The Missing Fat Loss Manuscript

The Top 10 Physiological Reasons You Aren't Losing Fat

By: Dr. Bryan Walsh
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Dr. Bryan Walsh
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QUICK START
(Before You Read Anything Else)

There are two types of people in the world – those that want the quick info and answers, and those that want the details.

This manual gives you both.

For those interested in quick information that summarizes the essence of each chapter, I’ve started each section with Lite Bites. While the info in Lite Bites won’t tell you everything, it will help you learn the basics of what is stopping you from losing fat.

**Lite Bites**

Lite Bites are designed to give you the quick information you’re after.

No fluff. No frills. Just the basics of why you are having a hard time losing fat despite following a good diet and exercise program.

Lite Bites will give you just enough to get an understanding of how complex fat loss really is and why diet and exercise might not be enough.

And of course for the rest of you interested in more detailed information, you can read the chapters in their entirety.

Enjoy!
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Introduction

Let’s be honest. This manual is not for people that sit around eating Ding Dongs all night while watching reruns of Dancing With the Stars.

It is not for people taking Alli hoping it will help them lose fat while they walk around the mall sipping on a mocha frappuccino.

This manual is for men and women who follow a good diet and exercise program - and give it their best effort - but are still having a hard time losing fat. Hard working men and women that for all intents and purposes should be losing fat on their program, but aren’t.

Losing fat should not be that hard. After all, we’re constantly told that all we need for fat loss is diet and exercise. If that doesn’t work then we simply need to diet more and exercise harder, right?

That’s what we’re told.

But what I’m about to say could be repeated a hundred times and it would still not be enough. It is the missing link in the diet and exercise industry today:

Your physiology dictates how well your body responds to diet and exercise.

A good physique does takes effort. It takes diligent dieting and consistent, hard exercise. These tools are necessary for fat loss and for getting the body you’ve always wanted. But what happens when you are following a good diet and exercise program and you aren’t getting results? It’s probably not your program, it’s your physiology.

What Happens When Your Garden Stops Growing?
Let's say you decided to take up gardening. We all know that the two things necessary for a plant to grow are sunshine and water. So you go down to the local nursery, buy a couple plants and start taking care of them. But after a few weeks, they don’t grow.

You give the plants a little more sunshine and extra water, but they still don’t grow. You add fertilizer. Nothing. You even sing to them and they still don’t budge.

Then one morning you wake up and see your son squirting Windex on your plants, thinking he was watering them for you. Is that your fault? No. You didn’t know about it, but now that you do it is your responsibility!

Just like sunshine and water are needed to make a plant grow, we need diet and exercise to lose fat. But a plant will only grow to the degree that it has healthy soil and when it comes to fat loss, we will only lose fat to the degree that our physiology allows us to. You can diet and exercise all you want, but if your physiology isn’t working properly, you won’t lose fat.

The Missing Link:
Where the Diet and Exercise Industry Is Wrong

This concept that your physiology dictates your response to diet and exercise is deceptively simple, but it is also incredibly true. Countless numbers of nutrition and fitness gurus tell us that in order to lose fat, all we need is diet and exercise. But they are only partly right. While it is true diet and exercise are important if we want to lose fat, the results you get from your diet and exercise program are directly related to your physiology. In other words, the better your body is working, the better your results will be from your diet and exercise program.
Far too many men and women are not seeing the results they should be from their program today. And I’m not talking about seriously overweight people either. Thousands of people just like you are struggling to lose weight despite the fact that they are following some of the top diet and exercise programs.

“Thousands of men and women are struggling to lose weight despite the fact that they are following some of the top diet and exercise programs.”

If you have been eating a healthy diet and following a good exercise program and you are still having a hard time losing fat, it probably has to do with your physiology. It cannot be overstated - your physiology dictates how well your body responds to diet and exercise.

Diet and exercise are also not enough to correct underlying physiological imbalances. For example, most people cannot correct a thyroid dysfunction simply by eating a better diet. Nor can someone eat a certain food that will automatically balance your hormones. Physiology is far more complex than that and, with all the stressors of today’s modern society, diet and exercise is simply not enough. Today we need to do more.

**It Might Not Be Your Fault**

If you’ve tried fat loss programs in the past, but failed to achieve the results you were looking for, it’s probably not be your fault. Maybe you lacked motivation or education, or perhaps you simply did not achieve measurable results using a particular program and ultimately gave up. I can’t blame you

The good news is that if you are overweight, you can do something about it. And despite what you have heard, losing weight is not only about diet and exercise.

Diet and exercise are essential components to a fat loss program. But there are many other underlying factors that can sabotage your efforts to lose fat. That’s what this manual is all about. This program will show you the top ten
physiological reasons that you aren’t losing fat. In fact, this is probably the most honest and comprehensive fat loss information you have read in a long time.

If you have tried a fat loss program in the past and had either limited success, or zero success, this information is what you have been waiting for. Despite what fitness and nutrition “gurus” have been telling you, fat loss is more than just diet and exercise.

A healthy body does not have a hard time losing weight. In fact, a healthy body is rarely overweight to begin with. The problem with the vast majority of fat loss programs today is that they focus entirely on diet and exercise, and not on physiology. As you will learn in this manual, certain glands like the thyroid gland dictates your metabolic rate and how easily you lose fat. If it’s not working correctly it will practically stop fat loss in its tracks.

If you’ve been following a good diet and exercise program and haven’t been getting results, it probably has to do with one or more of these underlying factors.

You, and only you, are responsible for your health. It is my sincere hope that armed with the proper information, you will be able to make choices that will forever change your health for the better and give you the body you’ve always wanted.

Yours in health and happiness,
Dr. Bryan P. Walsh
The Blood Sugar/Insulin-Fat Loss Connection

LITE BITES

- There are two types of blood sugar issues, 1) chronically elevated blood sugar and 2) fluctuating blood sugar. Each has insulin surges, which cause negative impacts on your body’s ability to lose fat.

- Insulin leads to a number of issues that stop you from losing weight including:
  - Hormone imbalances (testosterone in women, estrogen in men)
  - Inflammation, which promotes fat gain
  - Poor liver detoxification, leading to a slower metabolism
  - Leptin resistance, making you feel hungry all day long

- Diet and exercise are not enough to help manage blood sugar today, you must manage stress, balance cortisol and in some cases, support your blood sugar with necessary supplements.
A Modern Epidemic

Blood sugar issues are at an all time high. While most people are familiar with the effects of chronically elevated blood sugar, there is also a group of people who suffer from the effects of low blood sugar, or what could be more accurately characterized as blood sugar fluctuations, otherwise known as reactive hypoglycemia. Each are equally as damaging to our health as well as our ability to lose weight.

Everyone has heard of the modern epidemic of diabetes today, but that is not who we are talking about here. Remember, this book is dedicated to the hardworking men and women who diligently follow a good diet and exercise program but are not able to lose weight. In other words, not your run-of-the-mill Americans who spend their time eating Twinkies, bingeing at McDonalds and competing in the World’s Laziest Couch Potato competition. Not by a long shot.

Rather, we are referring to health-conscious, educated individuals who eat well, exercise regularly, take supplements, but are still having a hard time losing weight. To me, this is the modern epidemic – people who have a blood sugar issue despite a good, clean diet and lifestyle. And there are far more of them than you’d think.

How is it that people who are doing what they are “supposed” to be doing — eating healthy, exercising, maintaining a normal body composition — still have blood sugar issues?

Blood sugar, or glucose, is the body’s preferred source of fuel. The brain, organs and muscles run off of glucose. At the deepest level, the cells of our body use glucose to manufacture adenosine triphosphate (ATP) which is a fancy way of saying “energy”. In other words, if our cells do not get adequate amounts of glucose into them, we cannot produce energy to help run our body.

“Without adequate ATP production, hormones are not produced optimally, brain function does not work properly and practically every system of our body suffers, including our ability to lose fat.”

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ATP is the fundamental energy source for virtually every physiological process in our body. When ATP is lacking, so is our ability to function optimally. With inadequate ATP production, hormones are not produced optimally, brain function does not work properly and practically every system of our body suffers, including our ability to lose fat. While our world governments are working to correct today’s global energy crisis, people are having an internal energy crisis created by blood sugar issues.

Blood sugar imbalances create disturbances in our body, our mind, our ability to sleep, hormones, immune system, our response to stress, etc. And if you think simply eating right and exercising are the remedy to managing blood sugar, think again. There are many people who do those things but still have blood sugar issues, which create major issues to their body including their ability to lose fat.

As our primary energy source, blood sugar comes from two places – internal and external. Internally our body stores glucose as glycogen for later use by our muscles and some organs. Externally, we obtain glucose from the food we eat. In other words, we consume carbohydrates which are further broken down into glucose, which is a usable source of energy for our cells.

Glucose however, cannot get into our cells without help. The pancreatic hormone insulin creates a series of effects when it attaches to receptor sites on the cell surface, allowing glucose to be transported into the cell. The more easily this process occurs, the more efficiently ATP is made.

“There is a reason blood sugar balance is listed as the first of the top ten reasons you aren’t losing fat.”
The Ups and Downs of Blood Sugar

For simplicities sake, there are primarily two ways you can have imbalanced blood sugar, both causing massive negative impacts on your body. In fact, there is a reason blood sugar balance is listed as the first of the top ten reasons you aren’t losing fat. If there are any imbalances in blood sugar, optimal health and fat loss can be virtually impossible.

1. **Chronically elevated blood sugar** (insulin resistance), which is characterized by two things: chronically elevated glucose levels, and subsequent elevated insulin levels to help deal with the blood sugar.

2. **Blood sugar fluctuations** (reactive hypoglycemia), which refers generally to low (“hypo”) blood sugar (“glycemia”), but is really characterized by blood sugar fluctuations — sometimes it’s high and sometimes it’s low.

Both, however, have insulin surges, which is critical to understand. Blood sugar is problematic in the blood because, while the body needs it, it is almost toxic in extreme levels. This is why the body take such extreme measures to lower levels of glucose in the blood. It does so using insulin, which carries a wide variety of negative impacts on the body. Again, but chronically elevated blood sugar levels and blood sugar fluctuations (i.e. hypoglycemia) have problems with insulin.

The first issue someone can have with blood sugar is **chronically elevated blood sugar**, otherwise known as insulin resistance, metabolic syndrome, Syndrome X, pre-diabetes or even diabetes. This is often created over time by a gradual decrease in insulin receptor site sensitivity, leading to an inability for glucose to get into cells which then signals the body to secrete even more insulin to deal with the problem. In other words, when someone follows a poor quality diet or a high quantity diet, blood sugar will rise beyond healthy physiologic levels, signaling the pancreas to release insulin.
Any hormone in large quantities can eventually downregulate, or desensitize, cell receptors making the cells less responsive to that particular hormone. In the case of chronically elevated blood sugar levels, or insulin resistance, the body has become less sensitive to the effects of insulin, making it harder to transport glucose into cells and eventually leading to high glucose levels in the blood. These elevated levels of blood glucose end up getting stored as triglycerides and fat, which is just one of the ways elevated blood sugar makes it difficult to lose fat.

There is a second way blood sugar can cause issues in the body and that is having chronically low blood sugar, or reactive hypoglycemia, which can be just as damaging to the body as high blood sugar.
Reactive hypoglycemia is most accurately characterized by periods of low blood sugar followed by periods of high blood sugar. This somewhat elusive condition is difficult to recognize and even more difficult to diagnose due to the periods of low blood sugar being difficult to catch using laboratory testing. For this reason, the true incidence of reactive hypoglycemia is unknown, though clinically it is something we see far more often in our practice than chronically elevated blood sugar levels.

Besides the unwanted symptoms of reactive hypoglycemia which include, irritability and tremors between meals, the inability to concentrate and occasional bouts of lightheadedness, the negative impacts of reactive hypoglycemia on fat loss is due to the same thing that makes chronically elevated levels of blood sugar undesirable – insulin.
The Problem With Insulin

There is a major misconception running around today that diet and exercise is all we need to be healthy. This is not true. In fact, looking healthy, having a muscular body, and exercising regularly does not mean that you have normal blood sugar management. In today’s modern world, all bets are off with regard to physiology. In fact, researchers have started using new terms like “non-obese insulin resistance” and “atypical metabolic syndrome” because normal-looking people are having blood sugar management issues.

Below is a vicious cycle that is common in people today.

<table>
<thead>
<tr>
<th>Hypoglycemic tendencies</th>
<th>Insulin resistant tendencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feels better after meals</td>
<td>Feels tired after meals</td>
</tr>
<tr>
<td>Sugar cravings before meals</td>
<td>Sugar cravings after meals</td>
</tr>
<tr>
<td>May have difficulty staying asleep at night</td>
<td>May have difficulty getting to sleep at night</td>
</tr>
</tbody>
</table>
Though there are a number of mechanisms involved in this cycle, here is a basic explanation. Elevated blood sugar, whether a blood sugar spike (i.e. hypoglycemia) or in chronically elevated blood sugar (i.e. insulin resistance), results in an increase in insulin to remove excess glucose from the blood. Insulin stimulates the production of inflammatory chemicals which in turn cause an increase cortisol. Cortisol’s primary function in the body is to increase blood sugar, which then continues this vicious cycle.

“While insulin is necessary to sustain life, insulin surges it can have numerous devastating impacts on the body, including making fat loss almost impossible.”

People can enter into this cycle in one of two ways. The first is through improper eating. Excess sugar or carbohydrates, excessively large meals or glycemically imbalanced meals can excessively elevate blood sugar levels, causing this cycle of high blood sugar – high insulin – high cortisol to begin.

The second way the cycle can be started is via cortisol. Anything that elevates cortisol (i.e. stress, infection, food allergies, inflammation, etc.) will also elevate blood sugar and therefore insulin levels.

In other words, you could have a perfect diet and exercise program, but if you have elevated cortisol levels, you may also be increasing your blood sugar from the inside.

The Impacts of Blood Sugar on Fat Loss

The primary issue with blood sugar mismanagement on fat loss, whether chronically elevated (i.e. insulin resistance) or blood sugar fluctuations (i.e. hypoglycemia), is due to the negative effects of insulin. While insulin is necessary to sustain life, in excess it has numerous devastating impacts on our body, including making fat loss difficult.

When blood sugar is chronically elevated, insulin levels are also chronically elevated. However in cases of blood sugar fluctuations, the body will only produce periods of high insulin in response to the brief periods of high
blood sugar, following periods of low blood sugar. Both chronically elevated insulin and episodic insulin bursts have many negative metabolic effects, especially as it pertains to fat loss.

Firstly, insulin will create hormonal shifts in both men and women. In men, insulin will upregulate an enzyme called aromatase, which converts testosterone to estrogen. Estrogen in men, in addition to being a cardiovascular risk, makes it very difficult to lose fat. On the other hand, in women elevated insulin levels result in an increase in testosterone production which, in addition to being a cardiovascular risk for women, also makes fat loss very difficult.

