress score for the ultraprevention questionnaire.

The last force of illness is oxidative stress, or rusting. The reason we call it oxidative stress is because oxygen causes the damage. Obviously we need oxygen. We breathe oxygen and it's vital for life. But when oxygen is formed into these little damaging molecules called free radicals, it becomes harmful.

Oxidative stress is when oxygen runs out of control in your system. The oxygen that you're familiar with is usually  $O_2$ . It's two molecules of oxygen. When it's  $O_1$ , or singlet oxygen, it only has one molecule of oxygen and it's very lonely. It's always looking for another partner. The problem is that the lonely oxygen molecules will steal electrons from other molecules. When those molecules are damaged by losing an electron, they, in turn, become free radicals and start a chain reaction that injures other molecules, cells, and tissues. This is what we call oxidation.

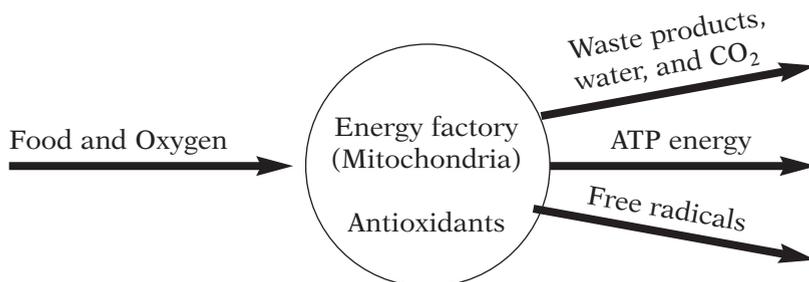
When your apple turns brown in the air, it's because oxygen is damaging or oxidizing the apple and turning it brown. When your car rusts, the oxygen in the air is damaging the metal by oxidizing, or rusting. When oil turns rancid, it's the oxygen that's affecting the fats to become rancid.

This oxidation process happens in the body. It causes rusting. When it's in the joints, we call this rusting arthritis. When it's in the brain, we call it Alzheimer's. When it's in the heart, we call it heart disease. When it's in the liver, we call it cirrhosis. When it's in the kidneys, we call it kidney failure. When it's in the skin, we call it dermatitis, we call it wrinkles. In fact, wrinkles are a great example of oxidation. The ultraviolet radiation causes these free radicals to become active in the skin. That leads to oxidation, which leads to inflammation, and, over the years, that leads to skin cancer.

You don't only wrinkle on the outside, you wrinkle on the inside. One of the major theories evolving in medicine now is that oxidation is at the root of most disease. When any of the five forces of illness is out of balance, the result is oxidation.

What causes oxidation? Probably the main source — and this is not going to be a pleasant thing for most of you to hear — is excess calories. We mentioned before that the only thing that's been shown to prolong life, to increase longevity in animal studies, has been the restriction of calories. This works because by restricting calories, you reduce oxidative stress.

In your car, gasoline is burned to create energy. In your body, food is burned to create energy. The calories from food, and the oxygen that you breathe, are combusted, just like the gas in a car's engine. That's a good thing. The energy that our body creates is called ATP. Every cell in your body runs on ATP energy. The ATP process produces waste products, water, and carbon dioxide. The water you urinate out, and the carbon dioxide you breathe out. It also generates a small number of free radicals. They are like the sparks that fly off the engine.



The problem occurs when those sparks become too plentiful, your body's antioxidant system can't cope. If your diet is very poor in antioxidants, which come from fruits and vegetables, you become oxidized. The more calories you eat, the more of these sparks you create, the more your cells age quickly, and the more your DNA is switched on to create more rapid aging.

This all happens because of this process of oxidation, or rusting, in the body. Eating too many calories, or eating more than you need to eat, is going to cause you to create these sparks that lead to damage throughout your body.

Another major cause of oxidative stress, or rusting, is stress itself. Simply being under psychological, emotional, or some physical stress, increases the trauma on the body and leads to these free radicals. Being sedentary increases free radicals. Infections will create free radicals. Allergens will create free radicals. Toxins, pollution, and smoking are big causes of free radicals. In fact, you might have noticed that the average smoker has more wrinkles than the average nonsmoker of the same age. Why is that? Because the 4,000 toxins in cigarette smoke create oxidation, or oxidative stress.

Radiation also causes oxidative stress. There are all kinds of background radiation in the universe, particularly in our atmosphere. There is also radiation we get from the sun. With the ozone layer damaged, we are more exposed to ultraviolet radiation. Melanomas and skin cancers are on the rise, and these are the result of oxidation that comes from ultraviolet radiation.

Ultraviolet radiation also causes cataracts. In fact, people who wear sun glasses get fewer cataracts than people who don't, because the sunlight contains ultraviolet radiation that damages the lens in the eye and leads to clouding, or cataracts.

In addition to excess calories, probably the most prevalent source of oxidation is the lack of adequate antioxidants. We've all heard about antioxidants. Most of us don't realize the reason we take antioxidants is to combat oxidative stress. We want to stop the rust. That's why we take antioxidants like vitamin E and vitamin C.

