

**Author Note:** This lengthy article below was originally a chapter that was supposed to be included in my book, “Nature’s Cancer-Fighting Foods.” When I saw my book galley proofs and realized that it was excluded, I asked my editor, “How could you omit a chapter on improving immunity for a cancer book?” His terse email reply was: “We didn’t think it was relative and we exceeded word count.” Therefore, never rely on a publisher for health advice! Below, for your consideration. Enjoy. — *Verne*

# Immunity, Stress & Cancer Prevention

by  
Verne Varona

“The preservation of health is a *duty*. Few seem conscious that there is such a thing as physical morality.”

— Herbert Spencer (1820-1903)  
*English Professor*

## Immunity & Prosecution

“*Man lives in a sea of micro-organisms; the immune system is his license to drive.*”<sup>1</sup>

— Robert Good, M.D.

Flip through any health magazine and you’re bound to notice numerous ads claiming you *can boost, enhance, increase, stimulate, strengthen,* and *activate* immune function *with clinically proven, innovative, cutting-edge technology,* and *revolutionary* supplements, or herbs.

While there have been many verifiable reports on the immune enhancement of certain supplements and herbs, the primary question we should really be asking is: “What factors weaken immunity?”

More than ever before, our daily diet, emotional climate and day-to-day lifestyle are being recognized as prime influences on the health and continued nourishment of this system. When you hear the term *immunity*, this is usually in reference to the body’s innate system of protection against disease-causing invaders. In the field of law, the term *immunity* is defined as exemption from legal obligations or freedom from liability.

However, in terms of physiology and medicine, *immunity* does not imply freedom, but is referred to as a state of lessened susceptibility to injury by microorganisms and

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<sup>1</sup> Dr. Robert Good – Sloan-Kettering Institute for Cancer Research — *Time*, (March 1973), 19:67

certain poisons formed by animals, plants or artificial means. The state of *natural immunity* (from the Latin *immunitas*, meaning “freedom from disease”) is accomplished by a still mysterious “immune system” that strangely enough, has no major organs of its own, yet is composed of many types of microscopic cells and molecules.

In the world of medicine and physiology, the immune system only recently gained the attention that merited it to be a valid influence on health and disease. Unlike other systems of the body, it is not a clearly identifiable organ, anatomically, such as the liver, heart or kidney. In an operational sense, it is a system, but not with a recognized physical presence. In fact, according to Rudolf Ballentine, M.D., “<sup>2</sup> ... until about a generation ago, the most identifiable organ involved in immune function, the thymus, was thought to be useless. Sometimes, it was actually shrink with radiation to get it out of the way.”

Today, we have greater respect for this “useless” organ and it’s relationship to lymph nodes and white blood cells. We have confirmed that the immune system is our primary defense, from not only infectious agents, bacteria and viruses, but also from malignant abnormal cells that have cancer forming potential.

Cancer can be considered an immune disease, since it is the immune systems function to monitor the body, recognize pre-cancerous cells and consume them, eventually dissolving them with powerful cellular enzymes. This occurs in each of us on a daily basis. *When someone’s immune defenses have become weakened, there is a possibility of pre-cancerous cells multiplying, which increases the probability of cancer progression.*

*The immune system is the body’s first line of defense against the onslaught of foreign substances* and is an intricate process involving specialized cells, tissues, organs and chemicals. Their main objective is to locate, disable and digest, or “prosecute,” any disease-causing invader through its army of white blood cells that have widespread access throughout the entire body. Some of the organs and tissues that comprise the immune system are the lymph nodes and vessels, spleen, bone marrow, thymus gland and tonsils.

Supporting immune function, the body has five additional systems<sup>3</sup> which offer primary protection against disease organisms or substances. Here is a brief look at those five immunity-aiding systems:

- *Skin Resistance* —the body’s main physical barrier—to all kinds of infection. The chances of potentially dangerous organisms are reduced from the antiseptic substances secreted by the skin.
- *Powerful Stomach Acids* — Acid secretions of the stomach along with digestive enzymes help to minimize unwanted potentially dangerous organisms.
- *Lymph Circulation* — Lymph circulation cleanses the blood through it’s flow and interaction with immune cells in the tissue linings of lymph channels as well as in the lymph nodes.
- *Liver Function* — The detoxification function of the liver acts to minimize the toxic effects of numerous compounds and drugs.
- *Bowel Function* — The absorption of toxins within the intestine by fiber and vegetable matter that becomes discharged as bowel helps reduce toxin levels within the blood. If

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<sup>2</sup> Ballentine, Rudolph, M.D. — “Assault on Immunity” — *Yoga International* , March/April (1993), p. 20

<sup>3</sup> Referenced from: Kushi, Michio., Mead, Mark, Mann, John D. — *A Natural Approach to Allergies* — Japan Publications, Tokyo, New York (1985) p. 38

these toxins were not bonded to the bowel matter, they would be reabsorbed into the blood.

It is a testimony to divine brilliance (or evolutionary progress, depending on your spiritual bent) that our physical designs have such intricate systems for cleansing. It has taken so long for us to evolve into this complicated physicality, yet, through dietary and lifestyle imbalance, our health can rapidly deteriorate. This fact reminds me of an aphorism that one of my Japanese teachers would frequently utter: “It takes three years to become industrious and three days to become lazy.”

To better understand how our body functions is to develop a greater value for its design and deeper respect for its care.

The simple understanding of how immunity system works and the various negative/positive influences which compromise it, can help determine the best natural strategies for bolstering immunity to support health, or for recovery from sickness. While the germ theory initiated a revolution in medicine at the time of its discovery, it conversely encouraged the attitude that the body was simply a passive recipient of disease. Since a weakened immune system makes us more vulnerable to sickness, it has been recognized today, that the body is not as much a victim of disease, but an accomplice.

Truth be told, the body *is* under attack— constant attack. Air, food water, animals, people and the environment continually overwhelm us as bacteria, viruses and other micro-organisms. Some of them can aid our health, while others pose a threat. The immune system is the most sensitive of body systems to toxic exposure and, at the same time, is very susceptible to dietary influence. This might be due to the fact that seventy percent of the immune system surrounds the intestinal tract, conveniently helping to protect you from toxins produced during digestion.

*Vibrant youth depends on an immune system in premium condition.* Immune function is unobtrusive when running smoothly—it’s quiet, efficient and protective. However, knock it out and a young person suddenly looks aged and worn. Late stage AIDS patients are an extreme example.

Our immune function reacts in three basic ways:<sup>4</sup>

- Overreactive
- Underreactive
- Self-reactive  
(aka *Autoimmune* reaction — attacking the body it was designed to protect)

Let’s look at these three reactions more closely:

- *Over-reaction* — Another word for overreaction is *hyper-immunity*, more commonly known as *allergy*. This occurs when the immune system is reacting to microbes or molecules that do not pose a direct threat. The white cells become indiscriminately active and begin to build antibodies that attack harmless objects within the internal environment. The consequence of this over-reaction produces inflammation, irritation and general discomfort.

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<sup>4</sup> *Ibid.* p. 20-21

Hay fever is a typical example of this condition. However, considering pollen (aka "the invader") as the prime culprit is after the fact; for whatever reason, our physical condition has *reduced tolerance*. While it makes sense to reduce outside aggravating agents, the key would be to strengthen the system to achieve better tolerance, because this is an indication that something in our physiology is off balance.

Until recently, the accepted method of dealing with immune-related diseases was chiefly to kill the invader, whether it was a bacteria, virus or cancer cell. In the last twenty years, this approach has become less popular and alternate strategies designed to support the body's immune system are now more popular and accepted.

The health and vitality of our immune systems is more a matter of nutrition and lifestyle factors than simply "destroying invaders." Modern medicine has spent billions of dollars in the last twenty-five years for antibiotic, anti-viral and anti-fungal medicines and to decreasing results. If this invader-killing approach was as effective as medical marketing would have us believe, there would be far fewer overall deaths from infections. Statistics have shown just the opposite.

A survey of all deaths in the US between 1980 and 1992 revealed a shocking 58 percent rise in deaths from infection.<sup>5</sup> A six-fold increase occurred in those between the ages of 25 and 44. — and this is only partly due to the increased number of deaths from HIV infection. Deaths from respiratory infections increased by 20 percent. Similar trends have been observed in Britain.<sup>6</sup>

The expanding rate of human infection, coupled with the multiplying risk of cancer, clearly suggest that human immune defenses have become perilously weakened.

