

You are reading an excerpt from  
Thyroid Healthy: Lose Weight, Look Beautiful  
and Live the Life You Imagine  
by Suzy Cohen, RPh

The entire book is available  
in paperback and E-reader version at  
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ISBN 978-0-9818173-6-1

Library of Congress Catalog Number: 2014938277

Printed in the United States of America

## **A Word to the Wise**

No comments in my book should be construed as medical advice. This book is not intended to treat, cure, or diagnose your condition. Please discuss and gain approval for any changes to your healthcare regimen, medications, or treatment protocol. Please be advised that suggested nutrients (and dosages where given) are intended as general guidelines and not right for everyone. Thyroid disease is a serious, complex illness that sometimes requires immediate medical attention. Follow your instincts and always comply with your practitioner's advice. You must accept total responsibility for your health regimen and every health decision you make, this book is strictly educational. Getting several opinions from licensed practitioners who have expertise with endocrine disorders is advised.

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# Introduction

**W**e are all striving to live each moment to the fullest and get more comfortable in our own skin. I'm aware we are all dealing with life situations, and our health is the number 1 priority. If you don't have good health, nothing else matters a while lot. I want to help you so much! I bet you've gone to the doctor and said, "I'm tired, depressed and heavier than I've been in years." The typical response from your doctor is, "Stop eating so much and exercise more." I'm very empathetic from having dealt with the crazy medical system myself so I hear you, I feel you and I wrote this book for you. Each tissue in your body has a different need for thyroid. This fact explains why you feel tired and cold all the time, while your hypothyroid friend can't lose 10 pounds and feels sad all the time. Your co-worker has hypothyroidism too, but she has 12 different symptoms!

I'm a mom, and a middle aged woman at the time of this writing. I've been through a lot in my life. Professionally speaking, I've been a pharmacist and natural health advocate for 25 years with a strong focus on natural medicine, versus prescription drugs which I was educated in. I'm also a Functional Medicine practitioner and have been for 15 years.

In order to lose weight, look beautiful and live the life you've imagined, you need to keep youthful levels of key hormones. At the top of the list is thyroid hormone. I know that because I have had to overcome low levels of thyroid hormone myself. As a pharmacist for 25 years, I can assure you medication treatment

and testing for this condition has barely budged in decades and as a result, you are suffering needlessly.

Did you know that thyroid hormone affects every cell in your body? Most people think thyroid hormone affects the gland only, which is situated down low in the front of your neck. The truth is, thyroid deficiency causes symptoms that are so obvious that it's ridiculous to *not* get diagnosed properly if only from your clinical presentation. The most common symptoms affect metabolism and emotions. You gain weight, and your mood deteriorates. The next obvious sign is fatigue. You tire easily, and energy runs out faster than it used to for no apparent reason. You feel cold more often. You don't handle stress. You feel less attractive and cry easily. Things in your body stop responding the way they should and it's not because you're getting old. Thyroid disease can strike 20-something year olds, so this is not an old person's problem.

Your thyroid gland literally drives your health one way or the other. It can make you look like the woman on the left, or the right. You can see from the picture how important thyroid hormone is to your health. That's me, and the image on the left is about 10 years younger than the image on the right which was taken a few months ago. Improving thyroid function wiped years off my face and 15 pounds off my body. I was never very heavy, but that's still a lot of weight for a small 5'3" frame. I went from 125 to 110 and you can see the difference for yourself.

Today I have much more energy than I did back then, I sleep well and feel great for almost 50. I'm active in yoga and Zumba and always up for a hike around Colorado if you want to come visit me. Back in the old days, I couldn't exercise for very long, I had dark circles under my eyes and I wanted to lie down and catch a breather several times a day.

This went on for a few years, back when I lived in Florida. I recall telling a physician in 2007 that I was tired frequently, and before I could finish the sentence he offered me a prescription for Zoloft. I wasn't depressed, I was just tired and sleeping 9 hours

didn't change it. If you know me, you know I'm really easy going and happy, and laugh easily, even to this day. To be fair, I worked part-time at the pharmacy, and was writing my first book, plus I was a full time care giver. I did feel pretty squeezed when it came to my energy reserves, but this kind of fatigue felt abnormal in a way that is hard to describe. I think you know what I mean, I just felt heavy, easily winded, short of breath, and I got dizzy doing certain dance moves in Zumba. My mind was always sharp like a tack, and during this time I found it hard to stay focused which was weird for me.



Anyway, when the doctor failed to recognize the true cause of my unrelenting fatigue and offered a mind-altering drug I knew I didn't need, I felt very alone and scared. *Is this going to be my life forever? Is this all my pharmacy has to offer?* At the same time, I was watching my sweet husband's health crumble despite

interventions by dozens of doctors, he had Lyme but we didn't know it at the time, and the antibiotics he was given, actually poisoned his nervous system forever. You'll read more about those drugs later in this book. What a situation! It really made me think about my path in life, and how I would help myself and my husband. I vowed that if I could myself figure it out and get us well, I'd pay it forward. You are holding the result of my journey.

To keep the story short, I'll tell you that I eventually had my ferritin levels tested by another doctor. Ferritin is a marker of stored iron, and it was dreadfully low. It was 8, and it should have been between 70 and 90. My iron deficiency anemia was affecting my thyroid hormone, and causing fatigue. Ah ha! That was a major discovery because standard tests for iron and thyroid were "normal." All of this affected my adrenal hormones too, making some of them literally undetectable (meaning zero). Iron and thyroid go together like best buds and I'll tell you more about this connection in Chapter 14 Iron Deficiency and Chronic Fatigue.

