Hypothyroidism (Low Thyroid) In 21 lectures

How to make your thyroid gland as healthy as possible

*By **Michael Teplisky, MD***

Hypothyroidism (low thyroid) in 21 lectures

Lecture 1. Introduction to the thyroid gland.

Hello,

I am Dr Michael Teplisky, a holistic medical doctor from Low Thyroid Doctor.com and I am here to talk to you about low thyroid or hypothyroidism.

Low thyroid is a very common problem, about 35 million people are being treated for it. Some feel better with treatment, some don't, but at least they are being treated. The problem is that there are about 35-40 million more people who have low thyroid, but they are NOT being treated.

I have been practicing internal medicine in NYC for almost 30 years and I have personally treated close to 3,000 people with low thyroid. Most of the patients came to me because either they had all the symptoms of low thyroid but their doctor would not treat them. Or they were given a medication for low thyroid, and it did not help them.

The point is that there are tens of millions of people with low thyroid who are not being treated because their doctors tell them that everything is fine, they are OK, they don't have any problems, or they are being treated in a way that does not help. We'll talk about why and how this happens. How it is possible that the patient knows that she (it's usually a woman) is not fine, but the doctor says she is.

And then there are people who have low thyroid and do not even know it, because the changes in their health were so slow that people have gotten used to the way they feel and don't complain. I have discovered many such people by doing a very comprehensive blood test that I do on every new patient.

As I said, I have seen a few thousand patients with low thyroid, so I know a lot about it and I wanted to share what I know with you in the hope that if you are not feeling well you will consider low thyroid as a potential reason. Or, if you are being treated for low thyroid, you may understand why your treatment is not working and how to make it work.

Now, there are many excellent discussions of hypothyroidism on the internet. However, they are all rather short. This is understandable because there is only so much information you can provide in 10-12 minutes. A typical lecture gives you a brief overview of what low thyroid is and how it is usually treated. But it does not give you all the information that you should have.

For example, most reviews mention that patients with hypothyroidism have low energy and weight gain. But they don't usually mention heavy menstrual bleeding or elevated blood liver tests. But these are also symptoms of low thyroid. And if you are trying to figure out why you are not feeling well, you and your doctor will not consider low thyroid unless you know all the symptoms, not just a few common ones.

Which is why I came up with an idea of doing a more comprehensive review of low thyroid. Not 10-15 minutes, but as much time as needed. I have created a seminar on low thyroid to give you all the information you need to have a better understanding of the problem. My goal is to educate you, so you know a lot about low thyroid, can recognize it, and know how to deal with it. Or, if you are already being treated and not getting the results you would like, it is my hope that you will learn how to change that and what else can be done.

I called this course "Hypothyroidism in 21 lectures". It could be many more lectures, because I could provide a lot more information about thyroid. But I did not want to make it too long and bore you. So I managed to get all the basic information in 21 lectures. This is the transcript of the lectures in the form of an eBook.

I plan to do a recording of each lecture on YouTube and maybe put them together as a seminar on my site.

I will use simple, non-technical words and descriptions. When I have to use a medical term, I will explain what it means. The first few lectures will be about how things should be when the thyroid functions normally. It will be about what thyroid is, where it is, what it does, how thyroid hormones are produced, how they are regulated and so on. In other words, how things are when everything is normal. And then we'll talk about low thyroid or hypothyroidism, what it is, why it happens, what it does to your body (and if you are pregnant, to the developing child) and how we can deal with it and make you healthy again. In short, we'll cover many topics.

Today I am going to introduce you to your thyroid, tell you what it is, what it does and why It is important.

So, what is the thyroid? Thyroid is an endocrine gland. A gland is an organ that produces something and releases it either outside the body or inside the body. For example, sweat glands, salivary glands that make saliva, lacrimal glands that make tears, their product goes outside the body, which is why they are called Exocrine glands. EXO means outside. Then there are Endocrine glands, they make a product or products that stay inside the body, ENDO means inside. These come from Greek, like many other medical terms. The product of endocrine gland is called a *hormone*. Hormones are released into the blood and go on to do their job.

Some hormones have a local effect, in other words they don't affect the whole body. Later on, we will learn about a hormone called TSH or thyroid stimulating hormone. It is produced by a pituitary gland, which is located in the brain. The job of TSH is to travel from the brain to the thyroid gland and stimulate it, make it work harder, produce more thyroid hormones. It does not influence other organs. Purely local.

Then there are hormones that affect the entire body. Insulin, which regulates blood sugar, is one of them. And so are the hormones made by the thyroid gland. Thyroid actually makes 3 different hormones, but for our purposes only 2 are important. They are triiodothyronine or T3 and

tetraiodothyronine or T4, also called thyroxine. Both contain Iodine, T3 has 3 of them and T4 has 4.

Thyroid hormones go inside the cells of the body. They help every cell produce energy and heat. In other words, they are responsible for overall metabolism. Energy is what the cells run on, sort of like gasoline. Energy allows the cells to grow, develop, replicate, multiply, repair and do everything else. Energy allows us to grow from infants into adults. And thyroid hormones are responsible for that.

We'll have plenty to say about thyroid hormones in the future lectures, for now I just want you to realize that life without thyroid hormones is impossible.

Now, let's talk about the actual physical thyroid. It's a small organ, about 1 oz, it's located at the base of the neck. It looks like a butterfly, and it surrounds the trachea, the pipe that that brings air into the lungs.

Normally, thyroid is very small, so you do not see it or feel it. There are conditions when it can become big, when you can see it and feel it. This is called a goiter, which is another word for enlarged thyroid.

This ends lecture number 1 in our "Hypothyroidism in 21 Lectures" seminar. Next time I will tell you how thyroid hormones work inside the cells.

If you know someone who might find this information useful, please ask them to go to LowThyroidDoctor.com and download this free ebook. Also, if you have questions or comments, please email them to DrTeplisky@gmail.com. I try to read and answer all of them, time permitting.

Also, please keep in mind that if you suspect that you have low thyroid or you are being treated and are not getting better, you can get a free, no obligation 30 min phone consultation with me to see if I can help you get better. Just schedule it online or call my office at 718-769-0997.

Lecture 2. How thyroid makes energy

Last time I introduced the thyroid gland. I said that thyroid is a small organ, about 1 oz. It is located at the base of the neck, and it produces hormones, T3 and T4, that regulate the metabolism of the whole body. They are important for growth and development, repairs and maintenance, normal cell functions, basically all the activities in the body that require energy.

All cells need energy to do their job. The cells run on energy; sort of like cars run on gasoline. But unlike gasoline, energy doesn't come from outside, it is made inside each cell and that's where thyroid hormones come in.

The thyroid hormones do not actually provide the energy. What they do is make the cells of the body burn fuel to produce energy and heat.

Our cells have little “power houses” that make energy by burning fuel. These power houses are called mitochondria, which is pleural for “mitochondrion.” No cell has just one mitochondrion. The number usually ranges from a dozen to a few thousand, depending on how active the cell is.

For example, a skin cell doesn’t really need a lot of energy to do its job. That’s why it has about a dozen mitochondria. On the other hand, a heart cell needs a tremendous amount of energy, so it has 4-5 thousand mitochondria.

Imagine a fireplace, filled with wood, just waiting to be fired. All you need is a lighted match to start the fire. This is what thyroid hormone T3 does – it turns on the fire in the mitochondria, it starts and supports this process of burning the fuel to produce energy and heat.

The fuel comes from the food we eat. It is usually the carbohydrates and fats that are used for fuel. Under some extreme conditions protein can be used as fuel also, but normally it’s just carbohydrates and fats.

The easiest thing to turn into energy is a substance called glucose, or blood sugar. We make glucose from carbohydrates. Burning glucose is the preferred way to make energy. There is always a certain amount of glucose in the blood, plus some glucose is stored in the liver, in the form called “glycogen”, so there is usually enough for normal daily activities. I

If the activities are higher than normal, say you are doing a lot of physical work, or running a marathon, or you are not eating enough carbohydrates, then the body starts burning the stored glucose. After that is gone, the body starts burning fats. Many of us have extra fat that is stored just for this eventuality, when we are getting fewer calories from food than we need for our daily activities. In other words, when we don’t eat enough. Stored fat is our protection against starvation.

After the body burns the glucose and fat it begins burning proteins. Proteins are the last to go into the oven, because while carbs and fats are mostly used for energy, proteins are used for many other things. We can turn proteins into fat and carbohydrates, if necessary, but it’s a one-way street. We cannot make proteins from fats or carbohydrates, which is why we hold on to proteins as long as we can.

All the enzymes, used by the cells to perform thousands of different processes, are made from proteins. Many hormones are made from proteins, for example insulin, growth hormone, thyroid hormones and many others, Proteins are used for building and repairing the cells of the body. The muscles and the heart are made from protein. That’s why the body holds on to protein to the very last.

How do thyroid hormones get inside the cells? Practically every cell in the body has thyroid receptors. A receptor is like a door with a lock that only a particular key can open.

You see, each of our cells is like a house. When all the windows and doors are closed, you can't get into a house, unless you are invited, or you have the key.

And this is what receptors are for. They create an entrance for a particular substance. It could be a hormone, a neurotransmitter, a nutrient, a vitamin, whatever a cell wants to invite.

Thyroid hormone has a door through which it enters the cell and lights up the mitochondria. When I say "lights us" I don't mean that it literally starts the fire. A better description would be that it turns on the mitochondria, which then start burning the fuel. And it keeps this process going.

For technically inclined, this process is called oxidative phosphorylation. It requires oxygen, just like the actual fire. And it produces a waste product called CO2 (carbon dioxide). That's why we inhale oxygen and exhale CO2.

So now you know why thyroid hormones are essential for energy production. In the next lecture we'll talk in detail about thyroid hormones, how they are made, how they become active. In the future lectures I'll talk about how thyroid hormones are regulated and how they are distributed by the blood to all the cells of the body.

My website LowThyroidDoctor.com has even more information about low thyroid. There are many reports that explain things in more details, and they can be downloaded for free any time.

If you know someone who might be interested in low thyroid, please direct them to the site. Also, if you have questions or comments, please email to DrTeplisky@gmail.com.

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Lecture 3. Thyroid hormones T4 and T3

So far, we've learned that thyroid is a small endocrine gland located in the base of the neck, it's very small, about 1 oz, so you cannot see it or feel it, but it's vital for your health. It regulates the metabolism, growth, development and normal functioning of the whole body because it produces hormones that turn on the mitochondria in the cells. Mitochondria produce energy and heat by burning carbohydrates and fats and sometimes proteins.

Today we'll talk about thyroid hormones, T4 and T3. Thyroid gland actually makes another hormone called Calcitonin, which regulates calcium metabolism, and I'll talk about calcitonin in a future lecture, but when we talk about thyroid hormones, we mean T4 and T3.

There are two things you need to make thyroid hormones – amino acid Tyrosine and a mineral Iodine. There are many other things that are important, but these two are absolutely essential.

An amino acid is a building block of protein. There are 20 amino acids from which all the proteins in the world - plant, animal, human - are made. Just like all the hundreds of thousands of

words in the English language are made from the same 26 letters. Tyrosine is one of these amino acids. We get amino acids by eating foods that have proteins in them.

Iodine is a mineral that is abundant in the ocean, but not in the soil. There is a lot of iodine in seafood, especially in seaweed. People regularly eating fish and seaweed usually get enough iodine.

You can also get iodine from plants and animals. The problem is, there are areas of the world where iodine in the soil is very low, so plants growing on that soil and animals eating those plants do not get enough iodine. This makes people living in those areas and eating those plants and animals deficient in iodine. In fact, iodine deficiency is the #1 cause of low thyroid in the world.

All of the cells in the body need iodine. Some organs use more, some less, but all use some. The bulk of the iodine we consume ends up in the thyroid gland, about 70-80%. Breast tissue needs iodine, especially during development and during lactation. Salivary glands and lining of the stomach concentrate some iodine, which helps them protect the body from viruses, bacteria and parasites.

In the US, the northern states bordering Canada, especially in the Midwest and Great Lakes, were known as "Goiter Belt" because many people living there developed goiter, which is an enlargement of thyroid gland. To combat that, US government started encouraging the use of iodized salt in 1920s. This was largely successful because we don't have Goiter Belt anymore, but many people are still deficient in Iodine, which contributes to low thyroid.

Please download the report telling you how to check if you are deficient in iodine. Go to LowThyroidDoctor.com. I will also mention it in one of the upcoming lectures.

Chemical structure of tyrosine is relatively simple. It consists of a round-looking hexagonal center made of carbons. Carbons are attached to oxygen, hydrogen and nitrogen. Plus one or two iodines. Tyrosine with one iodine is called mono-iodo-tyrosine. Mono means one, iodo means iodine, plus tyrosine. If 2 iodines are present, the structure is called bi-iodo-tyrosine, bi meaning two.

The thyroid gland combines 2 such tyrosines with attached iodine. If you put together two tyrosines with 2 iodines each, you get a total of 4 iodines, which is the hormone T4 or thyroxine. Or, you can combine a tyrosine with 1 iodine plus tyrosine with 2 iodines, in which case we get a hormone with 3 iodines or T3.

This all does not happen randomly. There are many special enzymes, special proteins, that make the whole process possible. There are many minerals and vitamins that are required to make it all happen. We will talk a lot more about it in a later lecture.

One important protein from which thyroid hormones are made is called thyroglobulin. Thyroglobulin is made by the thyroid cells. It has many amino acids tyrosines already attached to

iodine, so thyroid hormone can be made from it very quickly. Thyroglobulin is stored inside the thyroid gland.

One enzyme that is especially important in thyroglobulin metabolism, iodine metabolism and thyroid hormone production is called thyroid peroxidase or TPO. The reason I mention these names is because they will be important when I talk about blood tests we use to diagnose thyroid problems.

Let's summarize what we have learned in this lecture. Thyroid cells need many things to make thyroid hormones, especially an amino acid tyrosine and a mineral iodine. Thyroid cells need the help of multiple minerals, vitamins and enzymes. We have also learned that T4 has 2 tyrosines and 4 iodines, while T3 has 2 tyrosines and 3 iodines.

In the next lecture we will learn how thyroid hormone production is regulated and controlled, how thyroid hormones are distributed to provide normal activity. Remember, we are still discussing how things work when everything is normal.

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Lecture 4. How T4 & T3 are regulated and distributed in the body

So far, we have learned that thyroid gland makes hormones T3 and T4, these hormones regulate the metabolism and energy production in all the cells of the body. And ideally, thyroid gland produces just the right amount of these hormones.

The question is, how does the thyroid gland know how many hormones to make? It turns out that there is a very sophisticated system designed to regulate the production and distribution of the thyroid hormones.

First, the thyroid has a direct boss that issues instructions and orders.

This boss is another gland called *pituitary*. It is located inside the brain. The pituitary gland is the "boss" of quite a few endocrine glands, including adrenal glands, testicles, ovaries, and some others. It regulates them by producing special hormones that stimulate their activity and makes them produce more of their products.