The reality is that most of the important antioxidants don't come from vitamins, they come from food. Antioxidants come from plant foods. There was a recent six-day study in which they

looked at the effects of fruits and vegetables on markers of oxidative stress in healthy nonsmokers. They found that people's oxidative stress levels were dramatically reduced by eating more fruits and vegetables. It was more effective than taking antioxidant vitamins. The reason is that in fruits and vegetables there are all kinds of these phytonutrient compounds that work better than any vitamin pill you could take. Here are some phyto nutrients:

- Chlorophyll: This is the green pigment you will find in many green vegetables.
- Carotenoids: These include alpha-carotene, beta-carotene, lycopene, lutein, zeaxanthin, and cryptoxanthin.
- Capsaicin: This compound has anti-inflammatory properties and helps prevent the activation of carcinogens.
- Coumarins: This is contained within cruciferous vegetables.
- Flavanoids: These act as anti-oxidants, help prevent blood clotting, and protect against heart disease. They are also believed to protect veins and help prevent cataracts.
- Ellagic Acid: This helps to neutralize carcinogens found in tobacco smoke, processed foods, and barbecued meats.
- Glucosinolates: These help to activate enzymes that detoxify the liver.
- Indoles: These help lower levels of harmful estrogen.
- Isoflavones: These act to block tumor-causing enzymes and lower levels of estrogen.
- Isothiocyanates: These are found in cruciferous vegetables and act in a similar way to isoflavones.
- Lignans: These are protective against colon cancer and heart disease.
- Phenols: These come from almost all fruits, vegetables, and grains.
- Saponins: These are found in tomatoes, spinach, onions, and garlic. They help stimulate the immune system and lower circulating levels of fats.
- Sulfides: Their function includes fighting bacterial, viral, and fungal infections.
- Phytosterols: Considered to be beneficial in helping regulate cholesterol.

Most Americans don't eat 8 to 10 servings of fruits and vegetables every day. They're not getting the deeply colored vegetables that are going to make a difference in their life. Eating colorful fruits and vegetables that contain these pigmented antioxidants is a powerful way to reduce oxidative stress.

It's important to get plant foods in your diet, for more than just the vitamins. In one study in the *Journal of the American Medical Association*, they found that high dietary intake of vitamin C and E, not from supplements but from diet, could lower the risk of Alzheimer's by 70 percent. Simply increasing your dietary intake of antioxidants has a dramatic effect on lowering oxidation.

And more good news is that the flavonols in chocolate are an antioxidant. Dark chocolate in moderate amounts is a powerful tool for combating oxidative stress.

A wonderful recent review paper on oxidative stress and the biology of aging explained how this system works. It said regardless of how or why free radicals are generated or how oxidative stress is generated, a rise in the intracellular oxidant levels, or free radicals, has two potentially important effects: the initial damage to the cells and the subsequent turning on and off of signals in the body that can change your genetics and the genetic expression that leads to more rapid aging. Both of these effects, they said, influence numerous cellular processes linked to aging and the development of age-related disease.

Imbalances in all or any of the five forces of illness accelerates aging. When you have malnutrition, when you eat antinutrients, when you have inflammation, infections, allergens, when your metabolism is impaired and you have insulin resistance, or your thyroid isn't functioning properly, or your mitochondria are injured, you have more oxidation. Or when you have exposure to heavy metals, all of these things lead to oxidative stress. Oxidative stress results from all the other imbalances in the five forces of illness and is often the end step in a long process of derangements of cellular signals that lead to disease and aging.

Once we've identified that oxidative stress is a problem in our life, once we've tried to reduce the impact from the other imbalanced forces of illness, is there anything else we can do to identify if we're rusting or not? One easy way is look in the mirror. If you have wrinkles, you're probably rusting. There are some more sophisticated ways to identify oxidative stress, or oxidative damage. These are called biomarkers of oxidative stress.

## Lab Tests for Oxidative Stress

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There is no perfect clinical test for oxidative stress. Many of the tests available are used mostly for research, although they are becoming more available to the healthcare consumer. They need to be interpreted by someone experienced in dealing with oxidative stress. With that caveat, here are some of the indicators of oxidative stress now in use and available (although perhaps only at specialty laboratories) for your doctor to order.

### ❑ LIPID PEROXIDE ASSAYS

(indicators of rancid fat in the body, especially the fats from our cell membranes)

- Lipid peroxides (TBARS) in urine or serum Malondialdehyde (MDA)
- 4-hydroxy-2(E)-nonenal (4-HNE)

### ❑ MYELOPEROXIDASE

This is a protein stored inside white blood cells (neutrophils) and released during activation of the immune system.

### ❑ SERUM LACTOFERRIN

This comes from white blood cells and indicates increased immune activity.

### ❑ F2 ISOPROSTANES

These are basically the rancid fats from our destroyed cell membranes.

### ❑ WHOLE BLOOD OR INTRACELLULAR GLUTATHIONE AND REDUCED GLUTATHIONE

This is the body's master antioxidant and detoxifier.

### ❑ ANTIOXIDANT ENZYME ASSAYS OF SUPER OXIDE DISMUTASE (SOD), GLUTATHIONE PEROXIDASE (GSHPX), AND CATALASE

- Urinary hydroxyl markers, including catechol and 2,3-dihydroxybenzoate, measured after an aspirin and acetaminophen challenge
- Assessment of iron overload
- Hemochromatosis or iron storage disease is the most commonly inherited genetic disorder in the Northern Hemisphere. Doing a blood test for transferrin saturation, ferritin, serum iron, and total iron binding capacity is the best test for this. There is also a gene analysis that can tell you if you have this disease.