Second, insulin stimulates a pro-inflammatory chemical called interleukin-6 (IL-6). IL-6 has a number of damaging effects on the body, one of which includes raising levels of cortisol, a stress hormone produced by the adrenal glands. One of cortisol’s primary effects on the body is increasing blood sugar levels, which of course further elevates insulin, creating a vicious cycle.

Thirdly, elevated insulin has been shown to create alterations in leptin, a hormone responsible for satiety signals, or letting us know when we are full. Chronically elevated levels of leptin has a similar fate to that of other chronically elevated levels of a hormone – downregulation or desensitization of receptor sites specific to that particular hormone. Prolonged release of leptin causes a condition called “leptin resistance”, which means our body does not sense the leptin being secreted and therefore never gets the signal that we are full and should stop eating.

Finally, insulin creates alterations in our liver’s ability to detoxify and clear substances from our body. This includes toxins and hormones, leaving them to remain in our body longer and cause further damage. As discussed earlier, insulin resistance can also decrease the ability for glucose to get in the cell, causing a decreased production of ATP, resulting in low energy state and poor cell function all over our body.

Make no mistake – blood sugar and insulin issues are far more common than people understand and they can cause massive, unwanted metabolic shifts that make it difficult to lose fat and be healthy. A summary of some of these impacts is below.
What To Do

The first thing to do is to check symptoms. For example, do you get fatigued after meals or have a difficult time getting to sleep? If so, you may have chronically elevated blood sugar and insulin resistant tendencies.

On the other hand, if you get shaky or lightheaded between meals and wake up often during the night, this could indicate that you have tendencies towards reactive hypoglycemia.

Ultimately a good quality blood chemistry panel, interpreted by someone who really understands how to read them from a functional perspective, can help identify if there are any underlying blood sugar issues. Blood sugar issues are far more common than you think, even in otherwise healthy individuals. Information on how to properly interpret blood sugar testing as well as what to do about the different type of imbalances can be found at www.fatisnotyourfault.com.

When addressing blood sugar issues, one question that must be asked is why are they present. Very often there is also an adrenal gland issue involved as well. These two issue typically go hand in hand, which is the topic of the next section.
The Cortisol/Adrenal-Fat Loss Connection

LITE BITES

- Stress is everywhere in our society, and has serious consequences for our health.
- Stress damages our adrenal glands’ function, resulting in either chronically high or low cortisol.
- This has widespread effects on our
  - sex hormones;
  - metabolism and blood sugar;
  - gastrointestinal system; and
  - immune system.
- All of these things can prevent you from losing fat effectively.
Stress: The 21st Century Plague

Few things in our modern life have the negative impacts that stress does on our body. Yet stress has become ubiquitous in today’s society. There are more physiological stressors in our environment and society than ever before in human history. And while this has profound impacts on our health and physiology as a whole, it can virtually stop fat loss in its tracks.

Stress will sabotage anyone’s ability to lose fat. There are a number of reasons for this but the major one has to do with cortisol. Cortisol is a hormone secreted by the adrenal glands and its primary action on the body is to increase blood sugar levels during times of stress.

While this is a normal physiological process that was important for survival of our ancestors, in today’s world of chronic and ongoing stress, we often have an over production of cortisol, which has numerous damaging effects on the body. In fact, there is almost no single response that can cause as much damage to our body, and our ability to lose fat, than a chronic stress response and elevated cortisol levels.

When you look at the top ten drugs prescribed in 2008, it is clear that stress is taking a toll on our culture.
Cortisol’s primary role in the body is to increase blood sugar, therefore chronically elevated cortisol levels can lead to chronically elevated blood sugar levels. This in turn, leads to chronically elevated insulin levels, a hormone secreted by the pancreas to help manage blood sugar levels. Chronically elevated insulin levels can eventually lead to diabetes.

Today’s stress comes in many forms including psychological stress such as money, relationships, and work, as well physical stressors such as infections, lack of sleep, food allergies and even excess exercise.

Top 10 Drugs of 2008 and Stress

1. Lipitor – Cholesterol lowering medication. Cholesterol is often increased during times of stress.
2. Acetaminophen – Pain medication. (WTS) Stress causes inflammation, which drives pain.
3. Acetaminophen – Pain medication. (MKR)
4. Levothyroxine – Thyroid medication. Stress responses directly causes defects in thyroid hormone physiology.
5. Amoxicillin – Antibiotic. Stress negatively impacts our immune system, making us more prone to infection.
6. Lisinopril – High blood pressure medication. Stress is well known for causing or contributing to high blood pressure.
7. Nexium – GERD medication. Stress is a well known contributor to symptoms of “heartburn”, or gastroesophageal reflux.
8. Synthroid – Thyroid medication. Stress responses negatively impacts defects in thyroid hormone physiology.
9. Lexapro – Depression and anxiety. Stress obviously contributes to both depression and anxiety.
10. Singular – Asthma medication. Stress can induce asthma and makes the condition worse if someone already has it.
Numerous studies have shown that lowering stress levels and managing cortisol levels can help to reduce body fat levels as well as help lower blood pressure, improve insulin sensitivity, balance blood sugar and control appetite.

Adrenal Glands 101

Before delving into the adrenal glands, it needs to be mentioned that they are today’s alternative medicine scapegoat. I say that because everyone is talking about having “adrenal fatigue” and blaming virtually everything from cancer to the economic recession on the adrenal glands. While the adrenal glands can be dysfunctional, their role in the body is completely misunderstood.

The adrenal glands are small, triangular shaped glands that sit atop your kidneys, hence their other name “suprarenal glands” (from the Latin supra, or “above”). Their primary function in the body is to help use respond to and survive stressful situations. Many years ago they served their purpose well by helping us get out of potentially life threatening situations, but in today’s modern society of chronic stress, the adrenal glands have been asked to work overtime and as a result, our body and fat loss abilities have suffered because of it.

The adrenal glands produce a number of important hormones. Epinephrine (aka adrenaline), cortisol and aldosterone are three such hormones. The adrenal glands also produce some sex hormones, such as estrogen and testosterone. The health and function of the adrenal glands is critical in our overall health and pursuit of fat loss.

For simplicities sake, people usually fall into one of two categories when it comes to adrenal gland dysfunction:

1. Chronically high cortisol production
2. Chronically low cortisol production
Both can cause people to have a difficult time losing fat for a variety of reasons, some of which are included below.

It is because high cortisol levels are known to have a negative impact on weight loss that the “cortisol blocking” supplements have been created. While the research behind the ingredients in these products is sound, the quantities of these ingredients in the actual supplements are negligible and will likely do nothing to decrease cortisol levels in the body.

High cortisol will elevate blood sugar, cause thyroid hormone imbalances, cause inflammatory responses, and will negatively impact the immune system, all having a negative impact on fat loss.

Other people, however, will tend to experience low cortisol. This is often accompanied by low blood sugar as well and many of the same symptoms apply. Low cortisol is not necessarily “adrenal fatigue” as some experts would have you believe, but rather the body sending signals to actually inhibit the production of cortisol. This can be problematic for people because we need a certain amount of cortisol for a variety of things including recovery from exercise, immune system function and to positively impact other hormones, such as melatonin.

High or low cortisol can have negative impacts on the body and fat loss efforts.
The Impacts of Cortisol on Fat Loss

In addition to elevating blood sugar levels, cortisol also has a number of other negative impacts on the body including:

- Decreasing your body’s ability to make and convert thyroid hormone. Result: lowered metabolism due to a thyroid imbalance.

- Decreasing your body’s ability to use insulin. Result: insulin resistance and pre-diabetes.

- Decreasing your body’s ability to use leptin, which helps send signals to your body that you’re hungry and that you’re full. Result: you eat more than your body needs.

- Decreasing your liver’s ability to detoxify substances, including hormones, leaving them to circulate in your body longer. Result: hormone imbalance leading to fat gain.

- Increasing gastrointestinal dysbiosis (good-to-bad ratio of bacteria) and leaky gut. Result: Food sensitivities and infections both lead to an increased stress response.

- High cortisol suppresses your body’s immune system. Result: Susceptible to bacterial and viral infections.

- Low cortisol can inhibit your body’s ability to have an immune response in the first place. Result: Prone to infections.

- Increases insomnia, leading to blood sugar dysregulation, decreased healing and increased appetite through the hormone, ghrelin. Result: Difficulty losing fat due to appetite control.

- Negatively impacts gastric “juices” leading to poor nutrient digestion, increased risk of infection and increased risk of anemia. Result: Fatigue, nutrient deficiency and further promoting the stress response.
Stress is a major contributor to a number of health issues and has negative, far-reaching effects on the body, including fat loss.

Even the most well-intentioned person on the best diet and exercise program, can have a difficult time losing fat if they are experiencing elevated cortisol levels and adrenal dysfunction. But the problem doesn’t end here – chronically elevated levels in some individuals, eventually leads to chronically low cortisol levels.

“Even the most well-intentioned person on the best diet and exercise program can have a difficult time losing fat if they are experiencing elevated cortisol levels...”

These individuals will likely have all the negative effects of elevated cortisol, along with significant fatigue, depressed sex hormones (i.e. testosterone in men, estrogen in women) and lack of motivation.

Stress in all of its forms – mental/emotional stress, food sensitivities, infection, lack of sleep, cell phones, deadlines, a poor diet – is often underlying many different health conditions, including the inability to lose fat.

What To Do

The first thing to do is to evaluate symptoms. However, symptoms are rarely an effective tool for determining underlying physiological conditions. There are a number of symptoms that can indicate a wide variety of different conditions. Fatigue is one such example. Fatigue is a symptom often related to adrenal gland dysfunction, but fatigue could also be due to anemic tendencies, thyroid dysfunction, hormone imbalances, neurotransmitter imbalances, etc.
That being said, here are some associated symptoms for adrenal-related issues:

<table>
<thead>
<tr>
<th>Hyperadrenal symptoms</th>
<th>Hypoadrenal symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty falling asleep</td>
<td>Difficulty staying asleep</td>
</tr>
<tr>
<td>Allergies</td>
<td>Dizziness when standing up quickly</td>
</tr>
<tr>
<td>Excessive perspiration</td>
<td>Blurred vision</td>
</tr>
<tr>
<td>Gastric ulcers</td>
<td>Shakiness or lightheadedness between meals</td>
</tr>
<tr>
<td>Fatigue after meals</td>
<td>Eating relieves fatigue</td>
</tr>
<tr>
<td>Sweets cravings</td>
<td>Salt cravings</td>
</tr>
<tr>
<td>Excessive urination</td>
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</table>

While symptoms can be valuable in evaluating physiology, lab testing is important. The preferred method for evaluating functional adrenal gland issues is salivary testing due to the ease of measuring circadian rhythm. This type of testing utilizes four salivary samples throughout the day and averages out the total production of DHEA. The adrenal salivary test not only allows you to evaluate adrenal function, but can also give implications into the function of certain aspects of brain function as well (i.e. hippocampus function, which regulates the hypothalamus-pituitary-adrenal axis).

However, properly evaluating this type of testing is not something most practitioners do correctly, much less the general public. So it is important to find someone qualified to evaluate adrenal salivary panels appropriately. More information on where to get this type of testing, how to interpret it correctly and what to do about the results can be found at www.fatisnotyourfault.com.
3

The Gut-Fat Loss Connection

**LITE BITES**

- The *gastrointestinal (GI) system* is closely linked to our health. It:
  - breaks down the food we eat into materials we can use
  - extracts some nutrients and synthesizes others
  - processes and excretes substances such as hormones and toxins
  - has its own nervous system
  - contains most of our immune system

- Problems emerge when:
  - we don’t have enough **good bacteria** (or too many bad bacteria)
  - we don’t absorb nutrients properly
  - we have **food sensitivities** that cause inflammation and damage

- This prevents us from losing fat effectively.
A Gut Feeling

Nobel prize winner and microbiologist Elie Metchnikoff once said, “Death begins in the colon.”

Based on his years of research in the early 1900s he concluded that disease and aging are mostly due to toxic bacteria in the gut.

While that idea may seem a bit farfetched, when you have an understanding of the havoc that a dysfunctional gastrointestinal system has on the body, his theories suddenly become far more plausible.

Our gastrointestinal system does not get enough attention. Yet, its proper functioning is paramount if we want to be healthy and to easily lose body fat. Consider some of the following statistics about the gastrointestinal system:

- There are more nerves in our gastrointestinal system than there are in the entire spinal cord. Our intestines have its own, independently working nervous system called the enteric nervous system. Some people have even referred to this nervous system in our gut as “the second brain”.

- There are supposedly more bacteria in our gut than there are stars in the sky. We have an entire ecosystem living in our intestines and without them, we would die. These little critters help our immune system, manufacture certain vitamins, and are vital to our health.

- If you laid the entire gastrointestinal system out end-to-end, it would have as much surface area as a regulation sized tennis court. All of that surface area is needed to properly digest, absorb and assimilate important nutrients into our body.

- The gastrointestinal system contains 75% of our body’s entire immune system.

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Based on the information above, it should be clear just how important the gastrointestinal system is to our health. In fact some old-time natural doctors used to say that “Death begins in the colon.” What they meant by this was, if your guts are unhealthy, you will be unhealthy, including your ability to lose fat.

“If your guts are unhealthy, you will be unhealthy, including your ability to lose fat.”

The gastrointestinal system performs a vast number of important processes including sterilizing our food, providing enzymes to help break down and absorb our food, protect our cells and internal environment from infection and as mentioned, even providing us with important vitamins (i.e. vitamin B and vitamin K).

Physiologically the gastrointestinal system starts in the brain. If we merely think about food, we can begin salivating and secreting digestive enzymes. Anatomically the gastrointestinal system includes our mouth, the stomach, the small intestines, the large intestines, and a number of associated organs such as the liver, pancreas and gall bladder.

While it is a fairly complex system, there are only a few things that can go wrong from a functional perspective, but the effects of these dysfunctions have far reaching negative impacts on the rest of our body.

Do You Have The Guts For Fat Loss?

If you have some of the following symptoms, you can be sure you have some type of gastrointestinal dysfunction:

- gas
- bloating
- burping after meals
- inadequate digestion
- undigested food in your stools
- foul smelling stools
- constipation
- diarrhea
A dysfunctional gastrointestinal system can sabotage our fat loss in a number of ways. Consider how the following three processes can contribute to your inability to lose fat:

**Dysbiosis** (imbalance of good to bad bacteria) can contribute to the following imbalances:

- **Thyroid dysfunction**: Dysbiosis negatively affects the conversion of thyroid hormone in the gut. Approximately 20% of the hormone produced by the thyroid needs to be metabolized by gut bacteria to become active. If someone has a disproportionate amount of good-to-bad gut bacteria in their gastrointestinal system, there will be a decrease in the amount of active thyroid hormone capable of increasing one’s metabolic rate.