- *Under-reaction* — This condition is opposite of an over-reaction and commonly known as *hypo-immunity*. In lay terms, it is colloquially known as "lowered resistance" or "burn-out." We seem to "catch whatever's going around," whether it be from the viruses that result in flu and colds or, in a more extreme circumstance, bacteria that result in pneumonia and tuberculosis. Our immune cells seem to be on hiatus— they're not performing. According to Rudolf Ballentine, M.D.,<sup>7</sup> author of *Radical Healing*, "...if the mutated abnormal cells that the body normally produces are not destroyed by the immune system, cancer can result."
- *Auto-immune Reaction* — This third immune reaction is the most bizarre. It is when the body's immune system actually turns against itself— a cellular mutiny of the highest order. An autoimmune reaction is when antibodies are built to attack one's own tissues. Autoimmunity is thought to play a prominent role in a growing number of diseases that currently number over twenty and could extend to numbers over forty. This list includes: *rheumatoid arthritis*, numerous *thyroid disorders* such as *Grave's disease* and *Hashimoto's disease*; *primary biliary cirrhosis of the liver*; *systemic lupus erythematosus*; *Guillain-Barre' syndrome*; *multiple sclerosis*; *diabetes mellitus*; *uveitis*;

<sup>5</sup> Pinner, R., et al — "Trends in infectious diseases mortality in the United States — *JAMA* — Vol. 275(3), pp 189-93 (1996) — Referenced: Holford, Patrick — *Say No to Cancer* — Judy Piatkus (Publishers) Ltd — London, England (1999), p. 36

<sup>6</sup> *The Health of Adult Britain 1841-1994* — Office of National Statistics — Referenced — *Ibid*.

<sup>7</sup> Ballentine, Rudolph, M.D. — "Assault on Immunity" — *Yoga International*, March/April (1993), p. 20

*pernicious anemia; myasthenia gravis; and inflammatory bowel disorders such as celiac disease, ulcerative colitis and Crohn’s disease.*<sup>8</sup>

The metaphor of ‘friendly fire’ is typically used to describe autoimmunity by those who use the analogy of the immune system as being an army of warriors fighting off foreign invaders. Since autoimmune diseases result from excessive immune activity, numerous immune-suppressive drugs are used in conventional medicine to symptomatically treat this condition.

It seems to be *biochemical individuality*<sup>9</sup> that allows the husband to come down with flu, or sore throat symptoms, while the wife might remain unaffected. The real challenge is to understand what factors first weaken immunity and then the positive factors that can enhance it, naturally and quickly.

## Cells with “Pit Bull” Appetites — An Immunity Primer

*“The quality of life is determined by its activities.”*

— Aristotle,  
*Nicomachean Ethics* (4<sup>th</sup> c. B.C.)

In the 1980s there was a popular game called *PacMan*™, where little quick moving video globes, armed with large snapping mouths defensively gobbled invading attackers in the shape of little dots. The Pac Men would roll along, engulf an entire dot with its large mouth and voila: enemy vanquished! Presumably, the enemy was eaten, dissolved and digested to never again stand in the way of that fearless, rolling PacMan—until you’d deposit a second quarter for another round.

Simple game. Simple strategy—and, quite similar to the general workings of your immune system.

Immune cells actually occupy every part of the body—the eyes, nostrils, skin, lungs and lining of internal organs. With watchful senses they stand guard to protect us from anything foreign to the body that could pose a threat. Some immune cells guard the lining and blood vessels of specific organs, while others circulate through the body looking for action via the lymph fluid. Lymph fluid circulates within a separate network from the circulatory system and consists of a pale, thick fluid made chiefly from fat and white blood cells. With many of the immune cells headquartered there, they are on alert status to be dispatched, via the lymph circulation, to the location of threat.

Interconnected by way of the lymphatic vessels, the immune system includes four key organs:<sup>10</sup> lymph nodes, thymus gland, spleen and bone marrow.

<sup>8</sup> Martin, Dr. Paul — *The Healing Mind* – The Vital Links Between Brain and Behavior, Immunity and Disease — St. Martin’s Press, New York (1998) p. 71

<sup>9</sup> This term was first coined by noted nutrition researcher, Roger Williams, Ph.D who discovered pantothenic acid.

<sup>10</sup> Referenced from: Roundtree, Robert, M.D., Colman Carol — *Immunotics* — G. P. Putnam’s Sons, New York (2000) p. 22

*Lymph Nodes* — These bean-shaped gland-like organs that vary from pinhead size to an inch, and filter the lymph fluid to keep foreign particles from entering the blood and major organs. The lymph nodes contain numerous immune cells and, while found throughout the body, are concentrated under the arms, behind the ears and in the groin area. “Swollen glands” typically indicate lymph node inflammation.

*Thymus Gland* — This small double-lobed gland weights less than 2 ounces at birth and doubles in size by puberty, after which time shrinks and is eventually replaced by fatty tissue. It is a pinkish-gray gland that’s situated behind the breast bone. The thymus plays a key role in the formation of antibodies in the first few weeks of life and in the development of fetal immunity. Removal of this gland causes a decrease in the amount of white blood cells and in a decrease in the size of the spleen and of lymph nodes throughout the body, leading researchers to believe that the thymus also stimulates the development of white blood cell formation.<sup>11</sup>

*Spleen* — The spleen is a somewhat flattened and purplish colored organ located beneath the lower left side of your rib cage, behind the stomach and beside the pancreas. The spleen contains involuntary muscle which enables it’s capsule to contract as well as to withstand some swelling. This ability allows the spleen to act as a blood reservoir in the event of a hemorrhage or other emergency. It is another source for immune cell and antibody production, while having the dual function of keeping the blood cleansed for undesirable matter. Specifically, it filters worn-out red blood cells, salvages the iron content of these cells and returns them to the blood.

*Bone Marrow* — Most immune cells are produced within the bone marrow from unique cells called *stem cells*. There they mature until called into action and then migrate to different areas of the immune system by way of lymphatic circulation.

### *On Alert! — The Special Tactical Forces of the Blood*

New developments in immune research practically occur daily. At this point what is known about maximum immune function is that it is dependent on teamwork performed by different immune cells. When these cells work together we remain healthy and disease-resistant.

This following information<sup>12</sup> outlines the amazing function of *B cells* and their *Antibodies*, the *Natural Killer (NK)* cells and their hormone-like chemicals called *Cytokines*, *Neutrophil cells*, *Macrophages* and the numerous *T-cells* produced in the Thymus.

Here is a brief overview of immune cells and how they work:

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<sup>11</sup> Memmler/Wood — *The Human Body in Health & Disease* — J.B. Lippincott Company, Philadelphia, Pennsylvania (1983), p.231

<sup>12</sup> Some referencing derived from: 1. *Ibid.* 2. Martin, Dr. Paul — *The Healing Mind* — St. Martin’s Press, New York (1998). 3. Passwater, Richard, Ph.d — *Cancer Prevention & Nutritional Therapies* — Keats Publishing, New Canaan, Connecticut (1978). 4. Memmler/Wood — *The Human Body in Health & Disease* — J.B. Lippincott Company, Philadelphia, Pennsylvania (1983), p. 330-338

- *B-cells* — Essential for normal immune function, B-cells are produced in the bone marrow. First some miscellaneous immune information that will help explain the significance of B-cells: Different immune cells have specialized functions. Some immune cells tackle foreign proteins known as *antigens*, immediately upon entering the body. Since the immune system is not infallible, they prevent B-cells from missing their antigen targets by providing a secondary attack plan— releasing antibody “tags.”

When B-cells first encounter an antigen they tag the foreign microorganism with proteins called *antibodies* (or *immunoglobulins*). This tag informs other immune cell of potential danger. This tagging reaction is vital to immune protection since immune cells will not attack and antigen unless it has this tag marking. If we were considering this a game, it certainly sounds like cheating, however, it’s protective and lucky for us.

Once this tagging occurs against an antigen, the immune system will always recognize it as a danger. Should it try to repeat attack, it is immediately recognized and dissolved. This accounts for the one time occurrence of chicken pox or measles—the body disables those antigens forever.

Using the B-cells is also the basis for vaccination. The dead strain of a particular virus or bacteria, while not potent enough to stimulate the sickness it originally carried, stimulates B-cells to produce protective antibodies.

Complicating matters slightly are five varieties of antibodies produced by B-cells. They are labeled as: *IgA*, *IgG*, *IgM*, *IgF*, *IgD* and in trace amounts, *IgE* and all have unique functions that span from immune system warnings of further invasions, protecting newborns from disease, combating allergic reactions and preventing parasitic infection, to assisting digestion.

- *Natural Killer cells* — Approximately 5 to 15 percent of the lymphocytes (white blood cells) are natural Killer (NK) cells. I visualize these cells wearing black body suits and hoods—they’re the *Ninja* force of the lymph system, and they’re *all* business. They don’t wait for attack orders, either; they have the innate ability to freely attack intruders at their own discretion.

Ninja’s *with* attitudes! In fact, I think it was Ninja Rogers who said, “I never met an invading microorganism I *liked* ...”

While NK cells have numerous functions they mainly control acute infectious conditions and cancer cells. Should the body be challenged by new bacteria, virus or cancer cell, the NK armies wages a full out war by producing the substance *interferon*. Interferon prevents viruses from replicating. Another trick NK cells have is to produce some poisonous chemicals such as *nitric oxide*. Nitric oxide destroys the internal workings of invading microorganisms.

NK cells produce hormone-like chemicals called *cytokines*, which allows these cells to communicate with other immune cells and influence their activity.