There's more to my personal story. My husband Sam has imbalances with thyroid hormone from the antibiotics that poisoned his thyroid gland. We learned about it because he is always cold, especially his hands and feet. Granted we live in Colorado now, but he was freezing in 100 degree Florida! When we went out together, we'd get in the car, and then he'd sit inside the steamy hot car in our driveway for a few minutes before turning on the vehicle and air conditioner. He said the hot car felt good to him. (I was cringing the whole time because I hate the heat). I would sit for as long as I could tolerate it and as sweetly as I could muster, I'd blurt out "Turn on the freaking car!"

At a routine doctor's check up, we found out his body temperature was 94.8 at 3pm in the afternoon! We kept tracking it, and found that it hovered between 94.5 to 96.0. Normal body temperatures are about 98.6. *No wonder he wanted to sit in his vehicular sauna!* Now we live in Colorado, and we've purchased



a real sauna so he can sit in that to his heart's content, instead of boiling me in our car.

You can imagine how every bodily system for Sam was compromised with a temperature that low. Your thyroid gland is one of the mechanisms in charge of your body temperature and sense of hot and cold. This information is not new, in fact, decades of research is available for you on Pubmed.com. You don't have to research yourself because I've done it for you. I'll share important life-changing tips from the literature I've poured through, and from well-designed clinical trials.

Some of the articles and citations I've used in this book are old. You may wonder why I chose to include old data. Instead, I want you to ponder this: *"If this data has been in the scientific journals so long, why have I not been told this?"* Sadly, it takes 20 to 30 years for mainstream medicine to incorporate new ideas. There are debates about how to test and treat a patient with thyroid disease. So many things in medicine become a very political or emotional debate with doctors who feel what they learned in school is absolutely correct. Sigh. They argue and you suffer.

The typical scenario goes down like this, your doctor orders a thyroid test, and when the results are within the normal reference range, you are told "Everything's normal, you're fine." But you know that you're not! You shouldn't have to look on 'Dr. Google' to find out you are hypothyroid when you are paying a physician to uncover this. One goal for my book is to give you mind-blowing information that you've never heard of before. I'll also offer simple solutions when I can, however I'm not going to mislead you into thinking that a "detox" cocktail will cure you, or a 3 day plan will solve 10 years of suffering. I'll never give you empty promises. Instead, I promise to give you hope and empower you with information about testing and treatments so you can uncover your true state of health. Remember, no two people are alike, so they can't be treated alike. We are all unique and our response to medicine and supplements is also unique.

Testing is a big deal because if I had been tested properly, I would have gotten better within months instead of dragging through my days for several years. The fact that you are probably hypothyroid and your test has not uncovered that just infuriates me. And it leaves you sick because you don't get the treatment you need. So the first point I want to make is that standard thyroid tests miss hypothyroidism up to 80% of the time! That's almost all the time isn't it? I'm validating you here and I believe you when you say your blood tests are normal, but you still feel like crap. Yep, been there, done that, got the T shirt!

The TSH (thyroid stimulating hormone) test is the one I'm referring to, and it's the first test ordered by physicians because that is the American 'standard of practice.' That's the lingo used to describe guidelines and principles that a doctor follows in order to treat patients. To offer other (better) tests for thyroid is not in keeping with the standard of practice, but I know excellent doctors who do it, while their peers stand in judgement. They're heroes in my book. Seeing a good doctor is the first step to getting well.

I'm honored that you have put your trust in me and I'm determined to hold your hand through this process. Nothing would make me happier than for you to live the life you imagine, one that is beautiful and happy, strong and healthy. You will have to find a doctor that believes you! I will teach you about labs so that you can get yourself tested properly. I'm going to teach you how to speak a thyroid 'language' so intelligently that you'll be taken seriously, and you'll be respected.

You have to become thyroid smart to become thyroid healthy! This means you will learn new concepts and at first they may seem complicated, but I'll keep repeating them throughout my book. I have videos at my website to help you understand everything that I've written here.

I have confidence in you. You deserve to enjoy a life that is energetic, healthy and happy. It's time to get thyroid healthy! For

all the money you have spent on doctors, tests, supplements, medicine... my gosh, you should have felt better years ago! I promise to help you the best that I can. We're in this together, okay?!

Love,

A handwritten signature in cursive script, reading "Dr. Cohen". The signature is written in a light gray color and is positioned below the word "Love,".

**Part I**

# **Thyroid Basics**



## Chapter 1

# One Gland with a Big Job

**Y**our thyroid is a precious gland, you only have one. It's very fragile, shaped like a butterfly at the base of your neck and highly susceptible to chemicals in your pool, your toothpaste, your drinking water and even your new car. All sorts of chemicals can hurt your thyroid gland which is in charge of secreting thyroid hormone.

Thyroid hormone affects every cell in your body and you have trillions. Thyroid hormone regulates all of your activities, every second of the day. One of its main duties is to break down what you eat and create energy for you. Turn food into fuel. What if your thyroid isn't functioning well? You will obviously be tired. That is why a classic symptom of low thyroid is fatigue, especially morning fatigue. If the fatigue lasts all day, it's a sign of poor adrenal function along with low thyroid. When thyroid goes down adrenal hormones go up for awhile. When your adrenals start pumping out excessive cortisol from all your stress, you get inflamed and have pain.

