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Adaptogenic Remedies in Cancer Therapy

How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth?

Sherlock Holmes

Over 400,000 patients in the U.S. are treated with chemotherapy each year without a firm basis for which drug they receive.

Joseph Nevins, Ph.D., Duke Institute for Genome Sciences

According to 2005 figures, cancer is the second-leading cause of death (22.8 percent) in the United States, surpassed only by heart disease (26.6 percent). Statistics show that the lifetime probability of the average American developing some form of cancer is one in two for men and one in three for women.[1]

From the 1930s to the present, despite the technological advances made in the diagnosis and treatment of cancer (including radiation, chemotherapy, and immunotherapy with biological response modifiers), the life span of most adults with cancer has remained constant, with the exception of a few types of cancer, such as cervical and lung.[2] Despite improved survival rates and some gains in treating many forms of cancer, mortality rates from this disease continue to mount. In addition, conventional cancer therapies cause many secondary diseases and conditions, which often dramatically diminish quality of life and can even shorten life span. These sobering facts, together with what I call my "spiritual calling," are what have motivated me to relentlessly pursue help for as many cancer sufferers as possible. I am also motivated to do clinical research in the area of collaborative oncology treatment and to share with other practitioners the wisdom and knowledge I have gained. Working with cancer and cancer patients called me; I didn't do anything other than pray to God about how I could best serve and be used. I first recognized this calling some twenty-seven years ago when a beautiful and saintly woman I had been working with—a cancer sufferer—made a ring for me. She finished it the day before she passed. I have never taken that ring off since the day I received it; and for

me it was a sign.

Throughout my twenty-five-plus years of clinical experience assisting several thousand patients in their journeys with cancer, I can say without reservation that it is possible to significantly enhance both the quality and quantity of life for those diagnosed with cancer. I have found that a comprehensive program that includes adaptogenic remedies, redox cycling agents, a healthy diet, exercise, and appropriate lifestyle changes can provide the body with the tools it needs to strengthen its own innate vitality and to bolster immunity to fight, and win, the battle against cancer.

Any view of cancer—or any disease for that matter—must regard the causative nature as well as the character of functional consequences as important factors; hence, a pathology and classification of disease complexes must necessarily include in its scope the general or special characteristics of the particular disease causation. For instance, a severe laceration caused by a rabid dog would require a different treatment than a bite caused by a perfectly healthy dog. In the case of cancer, a cancer (e.g., thyroid) caused by radiation should be treated differently than one caused by some other cause, whether known or unknown. A sixty-five-year-old obese diabetic man with colon cancer, who has had a poor diet his entire life, is a different situation from a young, thirty-year-old, apparently healthy-looking, woman with colon cancer. These kinds of factors as well as many others must all be considered before a cancer protocol can be formalized.

In the United States, we have been "at war" with cancer for a long time, often without any understanding of what we are fighting or what is the most effective way to fight, control, or perhaps make peace with this enemy we call cancer. After decades of hit-or-miss treatments and a reductionist and self-interested model of control, we are not much better off than we were when we began. Even though there have been many great breakthroughs in treatment for cancer, it is hard to say that more people have been helped than hurt. Fear, which comes from all directions, is a big factor in this picture as well. Cancer patients are often filled with fear, as are physicians, who are afraid to deviate from the accepted standard-of-care treatment protocol because they could be held accountable for a poor outcome. When we all know that love is what heals, how can there be healing in this atmosphere of fear? I am not afraid of cancer and I put 100 percent of myself—my brain and heart together—into assisting those with cancer. This is what I live for.

