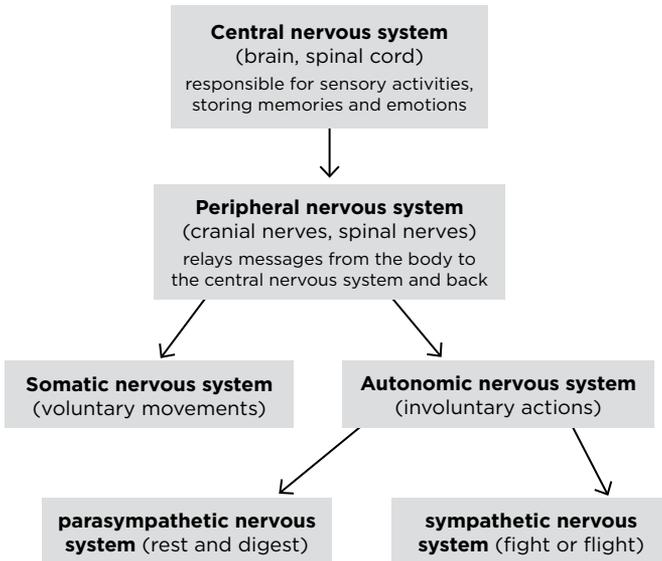


that affect our memory, mood, and functioning. To understand why, we need to know a bit about our brain.

## **BRAIN FUNCTION AND ANATOMY 101**

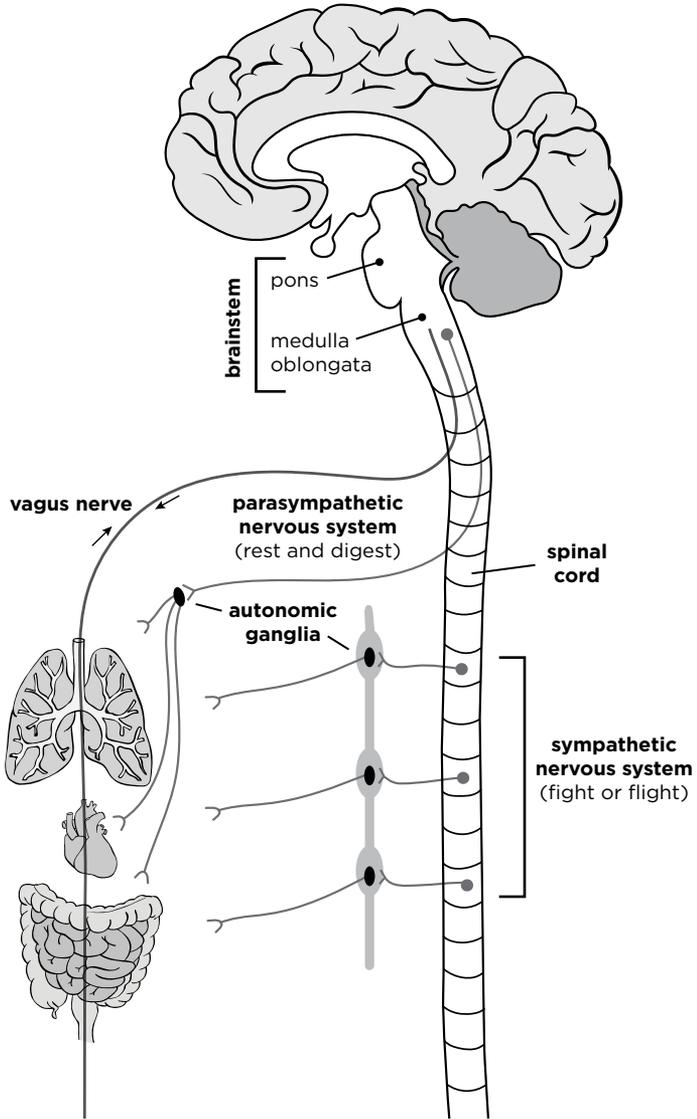
The central nervous system (CNS) is the control center for the whole body and comprises the brain and spinal cord (Figure 2.1). The nerves are bundles of fibers and receptors that sense changes within our body (for example, a feeling of hunger) and our external environment (for example, the sound of screeching tires). The nerves send these messages to the CNS to be interpreted. Nerves outside our brain and spinal cord make up the peripheral nervous system, a complex information highway that comprises the somatic nervous system and the autonomic nervous system (ANS).