- **Estrogen imbalance**: Dysbiosis can increase estrogen levels in the body by increasing the amount of an enzyme called beta-glucuronidase. This enzyme breaks a connection that was made in the liver in an attempt to remove the estrogen from the body. When this connection is broken, the estrogen can go back into circulation and lead to fat gain.

- **Excess calories**: Quite interestingly, recent research has demonstrated that a dysbiotic state can lead to an increase in the number of calories extracted from food. In other words, if you have an imbalance of good-to-bad bacteria, you could be eating a 1500 calorie diet, but are extracting 1,800 calories from your food.

> *If you have an imbalance of good-to-bad bacteria, you could be eating a 1,500 calorie diet, but are extracting 1,800 calories from your food.*
Maldigestion/Malabsorption

If someone lacks proper digestive capabilities, they will not be able to properly break down and absorb the food they eat. This creates a number of issues for the body including:

• An inability to digest protein, which provides substrate for neurotransmitters and helps repair numerous tissues in the body.

• Poor digestion can be caused by a deficiency in hydrochloric acid in the stomach, which can eventually lead to anemia - a condition characterized by general fatigue, especially to exertion such as exercise. Someone with anemia will have difficulty sustaining intense exercise, which will subsequently decrease their ability to lose fat.

Food Sensitivities/Inflammation

Inflammation in the gastrointestinal system leads to fat gain in a myriad of ways. Firstly, gut inflammation creates a stress response in the body, which will then produce cortisol, leading to a number of the issues discussed in the Adrenal section. This can lead to a suppression of the immune system, including suppression of the immune system of the gut, which can lead to an increased susceptibility to infection and further increase the inflammatory cycle. This process can lead to food sensitivities and “leaky gut syndrome”.

Food sensitivities are more common than you might think. Well beyond the typical food allergy causing an anaphylactic reaction (i.e. peanuts), food sensitivities are characterized by a low-grade reaction to certain foods that cause an inflammatory response in the body. Again, this leads to a stress response and cortisol release, leading to immune suppression and further gut issues. This vicious cycle will likely continue unless the offending foods are removed, the gut is allowed to heal and the stress response is reduced. However, discovering and addressing your food sensitivities is an effective way to increase your chances for sustained fat loss.
A European study recently showed that the removal of specific food sensitivities from the diet can be an effective treatment for obesity, without additional calorie restriction (i.e. dieting) or exercise. This is a profound statement about how food sensitivities affect fat gain and the ability to lose fat.

There are many reasons malfunctions in the gastrointestinal system can lead to fat loss resistance. If your guts do not work, neither will the body’s ability to lose fat.

What To Do

As with everything else, you first want to take a look at your symptoms. If you have any symptoms of bloating, gas, difficulty digesting proteins or fats, constipation, diarrhea, bad breath or any number of other GI related symptoms, you likely have some kind of gastrointestinal dysfunction. To determine what type, testing is ideally required.

It needs to be noted that the recommendation of certain supplements without proper laboratory testing or validation is irresponsible at best and
potentially harmful at worst. We often hear that we should take a “friendly bacteria” product such as a probiotic or to eat more yogurt for healthy intestinal function. While this isn’t necessarily false, you can still have gastrointestinal dysfunction despite how many probiotics you take. We run GI stool testing frequently in our practice and consistently find multiple different infections (i.e. parasites, bacteria, and fungus) despite someone taking probiotics.

A comprehensive GI symptom questionnaire and interpretation, as well as where to get good GI stool panels and what to do about it nutritionally, can all be found at www.fatisnotyourfault.com.

One of the best ways to stop a vicious GI-related cycle is to control inflammation and identify food sensitivities. In my clinic, we do this with a strict elimination diet for a period of 3-6 weeks.

A good elimination diet means removing foods to which many people are sensitive.

You may be asking, “What’s left to eat?” Good question. You’ll eat a lot of rice, turkey, fish, lamb, green vegetables, and certain fruits (i.e. blueberries, apples).

**Foods to Avoid During an Elimination Diet**

- Wheat and gluten containing foods
- soy
- all dairy products
- corn
- citrus
- the nightshade family of vegetables (i.e. onions, tomatoes, eggplant)
- pork
- eggs
- anything else you think may be causing you issues
This may seem restrictive but I assure you, the people who actually have the persistence to embark on such a program will be glad they did. The effects of a properly followed elimination diet can be nothing short of miraculous.

Finally, as a general rule, the more strict you are during the diet, the better. I often encourage people not to undertake such a diet without supervision. It’s just too demanding and requires too much specialized knowledge.

Reintroduction

Once people have followed three weeks of a strict elimination plan, you can then begin reintroducing foods to see which ones may cause you problems. To reintroduce a food, we continue following the elimination diet, but add in one eliminated food at a time. Keep it in the diet for two days and see what happens. For example, after 3 weeks you might try reintroducing egg. You would eat eggs for 1 to 2 days and then wait to see if there were any negative symptoms or reactions.

Pay careful attention to any symptoms experienced, such as joint pain, headaches, sinus issues, foggy thinking, fatigue, nausea, skin issues, and/or poor sleep. Almost anything can resurface that otherwise disappeared during the previous three weeks.

If there are any reactions to a food — meaning certain symptoms reappeared — that means the food is a problem and must be avoided for a period of at least 6 months.
This process may seem simple, but do not negate its power. In my clinic, I’ve seen profound effects with people going through a strict elimination diet. While there are a number of food sensitivity tests available, the gold standard in immunology is a good old-fashioned elimination diet.

**If you have a reaction**

If you have a reaction to certain foods, avoid them for a minimum of 6 months before trying them again. You may not have to avoid it for life. It may be that your gastrointestinal system is inflamed, making you sensitive to foods you might otherwise not have an issue with if your guts were healthy.

Having healthy guts is more than simply taking a supplement or probiotic. But understand that if your gastrointestinal system is not working optimally, fat loss will be difficult.
4

The Thyroid-Fat Loss Connection

**LITE BITES**

- Your **thyroid** is the gland responsible for your body’s **metabolic rate**. Think of the thyroid as the gland that “revs the motor” of your metabolism up or down.
- If your thyroid function is low, you will have trouble losing fat.
- Many other systems, such as your moods, your digestion, your immune function, and your energy levels will also suffer.
- Although thyroid disorders are extremely common, few medical professionals know how to diagnose, test for, and treat them.
The Master Metabolism Gland

Everyone has known someone who is overweight that said, “I have a thyroid condition.” And while a low-functioning thyroid can lead to fat gain, their “condition” was probably not being managed correctly by their doctor. The truth is hypothyroidism, though it is intimately connected to so many other functions in the body, is one of the most underdiagnosed and mistreated conditions today. As many as 30% of the American population (or more) have a low functioning thyroid.

Your thyroid is the gland responsible for your body’s metabolic rate. If your thyroid is sluggish, fat loss will be next to impossible.

Suffice it to say, if the thyroid is not functioning optimally, or if active thyroid hormone is not getting to where it needs to properly, fat loss will be next to impossible.

Low functioning thyroid symptoms include fatigue, fat gain, depression, constipation, poor circulation, muscle/joint aches, forgetfulness, loss of ambition, and decreased motivation/interest, to name a few. Each of these can contribute to the inability to lose fat either directly (i.e. constipation) or indirectly (i.e. loss of ambition).

The thyroid gland is the main metabolism gland in your body. As I stated previously, if your thyroid is not working correctly, you will have a difficult time losing fat. However, the thyroid does so much more than just help us lose weight. Consider the numerous important functions of the thyroid:

- Every cell in the body has receptors for thyroid hormone

- Low thyroid hormone leads to elevated cholesterol, triglycerides and gall stones
Your thyroid gland is the gland responsible for your body’s metabolic rate. If your thyroid gland is sluggish, fat loss will be next to impossible.

- There’s a higher chance of mental retardation in children whose mothers had low thyroid function during pregnancy

- Low thyroid hormone leads to poor digestive function, including low digestive enzymes and constipation

- There are intimate connections between the thyroid and other hormones
  - For example, thyroid hormone makes progesterone receptors more sensitive, meaning a woman with hormonal symptoms every month, may actually have a thyroid issue driving it

- Low thyroid hormone can impact neurotransmitters
  - For example, low thyroid hormone can cause low dopamine levels, leading to loss of motivation and will-power

As you can see, the thyroid is an important gland. It is also a very sensitive gland. The thyroid gland is negatively impacted by a number of external chemical influences such as chlorine, fluoride, some heavy metals and other synthetic chemicals. This is one of the explanations as to why there are so many thyroid issues today.

There are millions of people with a thyroid problem that do not know it because of flaws in understanding of basic thyroid physiology and in the way the thyroid is tested today.

Many Paths to Low Thyroid

Imagine nine people all lined up next to each other. Each one of them reports that they have the exact same symptoms: fatigue, difficulty losing fat, constipation, the “blues”, cold hands and feet, and feeling puffy all the time.
These are all classic symptoms of hypothyroidism, or a low functioning thyroid gland, but what I’m about to show you is that each of these nine people can have a different defect in thyroid physiology. Worse yet, there is a strong likelihood that none of them will be diagnosed correctly.

“There are millions of people with a thyroid problem that do not know it due to the flaws in understanding of basic thyroid physiology in conventional medicine.”

Here is how all nine people, all with the exact same symptoms, can all have a thyroid issue, but have a defect in a different area of thyroid physiology and therefore all requiring different treatment. While it is beyond the scope of this book to go into detail about these defects (more is available at www.fatisnotyourfault.com), hopefully this will help you understand the complexity of thyroid hormone physiology and how different defects can all cause the same symptoms, including the inability to lose fat.

Person 1: Pituitary defect
Person 2: Serotonin/Dopamine defect
Person 3: Thyroid defect
Person 4: High thyroid binding globulin defect (this is what carries thyroid hormone around your body)
Person 5: Low thyroid binding globulin defect
Person 6: Conversion defect (inability to convert inactive thyroid hormone to active thyroid hormone)
Person 7: Dysbiosis (imbalance of good to bad bacteria in the gut)
Person 8: Thyroid receptor defect
Person 9: Autoimmune thyroid
Nine different people. Nine different issues. All resulting in the exact same low thyroid symptoms, but all do a different defect in the thyroid hormone chain. And there is a strong likelihood that very few of their issues would be accurately diagnosed in conventional medicine today.

How The Thyroid Impacts Fat Loss

A low functioning thyroid will affect the body fat loss in a number of ways. Low thyroid function:

✓ Is associated with low leptin levels, a hormone that helps regulate our appetite and satiety signals. Result: Tendency to overeat due to continuously feeling hungry even though you are full.

✓ Affects our neurotransmitters (i.e. serotonin), resulting in sugar and fat cravings, depression and overeating behavior. Result: Inability to stay on a diet or maintain motivation to exercise.
✓ Contributes to anemia resulting in tiredness, muscle weakness and depressed mood. Result: Lack of interest and/or tolerance for exercise.

✓ Reduced levels of protein digestion, which reduces your ability to heal and produce neurotransmitters for brain function. Result: Lack of desire to exercise.

✓ Decreased production of growth hormone; a potent fat-burning hormone.

As the primary metabolism gland in the body, if there is any defect in thyroid hormone physiology, you will have a difficult time losing fat for a wide variety of reasons.

Vicious Cycle

What To Do

If you are experiencing thyroid symptoms, the best thing to do is to get tested using a complete thyroid panel and have it interpreted by someone who understands thyroid physiology. But I’ll be honest, finding a doctor willing to run all the necessary markers for you and that knows how to properly interpret it will difficult for most people. Accurate testing is absolutely necessary to determine what is going on in your thyroid physiology.
More information on getting tested and learning how to interpret it, including nutritional strategies to improve thyroid function can be found at www.fatisnotyourfault.com.

A good thyroid panel uses the following markers. Anything less will not be able to accurately identify the level of the defect in the thyroid physiological chain.

Here are makers contained in a comprehensive thyroid panel:

- TSH
- Total T4
- Free T4
- Total T3
- Free T3
- T3 Uptake
- And for good measure, due to the amount of autoimmune thyroid conditions today, also run thyroid peroxidase antibodies and anti-thyroglobulin antibodies.

Again, it is rare to find a conventional doctor that will run all of these markers for you and be able to interpret them in an accurate way.

The thyroid gland and thyroid physiology if not functioning properly will negatively impact your ability to lose fat.
A Quick Word about Autoimmune Thyroid

It is estimated that over 27 million Americans suffer from some type of thyroid dysfunction, with less than half of them not being accurately diagnosed. Perhaps most importantly, up to 80% of people with primary hypothyroidism (increased TSH) may have an autoimmune thyroid condition called Hashimoto’s.

Hashimoto's thyroiditis, or Hashimoto’s syndrome, is the most common cause of primary hypothyroidism in the United States. It is said that Hashimoto’s was one of the first conditions considered to be an “autoimmune” condition, and it is named after the doctor who described the condition in 1912, Dr. Hakaru Hashimoto.

Hashimoto’s syndrome is a unique condition in that it can have both hyper and hypothyroid symptoms. In other words, there are times with the immune system attacks the thyroid gland, producing excess thyroid hormone and causing hyperthyroid symptoms, such as inward trembling, anxiety, insomnia, and diarrhea, but at other times it is characterized by hypothyroid symptoms, including weight-gain, depression, fatigue, lethargy and constipation.

Clinically, it seems that the majority of Hashimoto’s patients experience hypothyroid symptoms, rather than hyper- symptoms. This may be due to the slow destruction of the thyroid and the hyper- symptoms, which at one time caused anxiety and weight-loss, were not considered to be severe enough to visit the doctor. However, after the thyroid gland has been progressively attacked for a period of time, symptoms of depression, fatigue and weight-gain are commonly what will send someone to seek medical advice from a doctor.

The fact that Hashimoto’s syndrome has biphasic symptoms, meaning hyper- and hypothyroid symptoms, speaks to the fact that it is the immune system causing the problems, and not the thyroid itself. As stated before, merely treating the thyroid will end up resulting in very poor management of this condition.
Another fact validating Hashimoto’s syndrome as an immune system issue, and not a thyroid issue, is the fact that there are commonly a cluster of other autoimmune conditions in a Hashimoto’s patient.

For example, according to research, celiac’s disease (an intolerance to gluten-containing foods) and pernicious anemia (a B-12 deficient anemia) are both very common in people with Hashimoto’s syndrome. These items demonstrate immune system mediated destruction of a number of different tissues in the body, not just the thyroid, necessitating focus on the immune system when attempting to manage the disease.

As was previously stated, up to 80% of people in the United States that have been diagnosed hypothyroidism have Hashimoto’s syndrome. Statistically, it is more common in women than it is in men, one reason researchers believe estrogen and/or testosterone has a role in the disease.

The main point of this is *Hashimoto’s is an autoimmune issue, not a thyroid issue*, and should be treated as such. Unfortunately Hashimoto’s is not being treated correctly in the conventional medical industry or the alternative medical industry.