The current standard-of-care approach to cancer results far too often in unnecessary suffering and/or shortened life span, along with astronomical health care costs. There is little scientific justification for many of the treatments, which offer only marginal overall improvements in life expectancy. Nor is there any attention to the person—the living, breathing human being who must endure these treatments. Anticancer drugs possess only moderate selectivity and often cause severe toxicity. As with all medicines, chemotherapy should be tailored to the individual—to that person's microenvironment and to the traits of his or her particular tumor. The goal of cancer treatment should be to strengthen the person and alter his or her chemistry

toward good health. Sometimes doing this alone can successfully fight the cancer by creating an environment in which it can no longer thrive. Often medications that attack the cancer directly will be necessary, as well, but they should be as precise and targeted as possible to minimize toxicity and debilitating side effects. I would rather see a person live better and longer with cancer than pursue an all-out attack on the cancer itself, with no regard for the person's overall health or quality of life. This is core to my healing philosophy and foundational to the collaborative model I have developed called the Eclectic Triphastic Medical System (ETMS).

Over the past decade I have made some important discoveries and methodological innovations in the emerging field of integrative oncology, which have led to the creation of the ETMS. The ETMS is not a single paradigm shift but rather a collection of paradigm shifts, involving everything from advances in the understanding of tumor biology and the importance of bio-behavioral influences to the multitude of diagnostic lenses applied and the comprehensive multilayered treatment plans developed in response to this thorough diagnosis. All of these factors converge to significantly improve patient quality of life and survival, as well as treatment response, inhibition of cancer reoccurrence, and prevention of cancer in the first place. I believe the ETMS approach can dramatically reduce health care costs, which have been spiraling out of control with no visible end in sight.

The ETMS features three distinct (yet interwoven) branches of diagnostics and assessment. Each branch effectively manages one of three primary targets in the person suffering from cancer by utilizing five therapeutic "toolboxes." The fifth therapeutic toolbox—modern pharmaceutical medicine—is typically a standard part of conventional cancer treatment, since it is the primary toolbox of Western medicine. However, in the ETMS approach, decisions about if, when, and how to use pharmaceuticals must be based on extensive investigation involving pathology testing, blood testing, and often clinical clues as well. This investigational process (which I refer to as "Sherlock's Corner" in Branch 3) is critically important for the patient's ultimate healing and quality of life.

When we approach a case of cancer, whatever type it may be, we design a customized treatment plan based on the three core branches listed below:

Branch 1: the endogenous component, comprising the personal energetic processes or the core constitution of the individual patient (spirit, mind, and body), evaluated from a highly individualized perspective.

Branch 2: the exogenous component, comprising the external environment in which the patient lives and operates, the patient's perceptions of this environment, and its influences on him or her, both psychic and physical.

Branch 3: the mixed endogenous/exogenous component, comprising the cancer (pathology) itself, assessing its energy and intelligence to identify the cancer "phenotype," when deciding upon optimal treatments (such as specific chemotherapy and targeted therapy), as opposed to basing treatment merely of the location of the tumor (breast, lung, kidney). The "genotype" is an organism's full hereditary information. Gene, or what is often called "molecular," profiling is useful but not perfect in and of itself. When it falls short, it is often because of the tumor's

phenotype. The phenotype is an organism's actual observed properties, such as morphology, development, or behavior. This distinction is fundamental in the study of the inheritance of traits and their evolution. There are too many variables within the cell itself, never mind the microenvironment, to believe that a particular abnormal gene is all we need to target in order to cure cancer. I have studied molecular profiling for many years and believe the pooled data of many biomarkers that I collect is often very useful (as opposed to relying on the results of a single test or two), especially when combined with all of the other test data that I often collect. The exogenous component of Branch 3 is the microenvironment, meaning the surrounding cells and tissue around the tumor that is influencing the tumor's growth, nourishment, protection (against the host), and ability to spread and invade the body. The micro-environment (or terrain) biomarker testing is mostly based on specific blood analysis.