A simple blood test can determine the presence of NK cells and is a good barometer for evaluating immune health. It has been observed that individuals with a high family incidence of cancer frequently have low NK cell activity, making them more vulnerable. Often, NK activity can be an indicator of an individual’s ability to overcome cancer; in cases of advanced metastatic breast cancer, or metastatic melanoma, NK cell counts have been noted to be lower than cancers which have not spread and are confined to one site.<sup>13</sup>

Another study with residents of a retirement community found that NK cell activity increased by as much as 30 percent after being taught relaxation exercises.<sup>14</sup>

In some research, NK cells appear to have little ability to inhibit the development of solid tumors,<sup>15</sup> but are effective in preventing a cancer from spreading by killing the cancer cells as they migrate and before they begin to form new tumors.<sup>16</sup>

In individuals with chronic emotional stress low NK readings have been observed while stress management techniques such as meditation and breathing exercises have elevated cell numbers. In addition to relaxation therapies, there are a number of other ways to boost NK activity, which we’ll discuss later on in this chapter.

- *Neutrophil cells* — Traveling throughout the blood and specializing in messing with bacteria, the Neutrophil cells are the bloods main circulating white blood cells and work by be summoned into action via other immune cells. With bacterial infection, neutrophil counts are typically elevated. Lacking the brain power of NK cells, the neutrophil cells do not specifically recognize and target specific invaders, but if one should get in the way—they’re history. They are immediately doused with a cellular toxin that neutrophil cells produce and then engulfed and destroyed. It’s kind of like applying a sauce to the meal—makes it easier to go down.
- *Macrophages* — Macrophages are large white blood cells that live in assigned areas of the bloodstream. In the lungs, the resident macrophages, also know as “scsavengers.” they help combat inhaled dust and numerous other toxins. Working in partnership with the neutrophils, they rush to areas of infection to help obliterate invaders and release a substance called *pyrogen* which signals the body to raise its temperature in order to “cook” invading bacteria or viruses. Brutal fate.

<sup>13</sup> Roundtree, Robert, M.D., Colman Carol — *Immunotics* — G. P. Putnam’s Sons, New York (2000) p. 26

<sup>14</sup> Keon, Joseph, Ph.D — *The Truth About Breast Cancer* — Parisound Publishing, Mill Valley, CA (1999), p. 163

<sup>15</sup> Brody, P., Cordon, J. — “Natural Resistance Mechanisms May Play a Role in Protection Against Chemical Carcinogenesis” — *Cancer Immunology and Immunotherapy* — 13:125-27 (1982)

<sup>16</sup> Hanna, N., Fidler, I. J. — “Role of Natural Killer Cells in the Destruction of Circulating Tumor Emboli” — *J Nat. Cancer Inst* — 65:801—9 (1980)

According to Dr. Norbert Roberts of the University of Rochester Medical School, the "... macrophages' production of interferon maybe on mechanism of their extensive anti-tumor activity, since interferon can render macrophages tumoricidal and can inhibit the growth of tumor cells directly. Interferon has not only anti-viral activity, but it also has cell-growth inhibitory activity."<sup>17</sup>

- *T-cells* — Produced in the thymus gland, the T-lymphocytes are also known as T-cells. T-cells are somewhat selective in who they choose to gobble up; they do not attack at random but first look for the antibody tag before engulfing their prey. The T-cells attack cancer cells and certain types of bacterial, fungal and viral infections. Since they do not produce antibodies, they join forces with other immune cells that do such as the neutrophils and NK cells.

There are three categories of T-cells:

1. *Helper T-cells* (usually refereed to as T4 or CD4 cells). The helper cells stimulate B-lymphocytes to produce antibodies. In this category there are a) T-Helper 1 and, b) T-helper 2 cells. T-helper 1 cells chiefly fight infection, while T-helper 2 cells are concerned with inflammatory and allergic responses. Ordinarily, the T-helper 2 cells defend the body from dust and other undesirable antigens. If these cells should become overactive, they could trigger allergic reaction to proteins that do not pose a threat to the body (example: foods and pollen).

2. Cytotoxic T-cells rush to the origin of microorganism invasion and attach themselves to the invaders. Once the basic structure of Chtotoxic is identified they are renamed as *interleukins*—messengers between leukocytes, or white cells.

3. *Suppressor T-cells*. These T-cells inform the B-lymphocytes when adequate antibodies have been produced and signal the cytotoxic T-cells to back off..

### *Passing Immunity to Baby*

During the first eight weeks of a child's life the immune system is still developing. It has not dealt with the gamut of *pathogens* it will face in the future and at this time the baby's system is at its most vulnerable—it can easily be overcome by the most common of microorganisms. This is one of the reasons that physicians generally recommend the newborn be kept in seclusion for up to eight weeks as the immune system continues to develop and strengthen in its ability to ward off pathogens.<sup>18</sup>

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<sup>17</sup> N. Roberts, *National Institutes of Hyealth Records*, (March 4trh, 1980) — Reference: Passwater, Richard, Ph.d — Cancer Prevention & Nutritional Therapies — Keats Publishing, New Canaan, Connecticut (1978), p. 187

<sup>18</sup> Reference: Roundtree, Robert, M.D., Colman Carol — *Immunotics* — G. P. Putnam's Sons, New York (2000) p. 30

One of the best ways a mother can positively influence the health of her newborn is via breast milk. The first milk produced by mother after birth is called *colostrum*. It is a powerful source of immune-enhancing proteins that ready the infant's immune system for living in a world full of ever present microorganisms. Additionally, breast feeding can reduce the potential of food allergy, which can have a debilitating impact on the immune system.<sup>19</sup>

## **The Biochemistry of Stress**

*"One of the symptoms of an approaching nervous breakdown  
is the belief that one's work is terribly important."*

— Bertrand Russell

In the 1950s, Canadian researcher, Hans Selye, Ph.D first introduced the concept of stress. His classic work, "The Stress of Life", coined the term "general adaptation response" to explain that stress is an unavoidable state because it is the body's adaptive response to any demand made of it.

Dr. Selye was actually investigating a hormonal substance that originated from animal ovaries. The now famous experiment he performed was to inject one group of rats with the ovarian substance and another group with a placebo. Several months later, he noticed some strange changes in the rats who had received the ovarian extract: they had developed ulcers and weakened immune systems.

Initially Dr. Selye considered that these changes were the result of the hormone shots. However, his mind was changed when the rats who were receiving the placebo shots had developed the same ulcer and damaged immune system symptoms. Rethinking his methodology, Dr. Selye finally realized that the only common factor affecting both groups of rats was the daily shots, which both groups of rats clearly did not like. Their negative resistance to these shots was so strong that Dr. Selye had to physically hold the rats down to give them the shots as they writhed and attempted to run away. What was becoming apparent was that this discomforting experience was producing a negative physical result.

Dr. Selye, conducted other experiments in which he duplicated unpleasant conditions for his rats by holding them down for specific periods throughout the day, plunging them in cold water, etc. Eventually, Dr. Selye realized that the emotional stress the rats were experiencing had been resulting in negative changes in their physiology. Their intense emotional reactions somehow triggered a stress response system.

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<sup>19</sup> Chandra, R. K., Hamed, A. — Cumulative incidence of atopic disorders in high risk infant why hydrolysate, soy and conventional cow milk formulas — *Ann Allergy* — 67:129-32, 1991

The body reacts to stress through two vehicles: chemical messengers and neurological impulses. The chemical messengers within the body are called hormones. The word *Hormone* is a Greek derivative meaning, "to arouse." The numerous glands that make up what we know as the endocrine system produce these hormones.

The adrenal glands are the foundation of the endocrine response system and produce 40 hormones responsible for numerous body functions. These tiny triangular shaped glands sit atop each kidney, are roughly the size of your fingertip and weigh as much as a nickel coin. They have an outer layer (cortex) and an inner layer (medulla). Considered the shock absorbers of the body, the adrenal glands produce two hormones essential for what is called the "flight or fright" response:

- Glucocorticoid hormone (from the cortex)
- Adrenaline (from the medulla).

Adrenaline provides the first burst of energy in a crisis situation while glucocorticoids assist this function by working for longer periods of time. Stressful events, physical or psychological can set off an avalanche of chemical reactions in the body. The instant a person perceives something stressful is happening, the brain signals the nerves to release adrenaline and related chemicals sending quick energy to the muscles. At the same time, a hormone called corticotrophin is released into the bloodstream and tells your adrenal glands to release more stress hormones called glucocorticoids. Acting as the Jekyll and Hyde of stress biology,<sup>20</sup> these stress hormones tell the body to dump sugar into the bloodstream, providing quick energy for a sprint away from danger.

However, in situations where there is repeated stress, the glucocorticoids "pound the brain like storm waves battering the shore" and the beneficial effects of stress hormones are reversed, decreasing memory function, energy levels and making one more susceptible to sickness.

The biochemical effects of stress orchestrate a glandular jazz band of reactions: as the glucocorticoid levels increase in response to stress, *immunity is turned off*, growth and repair functions cease and reproductive functions come to a halt. At the same time, blood sugar levels elevate, the heart rate speeds up and blood begins to concentrate in the lower extremities to prepare the body for its "flight or fight" response. The physical translation of this reaction is *greater susceptibility to sickness, prevention of recovery from illness and an obvious lack of sexual desire*.