It is beyond the scope of this book to go into the details of how to identify or treat it, but if you have ever been diagnosed with primary hypothyroidism, had elevated TSH or have been put on prescription thyroid hormone by your doctor, please talk to them about getting tested for Hashimoto’s. Also, do your research, because chances are your doctor will not know enough about it to adequately help you.
The Hormone-Fat Loss Connection

LITE BITES

- Sex hormones such as estrogen and testosterone have powerful effects throughout our bodies.
- Both sexes have these hormones, but the hormones’ amount and effects are different in men and women.
- If sex hormones are unbalanced both men and women will have trouble losing fat.
- Other hormone systems, such as our gastrointestinal system and thyroid systems, as well as stress, interact with our sex hormones and affect their function.
- Solving a hormone imbalance often requires more than a “quick fix” pill, patch, or cream.
Hormones

Hormones exert a powerful effect on the body and when they are out of control, it can seem as if nothing is working properly. Hormones must maintain a delicate and perfect symphony with one another and, when one hormone is off it is easy for the others to be thrown out of balance as well.

When hormones are not functioning properly, the results affect your entire body. For example, think about times in life where there are major hormonal surges – puberty, pregnancy, menopause - and you will begin to understand just how far-reaching hormones are physically, mentally and emotionally. They impact our mood, our behavior and even our ability to lose fat.

A Guide To Female Hormones

Women, you are beautiful, graceful and complex creatures. I have the utmost respect for you and it is my honest opinion that without you, the world would have fallen apart a long, long time ago.

As women, you have a multitude of depths to you emotionally, mentally and not surprisingly, hormonally. And therein lies the problem.
With the complexity of a female’s hormonal system, why does conventional medicine take such an overly simplistic view of it? When a woman goes to the doctor complaining about hormonal symptoms, it’s not as easy as putting her on hormones (birth control, hormone replacement therapy, etc.) and expecting everything to balance out. There is far more to balancing female hormones, which unfortunately it is impossible to go into here, but hopefully this will give you some insights into how hormones can contribute to an inability to lose fat.

When talking about female hormones, there is no simple 101 course. The entire system is complex and dependent on the step that proceeded it. For example, for progesterone to be produced, there must have been a release of another hormone called lutenizing hormone produced from the pituitary gland that stimulated progesterone’s release. For lutenizing hormone to be produced, there had to be an adequate amount of estrogen during the first part of the cycle. For estrogen to be produced, there had to be production of another pituitary hormone, follicle stimulating hormone. And so on.

“For women, hormonal imbalance is probably the number one reason you cannot lose fat.”

Rather than go into depth about how the female hormonal tree works, here are a few reasons you want to have balanced hormones:

- Estrogen and progesterone are neuroprotective, meaning they help brain function, reduce brain inflammation and help with cognitive function. There is also evidence that estrogen may prevent Alzheimer’s in women.

- There is an intimate relationship between hormones and neurotransmitters, which means hormones can have a major impact on mood, will power and motivation.

- There is a strong correlation between hormone and bone metabolism.

- Thyroid hormone, your metabolism hormone, works better when progesterone is functioning optimally.
• Estrogen is cardioprotective in women.

• Progesterone helps regulate the immune response.

However while health is abundantly important, one of the biggest reasons you want to consider hormonal balance is to make fat loss easier. For women, hormonal imbalance is probably the number one reason you cannot lose fat. However, it is not as simple as applying hormones to your skin or taking a pill.

For a woman to have hormone balance, other systems must be functioning optimally first. These systems include:

• Blood sugar management
• The adrenal glands
• The gastrointestinal system, including liver and gall bladder.

Do you see how this is all fitting together? Fat loss is not just about diet or exercise. Without proper hormonal balance, women will have a nearly impossible time losing fat.

If all those systems are working properly, here is a brief overview of how a woman’s monthly cycle works hormonally:

1. The beginning of the cycle starts on the first day of menstruation.
2. A hormone is released from the pituitary gland called follicle stimulating hormone, or FSH.
3. FSH then stimulates the production of estrogen from the follicle. The first half of the cycle is characterized by high levels of estrogen.
4. Near the middle of the cycle, when estrogen reaches a certain level, the pituitary then releases a second hormone called lutenizing hormones (LH).
5. LH has the effect of stimulating the body to produce progesterone, which characterizes the second half of the cycle. Ideally, estrogen will drop during this half of the cycle. If so, the second half of the cycle is characterized by high levels of progesterone.
6. Toward the end of the cycle, if pregnancy hasn’t occurred, both progesterone and estrogen will drop, causing the uterine lining to be sloughed off, and the cycle begins again.

As discussed previously, there are many important events in this cycle that occur based on an event or process directly prior to it. It is a delicate chain of events that is not corrected simply by taking a pill or a cream. Thorough evaluation must first take place to accurately determine where in the cycle the defect is taking place. Then, and only then, can accurate intervention take place.

Women that take any type of hormone replacement therapy, whether it be birth control methods, over-the-counter progesterone creams, or hormone replacement therapy after menopause, will have weight-related issues due to the impact of elevated or imbalanced hormone levels.

But make no mistake, female hormone imbalances can make fat loss nearly impossible.

A Guide To Male Hormones

Guys, we’re lucky. The hormonal system in male bodies is pretty basic. There are some subtle deviations to watch out for, but it’s nothing like a woman’s hormonal profile.

For simplicities sake, men produce testosterone from their testes when prompted by a hormone called lutenizing hormone produced from the pituitary gland.

However, there are a number of things that can misfire in a man’s body, all of which can create low testosterone symptoms, but none of which require hormone replacement. In fact in some cases, hormone replacement will make the situation much worse.

Similar to the thyroid section, you could have five men all lined up next to each other, all reporting typical low testosterone symptoms - libido issues, difficulty building muscle, lethargy, depression and having a difficult time losing fat. Each of these five men might be experiencing a different hormonal defect all leading to low testosterone symptoms, but only one may have low testosterone.
There are a number of things that can misfire in a man’s body, all of which can create low testosterone symptoms, but none of which require hormone replacement.

The following hormonal issues can all lead to low testosterone symptoms:

1. Poor pituitary function leading to low lutenizing hormone production
2. Elevated estrogen
3. Elevated dihydrotestosterone (DHT)
4. Elevated androstenedione
5. Poor adrenal dysfunction

If any of these men merely went on testosterone therapy, they would likely feel better for a very short period of time (i.e. a few weeks) but their symptoms would quickly return because the root of the problem was never addressed.

How Hormones Impact Fat Loss

Numerous sex hormones can strongly influence the inability to lose fat. Such hormones include testosterone, estrogen and DHEA. If any of these hormones are out of balance, fat loss will be difficult, if not impossible. This is true for both men and women.

Elevated testosterone in women and elevated estrogen in men will make fat loss difficult. However, it shouldn’t be surprising that this is what we find clinically all the time - men and women with the opposite hormones elevated. Testosterone is damaging to a woman, while estrogen is protective. For men, estrogen is damaging and testosterone is protective. However today we commonly see a shift in these two hormones in both men and women alike.

Elevated testosterone in women and elevated estrogen in men will make fat loss nearly impossible in either case.
There are numerous other factors that impact our endocrine (hormone) system including xenoestrogens, chronic stress, gastrointestinal dysfunction, blood sugar issues, liver dysfunction, etc. However, if a hormonal issue is present, fat loss will be very difficult for both men and women.

There is one other factor that deserves some attention. It will be expanded upon briefly in the Toxicity section, but a major contributor to hormone dysfunction is class of molecules called xenoestrogens.

Xenoestrogens, are synthetic compounds that mimic estrogen in the body and disrupt the delicate balance of hormones in both men and women. Xenoestrogens are typically found in pesticides, chemicals and plastics, and can wreak havoc on our endocrine system. It is thought that these compounds are the reasons estrogen-related diseases such as breast and uterine cancer, endometriosis, and even prostate cancer, are at an all time high today, and why children are reaching puberty faster than ever before.

While there is little we can do about the amount of xenoestrogens being poured into our environment, there are ways we can minimize their negative effects on our body. For starters, using non-toxic cosmetics and cleaning products will greatly reduce our exposure. Eating organic, unprocessed whole food and drinking filtered water whenever possible will likely help. Also, keeping our detoxification pathways running smoothly will help remove some of these chemicals from our body and limit their damage.

Another major factor to hormonally-induced fat loss resistance is chronic stress. Through a number of different mechanisms, stress physiology disrupts many of the body’s hormones including insulin, leptin, estrogen, DHEA, progesterone, and testosterone.

What To Do

Correcting the factors involved in imbalanced hormones will often result in much easier, and more significant fat-loss. But it is not as easy as merely rubbing a hormone cream on your body. In fact, these “miracle creams” can make you worse if the underlying issue is not attended to first.
It is easy to find books, articles and information on the internet about what supplements men and women can take to correct their hormonally-related symptoms. In fact it’s easy to find hormone replacement creams if you know where to look. But this is a bad idea for many reasons.

Vicious Cycle

In the alternative industry, hormone-correcting supplements are widely available. For men, zinc, tribulus terrestris, horny goat week and maca have all been touted as “testosterone boosters”, but this is far from the truth. The type of underlying defect a man has will dictate what type of supplement may work for him. This is why it is not uncommon to hear a man say, “I tried that supplement, but it didn’t work.” It didn’t work because it didn’t address his underlying issue.

Similarly for women, things like black cohosh, vitex, and soy will supposedly help balance hormones according to experts and companies selling these supplements. However, this couldn’t be further from the truth. While these compounds may work for some women, other women will derive no
benefit from them. Unless someone takes a supplement that directly addresses their particular defect, it will have no effect.

Therefore when it comes to hormones again, lab testing is important. A number of people can have the exact same symptoms, but because the symptoms are caused by completely different mechanisms, each person will require a different strategy and approach to balancing out their hormones.
Problems with Conventional Blood Chemistry Testing

Anytime you get tested by your doctor, consider the following flaws in modern blood chemistry analysis.

1. **Broad reference ranges** – Ranges are created using people who go to the doctor, not healthy ones. Therefore the reference ranges are far too broad to catch minor fluctuations in thyroid physiology.

2. **Non-standardized reference range** – Not only is the reference range too broad, but it varies from lab to lab, and state to state. Therefore you can have a thyroid issue in one state, but not another. That’s not health.

3. **Insurance company influence** – Doctors only run tests that are considered “medically necessary” by insurance companies. Therefore, doctors won’t often run a good thyroid panel because most insurance companies won’t pay for them.

   Many people have been to the doctor, had their blood tested and were later told they were fine by their doctor because all of their values fell within the laboratory reference range. This range is designed to identify disease and pathology, not identify health.

   To accurately evaluate health, you must have your blood work evaluated using a functional or optimal reference range to help identify subtle shifts in physiology that are contributing to negative or unwanted symptoms.
6

The Toxicity - Fat Loss Connection

LITE BITES

- The liver is one of our first lines of defense against harmful chemicals.
- Detoxification involves the metabolic processes of converting toxic substances into less toxic substances and ultimately, removing them from the body.
- Our liver function – and hence fat burning – is strongly affected by environmental toxins and the health of other systems in our bodies. If our liver isn’t healthy, then the rest of our body isn’t either, and we’ll struggle to lose fat.
- We’re living with – and absorbing – more industrial chemicals and environmental toxins than ever in human history, which has major consequences for our health and fat loss.
The Great Processor: The Liver

Welcome to the post WWII world. We now live in an era of plastics, pesticides, preservatives and perfumes. We put lotions, creams, shampoos, dyes, deodorant and make-up on our body. In our homes we use Teflon pans to cook our food, air fresheners to make things smell nice, a wide array of cleaning products to keep things shiny. Our carpets, mattresses, shelves and computers all pour chemicals into the air. We inhale toxic air when we drive, absorb toxic water when we shower and eat toxic food that has a wide array of chemicals on it and in it designed to make it last longer on the shelves and taste better when we eat it.

We live in a veritable chemical soup to which our planet has never seen before. Interestingly, over the past four to five decades where tens of thousands of chemicals are being released into our environment each year, so to have the number of autoimmune diseases been rising. It’s ironic that we are studying the effects of pollution in our environment but few people seem to be concerned with the effects of pollution on people. There have been some recent studies, however, that have started critically looking at how chemicals affect our physiology.

The liver is responsible for a large number of functions in the body including protein synthesis, production of chemicals required for digestion, storage of glycogen, break down of red blood cells, hormone production and probably it’s most well known function, detoxification. For purposes of this publication, we will be focusing on the last of those functions, detoxification, and how if it is not functioning properly, fat loss will be difficult.

Healthy detoxification is critical for optimal health and fat loss for a number of reasons. The liver has intimate connections with other systems of the body, including blood sugar management, hormones, the gastrointestinal system and the immune system. The liver is responsible for the metabolism and detoxification of a number of substances in the body, including hormones and toxins.
In today’s overly toxic environment, it is not uncommon to have a suboptimally performing liver, resulting in a number of metabolic issues system wide. For example, a defect in liver detoxification can lead to improperly metabolized hormones, leading to hormone overload, imbalances and unhealthy hormone metabolites.

The liver has two distinct phases for detoxification and clearance.  

“Healthy detoxification is critical for optimal health and fat loss.”

**Phase I**

The goal of liver detoxification is to transform fat-soluble compounds into water-soluble compounds for elimination from the kidneys, skin (i.e. sweat) and stool. Fat-soluble compounds include hormones, drugs, pesticides, and environmental chemicals. Phase I detoxification involves a class of enzymes called the cytochrome P450 enzymes. After having gone through Phase I, compounds can either be eliminated, or go through Phase II.

One important point to note is that in many cases, when a toxin or molecule has gone through Phase I conjugation, it becomes an intermediate compound capable of acting as a free radical and causing damage to the body. In other words it becomes even more toxic than the original compound being metabolized. Clinically this becomes relevant when someone has upregulated Phase I activity in the liver and downregulated Phase II capacities. These individuals, called *pathological detoxifiers*, will often have negative reactions when exposed to toxic chemicals due to the number of free radicals produced during Phase I detoxification.

**Phase II**

There are six distinct pathways involved in Phase II liver detoxification, each requiring its own set of necessary compounds for optimal functioning. They are:
Glutathione conjugation: Glutathione is one of the most important intracellular antioxidant in the body. It is obtained through two sources, diet and internal synthesis. Many nutrients are required for proper glutathione synthesis including magnesium, potassium, vitamin C and some B vitamins.

Acetylation: These pathways conjugate toxins using a compound called acetyl-CoA, which is dependent on nutrients such as pantothenic acid, thiamin and vitamin C.

Methylation: While no one pathway is more important than the others, methylation is one that many people are deficient in and could likely benefit from improving. Methylation requires nutrients such as vitamin C, vitamin E, magnesium, folic acid and vitamin B-12.