The three main targets of the ETMS approach are as follows:

1. **The whole person** (i.e., the host) is addressed, with the objective being to strengthen that person by means of the four main toolboxes (botanical, nutritional, dietary, and lifestyle).
2. **The microenvironment** (i.e., the internal terrain) is targeted, whereby the aforementioned same four toolboxes are employed, but in certain cases the person may also need to use the pharmaceutical toolbox as well, to alter the microenvironment in such a way that it favors the health of the host and is least conducive to the proliferation, growth, and metastasis of cancer. The host and tumor are often in a tug-of-war over control of the microenvironment. The ETMS practitioner must access this situation and target it with appropriate tools from the five toolboxes to tip the balance in favor of the host.
3. **The tumor/cancer itself** is targeted, wherein all five toolboxes are integrated to address the characteristics of the tumor phenotype, using an assessment of a multitude of biomarkers as opposed to a treatment based on the location of the primary cancer (which for the most part is the way of standard oncology). The pathology of the tumor is assessed through its protein expression, gene expression, mutation analysis, growth factors (when a fresh sample of the tumor is obtainable), tumor resistance, and sensitivity testing. This is further combined with several blood markers, such as gene mutations or SNPs (single nucleotide polymorphisms), as well as other factors such as age, gender, ethnic background, and so on. It is important that the practitioner be well trained in this area, for the approach is only as good as the person employing it.

This approach yields consistently effective results that manifest as better physical health, psycho-spiritual well-being, quality of life, and longevity for the person with cancer.

In the ETMS wholistic model, the development of cancer is viewed as a manifestation of several underlying conditions that represent an imbalance of the entire spirit-mind-body complex. The "cancer energy," the microenvironment, and the

person's own internal healing energy (the "host") need to be addressed, with an understanding of the relationship, dynamics, and interplay that exist between them. The cancer energy is defined as the complex makeup being expressed by the tumor or cancer cells, such as the manifestation of intercellular gene proteins, mutations, and growth factors, as well as proliferative, angiogenic, and invasive characteristics. When the energy of cancer overrides the internal healing ability of the person, it can impede health and do serious damage. In other words, cancer is a systemic disease from the very beginning, and it is essential to acknowledge that the terrain is as important as the tumor itself. Therefore, it stands to reason that if we can strengthen and rebalance the spirit-mind-body, the normal pattern of health can be restored, and this balanced state can help the person live a longer, healthier life, whether as a result of entirely getting rid of the cancer or by managing it and not allowing it to take control. In wholistic healing traditions, this state of harmony and vitality is brought about through the processes of detoxification and tonification.

Recent discoveries confirm a scientific basis for the application of natural approaches in the treatment of cancer: herbs, phytonutrients, amino acids, vitamins, minerals, diet, and energy therapies have all been proven effective in supporting healing from cancer. I strongly believe that the need for clinical studies in wholistic and integrative oncology cannot be overemphasized. There is enough preliminary evidence to encourage quality clinical trials to evaluate and prove the efficacy of this integrative model so that it can become an accepted part of Western cancer care. The time is now ripe for medicine to be rewritten to adopt a new collaborative and highly personalized system of care—one that does use all the modern-day tools but no longer in the standard-of-care fashion; instead, use of these tools would be informed by the wisdom and knowledge of the ETMS approach.

A Multifaceted Approach to Healing

First, let me emphasize: there is no "herbal cure-all." Just as there is no single cause of cancer, there is no single remedy. Therefore when approaching a complex disease like cancer it is important to formulate a balanced protocol that addresses:

- **Biomechanics:** the characteristics of the disease
- **External endogenous factors:** diet, environment, and lifestyle
- **Energetics:** organ weaknesses and the overall deficiency or excess of the person

Cancer has many causes, and its treatment, to be effective, must reflect this. It is necessary to review and address the energetic constitution of the person, including the Kidney Qi, Spleen Qi, and Liver Qi systems. It is also essential to evaluate the endocrine system, the detoxification system, and the person's dietary and lifestyle habits, including sleep patterns and life stressors. Most importantly, the inner spirit of the person must be considered.

In treating cancer, the first steps include addressing the person's stress level and building adaptive energy, guiding him or her toward healthy nutritional choices,

improving digestion and the ability to assimilate nutrients, supporting good-quality sleep, and encouraging appropriate exercise and time spent outdoors in fresh air and sunshine. From a biochemical perspective, we need to understand the characteristics of the specific cancer: what activates it, what controls its growth, and what enables it to metastasize.