### ❑ BLOOD TESTS FOR ANTIOXIDANT LEVELS

These can be occasionally helpful, including Vitamin A, Vitamin E, CoQ10, and beta-carotene.

These tests are important markers and tell us whether there's a lot of rusting going on. If there's a lot of rusting, then you need some antioxidant support.

There are three ways to get antioxidant support. One is through your diet. The other is through antioxidant supplements, and the third is through boosting your own antioxidant enzyme systems. By doing all these three things, you can combat oxidative stress.

How do you identify antioxidants in food? You want to have 8 to 10 colorful servings of fruits and vegetables every day. You want your plate to look like a Matisse painting, a colorful pallet of different pigments that bring out the best in your system and protect you from this rusting phenomenon.

The second thing is to take a good multivitamin and mineral that has the right balance of antioxidants. Antioxidants work as a team; they pass the free radical from one to another.

This is how an antioxidant works. Let's say vitamin E gives one of its electrons to the free radical to neutralize that free radical. Then the vitamin E itself becomes a free radical; it becomes an oxidant. But the vitamin E gets neutralized by vitamin C. And then the vitamin C becomes an oxidant or a free radical. This hot-potato game continues until you cool it off with something called glutathione. Glutathione is the mother of all antioxidants. This is what needs to get supported by foods like broccoli, cabbage, cauliflower that increase the activity of glutathione. Unless you have the whole family of antioxidants together, there's a good chance you're going to potentially do more harm than good. Taking them in isolation is not good.

Measuring the effects of oxidative stress on your system is also very important. You want to find out if the antioxidants in your diet and supplements are working or not. It is important to know if you have increased oxidative stress or decreased oxidative stress; if you have increased rusting or decreased rusting.

The other important thing to realize is that we have our own antioxidant defense system. We have catalases and superoxide dismutases and glutathione peroxidases and enzymes that are involved in protecting our cells from rusting. These are things that we have in our body that are generated every day, and we create our own antioxidant defense system.

This system is often impaired. If we don't sleep enough, if we don't exercise enough, if our diet is poor, if we're too stressed, we impair our own defense system. When you're sick, you need more oxidative-stress protection. You need more antioxidants. That's why you should increase your vitamin C intake when you're sick because it helps your body fight the infection.

We have our own defense system. It's fed by a healthy lifestyle: exercise, stress reduction, eating 8 to 10 servings of fruits and vegetables, sleeping 7 or 8 hours a night. These are critical aspects to resolving the chronic oxidative stress that we're all suffering from.

Just remember that oxidative stress is not something you need to be stressed out about. It's part of life. It's the normal byproduct of your metabolism. But when it gets out of control it leads to uncontrolled aging and disease. You have it in your power both to identify the causes and to implement very simple strategies to combat oxidative stress.

## How to Score Your Ultraprevention Questionnaire

This is where you are going to combine your subtotals for the questionnaire you've been taking all along. Go back to the modules on each of the five forces of illness, and write down your scores in the following space. The maximum Score is 100 (20 questions for each force @ 1 point each).

Score for Malnutrition \_\_\_\_\_  
(From page 50)

Score for Inflammation \_\_\_\_\_  
(From page 63)

Score for Impaired Metabolism \_\_\_\_\_  
(From page 82)

Score for Impaired Detoxification \_\_\_\_\_  
(From page 104)

Score for Oxidative Stress \_\_\_\_\_  
(From page 123)

TOTAL OVERALL SCORE (All 5 scores combined) \_\_\_\_\_

### SUBCATEGORY SCORING:

0 to 4:            You're doing well.

5 to 10:           You need some help.

11 to 15:           You are in trouble.

16 to 20:           Get to your nearest ultraprevention doctor for a complete evaluation.

### OVERALL SCORING:

0 to 20:            You're doing well.

21 to 50:           You need some help.

51 to 70:           Do the whole ultraprevention program.

More than 70:      Get to your nearest ultraprevention doctor for a complete evaluation.  
Go to [www.drhyman.com](http://www.drhyman.com) for listings of ultraprevention physicans.

## CONCLUSION

By Dr. Mark Hyman

Together we've gone on a journey from Hippocrates, from thousands of years ago, to the present, and into the future of medicine. The promise of this program is to help you take advantage of the medicine of the future today. You don't have to wait another 10 or 20 years until this information filters down to your doctor's office. You can empower yourself. You can take control of your own health today.

If you want to maintain a long, vital, and healthy life you must become CEO of your own health. It's time to deal with those chronic symptoms that make you feel lousy. It's time to prevent the diseases that maybe your parents or your grandparents had. You are no longer a victim. You no longer have to wait until something happens to go to the doctor. You no longer have to wait until you're sick to get well.

One of the most profound pieces of wisdom in medicine I've heard was from the Yellow Emperor, who, 5,000 years ago, said, "To administer medicine to diseases which have already developed, and thereby suppress bodily chaos which has already occurred, is comparable to the behavior of those who begin to dig a well after they had become thirsty, or those who would begin to cast weapons after they had engaged in a battle. Would these actions not be too late?"

Don't wait until you're sitting in your doctor's office and getting the bad news about cancer, heart disease, diabetes, or some other incurable condition that has gone too far for anybody to help. You can do more than just suppress the symptoms. You can get to the root of the problem. That's the promise of this program.