The pituitary gland regulates the thyroid by making a hormone called TSH or Thyroid Stimulating Hormone. TSH is also called thytrophin. In other words, TSH and thytrophin are the

same thing. TSH travels from the pituitary to the thyroid gland and stimulates all the phases of the hormone production. TSH makes the thyroid gland produce more T3 and T4. The more TSH, the more thyroid hormones are produced. The less TSH, the fewer thyroid hormones are made.

To complicate matters, it turns out that the pituitary gland is not the ultimate boss of the thyroid. There is another part of the brain called *hypothalamus* and it produces a hormone that controls the pituitary gland. The name of this hormone is TRH, thytrophin releasing hormone. It increases the production of TSH, which stimulates the thyroid and increases T3 and T4.

So far, pretty simple. Hypothalamus controls the pituitary, which in turn controls the thyroid gland. So ultimately, it's the brain that decided how much T3 and T4 should be produced.

Then, there is another regulating mechanism that is called *negative feedback*. The levels of T3 and T4 have an effect on TSH level. If the level of thyroid hormones is high, TSH production goes down. And if the level of T3 and T4 is low, the production of TSH will go up, to stimulate more thyroid activity. In other words, they move in the opposite directions. High TSH level is one of the tools for diagnosis of hypothyroidism.

Ultimately, the thyroid hormone production is controlled by the brain, by TRH and TSH and by the negative feedback mechanism.

Thyroid gland produces T4 and T3 in 4 to 1 ratio, about 80% T4 and 20% T3. The question is, why are there 2 thyroid hormones? The answer is that only one of them is really a hormone. That's T3. T4 is a precursor from which T3 is made. It's a ready source for creating T3 when the body needs it.

What happens to the thyroid hormones after they are made by the thyroid gland? Most of them remain inside the thyroid. At any given time, the thyroid gland contains a month-worth or more of the thyroid hormones, ready to be released into the blood when needed.

A small fracture of the hormones is not stored inside the gland. They are released directly into the blood. Almost all the T3 and T4 that go into the blood are attached to special proteins. There are several such proteins, and they can be measured by a blood test. We don't normally check them, only in some situations. About 99% of T3 and T4 in the blood are attached to proteins, so they are called "bound". Proteins with the hormones attached are carried by the blood throughout the body.

Only about 1% of the thyroid hormones in the blood is not attached to proteins. They are called "free" hormones, free T4 and free T3. Out of the two, it is free T3 that is active and does all the work.

When the body needs more free T3, it makes it from free T4 with the help of an enzyme called de-iodinase, which removes one of the iodines from T4 and makes it T3.

Only the free hormones can work, only they can go inside the cells, so eventually their level in the blood goes down.

That's where "bound" hormones come in. When the level of free hormones drops, some of the hormones that are bound to proteins are released and become free. At this point, some hormones that are stored inside the thyroid gland are released to replace those that were given up by the proteins. And new hormones are made by the thyroid to replace those that leave the gland.

To put it another way, thyroid hormones are so important, that the body produces more than it needs at any given moment to make sure that there is enough when more is needed. That's why there is this sophisticated system of regulation that tightly controls the production, release and storage of thyroid hormones.

The brain produces not one but two different hormones to tell the thyroid what to do and how many thyroid hormones to produce, how many to store inside, how many to release into the blood. The body makes sure that there are free hormones available for Immediate action and there is a large supply of thyroid hormones in the blood, bound to proteins but available to be released as needed.

Plus, there is a negative feedback mechanism, which lowers TSH when there is enough T4 and T3, and raises TSH when thyroid hormone are low.

That's why, when things are working properly, there are plenty of thyroid hormones in various stages of readiness. But if there are not enough, we run into problems.

In this lecture we have learned how thyroid hormones are regulated, how they are distributed and how they are designed to be plentiful and readily available. We also learned that it's free T3 that is the actual active hormone, that there are hormones that are bound and those that are free.

In the next lecture we'll talk about converting T4 into T3, how it is done, what is needed for that to happen, what can improve this process and what can make it worse, which can lead to low thyroid.

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Lecture 5. How T4 turns into T3

In the previous 4 lectures I have been talking about thyroid when it functions normally, as designed. We have learned that thyroid gland makes hormones T3 and T4, that these hormones regulate the metabolism and energy production in all the cells of the body. This energy is essential for the cells to work, to develop, to multiply, to repair, in short do all the functions that the cells are supposed to do. And ideally, thyroid gland should produce more hormones than is actually required and store them, releasing into the blood just as many as the body needs, not more, not less.

That's why normally thyroid is tightly regulated by the brain, which produces TRH (thytrophin releasing hormone) and TSH or thyroid stimulating hormone plus the negative feedback mechanism.

We learned that once made, the bulk of thyroid hormones is stored inside the thyroid gland. A small portion of the hormones is released into the blood where most are attached to special proteins, but some hormones are "free", not attached to anything. These are hormones that do the work.

All this elaborate mechanism exists to make sure that every cell of the body has just as much thyroid hormone as it needs. That's why the body makes sure that there are plenty of hormones in the thyroid gland, in the blood, bound to proteins, and in the blood not bound to anything, so called "free" hormones. This is what happens normally.

In the previous lecture I asked the question - why do we have 2 thyroid hormones? The answer is T4 is not really a hormone, it's a precursor from which the real hormone is made. The real hormone that does the work is the free T3.

We talked about the composition of T3 and T4. Both have 2 amino acids tyrosines joined together. Tyrosine's main feature is that it has a circular, or rather hexagonal, structure in the center to which either one or two atoms of iodine are attaches. T4 has 4 iodines, T3 has 3. To make T3 from T4, all you need to do is remove one of the iodines. Sounds simple, but it's a bit more complicated than that.

First, to make T3 from T4, you need to remove one iodine from a specific location. In other words, not just any iodine, but one specific iodine out of the 4.

Imagine T4 as a can of food, say a can of beans. A can of beans is a good thing, it has food inside. But if all you have is a can, you will still go hungry because you can't use it as is. You need a can opener to remove the top lid. Only then you'll be able to get the food.

And it must be the top lid, because what happens if you remove the lower lid? Then whatever is in the can will fall out and get wasted, and you'll still go hungry.

It's the same with T4. If you remove the right iodine, you will have T3, the active thyroid hormone. If you remove the wrong iodine, you end up with something called *reverse T3*, which is completely inactive.

The removal of iodine from T4 is done by an enzyme called de-iodinase. There are several types of deiodinases, each removing an iodine from a particular position. They all require selenium to work properly. People deficient in selenium cannot make enough free T3, which can lead to low thyroid.

Some people ask why should we be making inactive reverse T3 at all? There are many reasons, the first one is that it is like an escape valve. It helps regulate how much free T3 is available.

T4 can either turn into an active T3 or into inactive reverse T3. There are people who make too much thyroid hormone (hyperthyroidism) or take too much thyroid hormone medicine. The body can reduce potential harmful effects of too much thyroid by turning it into reverse T3.

The important point here is that people who seemingly have normal T4 level may not have normal amount of the active T3. Let's look at some of the factors that reduce T4 to T3:

1. Illness, acute or chronic. Especially kidney and liver disease, but any illness may reduce the conversion.

2. Stress, physical or phycological.

3. Not getting enough sleep.

4. Caloric restriction, dieting, fasting and starving.

5. Medications: betablockers, steroids (prednisone), high doses of iodine, amiodorone, anti-thyroid medications used in people with overactive thyroid, for example a drug called PTU.

6. Deficiency of certain minerals, especially zinc and selenium, but also iron, copper, magnesium, manganese and a few others.

7. Chronic inflammation. This could be a disease like rheumatoid arthritis, an allergy, chronic infection. Chronic inflammation has been linked to other diseases, including heart disease.

8. Heavy or toxic metals, like aluminum, cadmium, mercury. We are all exposed to those and whenever possible it is a good idea to encourage your detoxification system to get rid of them. I'll speak about it in one of the future lectures.

9. Genetics. Like with everything else in the body, genetics plays a role in how your enzymes work and how well you turn T4 into T3.

10. Getting older. Things generally slow down with age, and this includes the de-iodinases, which slows down T4 to T3 conversion. That's why it's important to get enough thyroid supporting nutrients, like the minerals I mentioned, certain vitamins and some herbs that support thyroid regardless of your age.

Now let's look at the factors that improve T4 to T3 conversion. That will be pretty much the opposite of what I said about reduced conversion.

1. Nutritional factors – adequate iodine, zinc, selenium, magnesium, iron, copper, vitamin A, vitamin D and pretty much all nutrients. Thyroid cells need the same nutrients as all the other cells, plus more Iodine and more tyrosine.

2. Stress management and relaxation. Relaxing minerals like Magnesium, herbs like Ashwagandha, Ginseng, Eleuthero and stress reducing techniques.

3. Adequate sleep.

4. Support healthy gut – we'll have separate lectures on that

5. Reduce exposure to toxins. Thant includes avoiding processed foods that have strange sounding ingredients, like butylated hydroxytoluene (BHT).

6. Make sure you are not low in iodine and reduce goitrogens, the foods that interfere with iodine absorption. You can download a free special report from LowThyroidDoctor.com on how to check if you are low in iodine and I will mention it in the upcoming lecture.

7. If you are taking thyroid medications, make sure you get the right dose and the right kind. Plus, make sure you are taking them correctly and have your complete thyroid tests regularly. I will cover all that in the upcoming lectures.

In this lecture we talked about the fact that T4 can be converted to active T3 or to inactive revere T3. We also discussed factors that reduce T3 production and factors that improve it.

So far we have been discussing how thyroid should work when everything is normal. Staarting with the next lecture we'll start talking about hypothyroidism or low thyroid. We will begin with the common symptoms.

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Lecture 6. Causes and common symptoms of low thyroid

Today, we'll start talking about low thyroid. Unfortunately, many people have it. By many I mean 35 to 40 million people, mostly women, in the US alone. These are the people who have been diagnosed with low thyroid and are being treated for it. There are about 35 to 40 million people who also have low thyroid, but they have not been diagnosed, so they are not being treated.

They experience all kinds of symptoms, but their doctors refuse to treat them because their blood tests are “normal”. The patient knows that something is wrong because she does not feel right, but the doctor tells her that it’s all in her head.

We will talk later about how low thyroid is diagnosed by most doctors and how it should be diagnosed and treated. For now, I just want to make a point that there are tens of millions of people with low thyroid and only about half of them are being treated.

Let’s summarize what we have learned so far. Thyroid gland is a tiny organ located at the base of the neck. It makes hormones T3 and T4. To do that, it needs an amino acid tyrosine and a mineral iodine. T3 is the active hormone, it goes inside the cells and turns on the mitochondria that burn fat and carbohydrates to make energy and heat. All the cells of the body run on energy. They need energy to grow, to multiply, to repair, to produce things. You need energy for heart to beat, for lungs to breathe, for intestine to digest and for dozens other things that the cells do.

For the body to have enough energy it must have enough thyroid hormones. There is a very sophisticated mechanism of thyroid regulation that involves not one, but 2 hormones made in the brain, various enzymes, minerals, vitamins and amino acids.

Ideally, there are plenty of hormones stored inside the thyroid glands, there are hormones in the blood, some bound to proteins and some not bound, ready to do the work. All this is done to make sure that every cell has just as much thyroid hormones as it needs because they are essential for normal function of the body. I also talked about how T4 turns into an active T3, what factors help with that and what interferes with that.

As I mentioned, tens of millions of people in US alone don’t have enough thyroid hormones. They have hypothyroidism or low thyroid. When people have low thyroid, their cells do not get enough T3.

Let’s talk about why people develop low thyroid. The #1 cause worldwide is iodine deficiency. Remember, you must have iodine to make thyroid hormones.

The #1 cause of low thyroid in US and other developed countries is the autoimmune disease called Hashimoto’s Thyroiditis or just Hashimoto’s or many doctors just call it Hashi. It is responsible for about 90% of low thyroid in US and other developed countries.

Hashimoto’s is a disease where your own immune system starts attacking the thyroid gland. In other words, there is nothing wrong with the thyroid, it’s just an innocent victim. The aggressor is your immune system. We’ll have a few lectures on Hashimoto’s to see why it develops and how to deal with it.

Another important cause of hypothyroidism is the treatment of other thyroid conditions. These conditions do not cause low thyroid, but after the treatment thyroid cannot produce enough thyroid hormones.

Some people develop thyroid nodules, thyroid cancer, hyperthyroidism, toxic adenomas and other conditions. In many cases, thyroid gland needs to be removed, either partially or completely, with radiation or surgery. You cannot make enough thyroid hormones without a thyroid gland, so the result is low thyroid. We'll have a more complete discussion of this in one of the future lectures.

Another risk factor is getting older. Some things get better with age. Unfortunately, human body is not one of them. Most organs and tissues, including the thyroid gland, get weaker and less functional.

Certain medications interfere with thyroid production, certain nutritional deficiencies, some rare problems with hypothalamus or pituitary can also cause low thyroid. Getting pregnant increases the risk. But these all account for only a few percent of the causes. The main cause, as I said, is Hashimoto's and we'll have a few lectures about it.

Low thyroid can appear in anybody. This includes infants, babies, teenagers, men and women of any age. But a typical patient is a woman over 30, and the older the woman gets, the higher are the chances. For each man with low thyroid there are 8-9 women.

Because every cell of the body needs thyroid hormones, every cell will suffer if it does not get enough. Every cell and every organ will react differently to low thyroid and will produce different symptoms. That's why low thyroid has many dozens of symptoms. But some of them are quite common and generally recognized as the main symptoms of low thyroid.

Here they are:

1. Low energy, fatigue. This is probably the most common symptoms. A person wakes up tired after a good night sleep. Getting tired easily. Feeling sluggish. Or just not feeling like doing anything. Like you would like to switch the channels on TV, but you don't feel like reaching for a remote.

2. Feeling colder than others, feeling cold when others feel comfortable. That's because not only the energy production goes down, but the heat production as well. You find yourself looking for a sweater when everyone else seems comfortable in a T-shirt.

3. Constipation. This happens because of slow bowel activity.

4. Depression, brain fog because of slow brain activity.

5. Weight gain. If you are eating the same number of calories as before, but burning only a fraction of them, they will accumulate in the form of fat.

6. Dry skin, dry coarse hair, hair loss on the head, the body, the outer third of eyebrows.

7. Muscle aches, joint aches, total body aches. Often confused with arthritis or fibromyalgia.

8. Slow heart rate.

If you have a few of these symptoms, there is a good chance that you have low thyroid, whether you are being treated or not. There are dozens of other symptoms, and I'll go over them in the future lectures, when I describe the effect of low thyroid on different organs. You can download the list of all the symptoms here.

Suppose you have a few of these symptoms, you go to your doctor and say, hey doc, I feel tired, cold, I am gaining weight, I am constipated, and I am losing hair like crazy. Most doctors will think of low thyroid as the cause and will check you for it.

How they check for low thyroid we'll discuss next time. We'll talk about what tests doctors do, how they diagnose hypothyroidism and why there are so many people with low thyroid symptoms who are told that they are normal and do not get the treatment they need.

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Lecture 7. How most doctors diagnose low thyroid

We talked about how thyroid should work. We talked about how common low thyroid is, with tens of millions of people treated for it. In the last lecture we talked about common symptoms of low thyroid - low energy, feeling sluggish and tired, gaining weight, dry skin, hair loss, cold intolerance, depression, brain fog, constipation. There are dozens of other symptoms, but these are the most common.