Sulfation: This is one of the major detoxification pathways for neurotransmitters, toxins and many hormones. Sulfur containing amino acids such as cystine, taurine and methionine help drive this detoxification pathway. Sulfur containing foods such as eggs, cheese and meat can be helpful in supporting this pathway.

Glucuronidation: This pathway does not require specific nutrients as much as it requires healthy glucose levels. Blood sugar issues such as insulin resistance or hypoglycemic tendencies can make this pathway not work optimally.

Amino acid conjugation: This pathway utilizes a number of amino acids such as glycine, taurine, glutamine, arginine and ornithine to help neutralize toxins. Of these, glycine is the most commonly utilized amino acid in this pathway.

Once a compound or toxin has been through Phase I and Phase II detoxification pathways, it is combined with bile for elimination through the stool. Therefore if the gall bladder, which stores bile, is not working properly, or if the large intestine is not transporting stool properly (i.e. constipation), these toxins will not be properly elimination and can negatively impact the body.
Overworked and Under Resourced

Detoxification is a buzz word today. When the word *detoxification* is mentioned, some people picture a washed up junkie or an ex-celebrity going into drug rehab. On the other hand we have new age people who use the term detoxification to mean colon cleansing, foot baths and liver flushes that leave them on the toilet for hours.

However neither one of these is detoxification from a functional perspective.

Detoxification refers to the metabolic processes of converting toxic substances into less toxic substances and ultimately, their removal from the body. Many organs are involved in this process, but for brevity’s sake, we will be focusing entirely on the liver and how if it’s not functioning well, it can impact your health and results in the gym.

Though the concept of detoxification has gained recent popularity, it has a long history spanning many thousands years across many different parts of the world. Methods of cleansing the body have been documented in ancient texts found in Egypt and India, and even Hippocrates, considered to be the father of western medicine, was reported to give cleansing herbs to help his patients heal their body.

"We’re toxic. Pure and simple. Anyone that tells you otherwise doesn’t know what they are talking about."

Cleansing one’s body has been around for a long time, and rightfully so. We produce a number of toxic byproducts simply through the normal physiological processes of digestion, metabolism, tissue regeneration, neuronal activity and various cellular processes. Ammonia, for example, is something our body naturally manufactures and needs to be cleared from our body.

We are also exposed to toxins from outside out body, which is a relatively new phenomenon. At least to the degree we experience that today. These
external toxins include synthetic chemicals, pesticides, xenobiotics and even in otherwise healthy food (i.e. oxalic acid in spinach).

**Vicious Cycle**

Without going into great detail about it, we’re toxic. Pure and simple. Anyone that tells you otherwise doesn’t know what they are talking about.

Sixty years ago the concept of synthetic chemicals was largely science fiction. Since then an estimated 90,000 manmade chemicals have been released into our environment, with the vast majority of not being adequately evaluated with regard to human physiology.

Numerous government and private party organizations have found vast amounts of toxic substances in people’s body around the globe. Insecticides, PCB’s, heavy metals, benzene, dioxin, phthalates, pesticides, Teflon byproducts, DDT metabolites, flame retardants, styrene, xylene and dichlorobenzene have been routinely found in the stool, urine and blood of people around the globe, including newborn infants not yet exposed to the outside world.
For example, some of these statistics are downright alarming:

✓ In 2003, the Mount Sinai School of Medicine tested the blood and urine of people from different areas in America and found that each person contained an average of 91 industrial chemicals that included insecticides, PCBs, heavy metals (i.e. mercury, cadmium), benzene and dioxin. None of the participants lived near an industrial facility or worked in a job that handled chemicals.

✓ In 2004, the Center for Disease Control and Prevention tested blood and urine from 2,500 people across the country and found traces of all 116 chemicals they tested for.

✓ In 2005, the American Red Cross took samples of fetal cord blood from 10 newborns and found a shocking 287 chemicals in the samples. Included dioxins, phthalates, pesticides, Teflon byproducts, flame retardants and many others.

✓ A study published in the journal Neurotoxicology took samples of the first bowel movement of 426 infants.
  o 84% contained mercury
  o 27% contained lead
  o 27% percent had DDT, a pesticide that had been banned in the US for the previous 25 years.

These chemicals are very new to our planet and to the human species. Many of these chemicals have only been created in the last fifty years and the long term effects of them are still relatively unknown. However it is safe to say that from what is known about these toxins, we should work to decrease our exposure as much as possible, not only for health, but for fat loss as well.
How Liver Health Impacts Fat Loss

There is a brand new term called “obesegens” that was created due to the strong correlation between certain chemicals and how they seem to contribute to, or even cause, obesity. (When I first heard that word, I honestly thought it was a joke, but it turns out its not.)

Research Connecting Pesticides to Fat Gain

✓ Small amounts of the pesticide, dieldrin, was given to rats, which lead to a doubling of their body fat.

✓ Another pesticide, hexachlorobenzene, caused rats to gain significant body fat compared to a control group, even though the rats were eating half as many calories.

✓ Humans exposed to PCBs have shown that the greater the toxic load, the greater the body fat.

✓ A mentioned in the hormone section, a group of chemicals collectively referred to as xenoestrogens are rampant in our food and water supply, which are potent endocrine disrupters and cause a host of estrogen-based hormonal issues, many of which lead to fat gain in human and animal studies.

✓ Synthetic chemicals were once used to be used to fatten up cattle for meat production - animals fed organophosphates gain fat while eating less food. While this practice is no longer used due to the toxic effects on the animals themselves, organophosphates are still widely found in our environment.

✓ Numerous toxic chemicals used in our food supply negatively affect the thyroid gland, slowing down metabolism and our ability to lose fat.

✓ All of these environmental toxins create an enormous burden on our liver, which normally helps the body burn fat for energy. If the liver is toxic and not working properly, it cannot adequately maintain its role in fat burning.
Some scientists believe that our body actually creates more fat to deal with the load of environmental toxins we are exposed to. Because toxins are so damaging to our sensitive cellular DNA, in an effort to protect itself from these toxins, the body may add more storage by increasing the amount of fat we have, and protect us from future damage by holding onto the toxins by not letting us release them back into our system.

Various studies of American adults showed that 100% of them had styrene (Styrofoam), xylene (solvent), dioxins, dieldrin, oxychlordane, heptachlor, and para-BHC in their fat cells. Eighty-three percent had chemicals known to damage the nervous system.

Research is somewhat new on this and it does not create an excuse for why we’re overweight, but it is something that cannot be ignored.

Let me quickly say that sharing these statistics is not a form of health terrorism or fist-waving about some conspiracy-theory about population control. I’m personally not into either of those. However, the reality is that we do live in a toxic environment and have an opportunity to do something about it. Many of these toxins have not been in our environment for very long, and the effects of them are relatively unknown. The little that is known about some of these chemicals brings up some concerns about our health and may negatively impact our results in the gym.

**What To Do**

Clinically we use a three stage process to eliminate toxins from our body in the hopes of improving our health and fat loss in the gym.

Step one is to eliminate toxic chemicals from our environment as much as possible. This can include using non-toxic cleaning products and cosmetics, using water purifiers, eating organic food and using air purifiers to clean our air. Combining these practices in our daily life can make a dramatic difference on the amount of chemical we are exposed to every day.

Step two is to make sure the organs of elimination are working properly. The organs of elimination are the skin, kidneys, lungs, liver, intestines and lymphatic system. Ensuring these systems are running properly can be as easy as drinking plenty of pure water, enjoying a sauna once a week, having at least
one bowel movement a day, exercising regularly, and taking in enough protein and nutrients to keep the detoxification pathways in the liver running smoothly.

Step three is to actively participate in regularly scheduled detoxification programs throughout the year. There are many different programs available at health food stores that call themselves “detoxification kits”, but many of these do not contain enough of the proper nutrients to adequately do what they are designed to do, and they are not for everyone. It is recommended that you participate in scientifically designed detoxification programs under the guidance of a qualified health professional.
The Immune System - Fat Loss Connection

- The immune system is closely connected to every other system in the body. This system protects us from foreign invaders such as bacteria and viruses.
- The immune system is made up a complex network of cell responders and signalers, such as macrophages, T cells, and B cells.
- If this tightly orchestrated system gets out of balance, the immune system will either be suppressed or attack the body’s own healthy tissue.
- The immune system has to confront unprecedented threats from our environment and lifestyle. This can result in autoimmune disorders and inflammation, both of which can affect fat loss.
Our Body’s Defense System

The immune system is probably one of the least thought about systems in the body, especially when it comes to fat loss. However, the immune system requires attention because of its intimate connections with every other system of the body.

The immune system is one of the more interesting systems in that it is impossible to separate if from the rest of the body. Many other systems could be theoretically removed from the body because they contain distinct structures. For example, the cardiovascular system consisting of the heart and blood vessels is a distinct system. The musculoskeletal system consisting of the muscles and bones could theoretically be removed from the body. But the immune system does not have any distinct structures and is deeply connected to all of the other systems. In fact in many ways, it is the system that allows all the other systems to communicate with one another.

The immune system is composed number of different cells, but for our purposes here we will be focusing on a group of chemical messengers called cytokines (i.e. interleukins, tumor necrosis factor, interferon gamma). Cytokines are not produced by any one particular organ or gland. They are manufactured throughout the body and impact virtually every part of the body including the heart, brain, organs, skin, blood, etc.

The immune system is designed primarily to help protect us from foreign invaders. To keep such unwanted invaders as antigens (i.e. parasites, bacteria) and haptens (i.e. heavy metals, xenobiotics) away from us and causing harm, we have what is referred to as the barrier system. The barrier system includes the skin, gut, lung and blood brain barrier to provide us with protection from the outside world.

But what happens when something breaches our barrier system and gains entry into our body?

The first line of defense is called the innate immune system and consists of immune cells designed to identify and start attacking the invader. Though they start the attack, their main role is to signal out to other more powerful aspects of the immune system.
The immune system requires attention because of its intimate connections with every other system of the body.

Those more powerful immune cells are called T cells, specifically cytotoxic cells and natural killer cells. (You can tell by their name what they are designed to do.) These cells are highly effective at neutralizing and killing most foreign invaders that enter our body. The T cells system is called the Th1 system.

T cells are very effective at killing invaders, but they are not very specific. In other words, if the macrophages tell the T cells to attack, they do so with vengeance and may end up killing other non-invader cells in the process. To limit this from happening, B cells come in and essentially tell the T cells what specifically to attack. The B cells are otherwise known as the antibody system, or the Th2 system.

Here’s an analogy of how all this works.

Picture a local mall getting invaded with terrorists. In the mall you have the overweight mall cops (macrophages) who grab the terrorists and beat them with their billy clubs. Mall cops are not very effective killers, but they hold onto the terrorist while using their walkie talkies to call in the SWAT team (cytotoxic cells and natural killer cells).

The SWAT team is very effective at killing the terrorists, but are a little trigger happy and will attack civilians if they aren’t careful. Therefore the antibody system (B cells) tag the terrorists with a little red dot so the SWAT team knows exactly who to go after.

Because of the interconnection between the immune system and the rest of the body, a dysfunctional immune system can negatively impact fat loss on many levels.
We didn’t talk about it yet, but there is another group of cells that calls the SWAT team back after the fight is over so they do not continue their attack. These are a subset of the T cells and are called the T suppressor cells.

While this is overly simplified hopefully it gives you a small understanding of what a tightly orchestrated event fighting an invader is and how if something goes wrong in this system, there can be far reaching and negative impacts throughout the body. For example, if the T cells do not know what to attack, they may start attacking our own body’s tissue. Or, the B cells may tag too many cells and the body may start attacking our own body’s tissue. Yet another scenario is if the T suppressor cells do not adequately call off the attack and the immune system never turns off.

Under Siege

There are a number of reasons our immune system is under attack today. Never before in the history of the world have we had as many changes in such a short period of time. As was talked about in the Toxicity section, in the past 60 years we have been exposed to tens of thousands of synthetic chemicals, a completely altered food supply, electromagnetic radiation, “superbugs” resistant to antibiotics, and far more possible foreign invaders to our body than ever before. Combine that with dysfunctional barrier systems (i.e. gut), and our body is under an assault the likes that human physiology has never seen.

It is no wonder that autoimmune conditions are at an all time high and are easily the next major epidemic in industrialized countries. Our immune system is so overwhelmed, it is attacking our own body tissues with veracity.

Unfortunately for us, because of the interconnection between the immune system and the rest of the body, a dysfunctional immune system can negatively impact fat loss on many levels. In fact when it comes to difficult fat loss, the immune system is likely to be involved to some degree. It might be the primary issue in some cases, but most often it will be secondary to something else. However once it’s wound up, the immune system can be very difficult to calm down.

For example, if someone has a gut infection or is consuming foods that they are sensitive to, there can be an upregulation of certain aspects of the immune system. With this upregulation often comes a tendency to become
overly sensitive to even more foods, which can then further cause issues in the immune system.

The primary point however, is that the immune system is a complex system that, when wound up (or wound down), can cause massive problems in health and fat loss.

**Vicious Cycle**

![Diagram](image)

**How the Immune System Impacts Fat Loss**

The immune system is a complex system. Far too complex to really go into here. But for simplicities sake, the immune system produces a number of compounds called cytokines. Some of them are considered to be pro-inflammatory and can cause a number of negative impacts in the body. One such compound is a cytokine called interleukin-6 (IL-6).

IL-6 is a pro-inflammatory cytokine that is produced during any type of stress physiology. IL-6 has a number of negative impacts on the body, one of which is to increase cortisol. As discussed in the Adrenal section, increased cortisol raises blood sugar, which raises insulin and can lead to all the negative impacts of insulin (i.e. hormonal imbalances, etc).
These studies suggest that IL-6 may trigger weight gain by increasing inflammation and therefore fat gain.

Some studies have demonstrated that people with increased IL-6 have a harder time losing weight, and keeping it off, than people with lower levels of IL-6. These studies suggest that IL-6 may trigger weight gain by increasing inflammation and therefore fat gain.

Compounding this issue even further, adipose tissue (i.e. fat) is no longer considered to be a mass of tissue that is simply along for the ride. Rather, it is now considered to be an endocrine organ due to the large number of chemicals and hormones it secretes independent of other tissues. In other words, it is a living, breathing endocrine gland that produces its own unique compounds (i.e. adipokines), and some of these chemicals are immune system mediators themselves.

There is some debate as to whether fat causes inflammation, or if inflammation causes the body to store fat. In all likelihood, it is a combination of both, making the immune system’s role in fat gain even more important. For example, fat tissue is known to secrete substances called adipokines which are essentially pro-inflammatory immune system modulators that, because of their inflammatory nature, end up encouraging the body to produce more body fat. This is possibly one of the most vicious cycles of all.

What To Do

The most important thing you can do for your health and fat loss is to decrease inflammation as much as possible. The first and easiest way to do this is through diet.