A glucocorticoid reaction also negatively influences large intestine function and locks the anal sphincter muscle. *Part of this immune breakdown is also the ability to control the inflammation process*. As digestion becomes inhibited, allergic reactions can force the

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<sup>20</sup> Resource: Vergano, Dan — "Long-term litany of tension can better the brain" — *USA Today*, August 3, 1999, in reference to a published article in an earlier *JAMA* article by Bruce McEwen, M.D. of Rockefeller University, New York.

intestine to swell, putting one at risk for celiac disease, malabsorption syndrome and greater susceptibility to numerous opportunistic invaders such as *Candida*, parasites and other dangerous microorganisms.

The end result is that these chain reactions deplete body reserves and result in a reduced output of necessary stress hormones from the adrenal glands. Over a period of consistent stress, the body will automatically convert sex hormones such as progesterone and testosterone to stress hormones. When this occurs, possible symptoms of this reaction include the following: *fibromyalgia, heart arrhythmia, increased urine flow, profuse sweating, night sweats, muscle spasms, migraine, anxiety, depression, common tension headaches, memory problems, stiff neck and shoulders, asthma, irritable bowel syndrome, herpes outbreaks, psoriasis, eczema, low back syndrome, sciatica, erectile dysfunction, amenorrhea, hot flashes, hypertension, skin blotching, rashes, acne, and general immune suppression*—just to name a few.

It is no doubt that daily life stresses can be consuming, in terms of the focus of our attentions, sense of joy, energy needs and peace of mind. The right diet, supplement program, discipline and will to live can be seriously undermined by the presence of constant stress. Reducing stress and finding renewed perspectives to keep from becoming overwhelmed by their presence is an integral part of the health equation.

## **Learning from “Kitty”**

*“Education does not mean teaching people to know what they do not know; it means teaching them to behave as they do not behave.”*

— John Ruskin (1819-1900)  
English Critic

A number of years ago, I had a cancer client named Ed, who was referred to me with lymphoma and had refused conventional therapy. At 74 years old, Texas born and patriotic to the bone, Ed personified hardiness. He had ramrod posture, lots of energy and a full head of hair that was framed by a contagiously ever-friendly smile. But, Ed was also a picture of stress. He wrote long "to do" lists every day and was compulsively driven to make sure all his "to do's" were crossed off by the end of the day. Always seeming to be on the move, Ed seemed to equate inactivity with stagnation, and stagnation, to him, meant death. He even hated the idea of sleeping, commenting that it "was such a waste of time."

Having been healthy for most of his life, Ed didn't take well to being sick. He had retired years ago, but still performed volunteer work, rain or shine, in the railroad yard that formerly employed him for 38 years. He still worked four hours per day, five days weekly and on the weekends busied himself with household projects, working on his grandson's car, doing yard work or running errands for handicapped neighbor's.

E's frequent lament was that he "never had time to cook" or take care of himself. "Too many *other* things to do," he'd complain. During one visit where he appeared very tense, I suggested some yoga (which he was familiar with), mediation (which he had abandoned years ago), and more attention to his diet. He gave me his typical head nod and a "Yeah, yeah, I'll do what I can" response. His lady-friend accompanying him would roll her eyes with a subtle glance of exasperation. "I can never get him to relax," she'd complained, "he just won't listen ..."

As they left the office, I watched him walk ahead of his companion to the car. I thought about how stressful he seemed, focusing on ten things at once, distracted and impatient at the same time. Relaxing was his biggest obstacle. I suspected that his tension created cravings for more "comfort food" meaning, fat and other sensorial foods, — "little pleasures," he called them—to take his mind off whatever he was trying to avoid thinking about.

No matter how much I championed about it, led him through visualizations, or showed documented studies on the importance of stress reduction, it had little enduring effect. Ed was so used to operating that way, it had become his way of life.

Two months later, I received an early morning telephone call from Ed. In a resolutely calm voice he asks to come by the office—has something "amazing" to tell me, he kept saying. I suggested we meet at the end of the day and by 6 pm I was sitting across from a brand new Ed; radiant, calm and very present—as if the Almighty had touched him with the hand of holy benediction. For one animated half hour, he related the following story, complete with witty asides, pantomime and philosophical commentary:

*"I'm pushing a broom in the rail yard, when I look around and see this little kitty limping along, dragging a bloody paw that was hanging by a thread of muscle. Guess he'd been in some kind of fight--he was chewed up something fierce. Heck, I figure I'd grab him and take him down to the vet. So I go real slow, but he scares and scuttles into the machinery we got all over the lot. In all that heavy tonnage of machinery there's all kinds of crooks and nanny's a little feller can hide. Now, I'm worried. I'm figurin' if he hides in there and dies, he'll stink up the place, so I tried to catch 'im, but the little critter just flew—even with that bum paw. Took off like a rocket!*

*"By the end of the day, still no trace of him. So, I set three little bowls down in the middle of the yard before I left. One for water, another for milk and the third for a bit of kttty kibble—you know, the crunchy stuff. Aw, well it looks crunchy, I ain't tried it myself, but I figure he'd like it. He's a cat—probably a hungry one, too. Now, each morning when I get into work, I go to check the bowls, and guess what I see?"*

I shrugged my shoulders. I could tell this was going to be a long one.

*"The water's gone, the milk's untouched and that kibble? Not a piece missing! Now, this goes on for nine days. And, every day—the same thing: No sign of kitty, never*

*touches the milk, or the kibble, but every morning, that water's gone—and I know it wasn't just evaporation. That little son-of-a-gun was thirsty! On the tenth morning, I was sawing a piece of wood, when outta the blue, this little kitty leaps on a 2x6 next to me and starts meowing up a storm. It was him! And boy, was he a sight: scrawny, bone-thin, his fur all matted, but that paw—I swear to high heaven—was completely fused. Fused! Of course, it wasn't perfect, but it wasn't dangling, either. He'd chewed the hair around the wound and I think he'd been lickin' at it 'cause it was kinda glistening in the sun. He had these little crystal clear eyes, wide like the moon! So, I pick him up and put him in front of the food. He looks at me, takes a bite of the kibble, a lick of milk and passes on the water..."*

By this time I have two calls on hold, a last minute client waiting and some forms I have to messenger to the airport by 7 PM. I interrupt Ed's dramatic pause.

"Ed, I don't understand the point of your story."

He looked at me with an understanding, yet indignant look that only someone nearly thirty years older has the right.

"Now *you* be patient, 'cause this gets better..."

Ed's age, warmth and bubbling enthusiasm took priority. I let everything go.

"Sorry. I'm all ears."

*"All right, where was I? Oh yeah, the kitty looks up at me after eyeing the bowls and turns and walks out the front gate—just like that!"*

Now, I'm sitting there, baffled.

"Ed, what's the point of the story? I don't think I understand."

He flashes me a look of wistful compassion. Suddenly, I feel very stupid.

*"That cat was my personal guru—taught me the deepest lesson; showed me that healing means focus; that you heal by finding a way to leave everything not essential to healing behind; make your life simple and just get better. That's all the damn kitty did!! Didn't mow anybody's lawn, do volunteer work, argue with anyone, or run crazy errands all day. He just went into himself. Took a break from all everything, took the minimum of food— in his case, nothing—and laid low for a while... I guess that's how you really heal."*

Ed's story illustrated the simple and time-tested wisdom, common to the animal kingdom, but growing increasingly alien to modern individuals. *To heal is to focus*. Stress stands in the way of focus because it distracts us, negatively altering our biochemistry and dampening the positive spirit necessary for sustaining our faith that we *can* heal. And all it took was a little Kitty's example.

## Hope for Helplessness

*"I was going to buy a copy of The Power of Positive Thinking,  
and then I thought: What the hell good would that do?"*

— Ronnie Shakes, Comedian

Another form of stress that is particularly harmful is called *learned helplessness*. This condition is brought about by constant exposure to uncontrollable stressors—specifically, finding oneself in a painful or very uncomfortable situation from which there seems to be no hope of relief or escape.<sup>21</sup>

For a moment, imagine you have entered a hospital (root word: *hospitality*) to have an operation. In the confines of the hospital you have no control over what you can eat, when you can eat, what you will wear, when you will sleep, or whom you may see. You are given medication, interrupted by visiting rounds of nurses or doctors, and must listen to the collective and constant sounds of other patients whining, conversing or dying.

Psychologically, you have surrendered control. In light of this situation, it is no small feat to keep from feeling victimized, watch your faith waver and begin to develop a sense of hopelessness. These feelings, alone can negatively influence your immune function.

*The patients that manage to regain their health in hospitals are the "difficult" ones; they ask questions, request test interpretations, eat selectively, or have food brought in and personalize their rooms to add whatever sense of home might be possible. A highly significant study published in 1979 revealed that cancer patients who were rated as less cooperative by doctors and nurses lived longer.*<sup>22</sup>

Much of the research on learned helplessness has been done with animals, specifically rats, that have been exposed to a number of repetitive electrical shocks or loud noises. At some point the rat was placed into a different cage where it could control the shocks; it could move to another side of the cage to avoid the shock, or remain in place and continue getting shocks. They even wired a warning bell to alert the rat that a shock was coming. Despite all of this, the fact that freedom from shocks was just a crawl away, the rat remained immobile and continued to receive shocks. However, when a rat that had not been subject to previous shocks in the cage was placed into the same circumstance, it quickly learned how to avoid the shocks.