Today we'll talk about how doctors are taught to diagnose hypothyroidism.

I mentioned that in the US, the number one reason for low thyroid is Hashimoto's thyroiditis. About 90% of people with low thyroid have Hashimoto's. It's an autoimmune disease, where the immune system starts making antibodies against the thyroid gland. These antibodies slowly destroy the thyroid.

This is not supposed to happen, the body is not supposed to attack itself, but it does happen. The immune system starts attacking an organ, in this case the thyroid. That's why Hashimoto's is called an auto-immune disease. We'll have plenty to say about Hashimoto's in the future lectures.

I mentioned before that in the case of Hashimoto's there is nothing wrong with the thyroid gland. Thyroid is fine, it is just a victim of the malfunctioning and overactive immune system.

The other 10% of hypothyroidism have different causes, like having thyroid removed, by a scalpel or by radiation, getting older, or getting pregnant, or going through menopause, or taking certain medications.

Whatever the cause, a typical patient notices some or all of the common symptoms, she suspects that she may have low thyroid and goes to see her doctor. The doctor, having heard her symptoms, agrees that she may have low thyroid and orders a blood test. The test is the level of TSH.

You remember TSH, thyroid stimulating hormone. It is produced by the pituitary gland. Its job Is to stimulate thyroid gland into action, into making more thyroid hormones. TSH is controlled by another hormone called TRH and by the level of thyroid hormones.

When there are plenty of thyroid hormones, TSH level will go down, but when thyroid hormones are low, TSH level goes up. That's why we use TSH levels to diagnose low thyroid. If your TSH is higher than what the lab says it should be, then you are diagnosed with low thyroid and get a prescription. But if your TSH is not high enough, if it's in the "normal range" then your doctor will say that you don't have low thyroid. You are normal.

And it does not matter what symptoms you may have or how bad they are, they simply don't matter. Only TSH matters, and if it's not high enough then you are normal. You do not have any thyroid problems and any symptoms you have are all in your head, not real, end of story.

This is how doctors are taught; this is how I've been taught. TSH rules. If you have the symptoms and high TSH, then you have low thyroid, and we'll treat you. If you have the symptoms, but your TSH is not high enough, then you are normal, nothing is wrong with you, and we will not treat you.

If you think about it, it doesn't make much sense. We are looking for low thyroid, but we measure a pituitary hormone.

In the next lecture, we will talk about what blood tests your doctor should be checking and how blood tests can be normal when you really have a problem. For now, I'll just tell you that this approach is wrong, and this is why there are tens of millions of people who have low thyroid, and you may be one of them, but their doctors refuse to treat them. Or even if you are being treated with thyroid medications, doctors decide what dose to give you based on TSH. If TSH is fine, then the dose you are taking is fine, even if your symptoms have not improved completely or at all.

Just think about it. Doctors have been treating patients with low thyroid for a few hundred years. There was no TSH test or any other blood tests. If you had the symptoms of low thyroid, the doctor would treat you. You know, if it looks like a duck and quacks like a duck, it's most likely a duck.

But not today. Today it's not a duck unless you have high TSH. If you don't, tt does not matter what symptoms you might have, doctors will not treat you.

If you are in this situation, you need to find another doctor. Most of my thyroid patients came to me because they could not get treatment from their own doctors. The other patients came because the synthetic drugs they were given (Synthroid, Levothyroxine) did not work and they wanted to try something more natural. Of course, many came because they were recommended by other patients.

Next time we'll talk about what blood test a doctor should order in a patient suspected of low thyroid.

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Lecture 8. The tests that should be done

In the past lectures we talked about why people have low thyroid, what kind of symptoms people with low thyroid often have and what tests doctors do to diagnose the problem.

Actually, I should not say tests, pleural. Usually doctors order just one test, it is called TSH, thyroid stimulating hormone. The job of TSH is to stimulate the thyroid gland into making more thyroid hormones. So if thyroid hormones go down, TSH goes up. And if thyroid hormones become high, TSH will go down. They usually move in the opposite directions.

TSH level is considered "the gold standard" of hypothyroid diagnosis. In most labs, TSH is considered normal if it's between 0.4 and 4.0. In other words, if your TSH is higher than 0.4 but lower than 4.0, you are considered normal. Even if you have all the symptoms of low thyroid.

We talked about various thyroid hormones, how they are present in the blood either completely free, ready to go to work immediately, or attached to proteins. They are called "bound", but ready to become free and unbound as soon as the body needs them.

In general, if you think of it, checking just one stimulating hormone to diagnose the disease is silly. We don't do that with other hormones. The same pituitary gland that makes TSH, also makes stimulating hormones for estrogen, progesterone, testosterone, and cortisone. But if we want to know how progesterone or testosterone are doing, we do not measure Luteinizing Hormone or LH, which stimulates the production of progesterone and testosterone. No, we

measure the hormones themselves, progesterone and testosterone. Pituitary also makes ACTH that stimulates the adrenal glands into making cortisol. But if we want to know the level of cortisol we don't measure ACTH, we measure cortisol. And the same with other hormones.

In case of thyroid, we can do the same thing. We certainly can measure TSH, but we can also measure the levels of thyroid hormones and a few other things besides, which I will mention in a moment.

I have seen many patients whose thyroid was low, but their TSH was not high. So, if I only checked TSH alone and if I were to follow the conventional thinking, I would be misled into thinking that these patients were normal. But I never check only TSH. I check all the thyroid hormones – total T3 (that's bound plus free), total T4, I check free T3 and free T4, I check reverse T3, and in case of Hashimoto's I also check antibodies against thyroglobulin and against thyroid peroxidase. They are called TPO antibodies for short.

I have seen many patients whose thyroid hormones, either total or free, were low, yet their TSH level was "within normal limits", below 4. So they have low thyroid with "normal" TSH. Or how about a patient whole T4 seems OK, but T3 is low. This means she does not turn her T4 into T3 very effectively, which makes her hypothyroid, but her TSH will be fine, because she has enough T4.

Or what about a patient who has seemingly enough T4, but high level of reverse t3, which means that her T4 is mostly turned into an inactive hormone.

And I have seen quite a few patients with a seemingly impossible combination – low T3 and T4 and low TSH. According to conventional thinking this is not possible. When T3 and T4 are low, TSH must be high, unless the patient has a pituitary tumor destroying the gland, which is rare. Yet, I have seen these patients.

As you see, there are many permutations and possibilities. There are also situations when a patient is clearly hypothyroid, but all her blood tests are "within normal limits." I will have a lecture about that in the future. You can also download a free report about how a patient with a disease can have "normal" blood tests.

The point is that blood tests are just tools that a doctor can use, but not rely on them entirely. Most doctors, when it comes to low thyroid, live and die by TSH. This is wrong.

Let me give you an example from another part of the body. Men have something called prostate, and some men develop prostate cancer. To detect the cancer, doctors measure something called PSA, prostatic specific antigen. Prostate cancer makes PSA go up. In most labs, normal PSA is 4 or less. If a man has PSA less than 4 then we say that he is OK and most of the time we are right. If PSA is above 4, then doctors become concerned. But the truth is that there is nothing magical about number 4. Doctors have found cancer in men whose PSA was 3 or 2 or 1 and even less than 1. At the same time, a person may have PSA of 30 and not have cancer.

The point is, PSA is not a gold standard for prostate cancer and TSH is not a gold standard for thyroid disease. TSH is just one of the tools we have to help diagnose and monitor low thyroid and it should be used with all the other tools.

If you are working with a doctor who is going to do a blood test for low thyroid (TSH), ask him or her to do all the other tests I mentioned. And if they refuse, find another doctor. Or sign up for one-on-one coaching with me.

I have mentioned common hypothyroid symptoms in the past lectures. Next time, I'll talk about symptoms that are less known.

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Lecture 9. Complete list of symptoms, part 1

Let's continue our discussion of hypothyroidism or low thyroid, a situation that develops when the body does not get enough thyroid hormones.

We talked about common symptoms of low thyroid, such as fatigue, gaining weight, feeling colder than others, dry skin, excessive hair loss, constipation, depression and mental fog. Most doctors, when hearing these symptoms, will think of low thyroid.

But there are symptoms that are less well known. There are so many that I will need two lectures to mention all of them. Today is lecture one of the 2 lecture series about low thyroid symptoms.

It will be easier to understand why there are so many symptoms if you remember that every cell, every organ needs enough thyroid hormone to produce energy, so they can function properly. The hallmark of low thyroid is that there is not enough free T3 available. The result is that every part of the body slows down and will show it, but in a different way. In other words, every organ becomes more sluggish, and depending on what that organ does, it will produce a different set of symptoms. This is why there are literally dozens of them.

One more important thing about the symptoms is that while every organ and tissue suffer from low thyroid, some organs produce more symptoms, while other produce fewer or none at all. That's why nobody has all the symptoms I am going to mention. People may have a few, or many, but not all.

Another important thing is that there is no symptom that is diagnostic of low thyroid, in other words there is no one symptom that only people with low thyroid have. Each of the low thyroid symptoms may happen in people who have other conditions, not just hypothyroidism. It's the combination of symptoms, the overall picture that helps us make the diagnosis.

Keep in mind that hypothyroidism does not happen suddenly. It can, if a person had her thyroid removed or destroyed by radiation, in which case thyroid stops working right away. But usually, like in Hashimoto's, the symptoms develop gradually and slowly, over many months and even years. That's why the patient doesn't immediately notice the changes and slowly gets used to the "new normal". Typically, it takes a long time for things to become really bad, when a patient realizes that something is wrong and starts noticing the symptoms. Many people don't even get to this point, they think they are OK and are discovered by a routine blood test.

I've mentioned the common symptoms before, so I'll just go over them quickly.

The most common and the most familiar symptom is general fatigue. A patient wakes up tired even after 7-8 hours of sleep, and even a small exertion will make her tired.

Because heat production is reduced, another common symptom is feeling colder than others and intolerance to cold. A person notices that she needs another layer of clothes to be comfortable. Your body temperature may be 1, 2 even 3 degrees below normal.

Weight gain is common. If you eat about the same amount of food but burn less of it, more of it will stay in your body as fat. It's sort of like if you start spending less but earning the same, your bank account will get larger.

Constipation is a common symptom, depression is another and so is high cholesterol.

These symptoms are common but remember that every organ and tissue produce their own symptoms. The underlying cause is the same - reduced metabolic activity, reduced energy production.

I will now go through the body from top to button and see what symptoms different parts of the body produce. I'll have 2 lectures about the symptoms because there are so many. I'll start at the top, the head, with hair and skin, then move to the brain, eyes, ears and mouth. I will cover the other organs in the next lecture.

Skin may be pale and puffy. Puffiness is the result of water accumulation because the kidneys and the heart are not working optimally. Puffiness may be under the eyes, or in the whole face, or hands and ankles. In some patients there is a yellow discoloration of the skin, almost like jaundice. Some people may develop irritation, like in psoriasis or eczema.

There is less sweating or no sweating at all. Hair follicles do not work properly, so hair becomes coarse and brittle, and there is a lot of hair loss on the head, on the body and the outer third of the eyebrow.

Brain and nervous system. Brain performs many different functions, conscious and unconscious. Conscious cognitive functions include thinking, decision making, mood and so on. Brain also controls autonomic unconscious functions that we don't think about, like heart beats, how often you take a breath, your blood pressure. It also regulated hormones through hypothalamus and pituitary. Nerves control muscle movements, they also make it possible to feel things like touch, pain, temperature, and other things.

People with hypothyroidism often have depression, lack of motivations, lack of desire to do anything, low interest in anything that is going on. Planning and decision-making get worse. There is a tendency to procrastinate. There is mental fog, memory gets worse, sometimes so bad that symptoms can get confused with dementia.

There can be sleep problems, from sleeping too much, to insomnia and sleep apnea.

Nerves can get damaged, developing neuropathy, pain, burning, tingling, numbness, usually in hands and feet. Restless leg syndrome and carpal tunnel syndrome can develop.

Eyes. Because of reduced activity of tear glands (lacrimal glands), there is lack of lubrication, which causes dryness, so eyes feel dry and gritty. The white of the eyes may be irritated. There may be a swelling or puffiness around the eyes. Blurry vision or even double vision may develop. And there may be drooping of the eyelids and increased sensitivity to light.

Ears can develop a few problems. There may be a feeling of fullness or clogged ears like when you fly in an airplane. There may be ringing in the ears or buzzing or some other noises. This is called *tinnitus*. Sometimes there is a complete hearing loss. People become more prone to ear infections. And there may be a feeling of lightheadedness or even dizziness because of the vestibular apparatus that is located in the inner each ear.

Mouth symptoms are several. Low thyroid leads to reduced production of saliva, which can give a feeling of dry mouth. But that's not the worst of it. Saliva contains immune elements that protect the mouth from inflammation and infections. Without enough saliva there can be mouth sores, gingivitis, periodontal disease, gum inflammation, cavities, and bad breath.

Healing may take longer after a dental procedure, like a tooth extraction. There may be bone loss in the jaw.

Tongue can become enlarged because of swelling. Most of the time it's a mild swelling and can be seen only as teeth marks on the tongue. But in more severe cases it can interfere with speaking and eating. Some people complain that their sense of taste has changed, the food tastes differently.

In this lecture I have briefly gone over the common symptoms and described the symptoms of low thyroid in hair, skin, brain, eyes, ears and mouth. I'll continue the travel through the body in the next lecture. I'll start with the heart and go all the way down to reproductive organs and immune system.

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Lecture 10. Complete list of symptoms, part 2

In this lecture I'll continue with the symptoms of low thyroid, covering the body from top to bottom. As I mentioned, the number of symptoms is very large because there are so many organs in the body, each organ producing a few to a dozen symptoms. That's why I needed 2 lectures to cover them. But even with 2 lectures I will not be able to mention all the symptoms for every organ, only the most common ones.

Last time we started at the top, talking about the skin, hair, the brain, eyes, mouth and ears. Today we'll keep going down, starting with the heart and moving on to lungs, liver, kidneys and bladder, ovaries and testicles, muscles, immune system and gastro-intestinal (GI) tract.

The job of the **Heart** muscle is to pump the blood, making sure it circulates through the network of arteries, capillaries and veins in the whole body.

In low thyroid, heart becomes weaker and does not pump the blood as effectively. The heart slows down. This means reduced circulation. It can be mild to severe. To compensate for that, the heart muscle may enlarge, which makes the situation worse, because bigger heart needs more thyroid, more nutrients, more oxygen, which are not coming because of reduced circulation. This may lead to heart failure.

Thyroid hormones relax the muscles around the arteries, making it easier for the blood to flow, and reduce the blood pressure. Low thyroid makes arteries more narrow, so the heart needs to work harder. High blood pressure may develop.

Because of heart weakness there is water retention, causing puffiness of the skin, fluid around the heart, fluid around the lungs and other places.

Low thyroid is an independent risk factor for hardening of the arteries and heart disease.