The Toolboxes and Objectives of the ETMS (Eclectic Triphasic Medical System)

The Main Toolboxes

1. *Botanical*
2. *Nutritional*
3. *Dietary*
4. *Lifestyle*
5. *Pharmaceutical (if necessary, and use always guided by ETMS principles)*

The Six General Objectives of the ETMS Tools

1. *Enhance vitality/life force*
2. *Increase efficiency and restore harmony and rhythm*
3. *Increase movement of oxygen, blood, lymph (fluid)*
4. *Correct nutritional deficiencies and excesses*
5. *Remove toxins*
6. *Target the cancer (or other specific disease)*

Present in herbs, as well in traditional foods, are a wide variety of active phytochemicals, including the flavonoids, terpenoids, lignans, sulfides, polyphenolics, carotenoids, coumarins, saponins, plant sterols, curcumins, and alkaloids. These phytochemicals have been found to possess important actions in promoting health and preventing cancer, as well as being useful in cancer treatment. The pleiotropic (multitasking) activities of many of these botanical and nutritional agents can influence multiple signaling pathways, including survival pathways such as those regulated by NF-κ B, Akt, and growth factors; cytoprotective pathways; and metastatic and angiogenic pathways, including those of the matrix metalloproteinases (MMPs), in particular MMP-2 and MMP-9. These plant compounds regulate cell behavior and redox cycling; they are able to act on healthy cells as free-radical scavengers and hydrogen donors, exhibiting both pro- and antioxidant activities. They can selectively act as pro-oxidants on cancer cells that need to undergo apoptosis; they can bind metals, particularly iron and copper, and can function as iron chelators; and they can protect against drug toxicity yet potentiate the antitumor effect of chemotherapy and targeted drug therapies as well. Finally, some of these phytochemical compounds can act as mild chemotherapeutics; in fact, many of these plant extracts are the source of presently used chemotherapeutic drugs.[3]

In my practice I emphasize a diet rich in a diversity of these important plant

compounds, as well as a supplemental program that includes concentrated forms of these compounds. One formula I have created contains an array of well-researched plant-based compounds, including concentrated extracts of the following:

Turmeric (*Curcuma longa*), 95 percent curcuminoids, 75 percent curcumin
Green tea (*Camellia sinensis*), 95 percent polyphenols, 60 percent catechins
Grape seed/skin (*Vitis vinifera*), proanthocyanidins and oligomeric proanthocyanidins (OPCs), 95 percent of the total polyphenols in the seed and 30 percent of the total in the skin, which is also rich in resveratrol (between 1 and 2 percent)
Japanese knotweed (*Polygonum cuspidatum*), 50 percent resveratrol
Ginger (*Zingiber officinale*), 5 percent gingerols
Rosemary (*Rosmarinus officinalis*), 6 percent carnosic acid, 1 percent rosmarinic acid, 1.5 percent ursolic acid

All of these compounds have demonstrated broad-spectrum, multitargeting, anticancer effects, as well as general health-promoting benefits, and they (in the form of phytochemical-rich foods, spices, and herbs) have been used regularly by many cultures throughout the world. In addition to these plant extracts, I have my patients consume a health-enriched smoothie that includes organic fruit and vegetable concentrates to assure therapeutic levels of a diversity of nutraceuticals, as well as the vitamins and minerals present in them.

The external environment of the person must also be reviewed with an understanding of stress, allostasis, and allostatic overload. If a person with cancer is in a state of allostatic overload and his or her lifestyle is a causative factor, this will easily allow the cancer energy to take control. Taking an approach that integrates adaptogenic remedies along with lifestyle changes will serve to strengthen the vital energy and weaken the cancer energy. This approach is the basis of my treatment programs.

The Wholistic Approach to Treatment

My philosophy of healing focuses on the interconnection between all the systems of the body and the continuous process of breaking down (catabolism) and becoming (anabolism). A central component of my approach involves herbs and immunonutrients that enhance anabolic metabolism to build up the whole body. I consider enhancing a person's vital force to be the most important aspect of healing.