In the Gastrointestinal section, an elimination diet was discussed as a way of reducing gastrointestinal inflammation. But the reality is, if you have GI inflammation, you have body inflammation. Therefore following a strict, whole-foods, non-processed, largely organic diet full of vegetables, meats, and good quality fats is of paramount importance. Anything less will likely contribute to
inflammation. An even better step to reducing inflammation is to try an elimination diet for 3-4 weeks.

The second step to reducing inflammation is to reduce stress as much as possible. While this is usually easier said than done, getting adequate amounts of sleep each night, occasionally participating in relaxing activities like yoga or meditation, and even reading self-help books that can help you improve your perspective on yourself and life can all help reduce stress, and therefore help reduce inflammation. By reducing inflammation, you will allow your body to lose more body fat, which will also further lower your inflammatory burden. Again, there is much more to reducing stress, but the goal and focus is to help reduce inflammation as much as possible.
The Brain Neurotransmitter - Fat Loss Connection

**LITE BITES**

- The healthier your brain, the healthier your digestion, your response to stress, your hormones, and your response to exercise. The better your brain functions, the better your body works and the easier it is to lose fat.

- The brain has its own chemical communication system (aka neurotransmitters), its own immune system, its own hormones, and its own protective barrier. Damage or imbalances to any of these will negatively affect your health and fat loss.

- The brain controls all systems in the body. It also depends on them. If other body systems (such as digestion) don’’t work properly, brain health – and thus overall health and fat loss – will suffer.
The Brain: The Forgotten Organ

Take a moment and think about an elderly person you know.

- How well do they taste or smell their food?
- How good is their memory?
- How well can they balance or walk?
- How healthy is their digestion?

If they haven’t aged gracefully, chances are they can’t do any of those things very well. And you can thank their brain function for these symptoms of degeneration.

The degree to which the elderly can perform normal daily activities is directly related to the amount of brain degeneration they’re experiencing in their twilight years. In fact, the anti-aging movement has it completely wrong. It’s not about hormones. It is about brain function.

When your brain stops functioning, your body stops functioning. Conversely, the healthier your brain, the healthier your digestion, your response to stress, your hormones, and your response to exercise. In other words, the better your brain functions, the better your body works and the easier it is to lose fat.

Your brain is a vital organ that helps run every other system in our body. For example, 90% of the brain stem’s output goes into something called the pontomedulary reticular formation, which stimulates the vagus nerve. That is just a fancy way of saying that 90% of your brain’s output directly impacts activities such as digestion, gastrointestinal function, enzyme production and salivation, and other parasympathetic activities.

“The healthier your brain functions, the better your body works and the easier it is to lose fat.”
Of course, there are a vast array of anatomical structures in your brain and covering them all is well beyond the scope of this publication. Just know that there are at least 30 distinct parts to the brain with a dizzying number of connections between them all. It’s this communication that’s critical for health, performance, and body composition.

The Brain’s Chemical Messaging System

One important communication method worth noting is chemical messaging. Through this method, certain chemicals, called neurotransmitters, travel around and relay messages between the neuronal receptors of different parts of the brain. Their signals impact mood, behavior, memory, coordination, and more. Some examples of powerful neurotransmitters include dopamine, serotonin, GABA, norepinephrine, and acetylcholine.

The Brain’s Immune System

In addition to an elaborate communication system, your brain also has its own independently operating immune system. These cells, called microglia cells, are found throughout the brain and serve the purpose of searching the brain for unwanted invaders and then destroying them.

Unfortunately, the microglia cells can be hyper vigilant at times. This means they can end up destroying healthy brain tissue in the process. The other problem with microglia cells is, once they turn on, they don’t easily turn off. Unlike other immune cells in the body that receive a signal when it is time to end the attack, microglia cells turn on and attack virtually everything in their path, including neurons. This makes sense from an evolutionary perspective because, if something were to attack your brain, your quality of life would quickly disappear. Therefore, microglia cells are there to protect one of your body’s most critical organs. And they do so with a vengeance.

“**The brain has the ability to synthesize, secrete and utilize a number of different substances, including hormones and neurotransmitters, has an independent immune system and has a barrier to protect it. It is an important organ.**”
The Brain’s Hormonal System

In addition to having its own immune system, the brain also manufactures its own hormones. Hormones have a critical impact on brain function. For example, many people are familiar with the personality changes that occur during a woman’s monthly cycle. This is largely due to hormonal impacts on the brain. Hormones play a very important role to the brain, which is why it’s not surprising to learn that the brain can independently produces its own hormones, including testosterone, estrogen and progesterone.

The Brain’s Protective Barrier

Lastly, the brain is protected by a semi-permeable membrane called the blood brain barrier. This barrier is designed to protect the brain from unwanted substances and invaders. Again, knowing that the function of the brain directly impacts the health and function of the rest of the body, learning that it has a structure designed to protect it is not surprising.

Hundreds of thousands of pages have been dedicated to describing the intricate structures, mechanisms and functions of the brain. So, obviously, this book doesn’t do it justice. What must be known, however, is that the brain is an incredibly sensitive organ and governs multiple functions in the body. The brain has the ability to synthesize, secrete and utilize a number of different substances including hormones and neurotransmitters, has an independent immune system, and it has a barrier to protect it.

Those are the basics. Now let’s look at what can go wrong.

The Imbalanced Brain

One point that must be understood is this. When a neuron dies, it’s dead. Permanently. There’s nothing you can do to get it back. In fact, you will have probably lost quite a few neurons by the time you’re done reading this book. It happens. It’s normal. But there are things you can do to speed up the process of neurodegeneration, and there are things you can do to slow it down. It’s all up to you.

Again, ask yourself, do you want to age gracefully? If so, don’t worry about anti-wrinkle cream or hormone balancing, you should worry about your brain.
The brain only needs three things for proper function: Oxygen, glucose, and stimulation. Let’s look at how each of these can impact your brain.

**Vicious Cycle**

![Vicious Cycle Diagram]

**Lack of Oxygen and Glucose**

If the brain does not receive adequate amounts, or stable levels of, oxygen or glucose, brain function will diminish. One way to know if you have poor circulation in your brain is to see if you have poor circulation to the other extremities. If you have cold hands and feet you may have poor blood flow, which means you probably have poor circulation to the brain. Also blood sugar issues, either chronically elevated or low, will impact neurotransmitter synthesis and ATP production, which impacts neuronal firing.

**Lack of Antioxidants**

Another issue is oxidation. As much as we need oxygen in the brain, we also need anti-oxidants to combat free radical damage that occurs to neurons. Unfortunately neuronal tissue is highly sensitive to oxidative damage and therefore must receive adequate amounts of antioxidants to reduce this damage. The caveat is that these antioxidants must be able to cross the blood brain barrier to effectively protect the brain. Inadequate levels of antioxidants, or
excessive amounts of free radical damage greatly contributes to neuronal death, or neurodegeneration.

Overactive Microglia Cells

As previously discussed, activation of the brain’s immune system is important for reasons of protection. But over-activation of microglia cells is a major promoter of neurodegeneration. Activated microglia cells serve an important function, but can lead to neuronal death if left unchecked. There are a number of natural compounds that have been shown to reduce microglia cell activity, which can be important in anyone with a history of head trauma, blood brain barrier permeability, or immune activation elsewhere in their body due to the impact these have on microglia cell activation.

Lack of Stimulation

Another issue is lack of stimulation. Sure, failing to engage in varied activities such as exercise, stretching, music, art, math, learning and reading can cause this lack of stimulation. But you also need neurotransmitter stimulation too. As discussed, neurotransmitters are necessary for neuronal signaling and communication, which are required for healthy brain function. Therefore if any given neurotransmitter is deficient or out of relative balance with other neurotransmitters, brain function will decline.

Lack of Brain Protection

As a somewhat separate issue to the brain itself, a damaged blood brain barrier can lead to neurodegeneration simply because it allows substances into the brain that otherwise should not be there, including compounds that can lead to microglia cell activation or that are damaging to brain tissue. Things like alcohol, the stress hormone cortisol, homocysteine, oxidative stress and blood sugar dysregulation have all been shown to break down the blood brain barrier.

There are more, but these are some of the most common triggers for neurodegeneration and remember, neurodegeneration leads to poorly functioning body overall, which means a difficult time losing fat.
How Brain Function Impacts Fat Loss

How many times have you started a fat loss program and you could not stay motivated or be able resist your food cravings. This may have occurred, in part, because of your neurotransmitter balance. Neurotransmitters, or brain chemicals, have an important role in our mood, our motivation and our food cravings. Research is currently learning more about our neurotransmitters every day, which is exciting for those of us wanting to lose fat while also improving our outlook on life.

There are four major neurotransmitters to consider when it comes to fat loss. They are dopamine, serotonin, GABA, and acetylcholine.

The first of these neurotransmitters, dopamine, helps regulate our metabolism and can function similar to a natural amphetamine in the body. It helps to control energy and, if deficient, can lead to fatigue, loss of energy,
carbohydrate binges, sugar and/or junk food cravings, and self-destructive thoughts. The more dopamine you produce, the faster your metabolism and the easier it is to lose fat. But as with all things in the body, you can have too much of a good thing. Too much dopamine has been linked to excessive and destructive behavior.

Serotonin deficiencies are well known creating symptoms of depression. What is not as well known about serotonin deficiencies is that it also leads to sugar cravings and progesterone deficiencies, which is linked to fat gain.

Lastly, GABA deficiencies also lead to carbohydrate cravings and depression, while acetylcholine deficiencies leads to craving for fatty foods. However, consuming large amounts of fat leads to a decrease in the body’s production of acetylcholine production, creating a vicious cycle - the more you consume fatty foods, the more your body will crave them.

Neurotransmitters also have an important role in the release of certain hormones. For example, serotonin and dopamine are involved in the preliminary steps of thyroid hormone release. Without adequate levels of these two important neurotransmitters, it is possible that someone may have low thyroid hormone as a result.

Dopamine is also responsible for the production of lutenizing hormone in the pituitary gland which leads to testosterone production in men and progesterone production in women.

As you can see, neurotransmitter balance can have a significant role in our ability to lose fat, including our cravings for certain foods. If you’ve ever “fallen off the wagon” during a diet and binged on sugary foods or skipped the gym, it may not be that you were simply weak-willed. It could have been caused by a neurotransmitter imbalance, which can often be corrected nutritionally.

But it doesn’t stop with neurotransmitters. If there is any drop in brain function, there is a concomitant drop in body function. Remember, your brain tells the rest of your body what to do – how much hormone to produce, how well to digest your food, how much weight you can lift, etc. If your brain stops functioning optimally, your body stops functioning optimally as well, which includes your ability to lose fat.
What To Do

Optimal brain health and function is far more complex than can be described in this book. But here are a few key things you can do to protect your most vital organ.

1. **Improve oxygen flow to the brain**
   Firstly, rule out any subclinical anemic tendencies you may have using blood work. Secondly, there are things you can take that can help increase blood flow to the brain. Compounds like ginkgo biloba, capsicum, and feverfew have all been shown to increase oxygen to the brain.

2. **Improve blood sugar management**
   Using blood work, identify any tendencies towards either hypoglycemia or insulin resistance. Either will decrease glucose flow to your brain and negatively impact its function.

3. **Decrease oxidative stress**
   Oxidative damage to mitochondria in our brain promotes massive neurodegeneration. Therefore it is important to take nutrients shown by research to stop free radical damage in the brain. Such nutrients include N-acetyl-cysteine, alpha lipoic acid, milk thistle, N-acetyl carnitine and creatine monohydrate.

4. **Decrease inflammation**
   There are strong connections between the gut and the brain. Therefore, following an anti-inflammatory diet and improving gut function can have profound impacts on brain function. Also compounds such as curcumin, rutin, resveratrol, apigenin and luteolin have all been shown to have a positive impact on reducing neuroinflammation.

5. **Improve fatty acid status**
   One of the most important fatty acids for the brain is Docosahexaenoic Acid, or DHA. There is ample research showing DHA to be helpful in brain function, including with cell signaling and neurotransmitter function.
6. **Balance neurotransmitters**
   There are no valid laboratory tests to evaluate neurotransmitters. Some labs do exist, but the neurophysiology and scientific literature do not validate their use. Therefore the only clinically valid way is to use subjective questionnaires, which can be found online, but are best evaluated by a medical professional.

7. **Evaluate Blood Brain Barrier Function**
   Take 500mg – 1000mg of GABA on an empty stomach during a time when you’ll be able to evaluate symptoms. If you have any response from taking the GABA, such as getting sleepy, lethargic or even anxious or giddy, that may be a strong indication you have a breach in your blood brain barrier. While it is beyond the scope of this article to go into what to do about this, the first step is to know whether or not your BBB is intact.

   The health of your brain directly impacts your entire life including your ability to taste and digest food, your ability to lift weights, your ability to recover from exercise, and your long term success in life. The more you do to protect your brain today, the better off you will be throughout the rest of your life.
The Cellular - Fat Loss Connection

**LITE BITES**

- **Mitochondria** are the energy producing powerhouses of our cells. They convert glucose to ATP, the body’s fuel.

- Mitochondria need fatty acids, glucose, and oxygen, as well as several nutrients such as amino acids and vitamins. If we are deficient in these, and/or if they cannot get into our cells properly, then mitochondrial function will be poor.

- If mitochondria are not working properly, they don’t produce enough ATP for our body’s needs. Our overall health and energy – and our fat loss – suffer.
Inner Space: The Importance of Our Cells

Deep within the cells of our body is our mitochondria, or the energy producing powerhouses of our body. The main purpose of glucose (blood sugar) entering our body is to eventually get down to the cellular level and produce ATP (adenosine triphosphate) to help run our body. This is a critical function of the body that is also grossly underrated. If mitochondrial function suffers, so does the vitality of numerous organs and tissues.

In order for the mitochondria to function properly, fatty acids need to be transported through the cell membrane to serve as fuel. A water soluble amino acid, l-carnitine, helps bring these long-chain fatty acids in to the mitochondria for beta-oxidation, where glucose and oxygen combine to help produce ATP. Pantethine, a B vitamin derivative, is also involved in this process. This somewhat complex biochemical reaction can have numerous areas of dysfunction but the long and short of it is, if we cannot adequately get fat into our cells to burn as energy, they will accumulate in the blood and cellular function will suffer.

In addition to nutrients, the two most important compounds that must be able to enter into the mitochondria are oxygen and glucose. If either of these are not able to effectively enter into a cell, the mitochondria will not function optimally and energy production will be compromised. In medicine, the inability for oxygen to be delivered into a cell is classically referred to as anemia. However, even if anemia is not diagnosable based on laboratory blood work, oxygen delivery still may be suboptimal.

Mitochondria are the primary producers of energy in our body. Technically, they create something called adenosine triphosphate (ATP), which is the main fuel source for much of our body’s machinery. Mitochondria are so important that if enough of them are not working properly, nothing in your body will including organs, glands, muscles, our brain, etc. In fact, dysfunctional mitochondria are a hallmark of aging and many chronic diseases.