What was the inability of the first rat to learn the same lesson?—especially considering that it had already experience the physical trauma of being shocked repeatedly? Call it "rat belief" or "rat misconception," but the first rat *believed that it was powerless*.

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<sup>21</sup> Seligman, Martin — *Learned Optimism* — Pocket Books, New York (reissue – 1998) - Additional Reference: Roundtree, Robert, M.D., Colman Carol — *Immunotics* — G. P. Putnam's Sons, New York (2000) p. 213

<sup>22</sup> Derogatis, L. R. , et al. — "Psychological Coping Mechanisms and Survival Time in Metastatic Breast Cancer" — *JAMA* — 242:1504—8 (1979)

Absorbed in such negative thinking, it merely collapses and doesn't even attempt to seek safe ground. This example is a definitive picture of learned helplessness in action. The bottom line was that animals that had learned helplessness were much more likely to become sick, develop immune breakdown and finally succumb.

On a human comparison, feeling that you have lost control around you can bring on similar negative physical consequences. Numerous studies have associated higher occurrences of heart disease and even cancer, to people who feel they have little control over their work. According to Martin Seligman, a researcher who documented the effects of learned helplessness in his book, *Learned Optimism: How to Change Your Mind and Your Life*, Seligman proposes that *people can learn to be more optimistic and in control by changing their basic assumptions to a more upbeat, empowered view*. Optimism is redefined not as a state of mind, but *as a reflection of daily action*.

A seven year follow-up of breast cancer patients by Sandra Levy, associate professor of psychiatry and medicine at the University of Pittsburgh and director of behavioral medicine in oncology at the Pittsburgh Cancer Institute, showed that those patients who expressed more joy in their lives when initially tested lived longer.<sup>23</sup> This result does not conflict with the studies that showed that an angry or fighting response to cancer predicts a better outcome, concluding that it is possible to have a sense of joy in life while still possessing a “fighting spirit.”<sup>24</sup>

Another study concerning optimism that centered on women with cervical abnormalities<sup>25</sup> reported that the women with high scores for pessimism, hopelessness, and social alienation, were more likely to progress to cancer of the cervix. Conversely, optimism and active coping styles were connected with reduced risk of progress to cancer.<sup>26</sup>

## Cancer, Emotions and Stress

*“The best doctors in the world are Doctor Diet, Doctor Quiet, and Doctor Merryman..”*

— Jonathan Swift (1711)

Cells of the immune system, like those of other body systems, can proliferate uncontrollably; the result is cancer. In the blood, leukemias are caused by the proliferation of white blood cells, or leukocytes. An uncontrolled growth of antibody-producing (plasma)

<sup>23</sup> Levy, S. M., et al. — “Survival Hazards Analysis in First Recurrent Breast Cancer Patients: Seven Year Follow-up” — *Psychosomatic Medicine* — 50:520–28 (1988)

<sup>24</sup> Referenced from: Pelton, Ross, Ph.D, Aoverholser, Lee, Ph.D — *Alternatives in Cancer Therapy* — Fireside Books, New York (1994), p. 219

<sup>25</sup> Goodkin, K., et al. — “Stress and Hopelessness in the Promotion of Cervical Intra-Epithelial Neoplasia to Invasive Squamous Cell Carcinoma of the Cervix — *Journal of the Psychosomatic Research* — 30:67-76 (1986)

<sup>26</sup> Antoni, M. H., and K. Goodkin — “Host Moderator Variables in the Promotion of Cervical Neoplasia: I. Personality Facets” — *Journal of Psychosomatic Research* — 32:327-38 (1988)

cells can lead to multiple myeloma. Cancers of the lymphoid organs, known as lymphomas, include Hodgkin's disease.<sup>27</sup>

While stresses might be difficult to measure, and vary in tolerance from one individual to another, *stressful influences can be defined as events, activities or interactions that exceed an individual's ability to comfortably cope.*

Research has shown that a wide range of stresses, from losing a spouse to facing a tough examination, can deplete immune resources, causing levels of B and T cells to decline, NK cells to become less responsive and fewer IgA antibodies to be secreted in the saliva, thus making one more susceptible to disease, including cancer. When American psychologist, Lawrence LeShan, examined more than four hundred cancer patients, he discovered that a phenomenally high 72 percent of these patients had experienced the loss of someone close to them in a short period before the onset of their cancer. In contrast, only 10 percent of comparable people without cancer had suffered such a loss.<sup>28</sup>

In a study<sup>29</sup> led by Dr. Arthur A. Stone, a psychiatrist at the State university of New York at Stony Brook, unusually high blood levels of a molecule linked to prostate cancer were found among men who had experienced periods of stress and social isolation.

Dr. Stone commented that, "We know very clearly that social interactions and events have impacts on the hormonal system. The hypothalamic, pituitary and adrenal systems are clearly affected by psychological stress." Stone's group looked at 318 men recruited for a prostate cancer screen program and measured their stresses and social isolation through questionnaires, as well as lab work on prostate-specific antigen (PSA) tests—a marker for prostate cancer.

The results showed *PSA readings more than three times higher for men with high levels of stress* than for those with low stress levels. And men with low levels of social support *were almost twice as likely to have high PSA readings.*

The brain is thought to directly influence the immune system by telegraphing its messages down nerve cells. Networks of nerve fibers have been found that connect to the thymus gland, spleen, lymph nodes, and bone marrow. Some experiments have also shown that immune function can be altered by actions that destroy specific brain areas.

Substantial evidence exists that show individuals overwhelmed by severe depression, and the resulting immuno-stress, exhibit a greater tendency to fall ill or die prematurely than do non-depressives. In a twenty-year study of two thousand middle-aged American men it was demonstrated that *depressives had twice the risk of developing a fatal cancer in later years*, aside from other medical risk factors that included smoking or a familial history of cancer.<sup>30</sup>

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<sup>27</sup> Encarta Reference Encyclopedia, 2000

<sup>28</sup> LeShan, Lawrence, Ph.D — *Cancer As A Turning Point* — Plume, New York City (1994)

<sup>29</sup> Reported by Edward Edelson, *HealthSCOUT* Reporter — [www.healthscout.com](http://www.healthscout.com) — Sept., 21<sup>st</sup>, 2000

<sup>30</sup> Irwin, M., et al. — "Impaired NK cell activity during bereavement" — *Brain Behav. Immun.* — 1,98 (1987) — Reference: Martin, Dr. Paul — *The Healing Mind* — St. Martin's Press, New York (1997), p. 97

Depression, like stress mechanisms, are associated with changes in hormone levels in the blood. Depressives have also shown higher levels of the stress hormones cortisol, adrenaline and noradrenaline, all of which negatively alter immune function. Another way in which depression can influence immune health is by behavior patterns. Typically, depressed people get less sleep, consume more alcohol, exercise less, often smoke tobacco and frequently use more drugs, either therapeutic or recreational. These behaviors strongly manipulate immunity and NK cell activity.<sup>31</sup>

Another group of chemical messengers that figure into stress-related changes in immunity, are the *endogenous opioids* (EO)—sounds like the name of an alien tribe, doesn't it? Actually, they are peptide molecules that are naturally produced in the brain and found throughout the body. Chemically, they share similar structures to opium-derived drugs like heroin and morphine. EO's can be divided into two basic categories of: a) endorphins and, b) enkephalins.

The positive value of these EO's is their ability to minimize our perception of pain. Severe stress can trigger the release of these peptide molecules, which have a temporary pain-relieving action equal to a high dose of morphine. This action is typically referred to as *stress-induced analgesia*. However, the benefits of this activity have a front and back. *What is labeled as 'opioid stress' can suppress immune activity of natural killer cells and lymphocytes and thus, increase the susceptibility to tumor growth.*<sup>32</sup>

In a carefully reviewed study examining emotional and psychosocial factors affecting cancer patients, it was determined that the "inability to express emotion, particularly in relation to anger" is a very valid factor contributing to the progress of cancer.<sup>33</sup>

Compelling evidence for associations between stressful life events and ensuing breast cancer was noted in a study from King's College Hospital in London. The results were published in the British Medical Journal toward the end of 1995. Women who had a "suspicious but (at that point) undiagnosed lump in their breast" underwent a psychological interview before a biopsy analysis. The outcome revealed that the women who had experienced severe life events during the preceding five years had a high probability of being diagnosed as having breast cancer, instead of a benign lump or no disease. Nearly half of these woman who had experienced emotional trauma turned out to have breast cancer, compared with less than a fifth of those whose biopsy results proved negative.<sup>34</sup>

As a keynote speaker at a recent *California Health Classic*<sup>35</sup> speaker's exposition, I had the opportunity to attend a talk by a pioneer in the mind-body cancer movement, O. Carl Simonton. Dr. Simonton, author of *Getting Well Again*,<sup>36</sup> which

<sup>31</sup> *Ibid.*, p. 97

<sup>32</sup> Reference: *Ibid.*, p. 137

<sup>33</sup> Pelton, Ross, Ph.D, Aoverholser, Lee, Ph.D — *Alternatives in Cancer Therapy* — Fireside Books, New York (1994), p. 218

<sup>34</sup> Martin, Dr. Paul — *The Healing Mind* — St. Martin's Press, New York (1997), p. 220-221

<sup>35</sup> *The Health Classic*, organized by Larry Cooper, Santa Barbara, Ca.