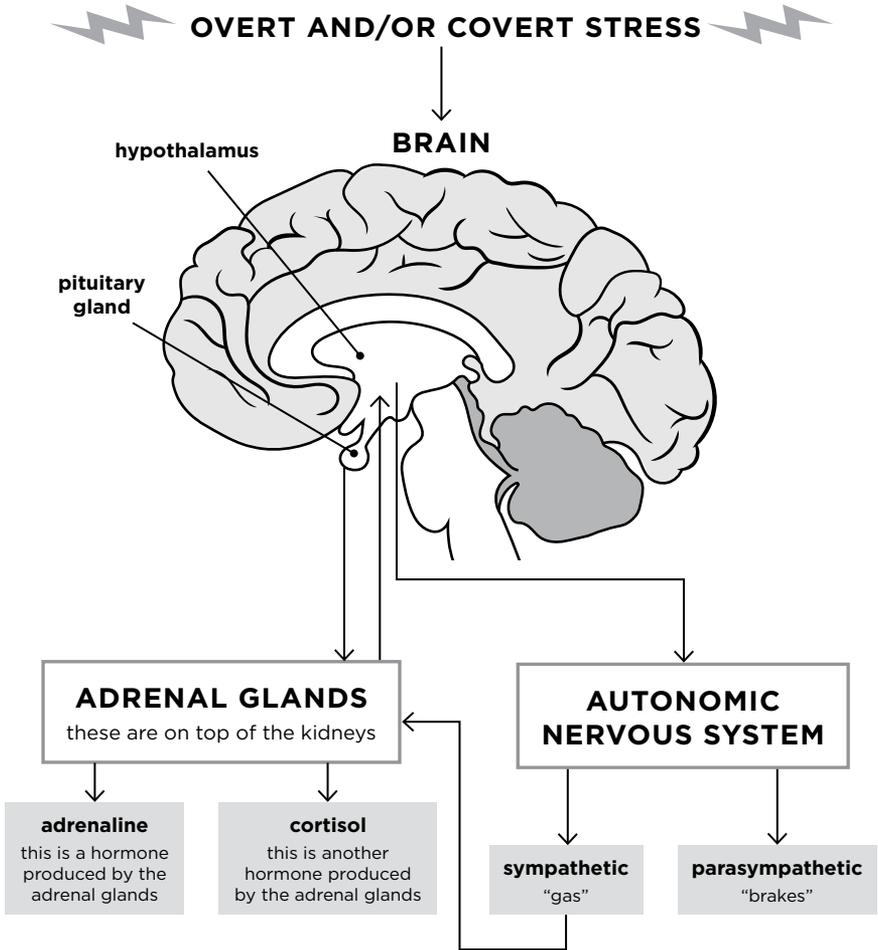
**Figure 2.1.** The central nervous system and its branches

**CENTRAL NERVOUS SYSTEM**

**AUTONOMIC NERVOUS SYSTEM**



**Figure 2.2.** The connection between the autonomic nervous system and the brain



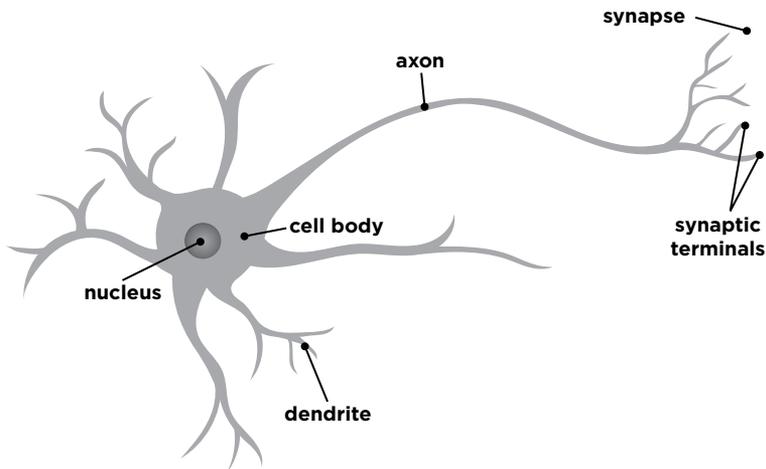
**Figure 2.3.** How the brain communicates stress to the body

inner part called the adrenal medulla. The outer part produces hormones that are essential to life; for example, cortisol, which regulates metabolism and helps your body achieve homeostasis, as well as aldosterone, which helps to regulate blood pressure. The inner part of the gland produces the body's nonessential

ongoing surges of stress hormones. Chronic exposure to stress hormones affects the brain, both directly and indirectly.