For the first time in history we're beginning to understand how the body works. We still have a long way to go, but with the revolution in genomics, with the understanding of the role that our lifestyle plays in our genes and how those interact to create healthy or disease, we've come to a place that no one has ever thought we'd be. We can turn on or off different genes that regulate health. We can create an environment inside our bodies that supports health rather than creates disease. This is a revolution. This is something radically new.

The basic concepts we call the five forces of illness affect everybody to some degree. As we've gone through these five forces that can create illness or wellness, you might have seen yourself. You might have recognized yourself with impaired metabolism in your fat belly, or you might have recognized yourself in the person with migraine headaches and impaired detoxification, or the person with digestive problems, or the person who's feeling wrinkled and old.

All of these symptoms are precious clues. They're like little secrets that can tell you what's really happening. Use the ultraprevention questionnaire to identify where you might be having problems. Some people have problems with metabolism; others may have problems with oxidative stress or impaired detoxification. The promise of this medicine is that it's not one size fits all.

The future of medicine is personalized, individualized medicine that's matched to your particular biochemical individuality and unique genetics.

This is where we're headed. We're going to be able to do this in a much more sophisticated way. Right now, by simply answering these questions, by looking a little deeply into your symptoms, by looking at these forces of illness, by analyzing where you might have problems, and by working through the program step by step, you can identify the major causes of imbalance for yourself.

I'm very passionate about this subject because I believe that there are many people suffering without need. Many people have chronic illnesses that can be easily fixed. Many people unnecessarily suffer from preventable symptoms. My belief and my mission and my passion is to give each one of you the tools with which to create a healthy, vigorous, and energetic life.

I am convinced that each and every one of you will find something in this program. You deserve a happier, healthy, more vital and energetic life. It's your birth right.

Sincerely,

Dr. Mark Hyman

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*Small Changes*  
**Big Rewards**

Five Ultraprevention  
Steps for Alleviating 25  
Common Health Problems

**Mark Hyman, M.D.**

*Small Changes*  
**Big Rewards**

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Steps for Alleviating 25  
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## FIVE ULTRAPREVENTION TIPS

Here are five ultraprevention tips for dealing with each of 25 common health problems. The supplements recommended are available through [www.drhyman.com](http://www.drhyman.com).

### **Immune System Problems**

1. Eliminate dairy products and gluten
2. Walk 30 minutes a day
3. Practice relaxation techniques such as yoga, meditation, or deep breathing
4. Take a multi-vitamin daily
5. Take vitamin C, 1000 mg a day

### **Weight Loss**

1. Eliminate the white menace: white flour and sugar
2. Eliminate hydrogenated fats
3. Eat protein every day for breakfast (eggs, protein shake, unsweetened yogurt, nuts)
4. Walk 30 minutes a day
5. Don't eat three hours before bed

### **During Flu Season**

1. Get plenty of sleep
2. Take vitamin C, 1000-2000 mg a day, and zinc, 20-30 mg a day
3. If you get the flu, drink ultraprevention tea: Boil 2 Tbsp. thinly sliced fresh gingerroot in water for 10 minutes. Remove from heat and add a clove of crushed garlic,  $\frac{1}{2}$  teaspoon of cayenne pepper, the juice of  $\frac{1}{2}$  a lemon, and 1 tsp honey. Drink 2 cups of tea, twice daily.
4. Take a sauna or steam
5. Get a massage

## **Heart**

1. Take folic acid, 800 mcg a day
2. Eat wild salmon or sardines at least three times a week
3. Eliminate white flour and sugar from your diet
4. Eat 2 Tbsp. ground flax seeds a day
5. Walk 30 minutes a day

## **Digestion**

1. Try an elimination diet for two weeks — no dairy products, gluten, sugar, corn, or eggs
2. Increase fiber intake with whole grains, beans, vegetables or fruit, or 2 Tbsp. of ground flax seeds a day
3. Take a probiotic (acidophilus), 5 billion-10 billion organisms a day to help replace healthy bacteria
4. Take digestive enzymes, 2 with each meal
5. For constipation, try 200-300 mg of magnesium citrate capsules, once or twice a day

## **Brain/“Brain Fog”**

1. Take a purified form of fish oil containing EPA and DHA, 1000-2000 mg a day
2. Take folic acid, 800 mcg a day
3. Treat insulin resistance by eliminating white flour and sugar, eating protein in the morning and with every meal, including more fiber in your diet (whole grains, beans, vegetables or fruit), and eating smaller, more frequent meals (3 meals, 2 snacks)
4. Eat 8-10 servings of a variety of colorful fruits and vegetables a day
5. Practice relaxation techniques daily (a hot bath, yoga, meditation, deep breathing)

### **Sinus Problems**

1. Eliminate dairy products from your diet for 2 weeks
2. Use sinus irrigation or rinse with salt water (1 tsp. of salt to 1 quart of warm water)
3. Get an ULPA or HEPA air filter for your bedroom
4. Try a probiotic (*acidophilus*), 5-10 billion organisms a day to help replace healthy bacteria (which help the immune system and help reduce yeast or fungi that are a common cause of sinus infections)
5. Take zinc, 30-50 mcg, and vitamin C, 1000-2000 mg a day

### **Menopause**

1. Remove things that make menopausal symptoms worse: sugar, alcohol, cigarettes, and caffeine
2. Eat foods with hormone-balancing phytonutrients: soy, flax seeds, cruciferous vegetables such as broccoli, collards, kale
3. Exercise 30 minutes daily
4. Take a good multivitamin with at least 25-50 mg of B<sub>6</sub>, 300-400 mg of magnesium, and 800 IU of vitamin E
5. Practice relaxation techniques daily: yoga, deep breathing, meditation