<sup>36</sup> Simonton, O. Carl — *Getting Well Again* — Bantam Books, New York (1992)

sparked the popularity of Visualization Therapy over twenty years ago, spoke about recent mind-body research:

"There are now *thousands* of studies on the mind-body connection. People will denounce these studies simply because they don't like the conclusions. The conclusions of these studies are: *'Psychological counseling for people with cancer is more effective than chemotherapy or radiation therapy alone in the person with advanced cancer.'* There's an increase in the number of long term survivor's, *there's a doubling of expected survival times* and the side effects are desirable—people feel better! And, that's the primary focus of good counseling. It's the quality of life. This is not debatable. This is from five studies; three preliminary and two randomized match controlled. The first one was done at Stanford and the second one was done at UCLA. The conclusion of the UCLA study was this: *'Any intervention that helps us cope more effectively with life events or any intervention that helps us resolve emotional distress, impacts survival, impacts tumor growth, as we obviously enhance the quality of life.'*"

## **Defining the “Type C” Individual**

*“Negative emotions will not harm you if you express them appropriately and then let them go. Bottling them up is far worse.”*

— Joan Borysenko, Ph.D

For all the research existing on stress and cancer, a general personality picture has developed that scientists are calling the Type C individual.<sup>37</sup> Similar to the established Type A coronary-prone behavior pattern, it is an evolving character profile that is not fixed in stone. That said, these are some of the characteristics of a Type C individual:

- Suppress strong emotions, especially anger.
- Lacks assertiveness and frequently complies with the wishes of others.
- Avoids conflict and is overly concerned with what might offend others.
- Exhibits a calm, outwardly rational and unemotional approach to life.
- Obeys conventional behavior norms and radiates ‘niceness.’
- Self-sacrifice (martyr syndrome) and stoicism.
- Tendency to experience feelings of helplessness or hopelessness.

It is not surprising that repeated psychological stress can accelerate cancer and thereby shorten survival times. Some research at Guy’s Hospital in London found that strong stress

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<sup>37</sup> *Ibid.*, p. 223

exposure heighten the risk of relapse in women who had been operated on for breast cancer. Women dealing with bereavement issues, job loss or other consistent events determined to be stressful were five times more likely to have a recurrence of breast cancer than women who had not experienced such stress.

For all the damage we can do to our immune function with repressed emotions, hopelessness and general pessimism, such effects can be, as numerous studies have proved, reversed. A major contribution on mental states and cancer comes from David Spiegel and his colleagues at Stanford University, whose conclusions revealed that a high quality social environment can dramatically help to improve a cancer patient’s mental and physical state and therefore, prolong their survival. Spiegel and his team discovered that women with advanced breast cancer survived twice as long when they took part in psychological therapy, which improved their social environment.<sup>38</sup>

### **Nutritional Factors That Damage Immunity**

*“I look upon it that he who does not mind his belly will hardly mind anything else.”*

— Samuel Butler

The adult body produces approximately 126 billion neutrophils on a daily basis. Normally, over 25 billion are patrolling the blood and another 2 1/2 trillion are headquartered in the bone marrow, while ten trillion lymphocytes are housed in the lymph tissues. The need to feed these hungry warriors good nutrition is crucial in order to maintain healthy immunity.

Nutritional deficiencies decrease a person’s natural capacity to resist infection and its aftermath while decreasing the overall functioning of the immune system.<sup>39</sup> Poor nutrition adversely affects all aspects of immunity, including T-cell function, other cellular-related killing, the ability of AB cells to make antibodies, the functioning of the complement proteins and phagocytic (ability of the white cells to engulf microorganism invaders) capacity.<sup>40</sup>

The following list<sup>41</sup> offers an overview of specific nutritional requirements of the immune system.

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<sup>38</sup> Reference: Martin, Dr. Paul — *The Healing Mind* — St. Martin’s Press, New York (1997), p. 231

<sup>39</sup> Chandra, R. — *Nutrition and Immunology* — Alan R. Liss, Inc. Press, New York (1989)

<sup>40</sup> Simone, Charles, B., M.D. — *Cancer & Nutrition* — Avery Publishing Group, Garden City Park, New York (1994), p. 46

<sup>41</sup> Keane, maureen, M.S., Chace, Daniella, M.S. — *What to Eat if You Have Cancer* — Contemporary Books, Chicago, Illinois (1996), p. 52

- *Vitamin A* — Can inhibit the growth and development of cancer. Vitamin A deficiency decreases the number of plasma cells that produce antibodies. Some recommendations run as high as suggesting 15-20,000 iu per day, however long term supplementation can lead to toxicity. Some research suggests that as even 10,000 iu per day can increase the risk of fetal abnormalities in pregnant women.
- *Vitamin C* — An antioxidant nutrient offering protection to the cell. As an antihistamine, it has a detoxifying action on histamine, which hinders immune function. There is reasonable evidence that shows vitamin C is necessary to many immunological mechanisms. In white blood cells it is found in high concentrations (10 to 80 times greater than plasma levels), specifically in lymphocytes. Deficiency of vitamin C can also reduce the normal inflammatory response.<sup>42</sup>
- *Vitamin E* — An antioxidant nutrient that protects the fat (lipid) ingredients of cells, including cellular membranes. Vitamin E works in conjunction with the mineral selenium. A deficiency of Vitamin E can lower immune resistance by reducing lymphocyte numbers and the antibody response to invading pathogens. Inadequate vitamin E also diminishes delayed hypersensitivity reactions, a vital immunological response to cancer, worms and chronic infections.<sup>43</sup> While vitamin E is a powerful intracellular antioxidant and protects lymphocytes from being broken apart by free radicals, large doses (over 600 iu) may inhibit the immune response.<sup>44</sup>
- *B Vitamins* — Deficiencies of some of the B vitamin group, particularly, B<sub>1</sub>, B<sub>2</sub>, B<sub>6</sub>, pantothenic acid and biotin can bring on reduced production of antibodies. Reduced amounts of folic acid and B<sub>12</sub> have also shown to inhibit immune defenses.
- *Pyridoxine* — A deficiency of this B vitamin reduces antibody volume and decreases lymphocyte functioning ability.
- *Zinc* — Deficiencies of this mineral cause a decrease in T Killer cells and NK cell activity. Zinc is an essential trace mineral element for immunity and plays numerous roles in immune maintenance.
- *Iron* — Inadequate iron stores reduces NK cell cytotoxicity, phagocytosis (lymph cells engulfing microorganism ability) and killing ability of neutrophils.
- *Copper* — A lack in copper reduces T cell populations causing immune depression.
- *Selenium* — Reduced selenium can cause a decrease in antibody production. Selenium is necessary for regular functioning of the body’s most critical antioxidants,

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<sup>42</sup> Chandra, R.K. — Nutrition and immunity: basic considerations, Part 1. — *Contemp Nutr* — 11:11, 1986 —

Referenced: Pizzorno, Joseph, N.D. — *Total Wellness* — Prima Publishing, Rocklin, CA (1998), p. 44

<sup>43</sup> Beisel, W. R., et al. — Single-nutrient effects on immunological functions — *JAMA* — 245:53-58, 1981 — Ref: Ibid.

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<sup>44</sup> Suskind, R. — “Immunological Mechanism and the Role of Nutrients” — in Suskind, R.: *Principals and Practices of Environmental Medicine* — Plenum Medical Book Company, New York, 1992

*glutathione peroxidase*, an internal produced enzyme that neutralizes free radicals. Selenium also has the ability to neutralize toxic metals, which can suppress immunity. Vitamin E and Selenium are two nutrients work synergistically. A shortage of these two nutrients can decrease the cytotoxic function of NK cells.

While these concentrated nutritional elements are important, the gamut of antioxidants, phytochemicals, whole grain and daily protein sources are the basis for it's maximum functioning. Within the daily diet, certain foods can inhibit immune function.