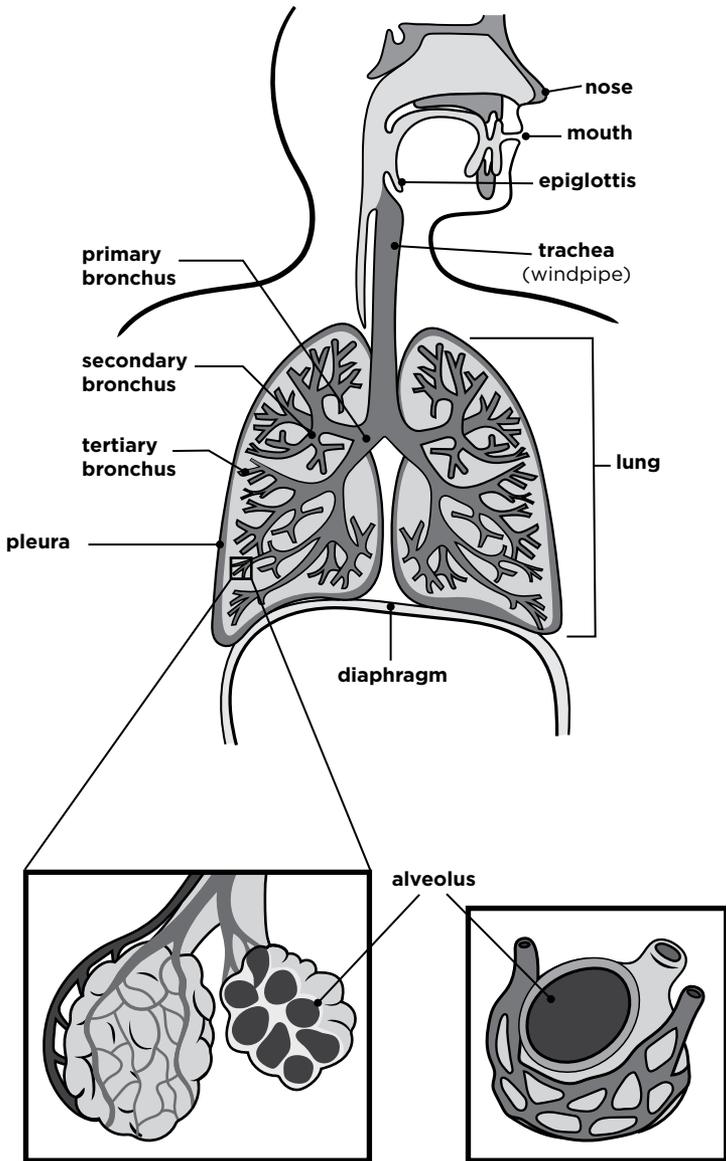
► Direct Effects of Chronic Stress on the Brain

The nervous system uses a system of nerve cells, or neurons, to take up, process, and transmit information through electrical and chemical signals (Figure 2.4). The brain alone contains about 100 million neurons and 100 trillion connections.<sup>2</sup> Each of these cells, which is about a tenth the diameter of a human hair, has three parts. The dendrites are treelike branches that receive input from other neurons. The cell body is attached to the dendrites and contains the DNA of the cell. The axons are wires of various lengths that carry electrical impulses at high speeds toward dendrites of other neurons. These impulses—which carry either excitatory (encourages neurons to fire) or inhibitory (discourages neurons from firing) messages—are transmitted across a gap called a synapse.



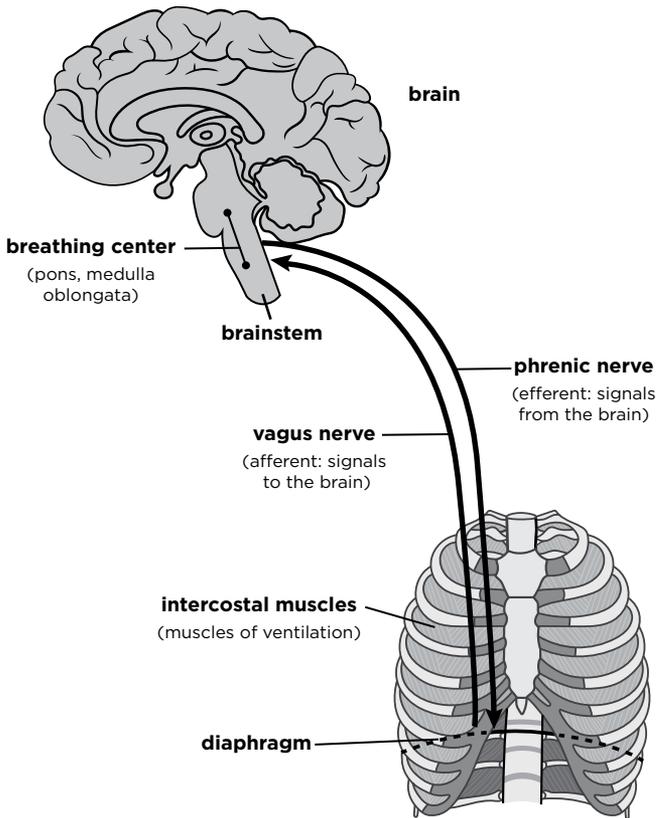
**Figure 2.4.** Anatomy of a neuron

MIND YOUR BREATH



**Figure 3.1.** The respiratory system

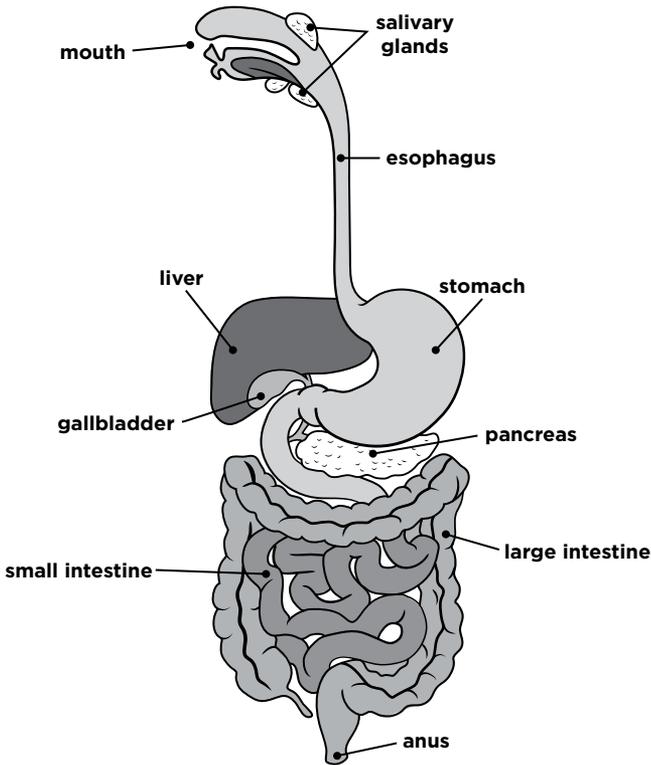
many nerve branches that communicate with the brain to let it know when the diaphragm is relaxed or contracted, so the brain can adjust its directions accordingly.