### **Sleep Problems**

1. Before bed, take a hot bath with 1 cup Epsom salt and 10 drops lavender oil in the water
2. Take magnesium, 200-300 mg, 45 minutes before bed
3. Avoid the computer, television, or anything stimulating 2-3 hours before bed
4. Exercise for at least 30 minutes a day
5. Take valerian, passionflower, hops, or lemon herbal therapies (tinctures or tablets, follow instructions on label), 45 minutes before bed

## **Fatigue**

1. Take a multivitamin daily
2. Try magnesium potassium aspartate, 80 mg, 2-3 times a day
3. Try NADH, 5-10 mg, in the morning
4. Sleep at least 8 hours a day
5. Exercise 30 minutes 4-5 times a week

## **Colds**

1. Take whole echinacea tincture,  $\frac{1}{2}$  to 1 tsp in water every 2 hours at the first sign of a cold for 3-7 days
2. Suck on zinc gluconate lozenges, 5 a day
3. Take 1000 mg of vitamin C 3-5 times a day
4. Drink ultraprevention tea (see flu for recipe) 2-4 cups a day
5. Sleep and rest

## **Soft, Cracked, or Brittle Nails**

1. Take 1000 mg of fish oil twice a day
2. Take evening primrose oil, 500 mg, twice a day
3. Eat wild salmon 2-3 times a week  
([www.vitalchoice.com](http://www.vitalchoice.com) is a good source)
4. Take biotin, 2000-4000 mcg a day, and zinc, 20-50 mg a day
5. Get your thyroid checked (TSH, free T4, free T3, TPO antibodies)

## **Nail Fungus**

1. Get rid of the white menace, which promotes yeast growth
2. Take antifungal herbs such as oregano
3. Use a probiotic to normalize gut flora
4. Use topical tea tree oil 2-3 times a day on your nails
5. Follow these guidelines for soft nails too!

## **Headaches**

1. Try an elimination diet to see if the headaches are related to food allergies (no gluten, dairy, eggs)
2. Avoid artificial sweeteners like aspartame and food additives like MSG
3. Take 400-600 mg of magnesium a day
4. Get a massage or practice relaxation strategies like yoga and exercise
5. If the headaches are premenstrual, follow the guideline for PMS

## **Arthritis**

1. Try an elimination diet (no gluten, dairy, eggs, corn) for 2 weeks
2. Take 1000-3000 mg of fish oil a day
3. Take a blend of antioxidants
4. Take 1500 mg of glucosamine a day
5. Exercise regularly

## **High Cholesterol**

1. Get rid of the white menace
2. Eliminate trans or hydrogenated fats
3. Take 2 Tbsp. of ground flax seeds a day
4. Eat soy products
5. Take red rice yeast, 1200 mg, twice a day

## **Anxiety/Seasonal Affective Disorder**

1. Fish oil (EPA/DHA), 1000 mg, 1-2 times a day
2. Vitamin D 2000 U a day
3. Magnesium, 400-600 mg a day
4. B complex daily
5. Try yoga to relax your body and your mind

## **Depression**

1. Fish oil (EPA/DHA) 1000 mg 1-2 times a day
2. Take a multivitamin and mineral daily
3. Exercise vigorously for 30 minutes 4-5 times a week
4. Try yoga to relax your body and your mind
5. Have your doctor check your thyroid (an unrecognized reason for depression - TSH, free T3, free T4, TPO antibodies)

## **Erectile Dysfunction (ED)**

1. Follow guidelines for heart: cholesterol and sugars problems show up first as ED
2. Exercise regularly
3. Avoid alcohol
4. Take arginine, 500 mg, twice a day
5. Take ginseng, 200 mg, twice a day

## **Smoking**

1. Stop
2. Stop
3. Stop
4. Stop
5. Stop

## **PMS (premenstrual syndrome)**

1. Take magnesium, 400-600 mg a day
2. Take B<sub>6</sub>, 50-200 mg a day
3. Take Vitex (Chaste Berry), 10 mg, twice a day
4. Stop caffeine, sugar, and alcohol
5. Exercise regularly (30 minutes of vigorous activity 4-5 times a week)

## **Infertility**

1. Eat organic foods and filter your water
2. Take a multivitamin
3. Take fish oil
4. Check for insulin resistance (pre-diabetes)
5. Engage the relaxation response through breathing, yoga, or meditation

## **ADD/ADHD**

1. Try a gluten/dairy-free diet
2. Get off all sugar and additives and sweeteners
3. Take a multivitamin including B<sub>6</sub>, magnesium, and zinc
4. Take fish oil, 1000 mg, twice a day
5. Have your doctor test for mercury in hair or blood or with a urine provocation test

## **Osteoporosis**

1. Take an absorbable calcium (citrate), 800-1200 mg and magnesium (mineral chelates), 400-600 mg in divided doses every day
2. Take vitamin D<sub>3</sub>, 1000-2000 U a day
3. Engage in both weight bearing (walking, running, jumping) and resistance exercises (weights, some forms of yoga) at least 3 times a week
4. Eat soy foods (tofu, edamame, soy nuts, soy milk), ground flax seeds, and dark green leafy vegetables (kale, collards, arugula) daily
5. Increase your intake of omega-3 fats from wild fish (salmon, sardines, herring) and fish oil supplements