There are two things mitochondria need to produce ATP, oxygen and glucose. Without either of these two compounds in sufficient amounts, the mitochondria will not produce optimal amounts of ATP to fuel our body’s processes. This can directly impact our tolerance to exercise, or our ability to lose fat, our athletic performance and our overall health.
One of the primary functions of a red blood cell is to transport oxygen around our body. As a red blood cell passes by our lungs, it grabs oxygen molecules and then drops them off wherever the body needs it. The red blood cell then goes back up to the lungs to repeat the cycle.

If for some reason our red blood cells are not functioning properly, they will not be able to carry, or deliver, oxygen to our cells. And again, without oxygen mitochondria cannot function optimally.

The same is true of our body. If your blood is delivering sub-optimal amounts of oxygen, the cells of your body will still work, but not as well as if they had optimal amounts of oxygen.

You can take all the fancy supplements, optimize your post-workout nutrition shake, and follow the latest exercise program, but if your cells are not getting oxygen, none of that really matters.

How Cellular Health Impacts Fat Loss

If cells are not functioning properly, nothing in the body will. Our body is really just a large number of cells all attached to one another. If enough cells in our body are not working correctly, we cannot have adequate hormone production, digestive function, brain function, or any function, including our ability to lose fat.

In conventional medicine, a decrease in the ability to deliver oxygen to cells is diagnosed as anemia, a condition referring to a quantitative and/or qualitative deficiency for red blood cells to deliver oxygen to the tissues and organs of the body.

Anemia can be caused by any number of things – iron deficiency, vitamin B12/folate deficiency, excessive blood loss (i.e. heavy menses, gastrointestinal bleeding), medications, specific chronic or hereditary conditions (i.e. thalassemia), etc. The three main causes of anemia are red blood cell destruction, blood loss, or an inability to produce an adequate number of healthy red blood cells.

But even if you do not have anemia, can you still have sub-optimal oxygen delivery? You bet.
We see patterns of decreased oxygen deliverability in our practice all the time – people with blood values within the laboratory reference range, but outside of the optimal reference range. In fact, this is one of the first patterns we look for because if it is present, everything else we do for the patient will have limited therapeutic value as long as the patient does not have oxygen being delivered to the cells of their body.

Oxygen is one of the two fundamental components necessary for proper energy production at the cellular level. The less oxygen is delivered, the more poorly cells will function. There are many possible reasons oxygen deliverability may be decreased, two of which are due discussed above. Other mechanisms must be ruled out and discussed with a medical professional.

What To Do

I’m beginning to sound like a broken record at this point, but it needs to be made clear. You can use signs and symptoms to help identify defects in any one particular system in the body, but it is not always the most accurate method. For example fatigue is a common symptom of someone with anemic tendencies, but it is also a symptom of thyroid issues, insulin resistance, adrenal dysfunction, hormone imbalances and immune system dysfunction. Therefore, lab testing must be considered.

The easiest way to evaluate sub-clinical anemic tendencies is with a routine blood work. But as I’ve already stated, it needs to be evaluated by someone who has knowledge of functional reference ranges and how to interpret blood work correctly.

Another valuable test for determining the health of cellular function and energy production is the Organic Acid test. Easily done through giving a urine sample, this test can help someone determine if they have specific nutrient deficiency that is driving cellular dysfunction (i.e. specific B vitamins, CoQ10, etc).

Information about both of these tests, how to interpret them and how to support the results nutritionally can be found at www.fatisnotyourfault.com.
10

The Mind/Body - Fat Loss Connection

LITE BITES

- Physiology follows psychology. Our bodies respond to what we think about, and how we view ourselves.
- Thus, if you want a different body than you currently have, you must change your perceptions and what you think.
We Become What We Think About

“There is a law in psychology that if you form a picture in your mind of what you would like to be, and you keep and hold that picture there long enough, you will soon become exactly as you have been thinking.”
- William James, 1842-1910, Psychologist and Author

Despite the popularity of movies like The Secret, the understanding that we become what we think about is nothing new, nor is it a big secret. In fact, it’s very simple concept – we become what we think about all day long. This pertains to our health and ability to lose fat in a variety of important ways.

If you see yourself as fat, you probably will be fat. There is an old adage that says:

If you want to know where your mind has been, look at your body today.

We become what we think about all day long. If you want be skinny or more fit, you need to act lean, feel lean and do the things a fit person does. The more you feel, experience, and act as if you have already achieved your goals, the more likely the goals will become your reality. True, this can be very difficult to do, but if you do not have the right attitude for fat loss, you won’t achieve fat loss.

Our physiology follows our psychology. In other words, our mind creates our reality. Take, for example, the last time you felt embarrassed. Did you blush? If so, that is a case of a thought or emotion (embarrassment) manifesting a physical change (blushing). Another example is when people get nervous (thought), their stomach feels queasy (body). Physiology follows psychology.

So if you want a different body than you currently have, you must change your perceptions and what you are thinking today.

Again, our psychology dictates physiology. In other words, our perception about ourselves, about diet, and about exercise dictates how our physiology responds to it. There have been studies showing that our thoughts can cause shifts in our hormones, neurotransmitters and even our immune

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system. Our thoughts literally impact how much of, and what type of chemicals are produced in our body.

This becomes important when we realize we have tens of thousands of thoughts a day. What percentage of those thoughts are confident, positive and affirming thoughts about yourself? What percentage of those thoughts are imagining yourself being thin, muscular and successful in your life?

We become what we think about all day long.

How Our Thoughts Impacts Fat Loss

There have been a number of studies examining at the effects of the mind and perception on physical processes, including the ability to lose weight. The results of these studies are enough to make one wonder if we even need to exercise at all. (The answer is of course yes, we do.) Let’s take a look at a few of these studies.

Thinking Yourself Strong

A study conducted at Bishop’s University looked at how merely thinking about performing an exercise could increase their strength in that particular exercise.

This study had three groups of people. Each person performed a strength exercise at the beginning of the study to find out how strong they were in that particular exercise. Then they split up the groups. The first group was the control group and did no exercise during the study. The second group performed the exercise three times a week, and the third group listened to an audio CD guiding them through a visualization of them performing the exercise, which they used three times a week.

Here were the results:

Group 1 (no exercise): No increase in strength during the study.

Group 2 (exercise): Twenty-eight percent increase in strength

Group 3 (visualization): Twenty-four percent increase in strength.
Simply by visualizing themselves performing the exercise three times a week resulted in similar strength increases as the people who actually performed the exercise.

In other words, they got stronger simply by thinking about it.

**Thinking Yourself Thin**

A recent Harvard study looked at how thoughts may impact specific health markers, as well as weight loss.

Researchers took a group of 84 maids from a major hotel and separated them into two groups. One group was told that the work they do cleaning rooms at the hotel is adequate exercise to satisfy the Surgeon General’s recommendations for an active, healthy lifestyle. Participants in the second group were not told this information.

The group who was told that the work they perform on a daily basis is a good form of exercise lost body fat, decreased blood pressure, lowered their waist-to-hip ratio and improved their Body Mass Index (BMI).

What is significant about this study is that the women were performing the same activities they were doing prior to the study, but now that they believed it was enough to be healthy, they lose weight and become healthier.

A different, but related study looked at 105 obese individuals, split into two groups. One group participated in cognitive therapy three times a week for 10 weeks. The other group served as the control group. The group receiving cognitive therapy at the end of 18 months lost 23 pounds, while the control group gained an average of 5 pound.

While these results are not terribly significant, it helps demonstrate simply how focusing on our perception and the way we think can have impacts on how we see ourselves and our ability to lose fat.

**Thinking Your Way To High Performance**

Furthering the concept that we become what we think about, there was a study performed using a group of students that never had any experience with visualization on their ability to perform free throws (basketball).
The students were split into three groups. The first group performed free throws every day for a twenty day period. The second group served as the control group and did nothing with regard to free throws for the duration of the study. The third group spent twenty minutes a day visualizing themselves performing free throws.

At the end of the study, the results were as follows:

- Group 1 (practiced): No change.
- Group 2 (control): Improved free throw accuracy by twenty-four percent.
- Group 3 (visualized): Improved free throw accuracy by twenty-three percent.

This is amazing. The fact people are able to improve their performance in an activity simply by visualizing themselves doing it has profound implications on our body image and how easily we are able to lose body fat. Simply thinking about the perfect body won’t get you the perfect body, but it will help a lot.

What To Do

The key is to see, feel and experience what you want to become. The more often you can do this, the more likely it will happen.

There are many books written about this process, but here are the basics.

Step one is to decide on your goals and figure out what it is that you want in specific and measurable terms. This is nothing new, but it is an all important step. You need to be very clear about what you want and write it down.

Step two is to spend ten minutes every day experiencing yourself as having achieved those goals. But it is not just picturing it, it is experiencing it, feeling it and being it. In other words, how does it feel putting on a pair of jeans and having them fit. How does it smell, taste or sound when you are walking down the street knowing you’ve lost 25 pounds. The more you experience the feelings associated with achieving a certain goal, the more likely it will happen.
The third step is to determine actionable items that will help you achieve them, and do them. There is more to goal setting than is written here, but these are the basics about mental attitude and how it can impact your ability to lose fat.
Summary

There is a major misconception in the fitness and nutrition industry that all you need to lose weight is diet and exercise. While this works for some people, it does not work for everyone. As was stated at the beginning of this manual, your physiology dictates your response from diet and exercise. If your body is not working properly, your ability to lose weight will suffer, too.

There are ten systems of your body that needs to be healthy for you to lose fat. The lack of function in any one of these systems can hinder your results in the gym.

Step 1

The first thing to do is identify which of the systems in you are not working correctly. It could be one system, or more than one system. If there is more than one system involved, there may be one particular system that is the priority causing issues elsewhere in the body. For example, someone may have a gastrointestinal issue causing stress and inflammation, which can cause blood sugar and insulin issues, which can cause brain and neurotransmitter imbalances.

The fastest and easiest way to determine which system is causing you the biggest issues is to use a subjective questionnaire form. In most cases, you can cluster together symptoms as they relate to a particular system of the body and

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the degree to which certain symptoms exist, the greater the likelihood there is an issue in a given system.

**Step 2**

After a certain problematic system, or systems, have been identified, laboratory testing is next. This is a *very* important and underappreciated step.

Today there are many different websites and health books that recommend supplements for given conditions or symptoms without first having laboratory testing to validate it. This, to me, is irresponsible medicine.

For example, a man could have symptoms of low testosterone, but it could be due to a number of distinct defects in male hormone physiology. So which defect to you supplement? This is the very reason that two people with the exact same symptom can have completely different responses to the same supplement. In one, the defect was impacted and the other was not. This is irresponsible medicine.

Laboratory testing is not infallible itself, but it takes much of the guess work out of determining where defects lie and how to treat them nutritionally. Lack of laboratory testing ends up costing people a lot of time and money trying to determine which pathway is defective, and ultimately is an inefficient way of determining which nutritional supplementation, or medical intervention, is necessary.

Fortunately today, many good tests are available, some through practitioners, and others to the general public.

Testing information, how to interpret it, and most importantly what to do about it is available at [www.fatisnotyourfault.com](http://www.fatisnotyourfault.com).
Fat Is Not Your Fault
Fat Loss Resistance Assessment Form

Answer the following questions on a scale of “0” (least/never) to “3” (often/always). Take your time and be honest with the answers; the more accurate you the better your will understand which systems are a priority for you.

<table>
<thead>
<tr>
<th>Category A</th>
<th></th>
<th>Category E</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling that bowels do not empty completely</td>
<td>0 1 2 3</td>
<td>Greasy of high fat foods cause distress</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Lower abdominal pain relief by passing stool or gas</td>
<td>0 1 2 3</td>
<td>Lower bowel or gas or bloating several hours after eating</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Alternating constipation and diarrhea</td>
<td>0 1 2 3</td>
<td>Bitter, metallic taste in mouth, especially in the morning</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>0 1 2 3</td>
<td>Unexplained itchy skin</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Constipation</td>
<td>0 1 2 3</td>
<td>Yellowing cast to eyes</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Hard dry or small stool</td>
<td>0 1 2 3</td>
<td>Stool color alternates from clay colored to normal brown</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Coated tongue or “fuzzy” debris on tongue</td>
<td>0 1 2 3</td>
<td>Reddened skin, especially palms</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Pass large amount of foul smelling gas</td>
<td>0 1 2 3</td>
<td>Pass large amount of foul smelling gas</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>More than three bowel movements daily</td>
<td>0 1 2 3</td>
<td>More than three bowel movements daily</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Do you use laxatives frequently?</td>
<td>0 1 2 3</td>
<td>Do you use laxatives frequently?</td>
<td>0 1 2 3</td>
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Total ________

<table>
<thead>
<tr>
<th>Category B</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Excessive belching or burping</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Gas immediately following a meal</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Offensive breath</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Difficult bowel movement</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Sense of fullness during and after meals</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Difficulty digesting fruits and vegetables</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Undigested foods found in stool</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Pass large amount of foul smelling gas</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>More than three bowel movements daily</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Do you use laxatives frequently?</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

Total ________

<table>
<thead>
<tr>
<th>Category C</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach pain, burning or aching 1-4 hours after eating</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Frequent use of antacids</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Feeling hungry an hour or two after eating</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Heartburn when lying down or bending forward</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Temporary relief from antacids, food, milk, carbonation</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Digestive problems subside with rest and relaxation</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Heartburn due to spicy foods, chocolate, citrus, peppers, alcohol and caffeine</td>
<td>0 1 2 3</td>
</tr>
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Total ________

<table>
<thead>
<tr>
<th>Category D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Roughage and fiber cause constipation</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Indigestion and fullness lasts 2-4 hours after eating</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Pain, tenderness, soreness on left side under rib cage</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Excessive passage of gas</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Nausea and/or vomiting</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Stool undigested, foul smelling, mucous-like greyish or poorly formed</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Frequent urination</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Increased thirst and appetite</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Difficulty losing weight</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

Total ________

<table>
<thead>
<tr>
<th>Category E</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>History of gallbladder attacks or stones</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Have you had your gall bladder removed</td>
<td>Yes(3) No(0)</td>
</tr>
</tbody>
</table>

Total ________

<table>
<thead>
<tr>
<th>Category F</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crave sweets during the day</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Irritable if meals are missed</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Depend on coffee to keep yourself going or get started</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Get lightheaded if meals are missed</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Eating relieves fatigue</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Feel shaky, jittery, tremors</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Agitated, easily upset, nervous</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Poor memory, forgetful</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

Total ________

<table>
<thead>
<tr>
<th>Category G</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue after meals</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Craves sweets during the day</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Eating sweets does not relieve cravings for sugar</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Must have sweets after meals</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Waist girth is equal or larger than hip girth</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Frequent urination</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Increased girth</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Difficulty losing weight</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