**Figure 3.2.** The nerve pathways for automatic and voluntary breathing

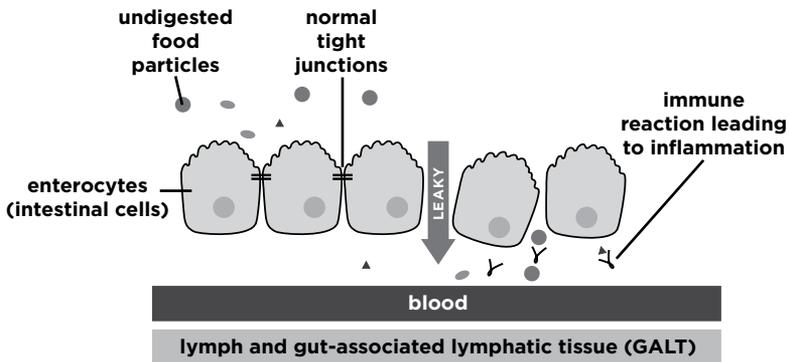
The respiratory center knows how to control the depth and rate of breathing by the amount of carbon dioxide and oxygen in the blood. For example, when you exercise, carbon dioxide levels

it through our digestive system using a process of progressive contractions known as peristalsis. The gut tube is like a long and winding road with many glands that secrete juices to aid in digestion and breakdown. From the esophagus food enters the stomach, a bag-like, muscular organ where powerful acids and enzymes known as gastric juices further break down the food into a sludge called chyme. Sphincters at either end of the stomach prevent the chyme from exiting upward or downward before it is ready to move on.



**Figure 4.1.** The digestive system, including the gastrointestinal (GI) tract (a.k.a. the gut)

shoulder, creating a wall of tight junctions to keep the border safe (Figure 4.2). This barrier between what is inside our gut and everything outside is only one cell thick and less than one micron wide (smaller than a dust particle)!

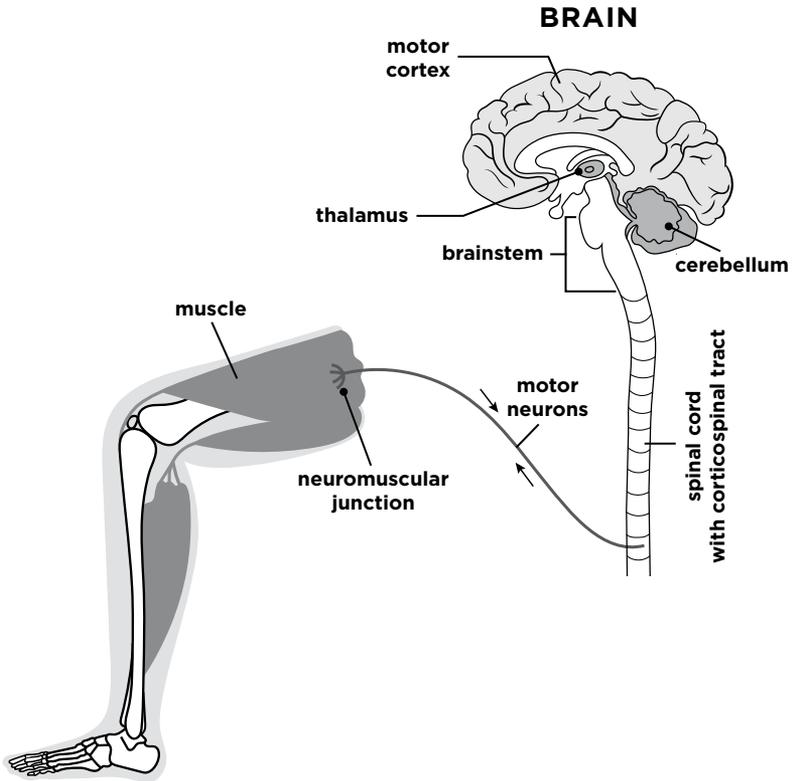


**Figure 4.2.** Enterocytes in a healthy gut (left) versus a leaky gut

In a healthy gut, the life-sustaining enterocytes do a fantastic job of protecting our body from toxic bacteria, chemical toxins, short-term stress, and wear and tear. Although the soldier cells are completely renewed about once a week, the key to maintaining this border security is to keep the frequency, intensity, and amount of exposure to offending agents at a minimum. These offending agents include alcohol, bacteria, viruses, toxins, and stress hormones, all of which attack the gut wall.