### **Environmental/Food Allergies**

1. Try an elimination diet avoiding dairy, gluten, and eggs for a few weeks to see if you feel better
2. Take 1000-2000 mg of vitamin C daily
3. Try Stinging Nettles, 300mg three times a day during the allergy season
4. Take Quercetin (a natural anti-histamine), 500mg twice a day before meals
5. Clean up your environment: use a HEPA filter at home, get rids of rugs, drapes and other dust collectors at home, and try to keep a dust-free bedroom

## THE FIVE FORCES OF ILLNESS

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### FORCE ONE:

## **MALNUTRITION**

*or Sludge*

More than 80 percent of Americans are malnourished, even by the government's own assessments. Not the malnutrition of children with swollen bellies and skin stretched over bones but the opposite: overconsumption, undernutrition, or too many calories and too few nutrients. To get the nutrients we need, we must have normally functioning digestion and absorption of the food we eat. The main areas of malnutrition among Americans include essential fatty acids, essential minerals, magnesium, zinc, calcium, selenium, folic acid, B-complex vitamins, and antioxidants.

### FORCE TWO:

## **IMPAIRED METABOLISM**

*or Burnout*

Impaired metabolism is literally burnout on the cellular level. This is a food-related problem that can smolder for years before exploding into full-blown disease. Ultraprevention goes to the heart of burnout, monitoring insulin, thyroid dysfunction, and how an individual's cells do, or do not, burn energy. The culprits? Sugars and refined carbohydrates. Heavy metals (such as the mercury in tuna, swordfish, mahi mahi, and halibut, or in your dental fillings), environmental toxins, and inflammation all can impair your metabolism.

FORCE THREE:  
**INFLAMMATION**  
*or Heat*

The complicated and poorly understood condition known as Alzheimer's is merely a description of a brain that has become damaged or scarred by inflammation. A heart attack occurs when the wall of an artery, inflamed by plaque formation, bursts and sends a blood clot to the heart. Inflammation is an important part of ultraprevention because even at a low level, it has the potential to cause serious illness: Alzheimer's, arthritis, heart disease, diabetes, Parkinson's disease, and prostatitis. But you won't necessarily know about inflammation, because you can't feel it. It has many causes, including toxins, allergens, lack of oxygen, free radicals and oxidative stress, injury and trauma, infections, obesity, and problems with blood sugar.

FORCE FOUR:  
**IMPAIRED DETOXIFICATION**  
*or Waste*

All of us have detoxification problems. Eons ago, our diet was all natural. Today, it's anything but. So the body must break down and eliminate anything that shouldn't be there — pesticides, additives, food coloring — as well as natural substances such as hormones and carbon dioxide and water — the cellular waste. Detoxification takes place in every cell of the body. Your ability to detoxify is based on the level of toxins you are exposed to and your genetic ability to process them. If the process doesn't work well, undesirable substances may accumulate, causing symptoms that can lead to serious disease.

FORCE FIVE:  
**OXIDATIVE STRESS**  
*or Rust*

Oxidative stress causes most of the conditions we associate with aging — wrinkles, osteoarthritis, and rheumatoid arthritis — and is caused by free radicals (an excess of high-energy oxygen molecules in the cells) that damage the cell's structure and tissues. One of the chief causes of oxidative stress is, surprisingly and unfortunately, the processing by your body of the food you eat. Poor lifestyle habits also trigger oxidative stress, including smoking, drinking alcohol, excessive exercise, prescription drugs, and, especially, overeating. The answer involves changes in lifestyle, adding supplements, and, most importantly, modifying the diet to better NCR (nutrient-to-calorie ratio) foods.

## THE NEW QUESTIONS TO ASK YOUR DOCTOR

If I don't have any symptoms, how are you going to keep me healthy? What tests should I have to measure my health?

What are biomarkers? Are you willing to give me my test results and explain what they mean?

How can we measure and improve my fitness?

How would you treat me if you didn't have your prescription pad?

How would you treat me if you were being paid by the hour?

How are you going to treat the cause of my disease, not just the symptoms?

How can you help prevent the diseases of aging?

Do you think chronic disease, such as heart disease or diabetes or osteoporosis, is reversible?

What's your point of view on nutrition and health?

Do you think the majority of Americans suffer from vitamin deficiencies?

Do you think that heart disease should be treated with a low-fat diet?

Do you think cholesterol or sugar is the most important cause of heart disease?

How do you feel about the role of vitamins and health?

Do you believe that food allergies can cause health problems, such as arthritis, asthma, sinus problems, irritable bowel disease, or autoimmune disease?

Do you know how to diagnose insulin resistance (metabolic syndrome)? How would you treat it?

What are the causes of inflammation and how do you treat it?

## Q&A with Dr. Mark Hyman

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*Why is it that although we have been practicing “medicine as usual,” people are now sicker than ever?*

Mainstream medicine or “medicine as usual” is focused on the wrong goal: to relieve symptoms with medication or surgery. Two key questions are never asked in the average doctor’s visit: What is at the root of illness, or why do people get sick? And what things does the body need to be fully healthy and in balance? The chronic illnesses facing citizens of the 21st century — cardiovascular disease, diabetes, cancer, dementia, obesity, and which account for over 29 million deaths a year — will not find their solution in the bottom of a pill bottle or in dramatic surgeries like heart or stomach bypass. They are lifestyle diseases, and a change in lifestyle is the cure.