The job of the **Lungs** is to inhale air rich in oxygen and exhale stale air rich in CO2. This requires the action of the muscles inside the lungs and the muscle called the diaphragm, located right under the lungs. All the muscles become weaker, so the lung function goes down. The air exchange is less efficient. Plus, there may be some fluid accumulating around the lungs, called *pleural effusion*. This may lead to shortness of breath, especially on exertion, but even at rest in

severe cases. There is also an increased risk of respiratory infections, like cold or flu, bronchitis and even pneumonia.

Liver is the busiest organ in the body. It produces a number of important proteins, it is necessary for sugar metabolism, it is involved in detoxification, it produces bile and cholesterol, It converts T4 to T3, it is involved in metabolism of medications, it is important for normal blood clotting and does dozens of other things. Hypothyroidism interferes with all that, it interferes with detoxification, worsens sugar control, increases cholesterol, makes bile thicker, increases the likelihood of gallstones. It can also increase certain liver enzymes in the blood. And it can cause fat accumulation in the liver and cause Non-Alcoholic Fatty Liver Disease or NAFLD. Liver removes medications from the blood, so if you are taking certain medications and have low thyroid, you should check with your doctor if you need to decrease the dose.

Kidneys. The job of the kidneys is to remove toxins and extra water. All this slows down in low thyroid. There is water retention. This leads to puffiness of the face, puffiness of eyelids, swelling of the hands and feet, carpal tunnel syndrome. Your tongue becomes slightly swollen and presses against the teeth. If you stick your tongue out in front of the mirror, you will see tooth marks.

Bladder muscle becomes weaker, so it does not push out urine as effectively. This could lead to more frequent urinations, sort of like in men with enlarged prostate. It also increases the risk of the urinary tract infections, especially in women.

Kidneys regulate minerals sodium, potassium, chloride, zinc, magnesium, calcium and many others. In hypothyroidism, sodium, potassium and other minerals may be low on the blood test.

Ovaries and testicles. Low thyroid causes decreased libido in both men and women. It also causes infertility or difficulty conceiving in both men and women.

Women can have problems with menstruations. They can become less or more frequent or totally irregular or they last longer than usual. Often, women have very heavy periods, with so much blood loss that it can cause anemia. There are also problems with ovulation, it may happen irregularly or stop altogether. This also can cause infertility.

In men, there is decreased testosterone production and decreased sperm production. Plus, the sperm is not as active as it should be, which also contributes to fertility problems.

M**uscles** become painful and weak. **Joints** become painful and stiff, pain usually affects hands, knees, other large joints. It can be so bad that it is confused with Rheumatoid Arthritis. Low thyroid reduces bone turnover, so new bone tissue is made more slowly, while old, dead tissue that should be removed, is not removed properly, making the bones more brittle.

Immune system is like the military which consists of many different branches with many specialized units. The immune system consists of different types and subtypes of white cells and the organs that make them and train them. And just like the military, it protects you against

enemies, such as bacteria, viruses, toxins and everything that is not part of you. Or even your own cells that become abnormal, like cancer cells.

Some white cells engage in hand-to-hand fighting with the microbes and other things that are trying to invade you. Most white cells, like neutrophils and macrophages, are much bigger than the bugs. So, the white cells just swallow them, the way a snake swallows a mouse or a fox.

Some white cells fight by making antibodies against the bugs. Some produce certain chemicals that make holes in the membrane of the microorganisms, which destroys them. Sort of like making a hole in a balloon. Other while cells have other functions. All this requires a lot of energy, and all white cells suffer when thyroid is low. Which makes the immune system weaker. Which means, it does not defend you as well, so you become more susceptible to infections, like frequent colds and flues, sinusitis, sore throat, canker sores. And because immune system also protects you from cancer, the risk of cancers increases.

Immune cells are present everywhere in the body, but the bulk of the cells, about 80%, are located in the vicinity of the intestine, because that's where most pathogens get in.

Immune system is responsible for 2 important thyroid conditions. One is Hashimoto's, which is the #1 cause of low thyroid in US. Another is Graves disease, which causes overactive thyroid or hyperthyroidism. In both cases there is nothing wrong with the thyroid, it's the overactive immune system that does all the damage. The immune system causes various auto-immune diseases, such as Hashimoto's, Graves disease, scleroderma, rheumatoid arthritis and many others.

We'll have a few lectures about how and why this happens and how to deal with that.

GI tract. Gi tract starts in the mouth, followed by esophagus, stomach, duodenum, small and large intestine and ends at the anus. The intestine is about 30-35 feet long and it has a natural slow movement, which propels everything forward. This movement is called peristalsis. Its purpose is to push stool, bad bacteria and fungi (multiple of fungus), like Candida, slowly forward and out. As the muscles of the intestine become weaker and less energetic, this movement slows down. The most obvious result of that is constipation. Less obvious is the fact that bad bacteria and Candida are not pushed out, so they stay and create what's known as bacterial overgrowth. The full name is SIBO, small intestine bacterial overgrowth. There is also SIFO, small intestine fungal overgrowth. The same process is going on in the large intestine. This situation is called dysbiosis, which means bacterial imbalance. In general, there are trillions of different bacteria in the intestine, some good, some bad. Ideally good should predominate, because bad bacteria are called bad for a reason, and most yeasts or fungi are not much better. They produce toxins, they cause gut irritation, gut inflammation, and leaky gut syndrome. Normally gut is like a wall of a castle, preventing unauthorized things from getting in. Leaky gut is just the opposite, it allows bad things to get inside. This triggers the immune response, which

stimulates the immune system even more, creating a vicious cycle, because overstimulated immune system is what is attacking your thyroid gland.

As I said, it is impossible to list all the hypothyroid symptoms, but the main thing to get out of this lecture is that everything becomes sluggish and every part of the body, every organ becomes affected.

Because so many people are not treated for their hypothyroidism, this can lead to worsening of symptoms and the appearance of serious health issues, like cardiovascular, emotional and psychiatric, autoimmune conditions and many others, so it should be treated.

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Lecture 11. Why every patient should be checked for low thyroid

So far, we have learned that thyroid is vital for normal health and normal function and well-being of the body. We have learned that many people do not make enough thyroid hormones, which causes hypothyroidism or low thyroid. This produces symptoms, some common, some not, but because every cell and every organ suffer from lack of hormones, this can produce multiple symptoms. We have also learned that most doctors don't know much about hypothyroidism and treat it only if the blood level of TSH is higher than what the lab says is normal, usually above 4.0.

In the last 2 lectures I went through the whole body, top to bottom, and told you what symptoms various organs and tissues produce, from skin and hair down to bladder, ovaries and testicles, so now you have a better idea of the kinds of symptoms that can happen. I also have a handy guide to all the symptoms, which you can download here.

I told you that over the years I have treated thousands of patients with low thyroid. Many came to me because they had typical symptoms, but their doctors would not treat them because their TSH was 'in the normal range', not high enough. Many came because they were already diagnosed with low thyroid and were being treated with synthetic thyroid medication, which did not make them feel better.

I practiced as an internist, so I saw patients with many other diseases beside low thyroid – heart disease, diabetes, arthritis, asthma, poor circulation, high cholesterol and so on. I gave every new

patient a comprehensive blood test that included all the usual things that the doctors check plus vitamins, minerals, hormones, markers of inflammation and a complete thyroid panel which includes not just TSH, but also total T3, total T4, free T3, free T4, reverse T3, and sometimes antibodies against thyroglobulin and thyroid peroxidase.

I found that many people, who came for another condition, like diabetes or heart disease, had low thyroid. Especially if they had high cholesterol. The relationship of high cholesterol with low thyroid is well-known. This is part of the biochemistry that every first-year medical student learns.

The point is that many people, tens of millions, have low thyroid and don't know it. The problem develops very slowly over the course of many months or even years. A person becomes used to the "new normal". They may have some feeling of not being well, but not anything specific.

This is one of the reasons why doctors miss low thyroid so often, they just don't look for it, they don't do the right tests. The doctors start suspecting low thyroid when a person has typical symptoms and falls into a typical category – women in their late 40s, early 50s and older.

But what if you see a woman with pain in the muscles, slight weight gain, occasional anxiety and this woman was trying to conceive for a few years without success. Low thyroid would not be the first thing on your mind, yet all the symptoms can happen in a person with low thyroid.

What about a young man with stiffness in the joins, slow heart beats and dry eyes. Again, low thyroid would not be the first thing on your mind.

The point is, low thyroid is so common, you simply have to suspect it in every patient. Low thyroid can produce many "un-thyroid" symptoms. That's why I checked every patient for low thyroid and found many who did not even suspect they had it.

And that brings me to another point. My goal is to educate you, so you know how common low thyroid is, why it happens, what the symptoms are, what are the tests that need to be done to diagnose the problem. I also want you to know what nutrients thyroid needs, what supplements you should take, what foods you should eat and what foods to avoid.

If you are not feeling well, whatever the symptoms, your doctor should consider low thyroid, you can even suggest it yourself and perhaps the doctor will listen. You need a doctor who will be open-minded and will listen. Most doctors don't want to listen to a mere layman like you After all, who went to medical school, you or your doctor? So why should they listen to you? That's the usual attitude.

That's why you need a doctor like me, a doctor who is experienced and is willing to listen and to help. Like it or not, you will have to work with a doctor so you can get blood tests and the medications, either natural or synthetic.

We'll have a couple of lectures on the different medications available, and what else, beside the medications you need to do to make your thyroid better.

Next few lectures will be about Hashimoto's thyroiditis, the condition that causes about 90% of cases of low thyroid in the US. Hashimoto's is an auto-immune disease, which means that it is caused by your own immune system attacking your thyroid gland, something that is not supposed to happen. After all the immune system exists to protect you, not to fight your own organs.

We will talk about the immune system and why it develops antibodies against its own tissues. We'll learn why the immune system become overstimulated, overwhelmed and goes crazy.

We'll talk about GI tract, especially the intestine, and how it contributes to Hashimoto's and other auto-immune conditions. We'll talk about food allergies and a few other things.

And then we'll talk about treatment, what sort of treatment is available, about natural vs. synthetic drugs, supplements, vitamins, minerals, herbs.

If you know someone who might be interested in low thyroid, please refer them to LowThyroidDoctor.com so they can download this ebook. Also, if you have questions or comments, please email to DrTeplisky@gmail.com.

As an additional bonus, while available, you can get a free, no obligation 30 min phone consultation with me to see if I can help you figure out if you have low thyroid and what I can do to help you. Just book it online or call my office at 718-769-0997.

Lecture 12. Hashimoto's thyroiditis and the immune system.

Today we'll start the topic of Hashimoto's thyroiditis or Hashi, which causes over 90% of all the cases of hypothyroidism in the US and other developed countries. To put it another way, most people with low thyroid have Hashimoto's.

The first thing you should know is that Hashimoto's is not the fault of your thyroid gland, but of the immune system. Another thyroid condition called Graves disease that causes overactive thyroid, is also caused by the immune system. The thyroid is an innocent victim. It's your own immune system that attacks the thyroid cells, attacks thyroglobulin, the thyroid peroxidase (TPO), TSH receptors and other structures. Antibodies against TPO indicate the severity of the disease. The higher the antibodies, the more severe the disease.

I mentioned that one of the reasons why hypothyroidism develops is when the thyroid gland is partially or completely removed, either with a scalpel or by radiation. Hashimoto's kind of works like this. It slowly destroys your thyroid without the scalpel or radiation, but through the action of the immune system.

If you compare normal thyroid with Hashimoto's thyroid under a microscope, you'll see that many thyroid cells are gone. They are replaced by bluish looking cells. Those are lymphocytes, part of your immune system.

And this is a good time to say a few words about the immune system.

The immune system is unimaginably complex. It is like the military. It consists of billions of specialized while cells, each performing a different function, with the overall goal of attacking and destroying anything that is not part of you.

There are white cells that swallow the invading microbes, the way a snake swallows a mouse. There are white cells that release chemicals that make holes in the invading microbes and that kills them, kind of like poking a hole in a balloon. There are white cells that make antibodies against the invading microbes. The antibodies stick to their targets and mark them for destruction by other immune cells.

Your immune system knows which cell is yours and which is foreign. The cells of your body have a certain special protein on the surface, a marker, an identifier, a sign that this is you. Only your cells have this sign. Other cells have their own signs, but they are different from yours.

When the immune cells see your marker, they leave the cell alone. But if they don't see the marker on a cell or a particle, your immune cells will attack and try to destroy it.

This is how your immune system fights infections, because the bugs causing the infection don't have the right marker. They are foreign cells that must be destroyed. That's how we fight viruses, bacteria, parasites and even cancer.

Each day we are attacked by billions of all kinds of microbes. They try to enter through the skin, through the mouth or intestine, and your immune system fights them. It's a 24/7 process, a never-ending war that goes on behind the scene. You are not aware of it. In the end, the immune system is usually successful, that's why we are not sick all the time. But in the process, billions of white cells die, casualty of war. That's why each day an average person makes about 100 billion new white cells.

Because the infection can enter anywhere, these white cells are distributed everywhere, in the skin, in the blood, in all the organs, always ready to get into a fight. Many white cells accumulate inside the lymph nodes, which is like an army base, full of soldiers ready to go into action. Lymph nodes are full of different white cells, and they are also distributed all over the body. But about 80% of lymph nodes are located around the intestine, because that's where the most toxins and bad bacteria come from.

Intestinal bacteria live inside the intestine. Normally, most of the bacteria are good, but many are not. They are trying to get inside the body and cause harm. That's why there are so many lymph nodes around the intestine, ready to fight the bad guys.

When everything goes as usual, the immune system encounters billions of potential invaders. The usual workday for the immune system is identifying foreign organisms that managed to get inside of you and fight them hand to hand, swallow them, make chemicals against them, make holes in their skin wall and produce antibodies against them. And while this war is going on, your white cells don't attack your own cells.

But what if the immune system becomes overstimulated and overactive? What if the number of "bad guys" doesn't stay normal, but doubles, quadruples, or becomes 10 or 20 times higher? This puts the immune system into overdrive, so it becomes overstimulated and crazy, it starts attacking not only the bad guys, but the good ones also. It starts making antibodies again everything in sight, including your own tissues.

As we'll see in the next lecture, this sometimes happens by mistake, when the overstimulated immune system makes antibodies against a real foreign substance that happens to resemble to your own tissue. For example, gluten in wheat and rye has a structural resemblance to some proteins in the thyroid gland. If a person has gluten sensitivity and makes antibodies against gluten, these antibodies will also react with thyroid tissue. But whatever the reason, there are antibodies directed against your own organs, which damages those organs.

The result of this is an autoimmune disease. This disease can attack one organ or tissue, like thyroid gland, or several organs. In fact, a person with one autoimmune disease has a higher risk having a second or even a third one. All in all, there are over 80 auto-immune diseases caused by the immune system that has gone crazy from overstimulation. Remember, the organ itself has done nothing wrong, the whole thing is not the fault of the organ, but of the immune system.

Next time, we'll talk about the most important cause of overstimulated immune system – Leaky Gut Syndrome. We'll talk about how it develops, what causes it and what role it plays in Hashimoto's.

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Lecture 13. Hashimoto's thyroiditis, gastro-intestinal system and leaky gut

Today we continue the topic of Hashimoto's, a disease that causes over 90% of all the cases of hypothyroidism in US.

