Cortisol, Insulin and Your Health

The balance between cortisol and insulin is the hormonal fluctuation in your body with the greatest potential for causing disease. When either of these two hormones are increased in your blood over time, deterioration happens in multiple body systems. How do these hormones get chronically increased in your blood? Stressors to your body cause it, the most frequent stressors being repeated poor dietary choices.

Frequent intake of foods that sharply and rapidly increase your blood sugar, high glycemic index foods, soon become followed by a drop in blood sugar. Your adrenal glands, the organs in your body among the functions of which are to keep your blood sugar balanced, have been taxed and have lost some of their ability to maintain stable blood sugar levels. If your blood sugar drops, you may feel hypoglycemic: weak, lethargic, drowsy, faint, dizzy; nervous, irritable; internal trembling, tremors; depression, crying spells; fears, apprehension, panic; inability to concentrate, lack of coordination, confusion, poor memory, headaches, insomnia; addiction to alcohol or craving for sweets. These symptoms tell you that your blood sugar has dropped and your adrenal glands are not functioning optimally.

High glycemic index foods most often are refined foods, foods that are over processed and have very little nutritional value in them. They are empty calories which do not supply your adrenal glands with the nutrition they need to keep doing their job. Cortisol is secreted by your adrenals in response to high or low blood sugar, among other things. All the blood sugar fluctuation that poor food choices cause ultimately leads to high cortisol and insulin levels in your blood.

Regulation and minute, detailed modification of important bodily processes arise from your adrenal glands. Your adrenals produce many hormones that moderate blood sugar and mineral levels in your body. Among them is cortisol. All of this is done to maintain homeostasis, a steady internal biochemical and physiological balance in your body. Control of the level of glucose in your blood is one of the most micromanaged functions in your body.

Your body depends upon glucose as its form of energy, so it maintains blood sugar level within a narrow range. Your brain is dependent on a constant supply of glucose to function. It is life or death. Your brain cannot store glucose. Your body must be able to mobilize it instantaneously. Running your blood sugar up with the wrong food choices, having it drop, and then running it up again repeatedly, is like abusing a finely tuned Masaratti. The car, your body in this example, is bound to break down in complex ways because the system that manages your blood sugar levels is complex.

Cortisol modulates the level of blood sugar in your circulation either up or down. It takes less than a minute after its stimulation for newly synthesized cortisol to be circulating through your blood to every part of your body, including your brain, modifying blood glucose, and sometimes increasing insulin. Cortisol is the only hormone in the body that increases with age, the impact of this sometimes being a problem.

When you are stressed, cortisol elevates, and then it is supposed to come right back down. When this hormonal system disregulates, cortisol stays high and leaves you vulnerable to a range of symptoms including increased risk of osteoporosis, fatigue, irritability, sugar cravings, shakiness between meals,
confusion, low energy, night sweats, binge eating, increased infections, thin skin, easy bruising, muscle weakness, weight gain around the middle, sleep disturbances, and impaired thyroid hormone production, for a partial list. The important cardiovascular and metabolic impacts of high cortisol are detailed below.

Insulin opens your cell wall membranes to take in glucose. It does this by stimulating insulin receptor sites embedded in the cell walls. Insulin is a storage hormone. It acts to move glucose into your cells. Cortisol is a stress hormone. It acts to keep your body prepared for fight or flight in response to stressors, threats to your body or its equilibrium, like low blood sugar. When cortisol increases the glucose levels in your blood, it reduces the sensitivity of your cell wall insulin receptors to stimulation by insulin.

Cortisol acts to keep the glucose in your blood stream as opposed to having it taken into the cell. It keeps the sugar mobilized. So your cortisol, insulin and blood sugar levels all go up at the same time. And if the stimulus that started this chain of events is repeated, repeated again, and repeated again, as can happen in the course of a day, your levels of cortisol, insulin and blood glucose will remain high.

When your insulin receptors have lost sensitivity to insulin, and the cell membranes are transporting less glucose into the cell, even though glucose is high in your blood, your cells do not get the fuel they need. You get hunger signals continually and eat more even though your glucose is high. Your fat cells are also demanding input because the excess insulin in your blood is priming your body to store fat. Once you start gaining weight, you produce more insulin, and a vicious cycle results. The more weight you gain, the more weight you gain.