Basic clinical concepts that must always be addressed include the following:

- Enhance vitality and adaptive capability by strengthening the person in a rational and nontoxic fashion
- Balance the endocrine and nervous systems
- Improve metabolism, digestion, and assimilation
- Activate the body's innate healing mechanisms by taking notice of the blood, lymph, liver, kidneys, bowels, lungs, and skin to assess where detoxification is

needed
- Address imbalances and deficiencies with specifically indicated remedies

Evaluate and Address the Three Main Energetic Networks

When assessing and working with clients, I address the three main energetic systems of the body: the Kidney Qi/endocrine/hormonal network; the Liver Qi/detoxification network; and the Spleen Qi/immune/digestive network.

The Kidney Qi/Endocrine/ Hormonal Network

Physiologically, the hub of the Kidney Qi network is the HPA axis, and the maestro, to use a musical term, is most likely the hypothalamus, located deep in the brain center. The energy that feeds and flows throughout the Kidney Qi network is the vital essence. This network includes all of the endocrine glands, primarily the hormone-secreting glands of the pituitary, adrenal, thyroid, parathyroid, pineal, ovaries, and testes. This is why, within the energetic model of thinking, the Kidney Qi network is considered the single most important system for maintaining health and vitality. Increasing the network's strength and supporting the harmonious flow of Kidney Qi is the foundation of cancer inhibition.

Some adaptogens that help enhance the Kidney Qi network and nourish vital essence include schisandra seed and fruit, cordyceps, he shou wu (*Polygonum multiflorum*), shatavari (*Asparagus racemosus*), and ligustrum (*Ligustrum lucidum*). These herbs are most often taken together with adaptogens that strengthen the Spleen Qi/immune network, such as Asian ginseng and astragalus, which promote vitality and support immune and bone marrow health.

The Liver Qi/Detoxification Network

It is essential to support the liver's processing and detoxifying capacity in all phases of treatment. The antioxidant enzyme systems in the liver include phase 1, the cytochrome P450 oxidase system, a large and diverse group of enzymes that catalyze the oxidation of organic substances; and phase 2, the glutathione peroxidase system, an enzyme family with peroxidase activity whose main biological role is to protect the organism from oxidative damage.

Sometimes the Liver Qi detoxification network can be stuck in a metaphorical traffic jam in which waste products are not able to get out of the cells, while nutrients and oxygen cannot get in. Nrf2 (Nuclear factor [erythroid-derived 2]-like 2), the master regulator of redox-antioxidant genes, plays a pivotal role in controlling cellular redox-antioxidant balance. While healthy cells often have underactive Nrf2 signaling, cancer cells can have the opposite, overactive Nrf2 signaling, which results in the stubborn resistance of cancer cells to chemotherapy when host cells are experiencing oxidative stress.

Regulation of the Nrf2-mediated pathways by natural phytochemicals, including phenolic compounds (i.e., grape skin and seed [resveratrol and proanthocyanidins]), isothiocyanates (i.e., broccoli sprouts [sulforaphane]), curcuminoids (turmeric), carotenoids (i.e., sea buckthorn oil), and triterpenes (i.e., gotu kola), provides multiple modes of resistance to endocrine disruptors and other chemical carcinogens. At the same time, phytochemicals are able to down-regulate Nrf2 signaling in cancer cells.[4]

The pro-oxidant/antioxidant shift, one of the main events that occurs in cancer and other chronic diseases, can be greatly affected by herbs, foods, and lifestyle. When the balance of oxidative stress (lipid peroxidation, hydrogen peroxide, and hydroxyl radicals) overpowers the body's ability to regulate and detoxify, the antioxidant enzyme systems create an oxidative environment that can allow a chronic health condition to develop. Causative factors include genetic predisposition, exposure to drugs of all kinds, hormones such as estrogens or androgens, xenoestrogens (a type of xenohormone that imitates estrogen and can be either synthetic or natural chemical compounds), infectious agents, environmental and dietary factors, sleep deprivation, and aging.

Meta-analytic reviews have found a strong correlation between stressful life experiences and depression with poorer response to treatment and higher mortality rates across a diverse array of cancers (e.g., breast, lung, head and neck, liver and biliary, lymphoid, and hematopoietic).[5] This is one of several reasons why I believe adaptogenic formulations should be the cornerstone of herbal medicine for all people who have had cancer.