When you have a thyroid gland disorder, it could mean that you have too little thyroid hormone (hypothyroidism), or too much (hyperthyroidism). An estimated 20 million Americans suffer from thyroid disease, yet 60% of people are completely unaware they have it. Women are dramatically more prone to thyroid disease, some experts estimate that women are five to eight times

more likely to develop it compared to men. Thyroid disease, is always tied to adrenal fatigue and hormonal imbalances and you can see it in a woman's face quickly:

- ✓ Thin, dry hair
- ✓ Eyebrows may curve straight down on outer edges
- ✓ Hair missing on outer edge of eyebrows
- ✓ Lower eyelashes missing or sparse
- ✓ Cystic acne around mouth or chin due to hormonal imbalance
- ✓ Darkness on the inside corner of the eye due to adrenal fatigue
- ✓ Dry skin
- ✓ Puffiness around the Adam's apple

Because the symptoms of many thyroid disorders can be very subtle, they are often overlooked or mistaken for other health issues. I recommend that you have your thyroid hormones evaluated with a blood test annually. Many of you have hypothyroidism but it's not recognized. Have you heard any of these comments:

- ✓ You're just depressed.
- ✓ You're fat.
- ✓ You're going through the change.
- ✓ You're menopausal.
- ✓ It's in your head.
- ✓ Stop reading Facebook, I know more.

When you don't have the support and help of an educated practitioner you continue to feel poorly and relationships suffer. You could get depressed! You endure weight gain, or stubborn weight loss even though you eat very little. The way you feel physically and mentally taxes you. Worse, your course of action becomes blurred, costly, and frustrating. It's a derailment of life

that I feel is repairable. Turning to forums on the Internet doesn't help because you read about what others did, but their path may not be right for you. The advice on the Internet can be misleading, incorrect or downright dangerous. Hypothyroidism causes every system in your body to slow down. The opposite is true for hyperthyroidism. Most people suffer from hypo, so that is the primary focus of my book. I have included a short chapter on hyper (Chapter 17, *Graves' Disease*) for completeness sake.

### **Are You Hypothyroid or Thyroid Sick?**

This next section is HUGE news. I am making a distinction for you that should ultimately lead to your cure. Understanding what I'm about to tell you is important in speaking with your practitioners, and getting yourself tested, diagnosed properly and treated effectively. There is a difference between being hypothyroid and being "thyroid sick."

When you're thyroid gland malfunctions and produces too little thyroid hormone, I'm going to call you "hypothyroid." This leads to all the symptoms listed in Table 1, Symptoms of Low Thyroid Hormone, page 7. Your gland is not functioning well, and therefore, not making enough thyroid hormone. The term "hypothyroid" is commonly used in medicine.

I have to make a distinction for you somehow. So, if your thyroid gland is healthy, and it is making plenty of thyroid hormone, but you still have symptoms of hypothyroidism, I'm going to call you "thyroid sick." You may read scientific literature and see the term "thyroid resistant" or "cellular hypothyroidism." That is what I'm referring to, but I'm calling it "thyroid sick" for ease of reading. In this case, your thyroid gland is healthy, and it is making thyroid hormone but that hormone is not getting into your trillions of cells. You want thyroid hormone inside those cells, not loitering in your bloodstream. Make sense?

I hope this makes sense. Why would I refer to it as hypothyroid when your gland is pumping out plenty? I won't, I'll call you

“thyroid sick” to make the distinction that you can have a perfectly healthy thyroid gland, and still have all the clinical manifestations of hypothyroidism because your hormone is not getting inside your cells. Your cells organize themselves to form your tissues which make up your organs. So what I’m saying is that being thyroid sick means you’re cells are starving for thyroid hormone, therefore your organs are. And that can very well happen even though your gland is healthy and making plenty. You are not hypothyroid, technically speaking, but in my book you ARE thyroid sick. Most of you reading my book fall into the latter group.

## **Thyroid Hormone Production**

Thyroid hormone production happens within seconds, and all the magic happening takes place just inches apart, yet it controls all 5 or 6 feet of you! Your hypothalamus (in your brain) produces a compound called TRH (thyrotropin releasing hormone) also known as protirelin, which signals your pituitary gland at the base of your brain to release another compound called TSH (thyroid stimulating hormone). So the TRH makes you churn out TSH. The TSH stimulates your thyroid gland to release T4 (thyroxine). The T4 hormone is not active in terms of making you thyroid hormone. T4 is not really a do-nothing hormone, it’s “active” in the sense that it helps your body make a form of riboflavin called “flavin adenine dinucleotide” or FAD that helps you methylate. This FAD form of riboflavin reduces blood pressure better than a prescription drug according to one study. You need adequate amounts of thyroxine to create this FAD and use it for methylation. When you methylate you ‘take out the garbage’ from your body.

So we can’t use thyroxine (T4) to wake up, but we can certainly use some of it to help us with methylation which takes out poisons from our body. Hypothyroidism automatically means less thyroxine, and less detoxification. In terms of feeling great, we need to wait for T4 to turn into T3 and it’s that hormone that wakes us up. Therein lies one big problem with your health.



You hope it converts and activates itself to the form called T3 hormone, but if it goes another direction and forms Reverse T3 (rT3) it's a problem! This rT3 blocks the real T3 thyroid hormone from working, and then you're going to look like the poster child for hypothyroidism. Standard labs will all appear normal, because your thyroid gland is healthy, but you'll be face-planted on the couch, gaining weight without eating. You'll wash your hair and find wads of it in the drain. You're cold. Your cells are starving for thyroid hormone. You are thyroid sick!

**Table 1. Symptoms of Low Thyroid Hormone**

Apathy
Anxiety
Cold hands and feet
Concentration difficulties
Constipation
Depression
Disturbed sleep patterns and/or insomnia
Dry skin and hair
Fatigue or weakness
Hair loss or thinning on head
Hair missing on outer edge of eyebrows
Lower eyelashes missing or sparse
Heavy menstrual flow
Infertility
Joint pain
Low body temperature
Memory problems
Migraine
Muscle pain
Pale skin
Reduced ability to sweat
Shortness of breath with little exertion
Water retention
Weight gain or difficulty losing weight

## **Why Are We Being Misdiagnosed?**

There's an epidemic of people who are thyroid sick (but not hypothyroid because their gland works) and they are being misdiagnosed. Are you one of these people? Physicians assume you are "stressed out" or depressed. The reason for the inability to have thyroid disease diagnosed correctly is due to the widespread use of a standard thyroid blood test called the "TSH" which stands for thyroid stimulating hormone. TSH hormone is a brain hormone that tells your thyroid gland to get off it's butt and start working. Think of it this way, your gland goofs off unless it gets yelled at to work (by TSH which comes out of your pituitary in your brain). The pituitary gland is a tiny organ, about the size of a pea!