Insulin and cortisol are hormones. They are meant to fluctuate. A continued high level of insulin also has many effects. Your cell wall insulin receptors become more and more insulin resistant. It takes higher and higher insulin levels to induce them to move glucose into the cell. When insulin is present in your blood stream at high levels over time, it causes impaired immune function. It increases the build up of the smooth muscle in your artery walls, reducing blood flow to your organs. It induces plaque buildup in your arteries, leading to strokes and heart attacks. It also increases the stickiness of your platelets, increasing your risk of clots.

A high standing level of glucose in your blood stream is associated with both pre-diabetes and diabetes itself. Fatigue, loss of vision, loss of kidney function, and narrowing of arteries may ensue. Loss of organ function and perhaps body parts can accompany these disorders. Significant cellular changes and disabilities may come with blood sugar imbalances. Glucose molecules also attach to the protein moieties in your body, a process called glycosylation. This process changes the character of the protein to which it attaches and induces cellular aging, among other things.

Cortisol is produced in your adrenal glands, but its secretion is regulated primarily from your brain. Corticotrophin-releasing hormone (CRH) from your hypothalamus stimulates release of the pituitary hormone Adreno Cortical Trophic Hormone (ACTH). ACTH then stimulates your adrenal gland to produce cortisol. This induces intracellular enzymes that release cholesterol within your adrenal cells, and from there, it gets into your blood stream.

Cholesterol is one of the products in an important adrenal biochemical pathway that makes many hormones, including cortisol. Cholesterol is a lipid, a fat. So increased cholesterol, high triglycerides and disturbed lipid metabolism, leading to plaque deposition in your artery walls, come as a result of excessive demand for cortisol production.

Cortisol is a major metabolic regulator. It has an important role in weight control. One of its metabolic actions is to store body fat around your waist. It also causes increased blood pressure and insulin
resistance. It promotes a prothrombotic state in which your blood is primed to clot too quickly. It induces a proinflammatory state that increases your body’s propensity to inflammatory reactions. So cortisol levels that are higher than optimal over time lead to high blood pressure, high cholesterol, high fasting glucose, excess insulin release, and resistance to insulin effects, in addition to the symptoms noted earlier. Cortisol is the only hormone in your body that increases with age and takes particular effort to keep within the normal range.

It is estimated that about 47 million US adults have the constellation of symptoms brought on by imbalanced cortisol, insulin and glucose. It is called Metabolic Syndrome. Currently most often addressed with poly-pharmacy, this syndrome is actually best treated by approaching the underlying causes, the lifestyle issues that produce the imbalances, changing them to more health producing patterns of behavior. It is worthwhile to maintain steady cortisol and insulin levels. You suffer when you abuse this sensitive, finely tuned mechanism. The following are key components for balancing cortisol and insulin:

The quality of foods you eat each day is pivotal. High carbohydrate, high glycemic index foods, foods that run your blood sugar up and then let it drop precipitously, increase both cortisol and insulin in your blood and make it impossible for you to feel well. Keep your blood sugar even. Skipping meals and eating large amounts in the evening lead to more insulin and more fat storage.

Exercise balances either high or low cortisol. It acts to deliver glucose to your muscles, decreases insulin resistance, helps you burn fat for fuel, and builds more muscle with which to burn fat. Exercise elevates your cortisol level, as does food. The combination of regular, good quality meals, small snacks and exercise balances your cortisol levels, whether they are high or low.

Get control of the stressors in your life. It is important to either change stressful life situations or change the way you think about them so they are not damaging to you. Stress leads to poor food and vitamin intake, low energy, difficulty coping, and under performance of thyroid hormone, which then adds further stress. When your body is under stress from any source, there are more demands placed upon its various tissues and organs. Cortisol must simultaneously provide more glucose, mobilize fats and proteins, and modify immune responses, heartbeat, blood pressure, brain alertness and nervous system responsiveness. Reducing stressors removes a primary reason for elevated cortisol. Regular sleep is also critical in helping to lower high cortisol.