Adaptogens act as potent cellular and liver detoxifiers, quenching damaging free radicals and improving cellular redox response and balance. They are potent and direct antitoxins, protecting us from the onslaught of modern-day toxins we are all exposed to. A lot of research has been done on this important quality, though I think it has been overlooked by many. Eleuthero, rhodiola, and schisandra seed extracts are particularly effective at combating cellular and liver toxicity. Antihepatotoxic herbs interact with energized molecules such as free radicals and thus spare precious glutathione. Glutathione is one of the body's most important antioxidant enzymes and is a significant anticarcinogen, especially in the liver, where the highest level of glutathione is found. Glutathione combines with carcinogens to make them inert and also plays a role in protecting the nervous system.

The Spleen Qi/Immune/ Digestive Network

The Spleen Qi network includes the gastrointestinal tract, which plays a significant role in the health of the immune system. The objective is to strengthen the spleen/immune system as well as the pancreas, stomach, and gut. The secondary adaptogens such as astragalus (*Astagalus membranaceus*) and poria (*Poria cocos*) are also primary Spleen tonics, as are specific herbs such as red root (*Ceanothus americanus*), and cat's claw (*Uncaria tomentosa*). I often employ these herbs

because they enhance the immune, lymph, and digestive systems and have a wide range of applications.

Spleen Qi is responsible for extracting the beneficial nutrients and fluids from the food and drink we consume and transporting these nutrients to locations where they can most properly nourish the body, especially to places where they can provide energy to cellular mitochondria.

In treating people with cancer, vital energy/life force, adaptation, and protection are critically important for quality of life and to extend life span. Therapeutic strategies include restoring vitality through adaptogens, anabolics, tonics, and nutritives and increasing detoxification with alteratives (cellular and lymphatic catabolic detoxifiers that remove cellular waste and enhance efficiency), cholagogues (enhance bile production and flow, aiding gallbladder and liver function), and diaphoretics (induce perspiration, which helps reduce fever by dispersing heat and cooling the body, and also stimulate lymphatic activity and elimination of toxins). Together, these compounds give broad-spectrum support to the immune system, complementing the deeply immune-enhancing tonics and adaptogens, which are always the foundation to any and all protocols, especially for those with cancer. The final layer to botanical protocol building is the use of herbal compounds as cytotoxics, which act more directly against cancer cells often by activating apoptosis (cell self-destruction). Cytotoxic herbs that I use include *Artemisia annua* (Chinese wormwood), *Asimina triloba* (pawpaw) seed, *Taxus brevifolia* (Pacific yew), *Catharanthus roseus* (Madagascar periwinkle), *Camptotheca acuminata* (xi shu, or "happy tree") seed, and *Colchicum autumnale* (autumn crocus, or naked lady). Their actions include:

- Modification of biological response (increasing host defense), enhancing cytotoxic T and NK cells
- Induction of apoptosis
  - Inhibition of multidrug resistance, P-glycoprotein (Pgp), tubulin binding molecules, and telomerase
  - Selective inhibition of complex 1 in the electron transport system in the mitochondria, angiogenesis, and insulin-like growth factor receptor binding

The Role of Adaptogens in Cancer Prevention and Treatment

Adaptogenic formulations are not only the foundation to all of my protocols for treating cancer, I also recommend much higher doses (double or even triple) for people who have cancer, compared to my recommendations for most everyone else. Adaptogenic support is the key to both their short- and long-term health and is the reason they can respond so well to treatment in spite of enormous physical and emotional stress, which is often exacerbated by any pharmaceutical cytotoxic treatments they may be undergoing. Adaptogens protect human beings in the same way that mangroves protect a beach. If you are taking adaptogens, you can weather

the storms as they come and even become stronger as a result. Otherwise, your beautiful beach will erode into the ocean.