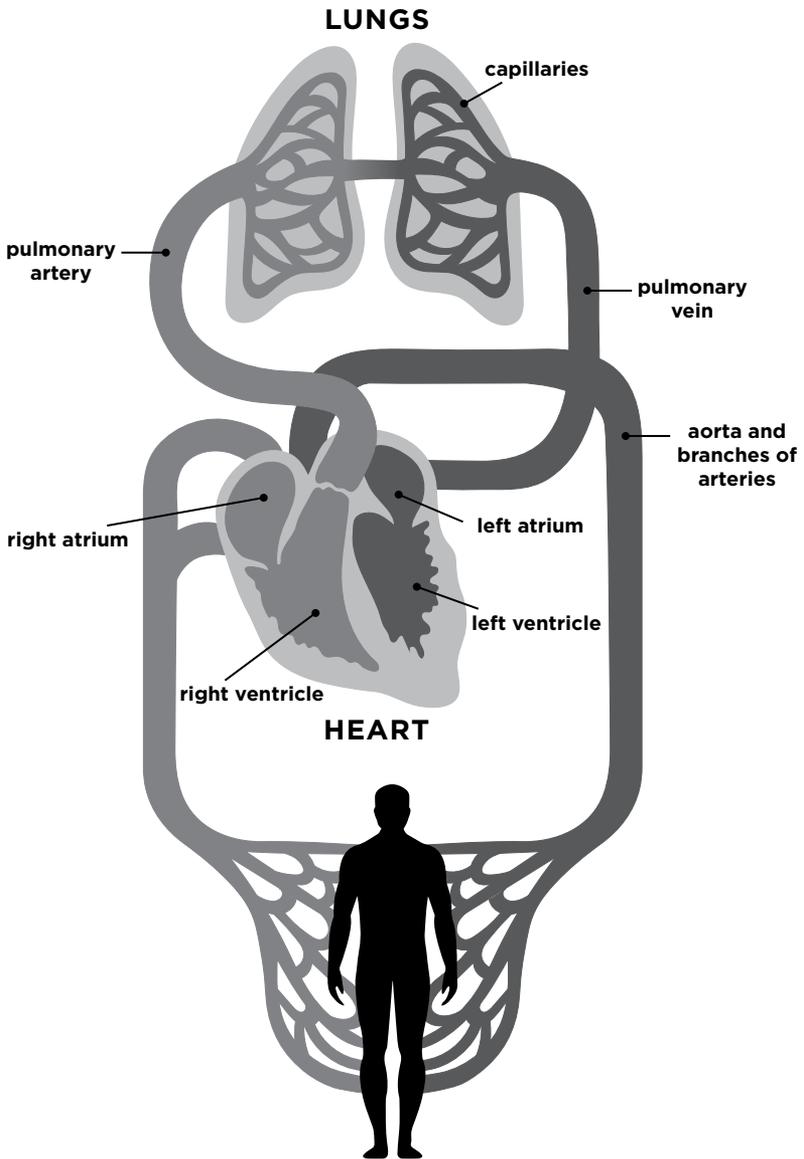
When the tight junctions between the enterocytes break down, these cells can no longer stand shoulder to shoulder like a line of soldiers. The physical breach in security can lead to an illness commonly called “leaky gut syndrome,” in which undigested food proteins, toxins, and harmful bacteria gain access to our body. This permeability becomes a major cause of

Flexibility exercises train our skeletal muscles, tendons, ligaments, and bones. Stretching, such as yoga, tai chi, and qigong, works the muscles and the fascia and ligaments that hold everything together, pushing blood to all these parts to improve balance, strength, and flexibility.



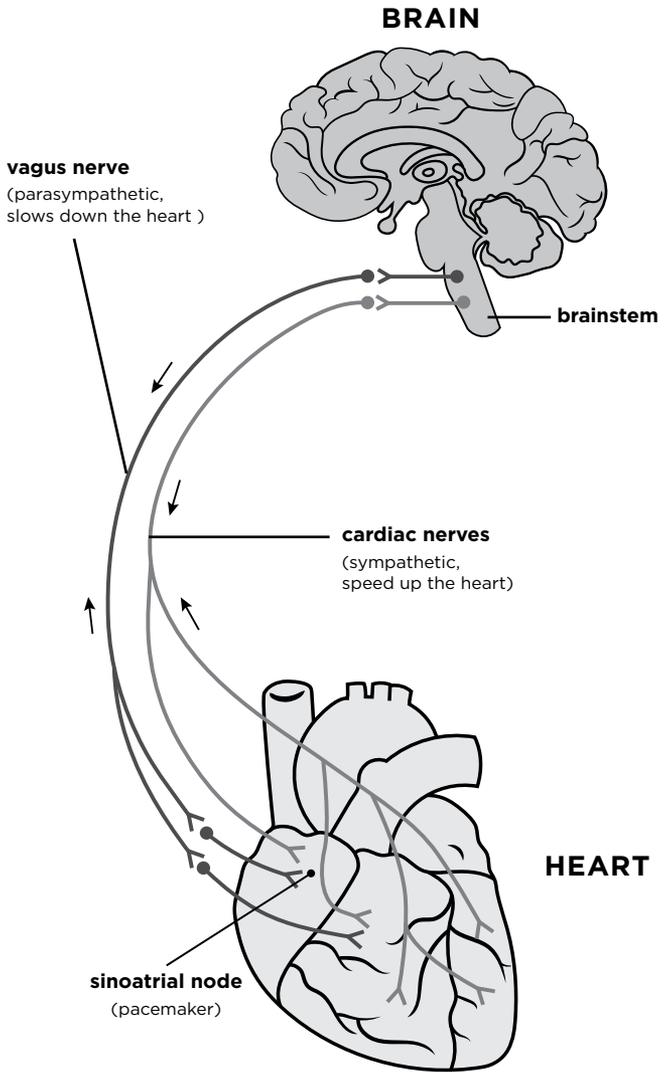
**Figure 5.1.** The musculoskeletal system