I told you last time that Hashimoto's is not the fault of your thyroid gland. The thyroid is an innocent victim, being attacked by antibodies produced by your own immune system.

As you know, the immune system is not supposed to attack your own cells because it can tell which cells are you and which cells are not you.

But when the immune system is overwhelmed, overstimulated and goes crazy, it starts making antibodies not only against the bad microbes but against everything in sight, including your own tissues as well. This is how auto-immune problems develop.

In other words, we have the immune system fully capable of handling billions of challenges daily. but suddenly it is confronted with 10 or 50 times as many. Of course, it will get overwhelmed and go crazy.

Why does it happen? One of the most important causes of this overstimulation is the Leaky Gut. It happens when the intestine becomes inflamed and damaged and develops multiple little holes in it.

Let's briefly describe your gastro-intestinal tract or GI tract. It starts in the mouth, which is sort of a continuation of the skin of the face. The skin cells slowly transition into the cells that line the mouth. The mouth forms the beginning of the pipe that we call the GI tract. It starts in the mouth, which turns into esophagus, stomach and intestine. Intestine ends with an anus which again joins with the skin.

In other words, a GI tract is a pipe, a tube that passes through your body. This is an important point. From the mouth to the anus the GI tract passes through you, and it seems to be inside of you, but it's not. Not the way the heart, or lungs or kidneys are inside. GI tract, just like the skin, is outside of you. It is located within you, but functionally it is outside of you. Most people need to think about it to grasp this point.

When it comes to the skin, it's obvious. Whatever microbes happen to be on the skin, they are not inside of you. They are outside. Well, it's the same with GI tract. Whatever happens to be in your mouth, stomach or intestine, those things are not inside of you. If you take a bite of an apple, chew it and swallow, it will end up inside your stomach, but not inside of you. Because the lining of the GI tract is like a wall that regulates what comes in and what does not.

To get inside of you, things that are in the stomach or intestine have to be absorbed. They need to be taken in. When we eat food, it doesn't enter the body as is. First, it needs to be digested or broken down. Our body produces digestive enzymes, which are like scissors. They cut all the foods into small basic blocks from which the food is made. For example, carbohydrates are broken into glucose, proteins are broken into amino acids and fats are broken into fatty acids. These things are then allowed to enter (absorbed) and used either as fuel for energy production or for building new cells or repairing existing cells or producing thousands of things that the body needs, like hormones and antibodies.

Big things, like bacteria, viruses or parasites, partially digested food, toxins and other large particles are not allowed in. Because the lining of the intestine is like the skin. It is made of cells that stick tightly together, without any gaps, forming a barrier. Only useful things are allowed to cross the barrier and come in. Things like water, fully digested food, vitamins, minerals, and so on. All the undesirable things are kept out.

But many bad guys still manage to sneak in. The good news is we know it's going to happen, and we are ready for it. That's why the bulk of the immune system and lymph nodes are located around the intestine, since this is where most assaults happen, where most bad guys try to get into the body.

As you know, the intestine is the home to 100 trillion bacteria, most of them good, some not so good, some very bad. The good ones are happy to stay where they are, they are not trying to get inside of you. But the bad ones are trying and they often succeed. You don't want any of them getting inside of you, neither good nor bad, because they are all foreign, they are not part of you, and the immune system will fight them.

These trillions of gut microbes are called intestinal biome or gut microbiome, and it contains not only bacteria, but also viruses, parasites and other microorganisms. The composition of the microbiome is very important and is unique to each person. Ideally the vast majority should be good bacteria, because good microbes make us healthy.

They perform multiple functions, for example they digest certain things that we can't, they produce substances that make the GI tract heathier, they make some vitamins, they convert T4 into T3, they improve the absorption of certain minerals, they help our immune system, they prevent leaky gut, and even affect the brain by producing certain neurotransmitters. And that's just a partial list.

Intestine also has an interesting structure. The job of the intestine is to absorb useful substances from food. Small intestine is about 25 feet long and about 1-1.5 inches in diameter. At first glance, it seems like the absorptive area of small intestine is about 3 sq feet.

That would be true if small intestine was like a smooth pipe, which it is not. It is covered by many billions of finger-like projections called villi, singular villus. Each villus has its own finger-like projections called micro-villi, millions of them. This increases the absorptive area tremendously. Small intestine is like an accordion. When folded, it looks small, but when fully open it looks quite big. Similarly, if you consider all the villi and microvilli, the total surface of the small intestine is not 3 sq feet, but about the size of a tennis court.

This court is covered by trillions of viruses, bacteria, parasites, yeasts, and other microbes, but because the intestine is like a wall, only a small portion – millions to billions – do get through. Fortunately, the immune system is ready for them.

Now imagine that this wall develops holes. This is what leaky gut syndrome is, a condition where instead of a solid wall you have a wall with multiple gaps in it.

And now bacteria, viruses, undigested particles of food, toxins and other bad things can pour in through the gaps. Good bacteria are helpful as long as they stay in the intestine. But if they leak through gaps into the bloodstream, the immune system sees them as harmful. Because they are not part of you. They are just the same foreign invaders as the bad guys, and the immune system is going to fight them.

In short, because of leaky gut, the immune system becomes exposed to 10-20-50 times more foreign things that it has to fight. This is what overwhelms and overstimulates the immune system. This is why it starts making antibodies against everything in sight, including your own tissues.

What causes leaky gut? Many things that irritate the intestine and make holes in the intestinal lining.

We eat Standard American Diet (SAD diet). A good diet is supposed to provide you with the nutrients your body needs and nothing that can cause harm. But the SAD diet doesn't do that. It has too much sugar, not enough fiber, too much processed foods, not enough real nutrients, lots of chemicals, like preservatives, flavor enhancers, coloring agents, and so on. All of them damage the intestine.

There are over 10,000 chemicals that FDA allows to add to food and an average person consumes about 150 lbs of them a year. There are thousands more chemicals that get into the food through processing, packaging, pesticides, and so on. And besides chemicals in food, there are also environmental toxins in the water, air, soil. We live in the ocean of toxic chemicals which damage the intestine.

We eat about 60 lb of sugar a year, that's about 18 teaspoons a day. Some people get a lot more. Candida, other yeasts and the bad bacteria love sugar, so they multiply and become stronger, which irritates the intestine and causes leaky gut.

Unnatural oils. So called "vegetable oils" – corn, canola, safflower, sunflower, etc. Corn, sunflower, cottonseeds are not vegetables, so the oil is not really a vegetable oil. To make this oil, they use high heat and various chemicals that are harmful for the body in general and particularly for the intestine.

Partially hydrogenated vegetable oils also irritate and damage the intestine. They are used to make margarine and for deep-frying.

Medications. Pain killers, like aspirin, ibuprofen and many others. They directly damage stomach and intestinal lining.

Acid inhibitors. They kill the acid, which decreases food digestion and absorption, plus it promotes growth of bacteria.

Antibiotics kill bacteria, good and bad. Good bacteria do many good things, one of them keeping bad bacteria in check. If you reduce good bacterial you create what's called "dysbiosis" or imbalance, so there are more bad bacteria relative to good. The result is more inflammation and leaky gut, plus more work for the immune system.

Synthetic hormones – birth control, hormone replacement with unnatural hormones.

Food allergies and sensitivities. Many people have them and don't realize it. Some may notice that a particular food always gives them a discomfort or bloating, this can be a sign. When you eat food to which you are allergic it causes intestinal inflammation.

Some people have severe allergy, for example gluten sensitivity causes celiac disease with severe inflammation and damage to the intestine. IBS, irritable bowel disease does the same. Candida infection, food poisoning, traveler's diarrhea all do the same. More about gluten later.

Chronic Stress can damage intestinal lining.

There are more causes, but you get the idea – diet, allergies, chemicals, medications, anything that can damage the lining of the intestine.

So leaky gut is one major reason why the immune system becomes overstimulated and makes antibodies against our own organs.

But there is another.

Certain foods have components similar in structure to thyroid gland or to some other organ. There are bacteria and other microbes that have proteins similar to the thyroid gland or another organ. For example, gluten. It has some proteins that are not exactly the same but very similar to some thyroid proteins.

If you have gluten sensitivity, even minor, your body will make antibodies against gluten. But because some thyroid tissues look similar to gluten, these antibodies attack not only gluten, but the thyroid also. Sort of a case of mistaken identity. Same with some milk proteins, like casein and whey. Same with some microbes. Since normally these microbes are located in the intestine, outside the body, this is not a problem. But in a leaky gut situation they start getting inside and trigger the antibody production.

To summarize, Hashimoto's is caused by overzealous, overstimulated, crazy immune system that has gone berserk. This happens because of leaky gut, certain food sensitivities and imbalance between good and bad bacteria in the intestine. Plus, some cases of mistaken identity, when the immune system makes antibodies against one thing, but they attack a similar looking structure. Overstimulated immune system makes antibodies mostly against the bad guys, but also against

the good ones, including thyroid. This slowly destroys the thyroid gland, making a person hypothyroid.

Now that you know why people develop Hashimoto's, we can start talking about treatment, which we'll do in the next lecture.

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Lecture 14. Thyroid medications

In the last two lectures we talked about Hashimoto's, the #1 cause of low thyroid in the developed world. We talked about the role of the immune system and the role of the intestine, especially leaky gut syndrome. In the "developed" world we use tons of chemicals, drugs, altered, processed, unnatural foods and the result is great many diseases, including low thyroid.

This lecture will begin the section of hypothyroidism treatment.

First, a person may have hypothyroidism not because there is something wrong with the thyroid gland. The gland may not be functioning properly simply because it is not getting all the things it needs. It's like a bone marrow, which produces red blood cells, will not make enough of them if there is not enough iron. Nothing is wrong with the bone marrow, but you simply cannot make red cells without iron. Many people have low thyroid because they are low in iodine. In the US the number one cause is Hashimoto's thyroiditis.

Just like any other organ in the body, thyroid gland needs nutrients, proteins, fats and carbohydrates, it needs vitamins, minerals and anti-oxidants. In short, it needs everything that all the other cells need. But it also has some special needs, for example it needs much more iodine than any other cell. And it needs more tyrosine. It has certain nutritional preferences and it does not like certain foods, and if you disregard that, it can contribute to low thyroid. I will discuss all that in a future lecture,

Today we will be talking about thyroid medications.

With most hormone deficiencies, the treatment is straightforward. If a patient does not have enough of hormone X, he or she will have some symptoms and often some abnormal blood tests. And if hormone X is low then we need to bring it back to normal. For example, many people with diabetes do not make enough insulin because of genetic reasons. So we just give them extra

insulin to make the level what it should be. The insulin we use it identical to the insulin produced by the body.

With low thyroid we do the same thing. We check if the thyroid is capable of making the hormones, we make sure that it has all the ingredients. If the gland cannot make enough hormones, like in a case of Hashimoto's, we give the person extra thyroid hormones to make the levels normal.

Ideally, like with insulin, we should give the same hormones that the body makes, T3 and T4. They do exist and I'll talk about them in a moment. For now, I'll just say that they are not very popular because the pharmaceutical industry promotes synthetic hormones because they are more profitable.

You see, natural hormones cannot be patented. To be profitable, a pharmaceutical company wants to have a drug that it can patent. But you cannot patent natural substances. You cannot patent an apple or a carrot. And you cannot patent real T3 or T4. You can only patent something brand new, something that did not exist before you invented it, something not natural.

Sometime in the 1950s someone came up with an idea of a synthetic thyroid, which could be patented. They called it Synthroid, short for synthetic thyroid. They took a real T4 molecule and replaced one hydrogen atom with a sodium atom. T4 naturally has hydrogen, but it does not have sodium. When we substitute sodium for hydrogen we get a brand-new molecule that never existed in nature but it still looks very much like T4 with one minor difference. Now you have something you can patent.

This fake thyroid is not called T4 anymore, it's called levothyroxine sodium, brand name Synthroid. Even though Synthroid is different from the real T4, it is similar enough that it actually works in about 7-8 people out of 10.

I have heard some people, even doctors, refer to Synthroid as "bio-identical" hormone. Bio-identical means identical in structure and function. For example, we use bio-identical estrogen and progesterone for postmenopausal women. They are exactly the same as the hormones that the body makes. You cannot tell them apart. That's why they work as if they were naturally produced by the body.

Synthroid is not bio-identical. It is fake. You can easily tell it apart from T4. But structurally it is pretty close, which is why it works in many people.

Ever since it was introduced, Synthroid has been one of the most prescribed drugs in the US, with over 100 million prescriptions a year, which puts it, depending on the year, in the top 5, sometimes in the top 3 prescribed drugs in the country.

Just like fake T4, we can make fake T3, which works in most people. It is sold under the name Cytomel. I told you that about one out of five people taking Synthroid does not have good results. In that case doctors may try adding Cytomel to Synthroid or using just Cytomel.

Ok, so now we know about synthetic thyroid hormones. What many people do not know, including many doctors, is that real natural hormones are available and can be prescribed just like the fake ones.

After all, doctors have been treating hypothyroidism for over 200 years, since early 1800s, long before TSH and other blood tests became available and long before Synthroid was invented. They listened to patient's symptoms, asked questions, looked for certain signs and made the diagnosis. The emphasis was always on the symptoms. The medication doctors used was something called "desiccated thyroid." Desiccated means dry.

Desiccated thyroid is not really a drug. It is dried-up thyroid gland of animals, usually pigs. It turns out that all the animals – pigs, sheep, cows, etc. – have a thyroid gland which is exactly the same as human. It produces exactly the same hormones as the human thyroid – T4, T3 and calcitonin. And in exactly the same proportion – about 80% T4 and 20% T3.

If you dry up a thyroid gland of a pig, a sheep or a cow, it eventually turns into a powder from which you can make a pill. Today they mostly use pigs for that. There are many companies that make desiccated thyroid, the most well know is Armour Thyroid, or simply Armour. There are other companies that make dried up thyroid, such as WP thyroid, NP thyroid, Nature-throid, Wellthroid and others. The main ingredient is the same in all of them, the only difference is the binding agent or agents that hold the powder together to form a pill.

The advantage of using Armour is that it provides all the same hormones as the human thyroid gland and in the same proportions. It is a very effective treatment, and many holistic doctors prefer it to Synthroid (synthetic thyroid). Many of my thyroid patients came to me because they were taking Synthroid but did not feel better. But they did great with Armour.

Many medical doctors are reluctant to prescribe Armour. First, many don't even know that it exists. All they know is Synthroid. Those doctors who do know about Armour have been told that it is unreliable, because who knows how much thyroid you are getting from pigs' thyroid and so on. This is a lie, because Armour is regulated by the Food and Drug Administration just like all the drugs, just like Synthroid.

And even though Armour is not really a drug, you still need a prescription to get it, so you will have to work with a medical doctor who is willing to prescribe it.

Now, about the dose. Both Synthroid and Armor come in a variety of doses. Synthroid starts at 25 mcg and goes all the way to 300 mcg with many doses in between. Each pill has a different color because a dye is added, so 25 mcg pill is orange, 75 mcg is violet, 100 mcg is yellow and so on. The only one without the dye is 50 mcg, which is white. When I have a patient who is taking Synthroid and is doing well on it, I try to switch her to the 50 mcg white pills. So, if she is taking 75 mcg, which is violet, I give her 1 and ½ of white instead, which gives her the same 75 mcg but without coloring chemicals. Or, if she is taking a 100 mcg yellow pill, I give her 2 whites.