Consuming over 100 grams (3 ounces) of simple-carbohydrate (table sugar) at one sitting dramatically reduces the ability of neutrophils to engulf and destroy bacteria. However, simple-carbohydrates are equally opportunity offenders; this applies to *all* simple carbohydrates, and not just ordinary table sugar, whether it be from glucose, fructose, sucrose (table variety), honey or even three glasses of orange juice. They all have a depressing effect on the immune system.<sup>45</sup>

In contrast, the consumption of 100 grams of *whole* complex-carbohydrates (aka "starch") yields has virtually no effect on immunity. Taking only 30 minutes to begin its immune damage, the suppressive effect of simple sugar consumption can last well over five hours. Only two hours after ingestion, neutrophil activity can be reduced by as much as 40%. Obviously, this can be devastating since the neutrophils make up from 60-70% of the total circulating white blood cells.<sup>46 47</sup> In glucose volumes of just 2 ounces (approx. 75 grams) lymphocyte activity has shown a marked decrease.<sup>48</sup>

If you're an "average American" you're consuming a whopping 140 - 150 grams of sucrose every day, and this amount does not include other refined simple sugars, such as fruit juice and honey. The problem extends not only into sugar intolerance due to concentration, but a physical low blood sugar state that can be triggered by sugar ingestion. Some research has found that immune function can be weakened by a low blood sugar levels.<sup>49</sup>

Protein deficiency can affect all body systems including enzyme production and nutrient absorption. In diets where protein deficiency was apparent, phagocytes and T cells were reduce in number,<sup>50</sup> and their ability to destroy cancer and other abnormal cells was impaired.<sup>51</sup>

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<sup>45</sup> *Ibid.*, p. 40

<sup>46</sup> Sanchez, A. Reeser, J., Lau, H., et al. — Role of sugars in human neutrophilic phagocytosis — *Am J Clin Nutr* — 26: 1180-84, 1973 — Referenced: Pizzorno, Joseph, N.D. — *Total Wellness* —Prima Publishing, Rocklin, CA (1998), p. 40

<sup>47</sup> Ringsdorf, W., Cheraskin, E., Ramsay, R — Sucrose, neutrophilic phagocytosis and resistance to disease — *Dent Surv* — 52:46-48, 1976 — Referenced: *Ibid.*

<sup>48</sup> Bernstein, J., Alpert, S., Nauss, K., Suskind, R — Depression of lymphocyte transformation following glucose ingestion — *Am J Clin Nutr* — 30:613, 1977

<sup>49</sup> Van Oss, C.J. — Influence of glucose levels on the *in vitro* phagocytosis of bacteria by human neutrophils — *Infect Immunol* — 4:54 (1971) — Referenced: Simone, Charles, B., M.D. — *Cancer & Nutrition* — Avery Publishing Group, Garden City Park, New York (1994), p. 47

<sup>50</sup> Aschekenasy, A. — Dietary protein and amino acids in leucopoiesis — *World Rev Nutri Diet* — 21:152 (1975) — Referenced: *Ibid.*

Physician, John McDougal<sup>52</sup> recommends the avoidance of animal-based proteins:

*“To avoid autoimmune diseases, such as insulin dependent diabetes, nephritis, rheumatoid arthritis and lupus, we should eliminate animal proteins from our diet and the diet of our children. Animal proteins can pass intact through the intestinal wall into the blood stream. The immune system recognized these proteins as foreign, invading substances, like a virus or bacteria. Our body makes antibodies that attack small segments of these proteins, consisting of a specific sequence of amino acids. Unfortunately, this same sequence of amino acids may be present on the cells of our body. In an effort to destroy the animal protein, the antibody attacks our own tissues, destroying them This process is known as immunologic mimicry.<sup>53</sup> ... Plant proteins are unlikely to cause mimicry because they are so structurally different from human proteins ... Ingested animal proteins from cows, chickens, pigs and other animals can stimulate an attack on our own body parts.”*

A high fat diet, in some experiments has also show to impair immunity,<sup>54</sup> however a deficiency of fatty acids can significantly contribute to immune dysfunction. Part of the strength of certain foods comes directly from their effect on your immune defenses. For your white blood cells to attack cancer cells they must recognize that they are abnormal. White cell function is dramatically enhanced with minimum fat in the bloodstream.<sup>55 56 57</sup>  
<sup>58</sup> Obesity can alter a variety of immune responses, most notably the risk of infection and a reduced capacity for the immune cells to protect.<sup>59</sup>

Associations between food allergy and chronic infections have been documented in a wide variety of studies. Many experts consider allergic reactions to foods as one of the most important (and generally unrecognized) immune-suppressing problems confronting us today.<sup>60</sup> Numerous allergy-related reactions and their resulting effects on immune function warrant attention to determining what foods may put one at risk.

<sup>51</sup> Jose, D. G., Good, R. A. — Absence of enhancing antibody in cell-mediated immunity to tumor homografts in protein deficient rats — *Nature* — 231:807 (1971) — Referenced: *Ibid.*

<sup>52</sup> The McDougal Newsletter — *Boosting Immunity* — Vol. 9, no.3, May-June, 1995

<sup>53</sup> *Scan J Immunol* — 40:623, 1994

<sup>54</sup> Clausen, J., Moller, J. — Allergic encephalomyelitis induced by brain antigen after deficiency in polyunsaturated during myelination — *Int Arch Allergy Appl Immunol* — 36:224 (1969)

<sup>55</sup> Barone, J., Hebert J.R., Reddy, M.M. — Dietary fat and natural-killer-cell cativity — *Am J Clin Nutr* — 50:861-67 (1989) — Referenced: Barnard, Neal, M.D. , — *Foods That Fight Pain* — Three Rivers Press, New York (1998), p. 161-162

<sup>56</sup> Nordenstrom, J., Jarstrand, C., Wiernik, A. — Decreased chemotactic and random migration of leukocytes during intralipid infusion — *Am J Clin Nutr* — 32:2416-22 (1979) — Ref: *Ibid.*

<sup>57</sup> Hawley, H.P., Gordon, G.B. — The effects of long chain free fatty acids on human neutrophil function and structure — *Lab Invest* — 34:216-22 (1976) — Ref: *Ibid.*

<sup>58</sup> Halpern, G. M., Trapp, C. L. — Nutrition and Immunity: Where are we standing? — *Allergy Immunopath* — 21:122-26, 1993

<sup>59</sup> *Ann Intern Med* — 104:540, 1986.

<sup>60</sup> Pizzorno, Joseph, N.D. — *Total Wellness* — Prima Publishing, Rocklin, CA (1998), p. 40

Studies with alcohol show a profound decrease of neutrophils after ingestion, even in nutritionally "normal" individuals. While alcoholics are known to be more susceptible to pneumonia and other infections, a major cause of disease and death among alcoholics is infectious disease.<sup>61</sup>

## Chemicals that Threaten Immune Health

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### *Tommy Toxicity's Monday Menu*

— Blue Plate Special! —

#### *Appetizer*

Fried PCB Swordfish with Mercury Dip

#### *Entrée*

Soft Tissue Baked Kidney in Cadmium Sauce  
Chlorinated, Lead Water Blanched Leafy Greens

*Free Refills of Dioxin Filtered Drip Coffee!*

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Blame it on the industrial revolution, but regardless of where we point our fingers, the modern reality is that society has become dependent on synthetically manufactured chemicals. Some research claims that over 600 different chemicals can be detected in our bodies that were not previously detected in human subjects prior to the early 1900s, and this correlates with increases of cancer, stroke, birth defects, immune, neurological reproductive disorders and the rise of infectious diseases. The inevitable ingestion of heavy metal exposure to mercury, lead, cadmium and arsenic have are known causes of immunological disorders and is irreversible.<sup>62</sup>

In a study that was done with harbor seals fed fish with higher pollutant levels, more infections and immune system dysfunction was consistently shown. Based on our increasing exposure and inevitable physical degeneration, the term *behavioral toxicology* came into existence during the 1980s.<sup>63</sup>

Additional immune system poisons that we are commonly exposed to include: *dioxin* (a toxic chemical formed in combustion and pulping of paper), *PCBs* (linked to increased breast cancer rates), *chromium*, *copper*, *nickel*, *tin*, *vanadium*, *DDT*,

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<sup>61</sup> *Ibid.* p. 41

<sup>62</sup> Stejskal, J. — Beward of metals: A possible cause of immunological disorders. — *CFN Symposium: Immunotoxicity and in vitro possibilities*. Stockholm, Sweden, September 19-21, 1993 — Referenced: Pizzorno, Joseph, N.D. — *Total Wellness* — Prima Publishing, Rocklin, CA (1998), p. 47-48

<sup>63</sup> Hatherill, Robert, J., Ph.D — *Eat to Beat Cancer* — Renaissance Books, Los Angeles, CA (1998), p. 36

*chlordan, dieldrin, heptachlor, lindane, mirex, toxaphene, pesticides* (including *carbamates, carbaryl, carbofuran, and malathion*) and *chlorine chemicals* primarily used for dry cleaning and formed during water treatment.<sup>64</sup> The source of some of these chemicals can be found in everyday ingredients we use in the workplace, at home, on our dinner tables as well as in the environment:<sup>65</sup>

**Lead** — can be found in paint, paint dust, colored newsprint, soil, and water. Rice and vegetables cooked in lead-contaminated water can absorb 80 percent of the lead. Other lead sources may come from food wrapping, canned foods, plastic wire insulation and even in calcium supplementation as well as antacids.

**Cadmium** — accumulates in the soft tissues (particularly the kidney and is generally found in high amounts in organ meats (especially liver and kidney). Shellfish such as snails, oysters, mussels, shrimp, crab and some fish, have been reported to have high amounts of cadmium. It is also found in cereal grains, root crops and green leafy vegetables. A common and highly absorbable source of cadmium is cigarettes.

**Mercury** — is easily absorbed into the body through food and can be frequently found in fish and seafood. The fish we are especially concerned about are predatory fish such as shark, swordfish, pike, and barracuda (any fish with teeth). These fish have shown repeatedly high levels of mercury and PCBs.<sup>66</sup> Freshwater fish usually are mercury carriers. Generally, deep water white fish that is low in fat content (flounder, cod, sole, haddock, red snapper, etc.) are better choices for choosing fish.

And, there's more; our exposure to organic solvents (paint thinner, petroleum distillates and household/carpet cleaning products), drugs, medications, pesticides, cosmetics, and certain vaccinations all take a toll on immune health. The evolving research and declining health of our immune systems warrant a serious look at what we tolerate and choose to be exposed to in everyday life.