A "normal" TSH value doesn't say much. But an abnormal value says a lot. Problem is, it takes a long time for the TSH to become abnormal, and you will be miserable by the time your TSH falls out of the normal reference range on a lab test. I'm telling you big news, do not rely solely on the TSH test. If you're uncomfortable and have all the signs and symptoms of low thyroid, despite a normal test, that's really common.

If your TSH falls within "normal" limits, you are told you're not hypothyroid. That part is true, but you could be thyroid sick ... and you often are! You could be dreadfully low in thyroid hormone inside a trillion cells. As I've just taught you, a person who is thyroid sick has every single symptom as a person who is hypothyroid! This is HUGE news. I want you to see that you can be clinically hypothyroid inside every cell of your body, but your TSH test could be normal. Only when you are severely thyroid sick, does the TSH move into the abnormal range on a lab test. By then you are super messed up, your relationship may be ruined, you may be on a medication-merry-go round and wondering how the heck did I wind up like this. Now you know, it's because

the standard test for thyroid doesn't capture the happenings inside the cell, it reflects brain levels, not tissues and organs that are starving.

### **Why, Why, Why?!**

The normal reference range for the TSH tests were established a long time ago. The range is based upon samples from very thyroid sick individuals. So from now on, I want you to assume the normal range to be much lower than what you see on your lab paperwork. The numbers keep changing, and differ from doctor to doctor, lab to lab. Some experts say a TSH above 4.5 or 5 is bad and requires treatment, but I personally think a TSH above 1.0 will make you feel bad. Most experts feel that a TSH somewhere between 1 and 2 is the goal, but I would never, ever depend on the TSH as my sole test.

If you're thyroid sick based upon your symptoms, and your physician stubbornly adheres to your TSH lab test telling you that you're okay because you are in the "normal" reference range, (and like I said, these are far from "normal"), this indicates he/she is not fully educated on thyroid disease or treatment. There are better ways to diagnose thyroid disease using the lab tests I recommend in Chapter 5, *The Best Lab Tests*. For me, it's really about how you feel. If you have a TSH of 3 and you feel great, let it be. If you have a TSH of 1.5 and you feel horrible, get treatment. We are all unique. The number one thing is to be gentle on yourself. Stop berating yourself for how you feel, and look, and all that you didn't do today because you were tired. Be gentle and loving to yourself.

To help you, I've crafted a "Script" for your gentle healing process. It's a plan to help you live thyroid healthy. As you continue reading the book, you will see me refer to this "Script" at times. In Chapter 24, *Live Thyroid Healthy*, I elaborate on each part of this S-C-R-I-P-T:

**See a good doctor. Stop banging your head. Find someone who can test you correctly and prescribe or recommend medicine or supplements that work.**

**Convert T4 to T3. Improving conversion gives you more active thyroid hormone. T4 hormone (whether you make it naturally or take it as levothyroxine) does not provide active hormone, you have to convert that molecule to T3 to feel well. Most people can't effectively do that because of nutritional deficiencies or high cortisol, or low vitamin D or something else. Regardless of why, you will be hypothyroid despite normal blood tests unless you convert T4 to T3. It's huge.**

**Restore mugged nutrients. You're being nutritionally robbed by medicine, food and beverages. When you drink coffee, you lose magnesium and iron. When you take cholesterol pills, you lose vitamin D and CoQ10, when you take steroids, antacids or hormones, you lose zinc, selenium and other nutrients. This 'drug mugging' of your nutrient stash cripples your ability to make thyroid hormone.**

**Interpret tests correctly. If you accept the "normal" values on your test, you'll remain sick. The reference ranges today are not designed to advance your health, and if you abide by some of them, you will be hypothyroid forever. I want to enlighten you to the fact that your black and white lab results might say "normal" but those ranges are not trustworthy, they were based on sick people, not healthy ones. Why would you want to match up with that?!**

**P**rotect your thyroid gland from poison- When I say “poison” I mean certain food antigens that inflame your thyroid gland. Soy, gluten, dairy, refined sugar and artificial ingredients that create a little metabolic fire in your body. The partially digested food particles make your internal chemistry go nuts causing your cells to spill excessive amounts of naturally-occurring compounds, but still, excessive amounts cause tremendous pain and inflammation as well as neurological, emotional and mental problems. Other “poisons” I want you to protect yourself from include chloride, fluoride and bromide found in every day products and foods.

**T**ransport thyroid hormone. If you can’t get thyroid hormone INTO your cell, you’ll be hypothyroid. Once you have your thyroid gland protected and your T4 is converted into the form called T3, you need to be able to move it into the cell, specifically inside the mitochondria “motors” which give you energy. Transport of thyroid hormone is an active dynamic process. Thyroid goes in and out of the cell, all day long and the process is taking place thousands of times while you read this sentence. The transportation system cannot be clogged up like it is on 5th Avenue in New York City! Ever been there? It’s a sea of yellow taxi cabs for miles, all honking. Why do they honk, there is no where to go, the cabs just sit there. You want the traffic of your thyroid hormone to flow, you don’t want it stuck. Transport mechanisms have to be in order and there are nutrients and lifestyle factors that improve this.