We don't have this problem with Armor, because all the pills are white, regardless of the dose. The pills range from quarter grain or 15 mg to 5 grain or 300 mg.

Then there is a question of how much medication the patient needs. Most doctors make that decision based on TSH. Just like they decide to treat a person only if her TSH is higher than normal, they are happy when TSH returns down to "normal" Even if the patient still has the symptoms of low thyroid, if her TSH is OK, most doctors will not increase the dose.

Holistic doctors like me listen to the patient, find out if her/his symptoms have improved, and adjust the dose based on how the patient feels. In other words, we do not treat numbers, we treat people.

Now you are familiar with thyroid medications, so in the next few lectures we'll continue to talk about treatment of hypothyroidism because it's not enough to just give thyroid hormones. It is important to correct and improve all other factors that contribute to low thyroid.

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Lecture 15. Supplements that help thyroid

In the last lecture we talked about medications for low thyroid. The most popular one is synthetic T4 called Synthroid or levothyroxine sodium. There are multiple other generic preparations of Synthroid with different names, but they all have the same chemical structure, with one hydrogen replaced by sodium.

Less popular among "regular" doctors, but often used by holistic doctors are the natural T3 and T4. They come from dried up thyroid glands of pigs and produce better results because they are not fake, like Synthroid, but real. There are many companies making desiccated or dry thyroid, they all have different names, but we usually just call desiccated thyroid Armour thyroid or simply Armour.

Today we'll talk about general treatment of hypothyroidism with emphasis on nutritional supplements. In the next lecture we'll talk specifically about treatment of Hashimoto's.

If a doctor diagnoses you with low thyroid, the first thing they do is give you a thyroid medication, usually Synthroid. And this usually helps, once you find the right dose. We'll talk about the right dose later.

For now, let's just consider why the person has low thyroid and has low T3 in the blood and inside the cells. Sometimes it's because she does not have the thyroid gland. It was removed or destroyed by radiation. In this case medication is the only solution. It doesn't matter how much iodine you consume, you still can't make any thyroid hormone without the thyroid gland.

But in 90 % of cases people have Hashimoto's, where the person still has the thyroid gland, although partially destroyed by the immune system. The person still has the thyroid gland, but there are fewer thyroid cells because some or many are gone. These people usually also need medication, although the dose may be less than in a person without the thyroid.

In short, almost all people with hypothyroidism end up taking thyroid medications. And most of these people do nothing else, just take medications. In most cases they feel so happy, so much better than before, that they don't think there is anything else that needs to be done. And that's where they are wrong. In most people we can reduce or even eliminate (rarely) thyroid medication if we make the thyroid gland work as productively as it can.

Thyroid cells are just like all the other cells in the body. They need proteins, carbohydrates and fats. They need vitamins and minerals and essential fatty acids. They need anti-oxidants and phytonutrients and many other things.

Things that we need but cannot make ourselves are called *essential*. These include vitamins, minerals, essential fatty acids and many other *essential* things. We must get all these things from food. And we did, up until about 100 years ago, when we started eating refined food, processed food and artificial food. The result is that many people are deficient in essential nutrients. That's why we use supplements.

We certainly get enough calories, but many people are deficient in important nutrients and need supplements. I think it's a good idea for everyone to take a good multivitamin/multimineral supplement. But I mean a good one. The one being advertised everywhere as #1 is not good, it's junk. It uses the cheapest ingredients that are poorly absorbed and contains dyes and potentially harmful chemicals.

Your doctor, if he is knowledgeable about these matters, will help you find a good multi. In my practice I use high quality supplements from several reliable companies.

It bears repeating. The best source of all these essential substances is food.

For example, you get the best fish oil by eating fish. Any fish or seafood contains fish oil, some more, some less, but it's natural, high quality fish oil that your body needs. Or you can get a fish oil supplement. And here you are at the mercy of the company that produces fish oil. How was the fish or krill processed to get the oil? Was high temperature used? Were chemicals used? Is the product in the form of triglycerides or in some other form? Is the product pure or contains contaminants? Does it supply the right combination of omega 3 fatty acids? Most people don't

realize all the factors that need to be considered, which is why a knowledgeable doctor is very helpful. And that's why it's important to use products from reputable companies.

Yes, they are usually more expensive, but they are also much healthier, more absorbable and as close to natural as possible.

Why do we need all these essential nutrients? For thousands of things. Vitamins and minerals are often used as structural components, like calcium for bones, iron for hemoglobin in red cells. And, of course, iodine to make thyroid hormones. They also function as co-enzymes.

Enzymes are special proteins, each performing a certain function, from digestion of food to creating hormones and regulating various biochemical processes. There are literally tens of thousands of enzymes in the body and without them life would not be possible.

You know that to make thyroid hormone you need to combine 2 amino acids called tyrosine with 3 or 4 iodines. We make it happen with the help of an enzyme call thyroid peroxidase (TPO).

To turn inactive T4 into an active T3, you need an enzyme deiodinase. Every important process in the body uses one or more enzymes.

Each enzyme needs one or more helpers. They are called *co-enzymes*. They must be present or else the enzyme will not work.

For example, imagine that you have the most recent Ferrari with all the advanced gadgets. You get into the driver's seat and press the start button. And nothing happens. Because you don't have the key. A little thing like a key is missing and your whole car does not work. In this example, the car is an enzyme, the key is co-enzyme, and as you see, coenzymes are just as important as enzymes.

The enzymes involved in production and release of thyroid hormones need many coenzymes. TPO needs iodine, zinc, copper, iron, vitamin D, vitamin A, chromium and quite a few other things to do its work. De-iodinase, the one that removes one iodine from T4, needs selenium. All the processes involving thyroid, from the production of TRH and TSH, production of T3 and T4, T3 going into the cells and doing its work there require multiple enzymes.

In other words, for thyroid to function properly, it needs quite a few vitamins and minerals. This is true about every organ in the body

There are many herbs that help thyroid gland. For example, guggul, which was used a lot in old Indian medicine called Ayurvedic medicine and is still used today. It has other names like *Commifora Mucul*. We are familiar with guggul as the herb that reduces the cholesterol level, which it does, but maybe the reason it works is because it improves the thyroid.

Ashwagandha is another Indian herb, it's Western name is Withania. It belongs to a class of adaptogens. They reduce stress, which improves T4 to T3 conversion. In addition, Ashwagandha

has separate positive effects on thyroid. I use a supplement that combines many of these products in a single pill. Of course, you can't put everything into one pill, just the essentials.

Many people have low vitamin D level, which is bad for bones and for immune system and may have a role in Hashimoto's. It's good for circulation, cognitive functions and has many other good properties. I check vitamin D level in everybody and give a supplement if the level is not high enough.

Many people, especially women, are deficient in Magnesium, starting from childhood. Magnesium participates as a structural enzyme or co-enzyme in almost 300 different reactions in the body, including many related to thyroid and I often give it to my hypothyroid patients.

There are supplements that restore proper balance of bacteria in the intestine and reduce leaky gut syndrome, like probiotics, digestive enzymes, and others. I will mention them in the next lecture where I'll talk about intestinal aspect of thyroid disease,

As you see, treating low thyroid is more than just taking a thyroid medication. It involves good diet, eliminating certain things, adding certain things, taking supplements. That's in addition to taking a medication.

Two more things that are good for the thyroid, and tor the whole body for that matter, is 1.getting enough sleep, which usually is 7-8 hours a night and 2. avoiding excessive stress. If stress is unavoidable, use relaxation techniques that work for you, from yoga and tai chi to just relaxing for 5-10 minutes or maybe meditating for 5-10 minutes with your eyes closed and concentrating on your breathing.

Next time we'll talk about gastro-intestinal aspect of thyroid disease and why GI tract needs to be fixed.

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Lecture 16. How to treat leaky gut

In the last few lectures, we talked about medications for low thyroid and the fact that almost all the people with low thyroid will need a medication. We also talked about supplements like vitamins, iodine, selenium, zinc and other minerals and herbs that make thyroid gland healthier.

Since most people with low thyroid have Hashimoto's, when their own immune system makes antibodies against the thyroid gland, the best thing is to quiet down the immune system. That does not mean suppressing the immune system with drugs. You want to have a strong immune system, what you don't want is the immune system that is overwhelmed because of overstimulation and goes crazy, making antibodies against everything, bad and good.

We know that the main reason for this is leaky gut syndrome, where the intestine becomes porous and permeable to all kinds of bacteria, parasites, viruses, yeasts, toxins, and undigested food particles. This makes the immune system exposed to 10-20-50 times more things than it was designed to handle, which makes it overstimulated, overexcited, and crazy.

This means that if you want to treat low thyroid, you need to get rid of leaky gut. Because just taking thyroid medications will not stop the immune assault on the thyroid gland. Plus you need to take the right supplements and the right herbs for the thyroid.

In one of the previous lectures, I told you about the things that contribute to leaky gut. It's everything that irritates the intestine and makes it inflamed. Most people in developed countries have leaky gut to some extent, because they are all exposed to the same risk factors that make the intestine inflamed.

Let's briefly review what makes intestine inflamed. First the diet. When I say "diet" I don't mean trying to lose weight. I mean things that you normally eat. Standard American diet (SAD diet) is full of processed foods filled with preservatives, coloring agents, flavor enhancers and many other chemicals, so that an average person consumes about 160 pounds of these chemicals per year.

An average person uses over 60 pounds of sugar per year. This not only irritates the intestine but also favors the growth of Candida, other yeasts and bad bacteria, because they love sugar.

We use so called vegetable oils that people never used in the past. Canola, corn oil, sunflower oil, cottonseed oil, soybean oil and many others. These oils are extracted using chemicals and heat. They are not designed for human consumption, and they irritate the intestine. Add to that "partially hydrogenated vegetable oils", totally unnatural and harmful.

Medications such as pain killers, acid blockers, antibiotics, synthetic hormones, birth control pills and many others irritate the intestine.

Many people have food allergies and sensitivities.

All of that contributes to dysbiosis, when the proportion of the bad bacteria is higher than is good for you.

There are many other factors, but that's enough for now. So, what do we do to fix the leaky gut?

We try to eliminate as many of the factors I just mentioned as possible, and we use some nutritional supplements.

First, you need to clean up your diet. SAD diet includes many processed and packaged foods with thousands of FDA approved chemicals. Don't eat any food that has ingredients which you cannot pronounce.

Second, you need to cut down on sugar. By that I mean any product containing sugar, whether obviously, like a cake or ice-cream or added to food under the names like glucose, corn syrup, high fructose corn syrup, and so on. There are over two dozen different ways to describe sugar, you can download a special report on LowThyroidDoctor.com. Just remember, all the bad bugs in your stomach love sugar.

I don't mean that you should never eat an ice cream or a piece of cake or a doughnut. But do it as a treat, not a daily part of the diet.

Don't use so called "vegetable oils", don't use partially hydrogenated oils. Use natural products, like olive oil, butter, lard, coconut oil.

See if you can eliminate some medications you take on a regular basis. If you take a pill for a headache occasionally, that's OK. But if you take a daily pain killer for chronic arthritis, see if you can use natural pain killers instead, such as Boswellia and Turmeric, which by the way are also good for intestinal inflammation. Plus, there are other natural things that help arthritis. Consider not using birth control pills, use another method instead. Don't take an antibiotic when you don't need it. Antibiotics are not effective against viruses, so there is no point taking them if you have a cold or a flu. But they can cause a lot of inflammation in the intestine, making leaky gut worse.

Look into food allergies. If you have discomfort after eating a particular food, like cramps, pain, bloating or gas, you may be allergic. You can exclude this food from your diet for a few weeks and see how you feel.

You definitely have to exclude gluten. This is a protein found in wheat, rye and barley. Some people have a severe gluten allergy which is called celiac disease. Most people do not have celiac disease, but they may still have gluten sensitivity. If you have Hashimoto's you almost certainly have gluten allergy and eating even a small amount of gluten worsens leaky gut. Plus, remember that antibodies made against gluten can attack the thyroid. On the other hand, if you go gluten-free you will definitely notice improvement in your Hashimoto's.

This applies to dairy products as well.

Ideally, your diet should be as close to natural as possible, without added sugar or chemicals or unnatural oils.

And don't listen to people who tell you to avoid meat, eggs, butter and other animal foods because they are high in cholesterol. Cholesterol does not cause heart disease or hardening of the arteries. You can eat meat, whether it's beef or lamb or chicken or any other kind, eat your eggs, fish, everything that's natural. But don't eat hot dogs and cold cuts, because they are full of

chemicals. Same with fruits and vegetables, the closer to natural the better. Cooked oatmeal is fine, but a cereal made from oats that looks like little colored doughnuts is highly processed and is full of chemicals, so don't eat it.

It's also important to drink enough water. Enough does not mean 8 glasses a day. Enough means drinking when you are thirsty and making sure that your urine is light yellow or clear, not dark.

Now let's talk about supplements that you can take to help leaky gut.

I mentioned that antibiotics promote yeast, Candida and bad bacteria because they kill a lot of good bacteria. The solution is to bring in more good bacteria which are also called probiotics. Normally we get probiotics from food, especially fermented foods like kefir, plain yogurt, sauerkraut, sourdough bread, fermented vegetables like pickles. Any vegetable can be fermented and in many countries people eat fermented tomatoes, fermented garlic and any other vegetable you can imagine. There are also many supplements that provide probiotics. I'll talk about probiotic supplements in a moment.

Digestive enzymes are very important. They break the food down into small units from which the food is made. Pancreas is the organ that makes digestive enzymes. When you are young, you make lots of enzymes, not only enough to digest the food you eat but much more, so extra enzymes go into the blood and digest/break down the waste products that are always produced by the cells. But as we get older, the pancreas makes less and less digestive enzymes, so many people over 50 do not have enough enzymes to digest the food they eat.

Food that is not fully digested is not absorbed. It stays in the intestine and provides food for the bad bacteria, yeasts and parasites. If you notice bloating, gas, discomfort after eating, you probably need digestive enzymes. If you are 50 or older, you definitely need enzyme supplements. When you start taking digestive enzymes you will notice an improvement in bloating, gas, belching, indigestion and other digestive symptoms.

Anti-inflammatory supplements like Boswellia and Turmeric are good for any kind of inflammation, including intestinal.

An amino acid L-glutamine also has anti-inflammatory effect on the lining of the gut and is a very good supplement to take.

Omega 3 fatty acids are also good anti-inflammatory agents, besides being good for circulation, heart health and brain health. You can get it from eating fatty fish or from taking supplements.

There are certain plants and supplements that help kill bad bacteria, like Artemisia or Wormwood, Olive leaf extract, garlic, and many others.

You know that there are about 100 trillion microbes living in our intestine. They are known as intestinal microbiome. Some of these microbes are bad for us, especially in large amounts, and especially if there aren't enough good bacteria to protect us. These good bacteria or probiotics do

many good things for us. They digest certain things that we can't, they produce certain vitamins, they activate Thyroid hormone, turning T4 into T3.

Probiotics are important for the immune system, they produce substances that bad bugs do not like. One of them is lactic acid. Bad bugs do not like acidity, but good ones do. There are over 400 types of good bacteria. One of the most numerous is called Lactobacillus acidophilus. Acidophilus means acid loving. Good intestinal bacteria protect us from leaky gut, from traveler's diarrhea, from IBS and other intestinal conditions. Probiotics even have an effect on cardiovascular and mental issues.

When looking for a good supplement, make sure that it contains many billions of probiotics, like 40 to 50 per capsule, many types of Lactobacillus and many types of another important probiotic called Bifidobacterium.

There is something called pre-biotic. This is the food for probiotics. There are several kinds. They are what we also call "fiber." We cannot digest it, but probiotics can and do. Pre-biotics are found in fruits, vegetables, legumes, root vegetables and everywhere else where you expect to find fiber.

When it comes to supplements, I tell you what works and it's up to you to get them and use them, or not – it's your choice. You just need to be aware that, like with everything else, some products are better than others. I do not make any supplements, but I do make supplements available to my patients if they choose to get them from me. I use products made by reputable companies that have been in business for decades and are known for high quality. They all have 3rd party testing, in other words they send their products to another independent lab to be tested for quality and content. These companies usually do not sell directly to consumers, only to health professionals.

To summarize, proper treatment of low thyroid is not just about taking the right dose of the right medication. It is also about healing the thyroid, supporting thyroid, providing it with the things it needs to stay healthy and repairing the leaky gut syndrome, reducing gut inflammation, help digestion and balance the intestinal microbiome.

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Lecture 17. Good foods, bad foods

In the last lecture we talked about a diet that's good for low thyroid. Today I would like to talk about specific foods that may help people with hypothyroidism and foods that can hurt the thyroid.

I mentioned before that thyroid gland, just like any other organ, needs all the nutrients, vitamins, minerals, amino acids, essential fatty acids and antioxidants. At the same time, thyroid needs more iodine than other organs. It needs zinc, selenium, magnesium, vitamin A, vitamin D, vitamin B12. It needs a lot of amino acid tyrosine and a few other things.

I told you general principals about a good diet for low thyroid, mostly what not to eat. Now I would like to mention specific foods that might be useful and helpful.

Helpful is the key word here. Most people with low thyroid, regardless of how good their diet is, will need thyroid medication. The role of the diet is to reduce the destruction of the thyroid by the immune system and to help the repair process. Supplements, such as vitamins, minerals, probiotics and herbs have the same function.

To make the thyroid hormones, your thyroid gland needs an amino acid *tyrosine*. It can come from food, or we can make it ourselves from another amino acid called *phenylalanine*, which also comes from food. Fortunately, both of these amino acids are plentiful in all the natural foods containing protein. Meat of any kind, fish, eggs, beans are good sources.

Whole eggs are not only a good source of protein, they also contain lots of vitamins and minerals, including iodine, selenium and vitamin D.

Fruits and vegetables usually contain very little protein, if any. But they are still very important for good health because they contain many vitamins, minerals, fiber, bioflavonoids, and other beneficial substances that are good for your health.

Thyroid gland needs a lot of iodine, which is found in abundance in the ocean and the coastal areas. Seafood and the plants growing in the ocean and the coastal areas contain good amounts of iodine. Plants growing inland usually don't have much. That's why about 100 years ago they decided to add iodine to salt.

Seaweed (kelp, arame, nori, dulse and others) have a good amount of iodine, especially kelp which can have as much as 2000 mcg or more per gram, depending on where it is grown. Fish and shellfish are good sources. Eggs, baked potato, cranberries are also good. RDA for iodine is 150 mcg, higher in pregnant and breastfeeding women.

Seafood, such as tuna fish, cod, salmon, sardines, mackerel are good sources of iodine, protein, selenium, and omega 3 fatty acids. Oysters and crabs are a good source of zinc.

Nuts and seeds are good for thyroid. Brazil nuts are an excellent source of selenium, one nut has up to 100 mcg. Other nuts, such as walnuts, almonds, pecans have selenium, zinc, vitamin E. Pumpkin seeds and sesame seeds are good sources of zinc, selenium, magnesium and copper.

Beans and lentils are good sources of protein, iodine and small amounts of zinc.

Spinach is a good source of vitamins A, K, Folic acid and minerals iron and magnesium. It's also high in antioxidants plus lutein and zeaxanthin (good for the eyes). Most leafy vegetables are good.

Berries – blue, black, red – are high in vitamin C and antioxidants.

Fermented foods, like yogurt, kefir, buttermilk, sourcrout, fermented pickles, miso, kombucha, sourdough bread provide good intestinal bacteria, also known as probiotics.

Foods that can affect thyroid negatively.

There are foods that may have a negative effect on the thyroid, especially when used in excess. They are called *goitrogens*. The reason they are bad is because they may interfere with the absorption of iodine and with the production of the thyroid hormones.

These foods mostly affect people who are low in iodine and are not as harmful for people with normal iodine levels. As you know, iodine is essential for normal thyroid hormone production.

Surprisingly, some of these foods are the same that are considered good for the thyroid, so it's a matter of the amount.

Certain cruciferous vegetables contain goitrogens, which can interfere with iodine uptake, especially when consumed in large amounts. Broccoli, cauliflower, cabbage, brussels sprouts, kale, bok choy, turnips, mustard greens are in this category. Cooking these vegetables reduces the goitrogenic effect.

Soy and soy-based products contain isoflavones, chemicals that may interfere with iodine absorption and thyroid hormone production, especially in people who are iodine deficient or have existing thyroid issues. Use edamame, soy milk, tofu, tempeh and soy sauce in moderation or not at all.

Some grains (millet), fruits (pear, peaches), nuts (pine nuts, peanuts), beans (lima beans, kidney beans, garbanzo beans), lentils, sweet potato, flaxseeds and a few other foods can be goitrogenic, especially in large amounts.

Paradoxically, taking large amounts of iodine could interfere with thyroid function. Eating a lot of kelp or taking large amounts of iodine supplements can reduce thyroid hormone production.

A few important points about goitrogenic foods. Cooking usually reduces goitrogenic effect. Eating foods in moderation does the same. And negative effects are less pronounced or may not even manifest at all in people who are not iodine deficient.

Click here to download free report on how to check yourself for iodine deficiency.

And remember, foods that are not goitrogenic can still be harmful. That's why anything that irritates and inflames the lining of the stomach should be avoided – processed foods, chemicals, excessive alcohol, pain killers, fertility and other drugs, especially antibiotics, too much sugar and especially gluten and milk products. We have discussed this in the previous lecture.

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Lecture 18. Tests you can do at home to see if you have low thyroid

In the last lecture I talked about specific foods that are good and bad for thyroid. Today I want to talk about things you can do at home to see if you have low thyroid. You can do them before you see a doctor and have a blood test.

1. Symptoms

First, let's look at symptoms. By now you know the most common:

Low energy, feeling tired.

Depression, brain fog, lack of motivation.

Feeling colder than others.

Weight gain, difficulty controlling weight.

Dry skin, which can be cracking or scaly or inflamed.

Hair loss.

Constipation.

Aches and pains in the muscles and joints.

You can download a complete list here and see how many you have. The more symptoms, the higher the chance of having low thyroid.

2. Temperature

You know that low thyroid makes your metabolism go down, so you burn fewer calories to produce energy and heat. That's why you feel colder than others. And that's why checking the temperature is one of the tests for low thyroid. Normal temperature is around 98.6 in most

people. That's during the day, when you are moving, working, doing something. If you were to check the temperature in the morning *before* getting out of bed, it could be one degree lower, 97.6 or thereabout. This is called *basal temperature*, in other words the real temperature, when the body is not moving and not doing anything.

If you check your basal temperature and find that it is 95 or 96 or even 97, this is a strong suggestion for low thyroid. You can put a thermometer by your bed before going to sleep and check the temperature first thing in the morning, as soon as you wake up. Then write it down. Keep doing it every day for 5-7 days. If your temperature is consistently below 97, then you have a very high chance of being hypothyroid.

In my experience, people with untreated hypothyroidism have low temperature even during the day. I have seen many patients whose temperature was 94 or 95 during the day, when they came for an office visit.

Check your temperature, either basal or just randomly during the day for 5 to 7 days. If the temperature is significantly lower than normal, then you most likely have low thyroid.

3. **Heart rate**

According to the textbook, normal heart rate in adults is 60 to 100 beats per minutes (bpm). But most people do not have 60 bpm or 100 bpm. Most are around 70-80. There are two exemptions.

One – trained athletes. Their cardiovascular system becomes so efficient that they can have lower bpm, 40 to 60, sometimes even as low as 35. Another group with low bpm is people with low thyroid. They may have 50-60 bpm.

The easiest way to count your pulse is manually, by feeling the pulse and counting how many beats you have per minute. You don't need to count for the whole minute. You can count for 10 seconds and multiply it by 6. Or 15 seconds and multiply it by 4. Of you can use a gadget, like an apple watch or something similar that checks your pulse.

If you are not a trained athlete, if you don't run 10 miles every day and you have slow heart beats, it's another strong suggestion that your thyroid may be low.

4. **Swelling**

Because in people with low thyroid the heart slows down and does not move blood efficiently, because the kidneys are not as effective, there is fluid accumulation in the body. Sometimes in places that you cannot see – around the heart or around the lungs. Fluid in the carpal tunnel can produce carpal tunnel syndrome.

But there are places where you can see water accumulation. Toes, feet, lower legs can be visibly more swollen, or you can see an imprint when you take your socks off.

Face may look puffy or there may be puffiness under the eyes.

Tongue can become slightly swollen and press against the teeth. It's usually mild, so people do not notice it, but in rare cases it may interfere with speaking and swallowing.

There is a simple way to check whether your tongue is swollen or not. Stand in front of the mirror and stick the tongue out slightly, not all the way. If it is swollen, you will see teeth impressions on it. Normally, the tongue should fit in the mouth perfectly and not press against the teeth. If you see toothmarks, it's another strong suggestion of low thyroid.

5. **Hair loss**

Hair loss is one of the common symptoms of low thyroid. You can lose hair on the head, on the body and wherever else you have hair. Everyone loses some hair every day, but in low thyroid the loss is noticeably much heavier.

Also, there is one spot that is particularly typical for low thyroid. It's the outer third of the eyebrow.

If you mentally divide an eyebrow into three parts - inner (closer to the nose), middle and outer, the inner and the middle parts will look OK. But the outer third will look a lot thinner. This is also a very strong sign that you may have low thyroid.

Speaking of hair, it can look more coarse than usual. Skin may appear yellowish and may be dry and rough.

Nails may have ridges on them, they may be brittle, weak, and break easily.

6. **Iodine deficiency**

You know that thyroid cannot make hormones without iodine. You also know that many people are deficient in iodine, which could cause low thyroid. In this case they need to eat more iodine-rich foods and may need a supplement.

Here is a short explanation on how to do a home test for iodine deficiency. You can download a longer, more detailed version from LowThyroidDoctor.com. Take a bottle of liquid iodine they sell in the "first aid" isle in the pharmacy. It's sold under the names Betadine, Povodine, and others. People put it on scrapes and bruises as an antiseptic.

Dip a Q tip in it and paint a circle the size of an egg or a tennis ball anywhere on your skin. Forearm, abdomen, inner thigh – any place you like. Or you can soak a cotton ball in iodine to paint the circle.

Once you have a nice solid circle, note the time. Usually, iodine stains stay visible for a few days, but at least 24 hours. However, if you are low in iodine, your skin will absorb iodine much faster. The stain may be gone within just a few hours. If that happens, there is a very high likelihood that you are low in iodine and more prone to low thyroid.

I want to emphasize that all these things are not diagnostic. In other words, you cannot say that you definitely have low thyroid if your temperature or hear rate are low. But they are very suggestive. If you have the symptoms and one or more things that I just talked about, it's time to contact a knowledgeable doctor who will do the proper thyroid tests, not just TSH.

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Lecture 19. Subclinical hypothyroidism – is it real?

In the last lecture I talked about tests you can do at home before seeing your doctor. Or you can use them to monitor how well your treatment is working. Today I'll talk about Subsclinical Hypothyroidism or SCH.

The prefix "sub" means below or under. Like suboptimal or submarine. Subclinical in this case means less than clinical. In other words, a clinical case of hypothyroidism is obvious, because there are the symptoms, and the blood tests indicate that the problem exists. There is high level of TSH and low level of T4 and T3.

We talked about all these hormones before but let me refresh your memory. TSH stands for Thyroid Stimulating Hormone. It's produced in the brain by the pituitary gland and its job is to stimulate the thyroid cells, make them work harder to produce more thyroid hormones. When the thyroid hormone production goes down, the level of TSH goes up, to stimulate the thyroid gland. In other words, higher TSH means that the body is not happy with thyroid hormones production and wants more of them. On the other hand, if thyroid hormones are too high, the level of TSH is going to be very low, so as not to stimulate the thyroid gland.

In most labs "normal" TSH level is from 0.4 to 4.0 or 4.5. Higher level of TSH means that the person has hypothyroidism. The optimal level of TSH is not 4 or 4.5. It is less than 2. That's what 95% of normal people have. There is a discussion about reducing "normal" TSH to reflect that. But for now, if your level is higher than 2 or 2.5, there is a very good chance that you have hypothyroidism. The chance is almost 100% if your TSH is higher than 4-4.5.

Suboptimal hypothyroidism (SCH) is defined as a situation when TSH is high but T4 is normal and there are no or minimal symptoms. Let's discuss these 3 elements (TSH, thyroid hormones and the symptoms) in details.

First TSH. High TSH, by definition, is the sign of low thyroid. The brain tells the pituitary gland to make more and more TSH because it senses the lack of thyroid hormones in the blood. The cells of the body send signals to the brain that they are not getting enough thyroid hormones, and the brain tells the pituitary to make more TSH. That's why, in my opinion, high TSH, regardless of anything else, is enough to make a diagnosis of hypothyroidism.

The second part of the definition is that while TSH is high, T3 and/or T4 instead of being low, are "within normal range." We have already discussed the idea that if you are in the "normal range" it does not mean that you are normal. For example, normal range for T4 is 5 to 12. If you were always 10 (in the range) and now you are 7 (also in the rage) we will call you normal, even though you are much lower than you used to be. This is why the brain is making more TSH. You can download a free special report about how a person can have low thyroid and have "normal" blood tests.

The third part is the symptoms. According to the definition, a person with SCH has no or minimal symptoms. As you know, hypothyroidism develops slowly, over a course of months or even years. The symptoms appear very slowly, so the patient has time to get used to them and it becomes "new normal" for her. That's why she may think that she has no symptoms or that she has mild symptoms, because she had a long time to accommodate to them.

SCH is fairly common, especially as people get older. The incidence is 5-10% in general, but it's more like 20% in women over 60.

It is usually diagnosed during a routine blood test, like a yearly physical or in early pregnancy.

The symptoms of SCH are the same as those of regular hypothyroidism, such as low energy, feeling colder than others, gaining weight, depression and brain fog, and all the others. You can download the list of all the symptoms here.