Many research studies have also established that aerobic exercise improves the flow of blood in the brain and enhances the function of many neurotransmitters involved in cognitive

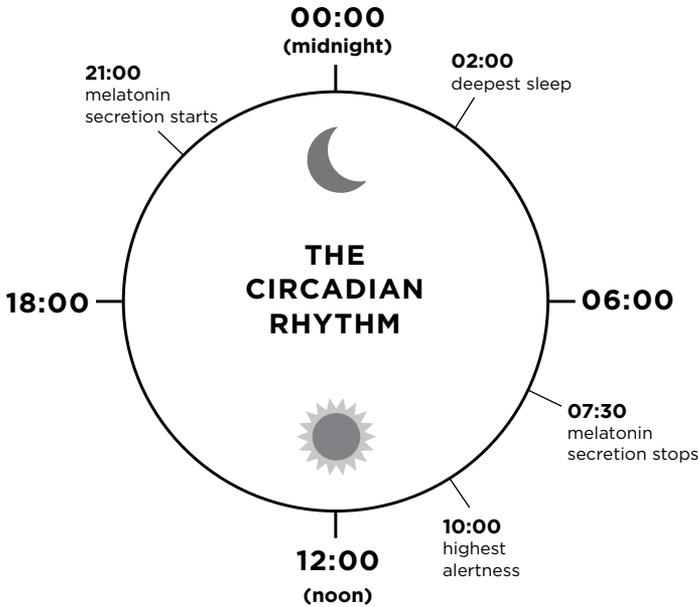


**Figure 6.1.** A simplified cardiovascular system

MIND YOUR HEART



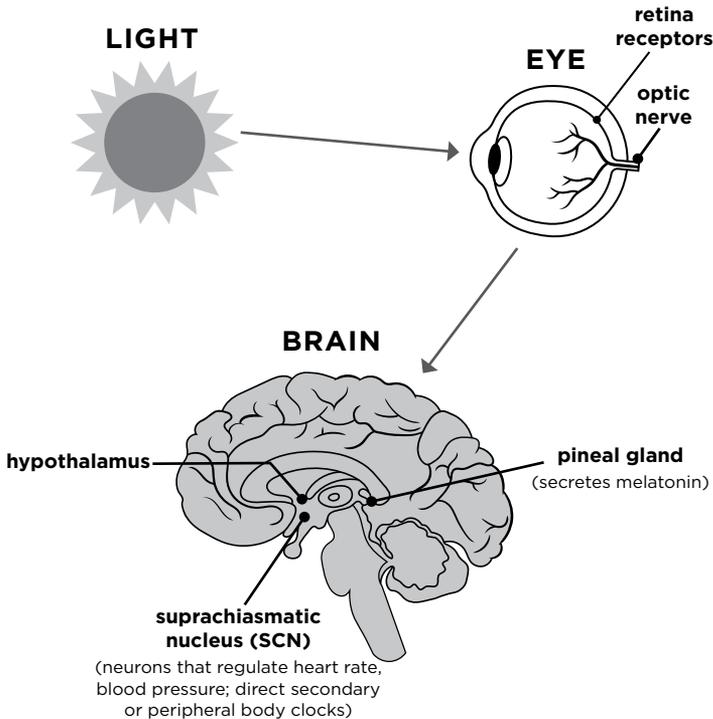
**Figure 6.2.** The heart-brain connection



**Figure 7.1.** The circadian rhythm

To make sure our body clock stays accurate and on schedule each day, the SCN relies on a number of external cues (Figure 7.2). When exposed to light, special light-sensitive cells in the retina of the eye stimulate the optic nerve, which alerts the SCN. The light-dark cycle (day and night), as well as temperature and meal timing, also helps to prevent small timing errors from accumulating and causing serious imbalance in the circadian rhythm. Secondary body clocks in organs such as the heart, the lungs, and the intestines are also influenced by and provide independent feedback to the SCN about timing. By the time we are about six months old, we have more or less developed our regular