## **Maximizing Immunity**

*“Fear less, hope more, eat less, chew more, whine less, breathe more, talk less, say more, hate less, love more, and all good things will be yours.”*

— Swedish Proverb

## ***Lifestyle Factors***

### ***1. Avoid Tobacco***

The list of destructive factors behind smoking grows continuously. Smoking creates irregular blood sugar patterns, taste and fragrance insensitivity, diminished lung function, circulatory

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<sup>64</sup> *Ibid.*

<sup>65</sup> List referenced from: *Ibid.*, p. 38

<sup>66</sup> Steinman, David — *Diet for a Poisoned Planet* — Ballantine Books, New York, 1990, p. 106-111

inhibition, blood toxicity, hormonal fluctuation and decreased oxygenation to cells, all of which negatively influence immunity. Smoking has been linked to coronary heart disease and respiratory cancers. You cannot freely enjoy something that wreaks such biochemical havoc.

### **2. *Go to bed before midnight.***

This will help you obtain a minimum of 6 1/2 to 7 hours of restful sleep. Your body produces its peak amount of the sleep-related hormone *melatonin* around 2 am. Ideally, you should be in a deep sleep by that time. Poor sleep can diminish the number of disease-fighting NK cells in the blood.<sup>67</sup> When a group of volunteers were denied half of their usual sleep times for a single night, levels of NK cells, which help fight off viral infection such as the flu, dropped by 30 percent and remained low until patients were able to get a normal night's sleep. In a landmark 1993 study at the *National Institute of Mental Health*, biopsychologist Carol Everson found long-term sleep deprivation caused fatal blood infections in laboratory rats.

Even a small amount of sleep loss over one night can weaken immune function. A *Science News* study of 23 healthy men from ages 22 to 61 were deprived of four hours sleep for one night. The following day, their NK cell activity plummeted to 30%. A good night's sleep the following night restored the cells to normal status.<sup>68</sup>

### **3. *Maintain an emotionally supportive emotional and social network.***

The mind and body interact in many ways to influence immunity. The emerging field of psycho-neuro-immunology is full of conclusive data on the positive influence, love, nurturing, and high motivational states have on immunity. Even pet ownership shows a marked influence on immunity. Feeling isolated and unmotivated lends toward depressive states. Volunteering, renewing old friendships, making new acquaintances, connecting with family members, etc., all offer a deep sense of belonging and emotional nourishment.

### **4. *Make stress manageable.***

There is always stress. In fact, the state of "no stress" might be considered death. However, it's a question of making your stresses *manageable*. Mental stress is one of most debilitating hazards to the immune system. Author, Blair Justice, Ph.D<sup>69</sup> has documented the many research studies that show stress-induced illness is real and contributes to numerous diseases. Justice clarifies that it's simply not just external sources of stress *but rather how each person reacts to stress*. Negative reactions increase the adrenal gland's secretion of hormones, especially the corticosteroids and catecholamines, which inhibit white blood cells and accelerate thymus shrinkage. The common result is a reduction in immune function and greater susceptibility to infections, cancer and other illnesses.

### **5. *Practice Daily Relaxation Therapies***

A whole host of therapies have proven effective for relaxing, immunity enhancement and restoring vitality that include: *Yoga, Meditation, Tai 'Chi, Biofeedback, Qi Gong, Worship,*

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<sup>67</sup> *Psychosomatic Medicine*, April, 1995

<sup>68</sup> *Science News* — "Fail to Snooze, Immune Cells Lose" — 147:11, 1995

<sup>69</sup> Justice, Blair — "*Who Gets Sick? How beliefs, Moods & Thoughts Affect Your Health*" — Peak Pr — April, 2000

*Chanting, Guided Visualizations, Massage and Breathing Practice.* Find a group, class, book, video, DVD/CD, online instruction or a private instructor to introduce a particular therapy and begin practice.

### **6. Exercise Moderately, but Consistently**

Moderate exercise can significantly benefit the immune system by causing short-term increases in white cell count and minimizing the occurrence of common infections. However, strenuous exercise can do just the opposite—it can result in immune suppression and increases the risk of infections. It has been documented that exhausting activity temporarily reduces the immune system’s defense frontlines for several hours after exertion.<sup>70</sup> Heavy acute or chronic exercise is associated with an increase in the occurrence of upper respiratory tract infections.<sup>71</sup>

## **Dietary Factors**

### **1. Reduce or Avoid alcohol.**

Alcohol, a fermented sugar product of great concentration, has been shown to increase susceptibility to infections in animals. Alcoholics are also known to be more prone to pneumonia and other infections. A study of human neutrophils (white blood cells) revealed a severe drop in their activity after alcohol ingestion, even in people who had tested nutritionally normal.<sup>72</sup>

### **2. Reduce Fat**

According to John McDougal, M.D.:

“The American diet filled with meats, dairy products, and refined foods is at the root of a deficient immune system. Some of the most detrimental foods in this diet are polyunsaturated fats (vegetable oils) and animal fats. The diet that best supports optimal immune function is a low-fat, complex-carbohydrate plant-based diet.”<sup>73</sup>

### **3. Avoid, or Minimize Simple Sugars**

Based on reducing immune function to nearly 50% for a period of one to five hours with as little as three ounces of sugar, major restriction of simple-carbohydrates would be advised. Choose small amounts of fibrous fruit for sweet cravings as opposed to the concentrated source of sugar available from juice.

### **4. Minimize Animal Protein**

Research from fat, protein, , digestive and toxicity studies have established that animal protein, *if* included in the diet, should be considered more of a side dish than a staple food,

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<sup>70</sup> Baenkler, H. W. —Exercise and the immune system: The impact on diseases — *Rheumatic Diseases Sport Rheumatology* — 16:5-21, 1992 — Referenced: Pizzorno, Joseph, N.D. — *Total Wellness* —Prima Publishing, Rocklin, CA (1998), p. 49

<sup>71</sup> *Med Sci Sports Exerc* — 26:128 (1994) — Reference: McDougall, John, M.D. — *The McDougall Newsletter* — May-June, 1995

<sup>72</sup> *New England Journal of Medicine*, 1970, vol. 282

<sup>73</sup> *Clin Immunol Immunopathol* — 62:240, 1992 — Reference: McDougall, John, M.D. — *The McDougall Newsletter* — May-June, 1995

and consumed less in frequency. It is advisable when including animal protein in a meal to complement it with abundant vegetable sources.

#### ***5. Eat Whole Grains, Vegetables and Beans***

The nutritional wealth and detoxifying effect of whole grains, vegetables and beans in the body make these foods excellent choices for daily fare.

#### ***6. Try New Foods – Miso, Tempeh, Sea-Salt, Sea Vegetables***

The healthy bacterial quality of fermented foods along with the mineral richness of sea vegetables offer adventurous palates expanded nutrition and additional immune protection.

#### ***7. Avoid Overeating***

“Quantity changes quality,” goes the saying. In excess, anything can be toxic. Overeating burdens not only digestion but the detoxifying action of our liver, which can be considered a frontline defense for maintaining good immunity.

#### ***8. Allow Time to Digest the Evening Meal Before Sleep***

Evening is usually a restful time and the time that use to wind down before retreating for the night into a restorative sleep that prepares us for the energy demands of the following day. If you’re digesting most of the night, chances are that your sleep will be disturbed, immunity impaired, and energy, along with mental clarity during your subsequent day will be compromised.

### ***Immune Supportive Supplements***

Nothing can substitute the power of good food as a daily nutritional source, however, some supplements have been shown to boost immune function. They can be used to awaken sluggish systems or maximize immunity.

1. *Essential Fatty Acids* — required for the production of prostaglandins (hormone-like chemicals that stimulate immunity).
2. Vitamins A,B, C, & E — Generally available from dietary sources, but can be enhanced with modest supplementation.
3. Zinc, Copper & Selenium — Clearly established as necessary for healthy immune function.

### ***Immune Supportive Herbs***

Herbal support for enhancing immunity is becoming recognized as a valuable supplementary healing resource. Since it is not within the scope of this book to elaborate any further than by a general outline of immune-boosting herbs, I would recommend two books I have found to be especially thorough: *Herbal Medicine, Healing & Cancer* (Keats Publishing – 1999), by

Donald R. Yance, Jr. with Arlene Valentine and *Total Wellness* (Prima Publishing – 1998),  
by Joseph Pizzorno, N.D.

The following herbs are known to contain strong immune-boosting qualities:

**Astragalus, Ashwagandha, Aloe Vera, Garlic, Ginseng (Panax & Siberian), Goldenseal,  
Echinacea, Cloud Fungus (PSK), Maitake, Reishi and Shiitake Mushrooms.**

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We are re-learning and scientifically documenting what ancient peoples have known all along: that mind and body are inseparable, that to move health forward we must unify the fragments; how we nourish ourselves, how we relate to others, our personal perceptions and the manner in which we live on a daily basis. From this unification we can achieve “hale”—the Germanic root word for *health* derived from *whole*.

*“The real voyage of discovery consists not in  
seeking new landscapes, but, in having new eyes.”*

— Marcel Proust