## Chapter 2

# Thyroid Hormones Control the Show

There are many players involved when it comes to producing and utilizing thyroid hormone. The pituitary gland and your thyroid gland work together but it's the thyroid gland that makes and releases your hormones. When things go off without a hitch, the thyroid hormone gets transported into your cell and activated from thyroxine (T4) to a form called triiodothyronine (T3) that makes you feel great. In fact, just look at all the wonderful things thyroid hormone does:

- ✓ Regulates your heartbeat
- ✓ Warms you up
- ✓ Speeds metabolism so you lose weight
- ✓ Improves muscle strength
- ✓ Replenish dying cells with healthy ones
- ✓ Grows your hair and nails
- ✓ Gives you regularity
- ✓ Improves your ability to conceive
- ✓ Reduces sensations of pain
- ✓ Makes you feel happy and content

You can see from this list that thyroid hormones really do control the show! One problem with production, transportation

into the cell, or activation and ‘we have a problem in Houston!’ In order to make thyroid hormone, your gland needs tyrosine which is an amino acid, and it needs iodine atoms. The tyrosine and iodine hook up together and form thyroid hormone. That’s what the “T” stands for, tyrosine. And the numbers like 3 or 4, mean the number of iodine atoms attached. So T4 hormone means a tyrosine attached to 4 iodines. And T3 hormone means a tyrosine attached to 3 iodines.

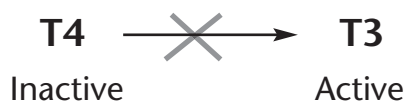
### Conversion of Thyroid Hormone

In order for T4 (inactive) to become T3 (active), it has to be converted in a biochemical reaction. The conversion takes place primarily in your liver, but also in your kidneys, brain, gut and other organs. Specific deiodinase enzymes are necessary for conversion, which you will learn about later in this chapter. These enzymes chop off an iodine from T4, and thus produce T3, and then the party starts. Remember, T3 is what you want to wake up, look good, be happy and feel alive.

**Figure 1**

---

#### Activation to T3 is blocked



So when doctors measure T4 levels in your body, it’s not saying what is inside the cells and remember it’s what’s inside your cells that matter most. T4 doesn’t even work, it is a pro-hormone. It has to become activated by dropping one of those four iodine atoms in a biochemical process called “deiodination.” Nutrients such as B vitamins and minerals are needed for you to have adequate active thyroid hormone. You need selenium for the enzyme to work, and

activate your thyroid. More specifically, you need selenium to make the enzyme that converts inactive T4 to active T3, Yeah, it's a big deal! Things are more complex than I'm saying here, but that's because I don't want to bog us down. Thyroid hormones can be metabolized in peripheral tissue by deiodination, deamination, conjugation, and decarboxylation enzyme reactions, but again, I'm not going to bog us down with these details because I know you really just want solutions, not science.

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### **Synthroid is Pure T4**

Your thyroid gland produces the natural hormone called thyroxine or T4. T4 is also sold as the popular prescription drug Synthroid or it's generic Levothyroxine. The medications are bio-identical to your own thyroid hormone. Whenever you see "T4" in the literature, or in my book, you can imagine it's acting just like your medication.

---

To become activated, T4 (thyroxine) must morph into T3 (tri-iodothyronine) and this, in turn, must find its way into the cells to do its work. Many things can go wrong with this process, often it is a deficiency in B vitamins, vitamin D or minerals which causes sluggish conversion of T4 to T3. The minerals are truly crucial, so eating mineral-rich foods can help you. Some people have a genetic polymorphism (mutation in genetic code) that causes impaired thyroid function. Whatever the reason, not having enough T4 to T3 conversion means you are clinically hypothyroid or what I call "thyroid sick." This is often overlooked because doctors are busy measuring TSH (thyroid stimulating hormone), a pituitary hormone that has nothing to do with what's happening inside your cells! All of the following improve the conversion of T4 to T3:



- ✓ B complex
- ✓ Vitamin D
- ✓ Magnesium chelate
- ✓ Folate
- ✓ Selenium
- ✓ Zinc
- ✓ Ashwagandha
- ✓ Mullein herb

### Let's Meet the Family!

TSH	Secreted by your pituitary gland that instigates thyroid production
T1	A hormone precursor or by-product, function not yet known*
T2	A hormone precursor or by-product, fairly weak*
T3	Triiodothyronine, the active thyroid hormone that you want
T4	Thyroxine, secreted by your thyroid gland and stored until needed (inactive)
rT3	Reverse T3, the mirror image of T3, non-functional
TPO	An enzyme often high in autoimmune thyroid conditions
Tg	Thyroglobulin, antibodies to this attack your thyroid (Hashimoto's)

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\*T1 and T2 are often dismissed because we don't know their complete function. These are both found in glandulars such as the prescription Armour Thyroid and I am convinced that one day, as research progresses, we will find out there was more to T1 and T2 than we know now. The big players in your body are T4 and T3.

More than 90% of the thyroid hormone produced is actually T4 (inactive storage form) and 7% is T3 (the active form). The inactive T4 has to be processed in your liver into the active form

T3. Under normal circumstances about 40% of available T4 is converted into the active T3 hormone. Some of it, about 20% gets activated in your gastrointestinal tract, compliments of a healthy microflora ... yes the beneficial gut bugs (probiotics). Lack of beneficial bacteria in the bowel can result in you losing 20% of your T3 thyroid hormone.

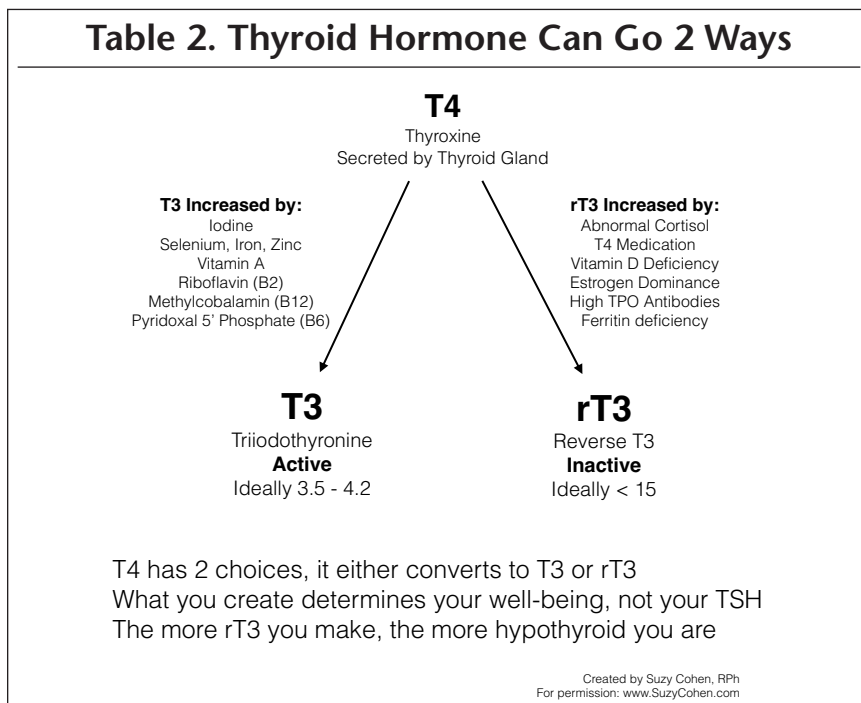
**TSH or Thyroid Stimulating Hormone.** It goes by “Thyrotropin” sometimes. It’s produced in your pituitary gland in your brain. It’s sometimes referred to as a “brain” hormone but to be technically correct it’s really from your pituitary which is a gland, and different from your brain. Anyway, TSH is a loudspeaker that shouts, “Hey thyroid gland, can you start making more thyroid hormone?” and for most of you, your gland happily responds, “Yes!” and makes T4 (thyroxine) for you.

Now, as I’ve explained, T4 is a pro-hormone, it’s completely inactive in the moment it’s birthed from your thyroid gland. If your TSH is high, you can assume your tissue thyroid levels are low because your brain always gets the most thyroid. Now, if your TSH is normal, your test is irrelevant because your cells may still be starving even while your brain is getting some. You need to look at other tests. If there’s one thing I want you to learn from my book it is this: The TSH hormone is really good for evaluating brain levels of thyroid hormone, it does not say much about tissue (cellular) levels of hormone. Your TSH level is blind to what’s going on inside your cell and so TSH is not useful at finding people who are thyroid sick, that’s why you may have fallen through the cracks.

**TPO or Thyroid Peroxidase Enzyme.** When your thyroid gland makes thyroxine in response to TSH shouting at it, the production happens with the help of this TPO enzyme. TPO is not a bad thing, it’s a great thing but you often hear TPO cast in a negative light. The reason is that antibodies (the ‘soldiers’ in your body) can form against TPO enzyme, and that’s the bad part. The enzyme

itself is innocent and if anything, helpful! The antibodies against it are what light your precious thyroid gland on fire. When doctors test you for antibodies to TPO enzyme, they are trying to find out if you have Hashimoto's disease. Read Chapter 16, *Hashimoto's Disease*.

**T4 or Thyroxine.** This is the form of thyroid hormone released from your thyroid gland. It's inactive and must be activated (converted) to something else (T3) in order for you to feel well. Think of T4 like you would a snack bar! You can tote that around in your purse or backpack anywhere you go. You only tear it open when you're hungry. That's the same thing with T4. It is something carried all around the body, but it isn't used by the cell until it gets unwrapped. T4 has a choice, it can go one of two directions. See Table 2 (image of T4, rT3 and T3).



In order to be activated to T3, it has to drop one atom of iodine, and it uses an enzyme. T4 hormone is commonly measured in the blood stream by conventional doctors and it can be normal even when you are thyroid sick. I don't want you to be dismissed again. I need you to learn, and teach your own doctor if you have to that T4 is not necessarily converted to T3 inside the cell. Therefore, levels of T4 are not useful to measure thyroid activity. T4 isn't always transported into the cell, or activated and so measuring it is fine, but only as part of a bigger thyroid profile. In people with chronic stress and depression, T4 will be normal, or sometimes high! You could be told you're hyperthyroid (too much), but that is a possible misdiagnosis due to the fact that T4 may not be transported properly into the cell, or converted to T3.

This is very very common if you've been ill for a few years. It goes back to what I taught you in the beginning of this book, that your thyroid gland may pump enough hormone (T4) so you're not technically "hypothyroid" but you could very well be "thyroid sick" because the T4 isn't going inside your cell (the transport system is broke).

**T3 or Triiodothyronine Hormone.** This is the unwrapped snack bar that I referred to above. It's the active form of thyroid hormone. Honestly, T3 is your dream come true, it's the hormone you want in all of your cells. When you read about how good you feel when thyroid hormone is optimized, they are really referring to T3 form. T3 will warm you up, make you happy, give you energy, make your hair grow. Production of T3 is halted in the presence of inflammatory chemicals and stress as you will soon see in the next chapter. There are studies to show that T3 dilates your blood vessels so as much as I want you to take this, I also want you supervised, be very careful with your levels if you happen to be taking it as a medication (Cytomel, Compounded T3). If you have heart disease please be careful taking too much T3 because it could backfire.