Adaptogens play a pivotal role in cancer prevention and treatment through multifaceted mechanisms such as inhibiting carcinogenesis (literally, the creation of cancer) and by stabilizing, or possibly even reversing, premalignant conditions, often by selective optimization of gene behavior through protection of cells, repair of cells, or inducing apoptosis in cells that are damaged, thus preventing mutational alteration that could lead to cancer cell development. These herbs possess antitumor properties, including inhibition of invasion, metastasis, and angiogenesis and induction of tumor cell apoptosis. Adaptogens are important when cancer is active because they assist the body's ability to cope with conventional cancer therapies such as surgery, chemotherapy, and radiation, allowing the person to withstand many of the negative side effects of such treatments. For instance, adaptogens increase the body's natural capacity to resist the damaging effects of radiation and increase the body's ability to adapt during the acute phase of radiation stress.[6]

The antitumor effects of adaptogens are associated with immunomodulation; in other words, they can activate macrophages, natural killer cells, antigen-dependent T lymphocytes, and interferon-inducing actions. They also have the ability to suppress tumor growth, enhance selective apoptosis, improve intercellular communication, and reduce the likelihood of metastasis. Most of the chemotherapeutic agents available today are cytotoxic and immunosuppressive and exert a variety of side effects. Botanical immunomodulators, including adaptogens, are often employed as supportive or adjuvant therapy to overcome the undesired effects of cytotoxic chemotherapeutic agents and to restore optimal health. Furthermore, the use of adaptogens improves drug tolerance and recovery and even poteniates the cytotoxic treatments.

The adaptogen monographs in part 2 of this book provide extensive research on the use of adaptogens in oncology. Extensive studies in animal and human models with tumors using various cytotoxic therapies have demonstrated that adaptogens, when used in combination with cytotoxic agents, reduce chemotherapeutic drug toxicity, particularly with regard to bone marrow restoration, and enhance antitumor and antimetastatic effects. Eleuthero (*Eleutherococcus senticosus*) in particular possesses profound interferon-enhancing activity, but in a "ready-and-wait" mode, meaning if the body is calling for an outpouring of interferon, it is ready for the mission at hand. Other important adaptogens to consider in oncology include *Panax ginseng, Rhodiola rosea, Schisandra chinensis, Rhaponticum carthamoides, Aralia elata,* and *Withania somnifera.* In addition to these primary adaptogens, secondary and companion adaptogens are equally the foundation to any cancer treatment/preventive protocol.

Some adaptogens and their pleiotropic effects in cancer treatment protocols:

- ***Astragalus membranaceus* (astragalus):** antitumor activity, immunomodulatory[7]
- ***Cordyceps sinensis* (cordyceps):** anticancer, chemoprotective,

immunomodulatory, antimetastic[8]

- ***Eleutherococcus senticosus*** **(eleuthero):** when administered along with chemotherapy, provides notable reduction in side effects like nausea, dizziness and appetite loss; inhibits metastasis[9]
- ***Ganoderma lucidum*** **(reishi):** anticancer, chemoprotective, immunomodulatory, antimetastic[10]
- ***Glycyrrhiza glabra*** **and** ***Glycyrrhiza uralensis*** **(licorice):** anticancer, chemoprotective, immunomodulatory[11]
- ***Panax ginseng*** **(Asian ginseng) and** ***Panax quinquefolius*** **(American ginseng):** anticancer, chemoenhancing, chemoprotective, immune-restorative, anti-inflammatory[12]
- ***Pfaffia paniculata*** **(suma, Brazilian ginseng):** anticancer, immunomodulatory[13]
- ***Rhaponticum carthamoides*** **(rhaponticum):** reduces occurrence and/or multiplicity of tumors, chemoprotective, chemopotentiating[14]
- ***Rhodiola rosea*** **(rhodiola):** anticancer, antimetastatic, chemoprotective, chemopotentiating[15]

- ***Withania somnifera*** **(ashwagandha):** anticancer, prevents bone marrow depression associated with anticancer drugs, prevents vital organ damage caused by chemotherapy[16]

In oncology, adaptogens have been scientifically proven to benefit patients in the following ways:

- As biological response modifiers, restoring immune surveillance and increasing nonspecific human resistance
- