testosterone, and progesterone. Then we'll explore how to optimize hormonal production, balance, and function to avoid that risk.

MEET YOUR HORMONES

Let's begin with one of my favorite hormones. It comes from a butterfly-shaped gland situated at the base of the neck that is about two inches in length.

Thyroid

The thyroid gland lies in the lower part of the front of your neck—it's just above your collarbone and below your voice box. (If you hum, you'll feel it.) It makes thyroid hormones that control many important processes in almost every cell of your body.

The production of thyroid hormone in your body is controlled by a feedback loop. When the level of thyroid hormone in your blood is low, the hypothalamus produces thyrotropin-releasing hormone (TRH). TRH travels to the pituitary gland in your brain, which releases thyroid-stimulating hormone (TSH). TSH travels to your thyroid gland, which starts producing the thyroid hormones thyroxine (T4) and triiodothyronine (T3). T4 is not very active biologically, so your liver, kidneys, and brain cells have to convert it to T3 in order for you to get the most benefit. This requires nutrients such as iodine, selenium, and zinc.

As the level of thyroid hormone in your blood increases, it sends a signal back to the hypothalamus and pituitary gland to stop producing TRH and TSH. This feedback loop helps to keep the level within a narrow range—that is, unless the loop has been impacted by various factors such as environmental burdens, viral and autoimmune disease, or an imbalance in the hypothalamic-pituitary-thyroid axis. When the thyroid hormone is out of its optimal range, you either have:

- *Hyper*thyroidism, a condition that occurs when too much thyroid hormone is made

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- *Hypo*thyroidism, when your thyroid does not make enough thyroid hormone

While panic is most commonly associated with *hyper*thyroidism, *hypo*thyroidism can lead to anxiety as well. We'll get into that later.

Let's start with a thyroid self-assessment.

THYROID SELF-ASSESSMENT CHECKLIST: TOO HIGH VS. TOO LOW THYROID

Instructions: Check the box(es) that relate to you, and write your total score in the space provided.

COMMON SYMPTOMS OF HYPERTHYROIDISM

- ❑ Unintended weight loss despite healthy diet
- ❑ Heat intolerance and sweating
- ❑ High blood pressure and rapid heartbeat
- ❑ Tremors and shaking in hands and fingers
- ❑ More frequent bowel movements, diarrhea

TOTAL: ____/5

SCORING: If you checked more than two boxes, consider getting a full thyroid workup for an overactive thyroid (*hyper*thyroidism) and autoimmune thyroid.

COMMON SYMPTOMS OF HYPOTHYROIDISM

- ❑ Unintended weight gain despite healthy diet and exercise
- ❑ Cold intolerance even in a warm climate
- ❑ Dry and brittle skin, hair, and nails
- ❑ Fatigue, sluggishness, weakness even with rest
- ❑ Constipation

TOTAL: ____/5

SCORING: If you checked more than two boxes, consider getting a full thyroid workup for an underactive thyroid (*hypo*thyroidism) and autoimmune thyroid.

Checked boxes do not indicate a diagnosis. They can help guide your investigation into potential thyroid imbalances, which may be an underlying factor for your panic. Details regarding thyroid testing are discussed later in this chapter.

The best treatments for resolving endocrine-related anxiety de-

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pends on the specific causative imbalance(s). It's important to investigate the many conditions that can interfere with the thyroid hormone, such as:

- **INFLAMMATION.** An exaggerated and/or chronic inflammatory response can wreak havoc on your thyroid through oxidative stress, resulting in brain-thyroid disruption and, potentially, autoimmune disease.
- **HORMONE IMBALANCES.** As a key player in your endocrine system, sex and stress hormones can influence your thyroid function. For example, estrogen and cortisol can decrease active thyroid hormone levels, while progesterone and testosterone may increase them.
- **NEUROTRANSMITTER CHANGES.** Your neurotransmitters also influence thyroid levels. Studies suggest that low levels of serotonin and dopamine may lead to reduced thyroid activity, while high levels may increase it.
- **CHANGES IN GUT BACTERIA.** Research on the thyroid-gut axis reveals that gut bacteria play a big role in regulating thyroid function. Dysbiosis, which we explored at length in Chapter 5, is associated with poorer absorption of necessary micronutrients, exaggerated inflammatory response, and imbalanced thyroid function, while robust microbial diversity is associated with better thyroid health.
- **ENVIRONMENTAL TOXINS.** Exposure to toxic metals such as mercury, lead, and cadmium can interfere with thyroid hormone production and metabolism.