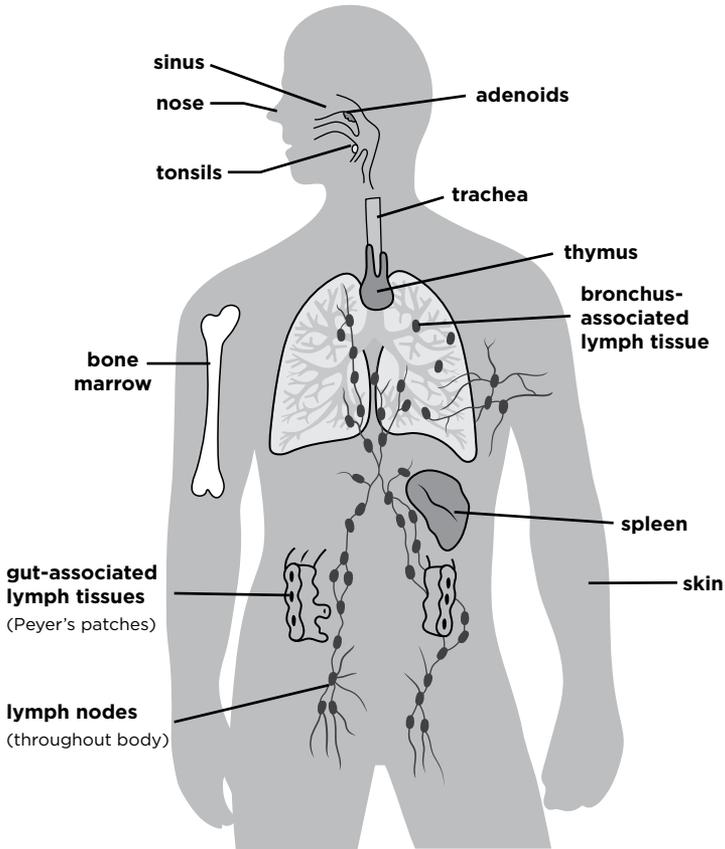
sleep-wake cycle. And although “morning people” and “night owls” may get up earlier or go to bed later than the average, they typically vary no more than two hours from “normal.”



**Figure 7.2.** How external factors cue the body’s circadian rhythm

The SCN sends signals to several other parts of the brain to regulate the body’s daily sleep-wake cycle, its temperature, and its hormone production. For example, we know that melatonin, a hormone produced by the pineal gland that causes drowsiness and lowers body temperature, rises as it gets dark in the late afternoon and evening. This is the signal for sleep. In the early

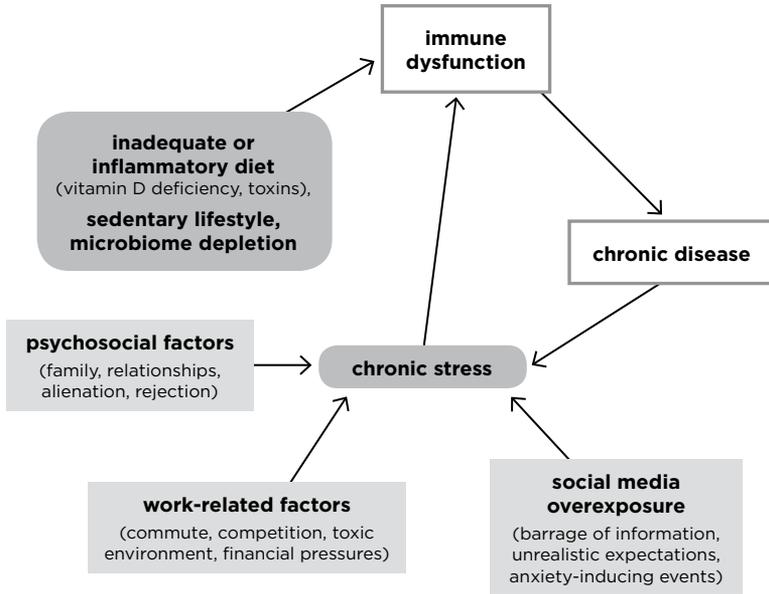
## MIND YOUR IMMUNE SYSTEM



**Figure 8.1.** The body's immune system (also includes the mucous membranes lining the inner nose, trachea, and gastrointestinal tract)

Communication within the immune system is complex, and this elaborate messaging network is the secret to its success. The amount of information exchanged within the millions and millions of cells is astounding. Like other body systems, our immune system seeks homeostasis (balance). And it has

infection. Poor diet, medication, alcohol, and toxin exposure also stress the gut, with the result that our immune system rarely gets downtime. It then goes into hyperresponsive or attack mode with serious repercussions for our health.



**Figure 8.2.** How chronic stress contributes to immune dysfunction and chronic disease

### How Stress Affects Our Immunity

#### ► Antibiotic-Resistant Diseases and Dysbiosis

Antibiotics fight bacterial infections that cause illness or death, such as strep throat, pneumonia, and wound infections. The drugs work by slowing the growth of bacteria or suspending their growth. Since bacteria have a cell wall and human cells do not, these drugs destroy the bacterial cell wall without affecting

<b>Disease</b>	<b>Autoimmune Target</b>
Rheumatoid arthritis	Joints
Crohn's disease	Gut
Ulcerative colitis	Large intestine
Multiple sclerosis	Nervous system
Type 1 diabetes	Pancreas
Psoriasis	Skin
Hashimoto's disease (Hypothyroid)	Thyroid
Graves' disease (Hyperthyroid)	Thyroid
Lupus	Multiple systems (e.g., joints, skin, kidney)
Myasthenia gravis	Muscles
Vasculitis	Blood vessels

AI diseases affect 35 million people in North America and the numbers continue to grow. New cases are being reported as data is collected, and AI diseases are now the third most commonly diagnosed chronic diseases after cancer and heart disease.<sup>5</sup> Women suffer more often than men—in fact, 78 percent more.<sup>6</sup> In my own practice, I see many young women being diagnosed with lupus and multiple sclerosis—most of them after severe stressors such as a failed marriage, toxic work conditions, or failed university courses. We used to attribute the cause of autoimmune diseases to viruses, genetics, and external agents but we now know that the causes are multifactorial and that stress is a large contributor.