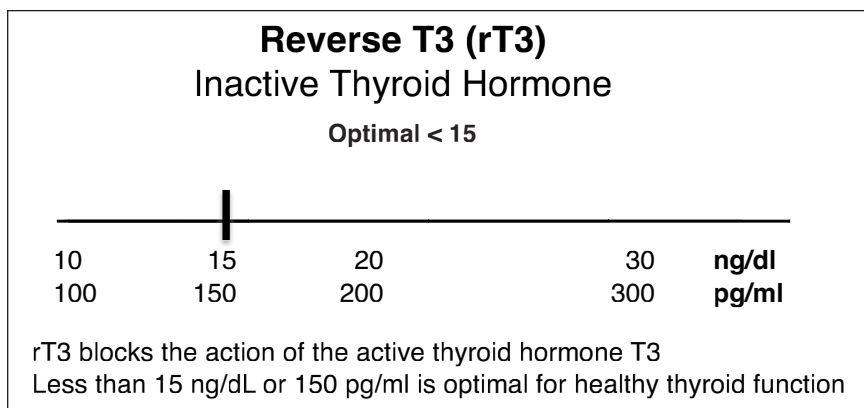
Like any good thing, too much is bad. Conversion from T4 to T3 can be slowed down by all sorts of things including imbalances of progesterone and estrogen, binding problems to the receptors on your cells, transport issues and nutritional deficiencies.

**Reverse T3 or rT3.** This is a mirror image of Free T3. Imagine your left and right hand, they are mirror images of each other. The rT3 is there as your check and balance. It clears out excess T4. Think about it, if you had nothing but T3 in your body you would be wound up tight, and toxic from all the T3 because it's a stimulating hormone. The check and balance is rT3 and the rT3 keeps things in balance. I never want you to think of rT3 as bad. That said, excessive amounts of it are bad! The more rT3 you have, the more you feel tired, depressed and "inactive." You see, the compound rT3 lowers thyroid activity.

Too much rT3 will cause you to be clinically thyroid sick. The value of rT3 is very important to your health but it's rare when a conventional physician volunteers to test you for this. When rT3 is measured, and found to be high, it's also telling you that thyroxine (T4) isn't going into the cell. It's common to see high rT3 and high T4 when you test yourself. Certain conditions like stress cause you to make more rT3.

Reverse T3 is high in hibernating bears, no joke! I've gotten countless emails from some of you saying "I could not get my physician to order this lab test for me." The reason there's such obstinance is that physicians are taught rT3 is an inactive metabolite (by-product in the body), and that it doesn't do anything and therefore they rarely measure it. But think about it, is it really inactive? I mean, it IS doing something! It's blocking your receptor site and preventing too much T3 from being transported into the cell (which is fine). The problem is that when levels of rT3 go up too high, it locks the doors to your cell. So high levels mean you are not thyroid healthy. It is extremely important to me that you

measure your rT3 so please ask your physician to test this next time they do your complete thyroid profile. If you are really up against a rock and a hard place, and you want this test, buy it yourself. I've arranged an affiliate website for you in case you want to order a blood test without any hassle. You use the home collection kits (or a local lab if a blood draw is required) and after you get your results, you take them to your physician for interpretation. My page is [www.DirectLabs.com/SuzyCohen](http://www.DirectLabs.com/SuzyCohen). This next part could be huge for you, and the words are rarely, if ever spoken. But I'm not afraid to say it: If you have high levels of rT3 don't use T4 drugs because you'll tend to make even more rT3, thus making yourself worse. Remember that. If you have high levels of rT3 don't use T4 drugs because you'll generate more rT3, instead of the biologically active T3 which makes you lose weight, look beautiful and live the life you imagine.



### How to Lower rT3 Naturally

The following information could make a big difference for you and it may be all you need to do. Bringing down high levels of rT3 means that your cells get nourished with biologically active T3. These are some ways to lower rT3 naturally:

1. Increase selenium in your diet, or through supplementation.
2. Support your liver and consider a liver cleanse or supplements like milk thistle, glutathione or artichoke extract.
3. Reduce or eliminate drinking, smoking and refined foods
4. Switch from a pure T4 drug to a T3 medication. The T4 drugs (levothyroxine) sometimes create more rT3 instead of bioactive T3.
5. Switch from natural dessicated thyroid to a T3 medication for awhile for the same reason as above.
6. Take adrenal supportive nutrients.

## **Enzymes Make the Magic Happen**

If you have diabetes, fibromyalgia, depression, or you're overweight, if you diet a lot, have leptin resistance, have high amounts of inflammation, or deal with a lot of stress you affect certain enzymes in your body that are responsible for thyroid hormone production and conversion at the cell level. This is a big problem.

Stick with me here, because understanding how your thyroid hormone gets activated (converted) in your body is important to you becoming thyroid healthy. Your precious human body has 3 different enzymes that push the gas pedal for you and make that wonderful T3 hormone happen!

I really dislike big words that are hard to pronounce but this one is important for you to know about. As a group these enzymes are known as "5' deiodinase." The apostrophe symbol that you see after the number 5 is called "prime" so the whole thing is pronounced "5 prime dee-eye-o-denase." We have 3 different kinds of deiodinase enzymes and luckily, the scientists gave us a break and named them 1, 2 or 3 so they're abbreviated as D1, D2 or D3 and for simplicity, that's how I will refer to them from now

on. D2 is specifically devoted to your brain, and it never leaves your brain.

**Table 3. The “D” Enzymes**

D1 converts T4 to T3 everywhere in your body except your brain
D2 converts T4 to T3 only in your brain
D3 converts T4 to rT3 all over your body except your brain
Your brain doesn't have D3 so it never makes rT3
The difference between D1 and D2 is that they antagonize each other. They both work to convert T4 to T3 but they are doing it in different parts of your human body. Think of them as working in opposing directions.