The thyroid is just one part of an intricate network in which each component can affect the others. Think of it like an orchestra: You have the violinist, bassist, harpist, and other instrumentalists. They all play their own part, and if any member is out of tune, it can throw off the entire performance. Cue Hormone Anxiety.

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Three Causes of Thyroid-Related Hormone Anxiety

THYROID OVERDRIVE

Hyperthyroidism can lead to a bunch of physical symptoms, for example, a fast and/or irregular resting heartbeat, digestive upset, weight loss, high blood pressure, and emotional symptoms such as anxiety, sweating, and feeling easily annoyed or overwhelmed—all contributors to panic.

There are several causes of hyperthyroidism, such as glands in the brain sending too many signals asking the thyroid to produce more and more thyroid hormone, or the thyroid gland itself becoming overactive due to an exaggerated immune response. Graves' disease, an autoimmune disorder, is the leading cause of hyperthyroidism. In contrast, Hashimoto's thyroiditis, another autoimmune condition, primarily causes hypothyroidism, where the thyroid doesn't produce enough hormone. However, Hashimoto's can also lead to occasional spikes in hormone levels.

THYROID SLOWDOWN

Hypothyroidism causes a range of unpleasant symptoms such as depression, anxiety, constipation, weight gain, and dry skin, hair, and nails. There are various reasons why thyroid hormone output may slow down, such as a sluggish gland, external interfering variables like inadequate iodine in the diet, or reduced stimulation from the brain and/or pituitary gland resulting from endocrine imbalance.

LOW T3 SYNDROME

Low T3 syndrome—also known as nonthyroidal illness syndrome, or euthyroid sick syndrome—is a condition where the thyroid gland seems to be working properly based on basic lab testing, but you feel symptoms of low thyroid hormone levels (and there's a reason why!).

Just imagine the frustration. You check all the boxes for hypothyroidism, but you go to the doctor, they run some labs, and everything is normal. *It can't be your thyroid,* they conclude.

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Don't stop your investigation here.

Here's how your thyroid can produce enough thyroid hormone but you develop symptoms of hypothyroidism: If you get really sick, are under a lot of stress, or don't have enough of certain nutrients like iodine, zinc, or selenium, your body may try to compensate by converting thyroid metabolism away from the active form of T3 thyroid into an *inactive* form of T3 called reverse T3. Reverse T3 can bind to the same receptors as T3, but it does not activate them, which is why it can cause you to experience symptoms that look like hypothyroidism: anxiety, fatigue, hair loss, and weight gain.

Unfortunately, low T3 syndrome is a commonly missed diagnosis. This is partly due to many doctors conducting *only* TSH screening tests, which usually fall within the normal range. In low T3 syndrome, you may see the pattern of test results in the Four Analyte Thyroid Panel.

> **Note:** You must have results for the entire Four Analyte Thyroid Panel to have clarity into the entire thyroid pathway.

FOUR ANALYTE THYROID PANEL

- TSH: normal
- Free* T4: normal
- Free T3: normal/low
- Reverse T3: high

Now that we have a basic understanding of how the thyroid works, let's talk about how to test its function.

* Measuring the free hormone level, as opposed to total levels, provides a more accurate assessment of thyroid hormone status than measuring total hormonal levels.

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Thyroid Testing

Here are some tips for getting the most out of your thyroid testing:

- Avoid taking biotin supplements or natural thyroid remedies for 72 hours before your blood test.
- Get your blood tested in the morning, before you take any medication.
- Eat breakfast or a snack before your test, as fasting can interfere with the results of your thyroid test.
- Include a full thyroid panel, including TSH, free T3, free T4, and reverse T3, as well as thyroid peroxidase antibodies (TPOAb), thyroglobulin antibodies (TgAb), and thyroid-stimulating immunoglobulin (TSI).

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INTERPRETING THYROID LABS

THYROID TEST	NORMAL RANGES*	HYPERTHYROIDISM	HYPOTHYROIDISM
TSH	0.45 to 4.5 mIU/L	Low	High
fT3	2.0 to 4.4 pg/mL	High/normal	Low/normal
fT4	0.93 to 1.6 ng/dL	High/normal	Low/normal
Reverse T3	9.2–24.1 ng/dL	Varies	Varies/high

* Reference ranges and units of measurement used can vary from lab to lab. I have included the ranges I see most commonly.

Remember, TSH can be normal, even if your thyroid isn't making proper thyroid hormone!