Total ________

<table>
<thead>
<tr>
<th>Category H</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot stay asleep</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Crave salt</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Slow starter in the morning</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Afternoon fatigue</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Dizziness when standing up quickly</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Headaches with exertion or stress</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Weak nails</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

Total ________
<table>
<thead>
<tr>
<th>Category I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot fall asleep 0 1 2 3</td>
</tr>
<tr>
<td>Perspire easily 0 1 2 3</td>
</tr>
<tr>
<td>Under high amounts of stress 0 1 2 3</td>
</tr>
<tr>
<td>Weight gain when under stress 0 1 2 3</td>
</tr>
<tr>
<td>Wake up tired even after six or more hours of sleep 0 1 2 3</td>
</tr>
<tr>
<td>Excessive perspiration or perspiration with little activity 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tired, sluggish 0 1 2 3</td>
</tr>
<tr>
<td>Feel cold – hands, feet, all over 0 1 2 3</td>
</tr>
<tr>
<td>Require excessive amount of sleep to function properly 0 1 2 3</td>
</tr>
<tr>
<td>Increase in weight gain even with low-calorie diet 0 1 2 3</td>
</tr>
<tr>
<td>Gain weight easily 0 1 2 3</td>
</tr>
<tr>
<td>Difficult, infrequent bowel movements 0 1 2 3</td>
</tr>
<tr>
<td>Depression, lack of motivation 0 1 2 3</td>
</tr>
<tr>
<td>Morning headaches that wear off as the day progresses 0 1 2 3</td>
</tr>
<tr>
<td>Outer third of eyebrow thins 0 1 2 3</td>
</tr>
<tr>
<td>Dryness of skin and/or scalp 0 1 2 3</td>
</tr>
<tr>
<td>Mental sluggishness 0 1 2 3</td>
</tr>
<tr>
<td>Thinning of hair on scalp, face or genitals, or excessive falling hair 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart palpitation 0 1 2 3</td>
</tr>
<tr>
<td>Inward trembling 0 1 2 3</td>
</tr>
<tr>
<td>Increased pulse even at rest 0 1 2 3</td>
</tr>
<tr>
<td>Nervous and emotional 0 1 2 3</td>
</tr>
<tr>
<td>Insomnia 0 1 2 3</td>
</tr>
<tr>
<td>Night sweats 0 1 2 3</td>
</tr>
<tr>
<td>Difficulty gaining weight 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Diminished sex drive 0 1 2 3</td>
</tr>
<tr>
<td>Menstrual disorders or lack of menstruation 0 1 2 3</td>
</tr>
<tr>
<td>Increased ability to eat sugars without symptoms 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Category M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased sex drive 0 1 2 3</td>
</tr>
<tr>
<td>Reduced tolerance to sugars 0 1 2 3</td>
</tr>
<tr>
<td>“Splitting” type headaches 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Category N (Men)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urination difficulty or dribbling 0 1 2 3</td>
</tr>
<tr>
<td>Frequent urination 0 1 2 3</td>
</tr>
<tr>
<td>Pain inside legs or heels 0 1 2 3</td>
</tr>
<tr>
<td>Feeling of incomplete bowel evacuation 0 1 2 3</td>
</tr>
<tr>
<td>Leg nervousness at night 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Category P (Women – still menstruating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you perimenopausal Yes(3) No(0)</td>
</tr>
<tr>
<td>Alternating menstrual cycle lengths Yes(3) No(0)</td>
</tr>
<tr>
<td>Extended menstrual cycle, greater than 32 days Yes(3) No(0)</td>
</tr>
<tr>
<td>Shortened menses, less than every 24 days Yes(3) No(0)</td>
</tr>
<tr>
<td>Pain and cramping during periods 0 1 2 3</td>
</tr>
<tr>
<td>Scanty blood flow 0 1 2 3</td>
</tr>
<tr>
<td>Heavy blood flow 0 1 2 3</td>
</tr>
<tr>
<td>Breast pain and swelling during menses 0 1 2 3</td>
</tr>
<tr>
<td>Pelvic pain during menses 0 1 2 3</td>
</tr>
<tr>
<td>Irritable and depressed during menses 0 1 2 3</td>
</tr>
<tr>
<td>Acne breakouts 0 1 2 3</td>
</tr>
<tr>
<td>Facial hair growth 0 1 2 3</td>
</tr>
<tr>
<td>Hair loss/thinning 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Category Q (Women – Menopausal)</th>
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</thead>
<tbody>
<tr>
<td>Since menopause, do you ever have uterine bleeding 0 1 2 3</td>
</tr>
<tr>
<td>Hot flashes 0 1 2 3</td>
</tr>
<tr>
<td>Mental fogginess 0 1 2 3</td>
</tr>
<tr>
<td>Disinterest in sex 0 1 2 3</td>
</tr>
<tr>
<td>Mood swings 0 1 2 3</td>
</tr>
<tr>
<td>Depression 0 1 2 3</td>
</tr>
<tr>
<td>Painful intercourse 0 1 2 3</td>
</tr>
<tr>
<td>Shrinking breasts 0 1 2 3</td>
</tr>
<tr>
<td>Facial hair growth 0 1 2 3</td>
</tr>
<tr>
<td>Acne 0 1 2 3</td>
</tr>
<tr>
<td>Increased vaginal pain, dryness or itching 0 1 2 3</td>
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<td><strong>Total</strong> ______</td>
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<table>
<thead>
<tr>
<th>Category R</th>
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</thead>
<tbody>
<tr>
<td>Is your memory noticeably declining? 0 1 2 3</td>
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<tr>
<td>Are you having a hard time remembering names and phone numbers? 0 1 2 3</td>
</tr>
<tr>
<td>Is your ability to focus noticeably declining? 0 1 2 3</td>
</tr>
<tr>
<td>Has it become harder for you to learn things 0 1 2 3</td>
</tr>
<tr>
<td>Do you have a hard time remembering appointments? 0 1 2 3</td>
</tr>
<tr>
<td>Is your temperament getting worse in general? 0 1 2 3</td>
</tr>
<tr>
<td>Are you losing your attention span endurance? 0 1 2 3</td>
</tr>
<tr>
<td>Are you feeling down or sad more than normal? 0 1 2 3</td>
</tr>
<tr>
<td><strong>Total</strong> ______</td>
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### Category R (con't)

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<td>Do you fatigued when reading sooner than in past?</td>
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<tr>
<td>Do you fatigued sooner when driving than in past?</td>
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<tr>
<td>Do you walk into rooms and forget why?</td>
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<tr>
<td>Do you pick up your cell phone and forget why?</td>
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**Total _____**

### Category S

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<tbody>
<tr>
<td>Are you losing your pleasure in hobbies and interests?</td>
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<tr>
<td>Do you feel overwhelmed with ideas to manage?</td>
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<tr>
<td>Do you have feelings of inner rage (anger)?</td>
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<tr>
<td>Do you have feelings of paranoia?</td>
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<tr>
<td>Do you feel sad or down for no reason?</td>
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<tr>
<td>In general, do you feel like you are not enjoying life?</td>
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<tr>
<td>Do you feel you lack artistic expression?</td>
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<td>Do you feel depressed in overcast weather?</td>
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<td>Are you losing your enthusiasm for your favorite activities?</td>
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<tr>
<td>Are you losing enjoyment of your favorite foods?</td>
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<tr>
<td>Are you losing your enjoyment of friendships and relationships?</td>
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<tr>
<td>Do you have difficulty falling into deep restful sleep?</td>
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<tr>
<td>Do you have feeling of dependency on others?</td>
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<tr>
<td>Do you feel more susceptible to pain?</td>
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<tr>
<td>Do you have feelings of unprovoked anger?</td>
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<tr>
<td>Are you losing interest in life?</td>
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**Total _____**

### Category T

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<tr>
<td>Do you have feelings of hopelessness?</td>
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<td>Do you have self-destructive thoughts?</td>
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<tr>
<td>Do you have an inability to handle stress?</td>
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<tr>
<td>Do you have anger and aggression while under stress?</td>
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<tr>
<td>Do you feel you are not rested even after long sleep?</td>
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<tr>
<td>Do you prefer to isolate yourself from others?</td>
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<tr>
<td>Do you have unexplained lack of concern for family and friends?</td>
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<tr>
<td>Are you distracted easily?</td>
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<tr>
<td>Do you have an inability to finish tasks?</td>
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<tr>
<td>Do you feel your libido has been decreased?</td>
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<tr>
<td>Do you feel the need to consume caffeine to stay alert?</td>
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<tr>
<td>Do you lose your temper for minor reasons?</td>
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<tr>
<td>Do you have feelings of worthlessness?</td>
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**Total _____**

### Category U

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<tbody>
<tr>
<td>Do you feel anxious or panic for no reason?</td>
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<tr>
<td>Do you have feelings of dread, or pending gloom?</td>
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<tr>
<td>Do you feel knots in your stomach?</td>
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<tr>
<td>Do you have feelings of being overwhelmed for no reason?</td>
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<tr>
<td>Do you have feelings of guilt about everyday decisions?</td>
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<tr>
<td>Does your mind feel restless?</td>
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<tr>
<td>Is it difficult to turn off your mind when you want to relax?</td>
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<tr>
<td>Do you have disorganized attention?</td>
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<tr>
<td>Do you now worry about things you were not worried about before?</td>
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**Total _____**

### Category U (con't)

<table>
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<th>Question</th>
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<tbody>
<tr>
<td>Do you have feelings of inner tension and inner excitability?</td>
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**Total _____**

### Category V

<table>
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<tbody>
<tr>
<td>Do you feel your visual memory (shapes &amp; images) is decreased?</td>
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<tr>
<td>Do you feel your verbal memory is decreased?</td>
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<tr>
<td>Do you have memory lapses?</td>
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<tr>
<td>Has your creativity been decreased?</td>
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<tr>
<td>Has your comprehension been diminished?</td>
<td></td>
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<tr>
<td>DO you have difficulty calculating numbers?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Do you have difficulty recognizing objects and faces?</td>
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<tr>
<td>Do you feel like your opinion about yourself is changed?</td>
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</tr>
<tr>
<td>Are you experiencing excessive urination?</td>
<td></td>
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<tr>
<td>Are you experiencing slower mental response?</td>
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**Total _____**

### Category W

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Does your skin look pale?</td>
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</tr>
<tr>
<td>Do you feel tired or fatigued?</td>
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<tr>
<td>Do you feel weak?</td>
<td></td>
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</tr>
<tr>
<td>Do you get short of breath?</td>
<td></td>
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<tr>
<td>Do you get dizzy?</td>
<td></td>
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</tr>
<tr>
<td>Have you experienced a rapid heart rate?</td>
<td></td>
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<tr>
<td>Do you have numbness/coldness in your hands or feet?</td>
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</tr>
<tr>
<td>Are you irritable?</td>
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<tr>
<td>Do you feel sad and depressed?</td>
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**Total _____**

### Category X

<table>
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<tbody>
<tr>
<td>Pain or aches in joints</td>
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<tr>
<td>Pain, aches in muscles</td>
<td></td>
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</tr>
<tr>
<td>Itchy ears</td>
<td></td>
<td></td>
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<tr>
<td>Belching, passing gas</td>
<td></td>
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</tr>
<tr>
<td>Dark circles under eyes</td>
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<tr>
<td>Gagging, frequent need to clear throat</td>
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<tr>
<td>Swollen or discolored tongue</td>
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<tr>
<td>Headaches</td>
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<tr>
<td>Stuffy nose</td>
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<tr>
<td>Water retention</td>
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<tr>
<td>Craving certain foods</td>
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<tr>
<td>Excessive mucous</td>
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<tr>
<td>Frequent illness</td>
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**Total _____**

Go to the “Fat Loss Resistance Assessment Guide” to fill in the totals in the appropriate column of each category.
<table>
<thead>
<tr>
<th>Gastrointestinal</th>
<th>L/GB</th>
<th>Glucose</th>
<th>Adrenal</th>
<th>Thyroid</th>
<th>Pituitary</th>
<th>Male</th>
<th>Female</th>
<th>Brain</th>
<th>Ane</th>
<th>Tox</th>
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| 30 | 30 | 21 | 27 | 39 | 27 | 14 | 21 | 18 | 26 | 21 | 8 | 0 | 15 | 39 | 30 | 27 | 39 | 48 | 39 | 30 | 30 | 27 | 39 |
| 28 | 28 | 19 | 24 | 34 | 24 | 16 | 20 | 17 | 17 | 17 | 7 | 7 | 12 | 34 | 28 | 32 | 44 | 38 | 28 | 28 | 24 | 34 |
| 26 | 26 | 17 | 21 | 18 | 15 | 14 | 16 | 14 | 17 | 7 | 7 | 12 | 34 | 28 | 32 | 44 | 38 | 28 | 28 | 24 | 34 |
| 24 | 24 | 17 | 21 | 18 | 15 | 14 | 16 | 14 | 17 | 7 | 7 | 12 | 34 | 28 | 32 | 44 | 38 | 28 | 28 | 24 | 34 |
| 22 | 22 | 15 | 18 | 26 | 18 | 16 | 14 | 12 | 26 | 21 | 10 | 26 | 21 | 10 | 26 | 30 | 34 | 38 | 30 | 27 | 26 | 20 |
| 20 | 20 | 14 | 18 | 26 | 18 | 16 | 14 | 12 | 26 | 21 | 10 | 26 | 21 | 10 | 26 | 30 | 34 | 38 | 30 | 27 | 26 | 20 |
| 18 | 18 | 12 | 15 | 21 | 15 | 14 | 12 | 10 | 21 | 19 | 19 | 21 | 21 | 21 | 20 | 28 | 18 | 18 | 15 | 21 |
| 16 | 16 | 10 | 15 | 21 | 15 | 14 | 12 | 10 | 21 | 19 | 19 | 21 | 21 | 21 | 20 | 28 | 18 | 18 | 15 | 21 |
| 14 | 14 | 10 | 15 | 21 | 15 | 14 | 12 | 10 | 21 | 19 | 19 | 21 | 21 | 21 | 20 | 28 | 18 | 18 | 15 | 21 |
| 12 | 12 | 8 | 17 | 12 | 10 | 8 | 16 | 10 | 21 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| 10 | 10 | 7 | 9 | 13 | 9 | 8 | 7 | 6 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 8 | 8 | 4 | 6 | 8 | 6 | 4 | 8 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 6 | 4 | 6 | 8 | 6 | 4 | 8 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 4 | 4 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 3 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 3 | 11 | 31 | 21 | 10 | 17 | 6 | 21 | 2 | 3 | 0 | 8 | 30 | N/A | N/A | 17 | 27 | 8 | 18 | 14 | 3 | 17 |
| 18 | 28 | 3 | 11 | 31 | 21 | 10 | 17 | 6 | 21 | 2 | 3 | 0 | 8 | 30 | N/A | N/A | 17 | 27 | 8 | 18 | 14 | 3 | 17 |

**Sample**