Our current paradigm was based on the germ theory of disease developed in the 19th century: one germ causing one disease treated by one pill, such as the pneumococcal bacteria causing pneumonia treated with penicillin. This approach is not appropriate for the 125 million Americans with chronic disease caused by diet and lifestyle. If the cause is from diet, lifestyle, and the environment, then taking a pill will not work. It is most important to fortify and improve the underlying condition or health of the person — what can be called the person’s biological terrain. A bad terrain or imbalanced state of health provides the background for illness to occur when a person is overwhelmed by factors that cause illness, such as poor nutritional status, high stress levels, or environmental toxins.

Mainstream medicine also focuses just on the symptoms, not the cause, and, attempting to find the right pill for every ill. The diagnosis is the end of the line for most physicians, but it should be the beginning of the search for the roots of illness. Physicians think that once we have named the disease, our job is over, but the name is not the cause. Asthma doesn't cause asthma; heart disease doesn't cause heart disease. The cause may be an allergy to dairy or gluten or a chronic infection if you have asthma, or a folic acid deficiency, bad teeth, mercury or insulin resistance from eating too much sugar if you have heart disease.

Therefore, medicine misses the two most important things in health: the biological terrain — how to help and support a person's innate healing system — and the root causes of illness.

*What is the 50-year rule, and what does it mean in the examination room?*

Max Planck, the famous physicist, said that, "A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it." Medicine is full of examples of new ideas that took decades to be incorporated into medical practice, despite ample evidence. The most common are the washing of hands before surgery, the use of the stethoscope, the small pox vaccine, the treatment of ulcers with antibiotics instead of "bland diets" or acid-blocking medications, and the use of folate to prevent birth defects. No one physician or practitioner can keep up with the blur of medical research. Despite thousands of research studies, many of the discoveries in lifestyle medi-

cine and nutrition have not made it into the clinic. For 10 years I have been testing for and treating inflammation, and now it is being touted as the latest medical discovery.

Many physicians are brainwashed to consider only “evidence-based” medicine, which favors drug therapies for disease. While we have to carefully evaluate all the research, we can get a head start on practices that have shown promise and have little risk. I don’t advocate using potentially harmful therapies or medications without extensive testing (although that happens all the time, as we have seen with the recent reversal of belief on hormone replacement therapy and the withdrawal of Vioxx from the market). Using aggressive lifestyle therapies — changes in diet, exercise, stress management, and supplements — can have profound effects on health. When doctors say there are no studies, I say, Do your homework! There are over half a million studies in the National Library of Medicine’s nutritional supplement database. They just haven’t read them. We need to be taking advantage of the new information on inflammation, insulin resistance, nutritional deficiencies, food allergies, and toxins, and testing for them in the clinic. We need to treat people for these problems, not wait until we have “enough evidence.” By then it will be 50 years from now. We have to go with the best evidence we have, which is a lot if anyone read it! The goal of ultraprevention is to help people take advantage of the medicine of the future, *now*.

*How can we create health in an aging population that is changing faster than doctors understand?*

What we see as normal aging is really abnormal aging. Diseases of old age start in childhood. Most age-related diseases, including heart disease, cancer, osteoporosis, diabetes, and dementia, are really pediatric illnesses with geriatric consequences. There is a continuum of dysfunction that starts early in life and gets progressively worse, and it is controlled primarily by what we eat, how much exercise we do, our nutritional deficiencies, and our exposure to toxins and other stresses. In order to successfully create health in an aging population, in order for people to have a health span equal to their life span, to die young as late as possible, to add more life to their years and years to their life, each person and his or her doctor must ask two simple questions. 1. What is impairing my health — poor diet, stress, lack of exercise, allergens, toxins, infections, etc.? And 2. What is it my body needs to be fully healthy — the right balance and quality of proteins, fats and carbohydrates, fiber, phytonutrients, vitamins, minerals, and special nutrients, exercise, sleep, rest, light, air, water, love? The process of answering those two questions will allow both patient and doctor to find all the things that get in the way of healthy aging. That is the promise of ultraprevention: getting to the answers to those simple questions.

*Why do people believe drugs cure disease?*

People go to the doctor with specific symptoms looking for relief — and often they get it — as long as they continue to take their pills. Once they stop the blood pressure pill, their blood pressure goes back up, or stop their cholesterol pill, their

cholesterol goes up, or stop their reflux pill, their heartburn comes back. The belief that drugs cure disease came from treating infections. If you have a strep throat and take penicillin, you're cured. If you have bladder infection and take antibiotics, you are cured. Unfortunately most medications don't work like antibiotics; they simply suppress symptoms and don't get to the root of the problem. That belief keeps people looking for doctors to fix them, or for pills to cure their ills, not where they should be looking, which is in the mirror, on their plate, or at their waking shoes!

*Which supplement can prevent breast cancer, colon cancer, Alzheimer's disease, cervical cancer, lung cancer, heart disease, depression, and stroke — and why do doctors not tell you to take it?*

Once you understand how the body works, it becomes clear that we need certain raw materials to make everything work. If you build a house but don't put in the electrical wiring, then you can't turn on any lights, work your computer, heat your house, cook your food, or play music. All these activities seem unrelated, but they are all connected by the need for electricity. The body is very much the same way. You need certain raw materials to make everything work. Just one missing ingredient can cause diseases in diverse systems of the body. That is why without enough folate, you can get many different diseases, from breast, colon, lung, and cervical cancer, to Alzheimer's, heart disease, stroke, and even depression and birth defects. A simple blood test, homocysteine, will tell you if you are deficient. The average person needs 800 mcg a day of folate. Eating greens and beans can also help. Most doctors don't test for homocysteine and believe that unless you have

anemia, you have enough folate. Others are waiting for more “evidence.” Millions will die from not taking enough folate, but not one person will die or be sick from taking too much.