### **A Closer Look at the D Enzymes**

I want to start at the top of your body (in your head), so I'm going to teach you about D2 enzyme right now.

**D2 Enzyme.** Converts T4 to T3 in the brain (and only your brain). Your pituitary gland sits at the base of your brain just in case you were daydreaming in high school biology about the football hunk you liked. Your pituitary has it's own local method for activating thyroid hormone. Just because you have adequate levels of T3 in your brain, doesn't mean anything about the rest of your body. This goes back to the difference between being hypothyroid and thyroid sick. Hypothyroid technically means your thyroid gland doesn't pump enough hormone out, whereas "thyroid sick" is my term for having enough hormone, but it doesn't get into your cells (tissues). My goal is to take you from feeling thyroid sick to feeling thyroid healthy!

There is a feedback loop with your thyroid gland. If you make too much T4, it signals back to the pituitary and says, "Stop making that TSH, we've got enough thyroid hormone now." TSH



levels are dependent on T4 levels, not T3. You can have ALL the symptoms of low thyroid because you don't convert T4 into T3, but your T4 and TSH levels are perfectly normal. That sucks because you're not going to get treated correctly. When doc sees those "normal" thyroid levels on your lab test (or sometimes slightly elevated), you'll be handed a prescription for an antidepressant or fibromyalgia drug! Doctors miss people who are thyroid sick, by the millions so it's up to you to learn this distinction.

The most insidious part is that chronic illness confuses your lab results. When I say chronic illness, I am referring to various conditions, among them insulin resistance, diabetes, fibromyalgia, chronic fatigue syndrome, infections, chronic Lyme, depression, obesity, leptin resistance, high cholesterol or a chronic pain syndrome. If you have high inflammatory cytokines from any disease, or if you just deal with chronic stress, I am referring to you right now. I hope you're sitting down, I'm about to blow your mind again with something I learned the hard way on my own.

All these conditions have been shown to stimulate D2 and suppress D1 enzymes. The net result of this is that you get more T3 in your brain and less in the rest of your body. One more thing, these conditions stimulate D3 enzyme. If you recall, that converts T4 to the 'hibernation' form of thyroid called rT3 in the rest of the body, which then starves your cells for thyroid hormone. You are going to feel absolutely miserable, but your TSH and your T4 levels are likely going to be normal. You can refer to Table 3 The "D" Enzymes, if this is confusing. What's happening though, is that the cells in your body are now hypothyroid and your pituitary is actually a little bit "hyper" so it is sometimes slightly higher than normal on your lab test. Your TSH drops to normal and you'll be told you're fine. But the rest of your body is not getting the thyroid hormone it needs.

Fast forward to a few more years of suffering. Now more D2 enzyme gets stimulated which causes more T3 conversion in your

brain (but not your body where you need it). So your pituitary gland senses plenty of thyroid hormone because it's gone up in your brain, while rest of the body and a trillion cells are starving for thyroid! The TSH will be normal though. See why the TSH test is useless in a person who is chronically ill? It's not measuring your tissue (intracellular levels) because it can't see inside the cell, it only knows what's happening in the brain, and up there, things look good. This is why I wrote this book, please help me spread the word about it. Not another day should go by without them knowing this precious information.

I understand you, I believe you, this miserable crappy state of affairs is not in your head, and if you're doctor dismisses you, take it as a cue to buy him a copy of my book. When we help one open-minded doctor, they help their patients all day long, hundreds each week, and it's a beautiful thing to have a trickle effect like that. If you have a physician that is not open-minded, I suggest you find another. Look on [www.FunctionalMedicine.org](http://www.FunctionalMedicine.org) for a Functional Medicine doctor. I'm not a doctor or I would help you myself, but I am a Functional Medicine practitioner (as a pharmacist). These docs think just like me and understand everything explained in my book. You'll be in good hands.

# About the Author

Suzy Cohen, America's Pharmacist™ is a licensed pharmacist and Functional Medicine practitioner. She writes a syndicated health column, "Dear Pharmacist," which circulates to millions of readers each week and you can get this sent to your email for free by signing up for her newsletter at [www.SuzyCohen.com](http://www.SuzyCohen.com). Suzy hosts a medical minute on "Know the Cause" television and is a Huffington Post blogger. You have seen her on The Dr. Oz Show, The View, The Doctors, Good Morning America Health and hundreds of other television networks. Suzy is also the Founder of ScriptEssentials.com, a company specializing in unique, bio-active nutritional supplements. Suzy is a member of the following organizations:

*The American College for Advancement in Medicine (ACAM)*

*The Institute of Functional Medicine (IFM)*

*The American Academy of Anti-Aging Medicine (A4M)*

*American Pharmacist's Association (APhA)*

*International Lyme and Associated Diseases Society (ILADS)*

*The Academy of Comprehensive Integrative Medicine (ACIM)*

Other Books by Suzy Cohen, RPh:

*Headache Free: Relieve Migraine, Tension, Cluster, Menstrual and Lyme Headaches (DPI 2013)*

*The 24-Hour Pharmacist: Advice, Options and Amazing Cures from America's Most Trusted Pharmacist (Collins 2009)*

*Diabetes Without Drugs, The 5-Step Program to Control Blood Sugar Naturally and Prevent Diabetes Complications*  
(Rodale 2010)

*Drug Muggers: Which Medications are Robbing Your Body of Essential Nutrients and How to Restore Them* (Rodale 2011)

*Eczema: Itchin' for a Cure* (DPI 2012) Kindle only

*Understanding Pancreatitis & Pancreatic Cancer* (DPI 2012)  
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