# Appendix A:

## Gut Health Assessment

This questionnaire is designed to give your doctor insight into how your intestinal system is functioning. Please circle the number that most accurately describes your current lifestyle, and then tally the total number in each subsection.

Please indicate if you use any of the following medications and how often	Rare	Occasional	Often	Frequent
Antacids	0	1	4	8
Laxatives	0	1	4	8
Antibiotics	0	1	4	8
Oral antifungals	0	1	4	8
Acid inhibitors (e.g., Zantac, Losec, Tecta)	0	1	4	8
Acetaminophen (e.g., Tylenol)	0	1	4	8
Anti-inflammatory meds (e.g., ibuprofen, aspirin)	0	1	4	8

APPENDIX A

<b>How many times do you consume the following foods in 1 week?</b>	<b>0–1</b>	<b>2–4</b>	<b>5–9</b>	<b>10+</b>
Sugary treats	0	1	4	8
Soft drinks	0	1	4	8
Coffee or black tea	0	1	4	8
Fried foods	0	1	4	8
Spicy foods	0	1	4	8

<b>Section A</b>	<b>Rare</b>	<b>Occasional</b>	<b>Often</b>	<b>Frequent</b>
1. Indigestion: food sits in stomach for a long time after eating	0	1	4	8
2. Excessive burping, belching, or bloating after meals	0	1	4	8
3. Stomach spasms and cramping during or after eating	0	1	4	8
4. Feeling that food sits in your stomach creating uncomfortable fullness and bloating during or after a meal	0	1	4	8
5. Bad taste in your mouth	0	1	4	8
6. Small amounts of food fill you up immediately	0	1	4	8
7. Skip meals or eat erratically because you have no appetite	0	1	4	8
	<b>Total</b>			

THE MIND-BODY CURE

<b>Section B</b>	<b>Rare</b>	<b>Occasional</b>	<b>Often</b>	<b>Frequent</b>
1. The thought or smell of food aggravates your stomach	0	1	4	8
2. Feel hungry an hour or two after a good-sized meal	0	1	4	8
3. Stomach pain, burning, and/or aching over a period of 1–4 hours after eating	0	1	4	8
4. Stomach pain, burning, and/or aching relieved by eating food, drinking carbonated beverages, cream or milk, or taking antacids	0	1	4	8
5. Burning sensation in the lower part of your chest, especially when lying down or bending forward	0	1	4	8
6. Digestive problems that subside with rest and relaxation	0	1	4	8
7. Burning or aching when eating spicy and fried foods, chocolate, coffee, alcohol, citrus or hot peppers	0	1	4	8
8. Feel a sense of nausea when you eat	0	1	4	8
9. Difficulty or pain when swallowing food or beverages	0	1	4	8
<b>Total</b>				

APPENDIX A

<b>Section C</b>	<b>Rare</b>	<b>Occasional</b>	<b>Often</b>	<b>Frequent</b>
1. When massaging under your rib cage on your left side, there is pain, tenderness, or soreness	0	1	4	8
2. Indigestion, fullness, or tension in your abdomen is delayed, occurring 2–4 hours after eating a meal	0	1	4	8
3. Lower abdominal discomfort is relieved with the passage of gas or with a bowel movement	0	1	4	8
4. Specific foods or beverages aggravate indigestion	0	1	4	8
5. The consistency or form of your stool changes (e.g., from formed to loose) within the course of a day	0	1	4	8
6. Stool odor is embarrassing	0	1	4	8
7. Undigested food is present in your stool	0	1	4	8
8. Three or more unformed bowel movements daily	0	1	4	8
9. Diarrhea (frequent loose, watery stool)	0	1	4	8
10. Bowel movement shortly after eating (within 30 minutes)	0	1	4	8
	<b>Total</b>			

THE MIND-BODY CURE

<b>Section D</b>	<b>Rare</b>	<b>Occasional</b>	<b>Often</b>	<b>Frequent</b>
1. Discomfort, pain, or cramps in your lower abdomen	0	1	4	8
2. Emotional stress and/or eating raw fruits and vegetables causes bloating, pain, cramps, or gas	0	1	4	8
3. Necessity to strain during bowel movements	0	1	4	8
4. Stool is small, hard, and dry	0	1	4	8
5. Pass mucus in your stool	0	1	4	8
6. Alternate between constipation and diarrhea	0	1	4	8
7. Rectal pain, itching, or cramping	0	1	4	8
8. Lack of urge to have a bowel movement	0	1	4	8
9. An almost continual need to have a bowel movement	0	1	4	8
	<b>Total</b>			