*Which supplement can prevent heart attacks, the pain of arthritis, depression, attention deficit disorder, inflammation, dry skin, hair loss, obesity, and even sudden death — and why don't doctors tell you to take it?*

Doctors don't learn how to create health in medical school and learn even less about nutrition. It is hard to fault them for what they are not taught. Unfortunately, what they are *not* taught is often more important than what they are taught. That is the case when it comes to understanding the role of essential fatty acids, also known as omega-3 fats, in creating health. Every cell in your body is made up of fat, your brain is 60 percent fat, and all your nerves are covered in fat. We are supposed to be made up of omega-3 fats, not saturated or trans fats (fake fat) because we evolved eating wild foods — wild animals, wild fish, and wild plants — which are all very rich in the essential omega-3 fatty acids. But nobody eats wild foods any more except a little fish, so over 99 percent of us are deficient in the omega-3 fats. Deficiencies of this essential group of fats can cause not just every illness mentioned in the question, but dementia and cancer too. Omega-3 fats are one of those essential raw materials without which our bodies cannot function optimally. Taking purified omega-3 fatty acid supplements from fish oil or from flax seeds can correct a host of ills and even make your hair shine and your skin glow.

*What are the 10 problems that doctors don't test for, and why not?*

Doctors are trained to diagnose problems after they occur. They are also trained to use tests to make a diagnosis. However tests can be used in two ways — one is to make a diagnosis, which simply gives you the name of the problem, not the cause. The other is to use tests to find the underlying cause. For example, a doctor can test for osteoporosis with a bone density test, but that doesn't tell you why there is bone loss — is it because there is a vitamin D deficiency or the person has an allergy to gluten and can't absorb nutrients effectively? An angiogram will tell you that a person has heart disease, but not why — is it because of insulin resistance, too much sugar, a folate vitamin deficiency, a lack of omega-3 fats, or something else? By looking at health through the perspective of the major forces that cause disease — malnutrition, inflammation, impaired metabolism, impaired detoxification, and oxidative stress — different tests can be used that get to the root of the problem. A number of these tests identify ten of the most common problems that I have found to be most useful in finding the causes of disease.

**1. Insulin resistance:** Taking a sugar drink and then measuring blood sugar one and two hours later is the best way to diagnose whether you have a sugar imbalance or pre-diabetes that increases your risk for heart disease, cancer, and dementia, and almost all the diseases of aging.

**2. *H. pylori* infection:** *H. pylori* antibodies check for an infection in the stomach that is a common cause of reflux, ulcers, stomach cancer, and rosacea.

**3. Mercury toxicity:** Unfortunately many people have hidden mercury toxicity that can lead to many common disorders, including fatigue, heart disease, thyroid and neurological disorders, as well as a host of inflammatory and autoimmune problems. The best way to test for this is a provocation test using a chelating agent and then measuring the levels of mercury in the urine.

**4. Chronic inflammation:** Hidden inflammation is at the root of most of the diseases of aging, such as heart disease, Alzheimer's, arthritis, cancer, diabetes, and more. A simple blood test for high-sensitivity C-reactive protein will tell you whether you have this hidden inflammation. Then you have to figure out why.

**5. Folate deficiency:** This can lead to many cancers, including breast, colon, and cervical cancers, heart disease, dementia, arthritis, osteoporosis, and depression. A blood test for homocysteine will tell you if you are deficient.

**6. Food allergies:** These are commonly overlooked triggers for common problems that decrease the quality of life, including migraines, sinus problems, irritable bowel syndrome and fatigue. Testing for delayed, or IgG, food allergies and for gluten antibodies or celiac disease can get to the root of many chronic diseases.

**7. Hidden thyroid disease:** Many people have subclinical thyroid problems and are not diagnosed or treated properly. Thyroid disease can account for many chronic symptoms, including fatigue, hair loss, dry skin, cold intolerance, constipation, high cholesterol, weight gain, depression, and more. If you have any of these symptoms, you should be tested using special thyroid tests: TSH, free T4, free T3, thyroid peroxidase, and anti-thyroglobulin antibodies.

**8. Omega-3 deficiency:** This common problem can lead to inflammation, skin problems, heart disease, and cancer. Blood tests can tell you if you are deficient — although almost everyone is deficient and simply supplementing with fish oil can help.

**9. Oxidative stress:** Free radicals are the common link to the end stage of most diseases, including obesity, fatigue, heart disease, dementia, cancer, and arthritis. Measuring the level of oxidative stress through lipid peroxides or damaged DNA products (8OHdG, 8 hydroxy-2-deoxyguanosine,) can be helpful in guiding treatment.

**10. Magnesium deficiency:** This common problem is often the overlooked cause of fatigue, muscle cramps, constipation, headaches, insomnia, anxiety, palpitations, and irritability. Testing for red blood cell magnesium, though not perfect, is a good way to test for this. If you have any of these symptoms, taking magnesium supplements can be very helpful.



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