The causes are the same as in regular hypothyroidism, except the patients diagnosed with SCH tend not to be iodine deficient. The main cause is the Hashimoto's disease, slow destruction of the thyroid gland by your own immune system.

The treatment is the subject of some debate. To treat or not to treat, that is the question. Many doctors feel that no treatment is necessary, since T3 and T4 are "normal" and the patient has minimal symptoms. They recommend "watchful waiting" which means doing nothing, and checking T3, T4 and TSH every 6 months. They are willing to wait till TSH reaches 10, some even wait till 15, but most doctors agree that 10 is the red line. They are willing to wait till TSH reaches 10 and then they will begin treatment with Synthroid, even though everything else is still the same – minimal symptoms and T3 and T4 withing normal range.

Then there is the minority of doctors, myself included, who feel that if one's TSH is above 2-2.5 and certainly if it is above 4, this is a clear sign of low thyroid and needs to be treated. Because if you dig deeper, ask about symptoms, look for other signs of hypothyroidism and look at previous

blood tests it often becomes clear that a change has taken place. A change from normal thyroid to low thyroid. So not treating the patient until TSH goes up to 10 or 15 is crazy, tantamount to malpractice.

Of course, you don't start the treatment after just one blood test. Many times, test results come from a lab as abnormal, something that you did not expect. In a case like that the first thing I do is repeat the test, and very often it comes back normal. Problem solved.

But if TSH is 4.9 the first time, you repeat it and it's now 4.8 or 5.0, then it's probably true. You can repeat it again in a month and if now it is 5.1 then it must be correct. Your TSH is too high.

As I said, there is a difference of opinions when to start treatment. To me SCH is hypothyroidism and needs to be treated. If you TSH is high, this is your body's cry for help. This is especially true during pregnancy. According to some studies up to 30% of pregnant women develop this type of hypothyroidism and I think they should be treated. In general, pregnant women should be carefully monitored for hypothyroidism because it develops quite often during pregnancy. And in pregnant women it's better to err on the side of treatment, because developing fetuses need enough thyroid hormone.

Generally, women with low thyroid have difficulty getting pregnant. Even if they do conceive, there is increased risk of abortion and various complications like hypertension and others. When it comes to the developing baby, it absolutely depends on adequate mother's thyroid function. Thyroid hormones are not only important for the overall physical development and growth of the baby, it's especially important for the brain and nervous system. Children born to mothers with low thyroid often have lower IQ and decreased psychomotor development.

To summarize, Subclinical Hypothyroidism is hypothyroidism and needs to be treated.

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Lecture 20. Conditions whose treatment causes low thyroid

In the last lecture I talked about Subclinical Hypothyroidism or SCH. And I told you that in my opinion, and that of many other doctors, there is no such thing. If you have high TSH then your thyroid is low and you need treatment.

Today I am going to talk about some thyroid diseases and conditions that do not cause low thyroid by themselves, but their treatment can and often does.

I will talk about goiter, Grave's disease, thyroiditis, thyroid nodules, hyperthyroidism and thyroid cancer.

By far the most common thyroid problem is hypothyroidism, low thyroid. Well over 30 million people (mostly women) are diagnosed with it and at least as many also have it but are not diagnosed. Medications for hypothyroidism are in the top 5 most prescribed drugs. We have discussed low thyroid in some details, so now let's talk about other thyroid conditions that can lead to hypothyroidism.

Goiter is a visible swelling of the thyroid; you can see it with a naked eye. There is a bulging where none should be because normal thyroid is tiny, you cannot see it or feel it. Many thyroid conditions can cause goiter. Some also produce protruding and bulging eyes, like Grave's disease.

Thyroid nodules are very common, especially as we get older or, as I like to say, more mature. Women are 3-4 time more likely to have them. Thyroid nodules are like age spots on the skin. About 60-70% of people have thyroid nodules. Some are very small, so you can't feel them. Some are large enough to feel. Some nodules become so big that they can interfere with breathing or swallowing, but that's very rare. The vast majority of nodules are small, not visible, you can't feel them and they are only visitable on a sonogram.

Most nodule are what we call "cold", they do not produce any hormones. Some nodules are "hot", they do produce thyroid hormones and can even cause hyperthyroidism. We do not know what causes nodules, just like we don't know what causes age spots.

About 95% of nodules are benign. The rest could be cancerous. Any nodule larger than 1-2 cm should be suspected to be cancerous. We monitor nodules with sonograms and sometimes with fine needle biopsy to check if the cells inside are benign. Of course, what's benign today may become malignant later on, so we keep an eye on these nodules and monitor them for any changes. If they should become malignant, we treat them like any other thyroid cancer.

Another thyroid problem is thyroiditis. The ending "itis" usually means inflammation, like arthritis, colitis, conjunctivitis. Thyroiditis is an inflammation of thyroid gland. For example, Hashimoto's thyroiditis is an inflammation of thyroid caused by the overactive immune system, which causes hypothyroidism. But in other kinds of thyroid inflammation, there is an excess of thyroid hormones, which are stored in the thyroid gland and can be released in large amounts. There are many preformed thyroid hormones stored in the thyroid gland. An inflammation causes all these hormones to be released all at once which can create hyperthyroidism.

Thyroiditis can be caused by many things. Sometimes it happens for no apparent reason, and it's called spontaneous thyroiditis. It can be caused by a viral infection, like a flu, then it is called

subacute thyroiditis. Postpartum thyroiditis happens in a woman after she gives birth. Infectious thyroiditis is caused by a bacterial or fungal infection. All the forms of thyroiditis (except Hashimoto's) start by releasing too much thyroid hormone, creating hyperthyroidism, and eventually the gland becomes underactive, ending up with low thyroid.

Another potential cause of hypothyroidism is, paradoxically, hyperthyroidism or overactive thyroid.

The most common cause of hyperthyroidism is Grave's disease, also an autoimmune condition. It is responsible for about 60-80% of all hyperthyroid cases. Graves, like Hashimoto's, is not a thyroid disease. It is caused by your immune system, which makes antibodies that look and act like TSH, thyroid stimulating hormone. As you know, TSH stimulates the thyroid gland into producing and releasing more thyroid hormones into the blood. So having too much TSH-like substance will cause the thyroid gland to overproduce thyroid hormones.

Thyroid nodules can produce thyroid hormones. This kind of nodule is called "hot" and can cause hyperthyroidism. Sometimes a person has many such nodules. This condition is called toxic multinodular goiter and accounts for 10-15% of hyperthyroidism.

Hyperthyroidism can happen in pregnant women. It's called gestational hyperthyroidism.

Depending on the severity, hyperthyroidism is treated with medications that control the symptoms or medications that reduce the production of thyroid hormones. This does not work in some people, in which case their thyroid is removed, completely or partially. This can be done surgically or with radiation. In either case, the result is low thyroid or hypothyroidism.

Thyroid cancer is fairly rare, in 2023 there were about 40,000 cases. Most cancers happen in women 40 to 60 years old, but men and young people of both sexes can get it.

Most thyroid cancers are not aggressive and are easily treatable. They usually grow slowly, do not spread, and have a good cure rate. 5-year survival is about 99.9%. There are certain forms of thyroid cancer that are aggressive and spread quickly, but they are very rare.

Thyroid cancer sometimes has no symptoms and is discovered on routine examination. Sometimes it may feel like a lump or swelling on the neck, causing pain, hoarseness, difficulty swallowing.

Treatment usually involves removal of the thyroid gland, either surgically or with radioactive iodine. Sometimes external radiation is used. The prognosis is usually quite good, and the rate of cure is very high. But the result of this treatment is hypothyroidism.

Most cases of thyroiditis turn into hypothyroidism and need to be treated, but in some cases thyroid function can be restored with diet and supplements, so patients no longer need medications. But they need to be monitored because hypothyroidism eventually returns.

But if part or all of the thyroid gland is removed, it results in permanent hypothyroidism, so the person needs to be treated for life.

I want to emphasize that this was a very superficial discussion of thyroiditis, thyroid nodules, hyperthyroidism and thyroid cancer. The purpose of this discussion was to show that other thyroid conditions can lead to low thyroid, even though they don't start this way.

If you know someone who might be interested in low thyroid, please refer them to LowThyroidDoctor.com so they can download this ebook. Also, if you have questions or comments, please email to DrTeplisky@gmail.com.

As an additional bonus, while available, you can get a free, no obligation 30 min phone consultation with me to see if I can help you figure out if you have low thyroid and what I can do to help you. Just book it online or call my office at 718-769-0997.

Lecture 21. Review and conclusions

If you are reading or listening to lecture 21, I assume that you have read or listened to the previous 20 lectures, and I want to congratulate you on getting to the end of this seminar.

I have provided you with a lot of information and now you know more about thyroid than most people, more even than most doctors. And I am not talking about orthopedic doctors or gastroenterologists or other specialists who do not normally deal with thyroid and know very little about it. I am talking about doctors who are supposed to know – internists, family practitioners and even endocrinologists. So give yourself a pat on the back.

Of course, you realize that all the information I gave you is just a tiny part of what there is to know about thyroid. I will continue to provide more information in my blog, so be sure to subscribe. The more you know, the better decisions you can make. But you certainly know enough to start further actions, especially if you suspect that you have low thyroid.

You are now equipped to see if you have the problem and how you can deal with it yourself. You know the symptoms, you know how to check certain things to confirm the diagnosis (low temperature, low pulse rate, low iodine, missing outer third of the eyebrows, etc.) and you can try some of the things we were talking about – excluding products like gluten and dairy, eating foods that help thyroid, making sure you get enough iodine, eating enough omega3 fatty acids, taking the right supplements and so on. You can download a list here.

There are many people who do only that, without using prescription medications, and many of them are just fine. I've had a few dozen patients like that, I did not give them any medicine, either synthetic or natural. I just monitored their blood tests regularly and adjusted their supplements.

The problem is that most people do need thyroid medications. Most people cannot correct the problem with only diet and supplements. They need either Synthroid with or without Cytomel, and about 3-4 people out of 5 do well with that. But at least 20%, that's at least one out of 5 people, possibly more, cannot turn Synthroid, the unnatural form of T4, into the T3 that the body needs.

That's why natural desiccated thyroid (NDT) is my preferred medicine. And, as you know, it is not really a medicine, it is dried up animal (usually pig's) thyroid, which is standardized to contain 38 mcg of T4 and 9 mcg of T3 per grain. A grain is 60 to 65 mg. Besides the T3 and T4 it contains different minerals, vitamins, proteins, and all the elements that normal thyroid gland contains.

I had two goals in creating this course.

One was to give you information that might help you help yourself. Again, I emphasize the diet, which means eating certain foods and staying away from certain other foods. I recommend the use of supplements. That' s why I have a "store" section on my website. It contains my ebooks plus many very useful supplements. They are all from highly reputable companies that I have used for the last few decades.

The other goal was to explain that most of the time, people with low thyroid need the help of a knowledgeable and experienced doctor, like me. A doctor who knows and understands various manifestations of low thyroid and knows how to correct the problem. Most doctors can't do it. They can deal with a typical hypothyroid patient, by finding high TSH and prescribing Synthroid. That's all they can do. If you have tried that and it did not work for you, the good news is that there are holistic doctors like me, who have seen hundreds or even thousands of patients with low thyroid and know how to deal with the problem. Doctors who are not stuck on and limit themselves to TSH and Synthroid.

This is why I offer a personal coaching program. I email you an order for a very comprehensive blood test (in my experience all insurances pay for the blood test), followed by a detailed consultation, which includes various aspects of your medical history, dietary review, what medications (if any) you take, what supplements you take, and many other things. Then I offer treatment recommendations, which may include medications like Armour Thyroid or another form of natural desiccated thyroid (NDT), and supplements.

You have several choices. This could be a one-time consultation, or a 3-month program, 6-month or 12-month program. Most people choose 12 months, because that gives us enough time to finetune the program that's right for you, find the right dose of medication plus the right supplements. After that we "meet" every 3 months to review your situation and to make any adjustments that are necessary. I also like to do a comprehensive blood test twice a year.

The idea is to help the patient become normal and keep it this way. Longer program is also more cost effective because it is less expensive per session plus you get some additional benefits. I

urge you to continue to work with your local doctor, because I will only help you with your thyroid, possibly menopause, if you need help in that area. I will also teach you about improving bone health, since most women have increased risk of bone fractures as they get longer.

Click here to learn more about coaching.

Speaking of cost effective, you should be aware that medical insurances do not cover non-traditional treatment, so there will be a fee, just like for other non-covered medical procedures like plastic surgery or dental implants.

Most insurance companies do not cover natural desiccated thyroid. They usually do pay for generic Synthroid called levothyroxine sodium, so if you need Armour thyroid or NP thyroid, it's usually an out-of-pocket expense, unless you have a really good insurance that covers everything. I personally take 2 grains of NP thyroid. I get a bottle of 100 pills for about $180, which lasts me a little over 3 months.

I mentioned that 1 or 2 out of 5 people do not do well on Synthroid. But that means that 3-4 out of 5 do have good results. Over the years I've head hundreds of patients whose insurance suddenly stopped covering NDT but continued to cover Synthroid (generic). We tried Synthroid instead of Armour and many people continued to do well. Of course, there were many who didn't and they had to go back to Armour. So my approach is this. If I start the patient on thyroid meds for the first time, I go with NDT first. But if a patient comes to me and she is already taking Synthroid and is doing well, then I continue using that. I just try to use the white pill (50 mcg) instead of a colored one.

My hope is that now you no longer feel lost and helpless, the way people do when they know that something is wrong, but their doctor tells them that everything is OK. Now you know a lot about thyroid, and you can take certain steps toward improving it.

If you need professional assistance, you can always arrange (while available) a free 30-minute no-obligation phone consultation with me or sign up for a coaching program.

You can also join my Facebook low thyroid group. You are already signed up for my thyroid newsletter. I will let you know what other new things I am going to provide as time goes on.

At this point I want to mention that I am not unique. Yes, I am different than the majority of doctors who treat low thyroid, but there are many other doctors like me. Unfortunately, they are few and far between compared to "regular" doctors. In my future blogs I will give you some ideas about how to find the right doctor. I also plan to organize an educational program for medical doctors and teach them the right way to treat hypothyroidism.

Until that time, you can use the resources on this site and set up a free consultation or a coaching program with me.

If you think that this information might be useful to your friends, please feel free to share it with them. Also, encourage them to go to LowThyroidDoctor.com and download this 21-lecture course for free. Please visit the site often because I am always updating it and it has many useful tools and a lot of information. All free, of course.

And, don't forget that a free, no-obligation, 30-minute phone consultation with me is still available. You can book it online or by calling the office at 718-769-0997. As of this writing the waiting time is fairly reasonable, about 3-4 weeks.

It was my pleasure to educate you about thyroid. I hope it will make a difference in your life. Please visit my store to get my ebooks and natural supplements.

Finally, please email me with any questions or comments, I may use them in my future seminars and presentations. Send them to DrTeplisky@gmail.com. I read all the emails and I try to answer as many as I can.

Thank you again. This is Michael Teplisky, MD from LowThyroidDoctor.com wishing you the best of health.