Charlotte's Story

LET'S CIRCLE BACK TO CHAPTER 1, WHERE WE MET CHARLOTTE FOR THE first time, and look at her symptoms: panic, difficulty sleeping, unintended weight loss, intolerance to heat, and tremors—all of which she tried to manage by drinking large amounts of calming kava kava tea. Charlotte was experiencing some of the cardinal signs and symptoms of hyperthyroidism. But

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in order to diagnose a thyroid condition, we need lab testing, which thankfully her second doctor was willing to order. This is what her results revealed:

THYROID PANEL

- TSH: low at 0.179 uLU/mL (the lab's reference range was 0.45–4.500 uLU/mL)
- Free T3: high at 14 (the lab's reference range was 2.0–4.4 pg/ml)
- Free T4: high at 12 ng/dL (the lab's reference range was 0.93–1.6 ng/dL)
- Reverse T3: suboptimal at 19.4 ng/dL (the lab's reference range was 9.2–24.1 ng/dL)
- Thyroid antibodies: high

Diagnosis? Autoimmune hyperthyroidism.

Next steps? Remember, effective treatment always addresses the reason behind the symptoms. Charlotte's first doctor recommended a benzodiazepine to address her anxiety, but that medication would have been only a Band-Aid. It would not have addressed the underlying autoimmunity. Instead, Charlotte dug deeper and now has information on the better next steps to take.

You'll see what happened next in Chapter 8.

THYROID TL;DR

- Imbalances in thyroid levels can be associated with panic and anxiety.
- A comprehensive thyroid test should always include TSH, free T3, free T4, and reverse T3 (consider including antibodies, too).
- Your thyroid test can look perfectly normal, and you could actually have a thyroid hormone problem.
- Your thyroid is affected by your hormones, gut, neurotransmitters, immune system, the environment, stress, and much more.

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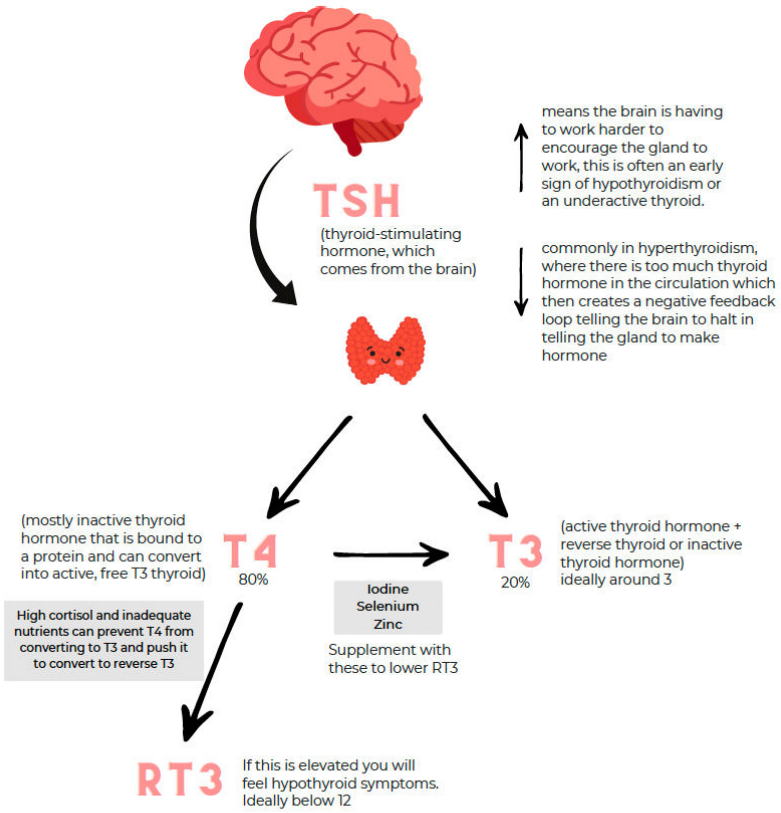
LESSON handout

HOLISTIC WELLNESS COLLECTIVE

THYROID FUNCTION



Learn more about Dr. Nicole Cain, ND, MA:

Disclaimer: Dr. Nicole Cain is a licensed physician in Arizona, however she is not a licensed physician in Michigan as Michigan does not yet license medically trained naturopathic doctors. As such, any information from this talk is to be consider strictly educational and is not a substitute for medical or psychiatric care. Please consult with your own trusted doctor for medical advice or before making changes to your health protocol.

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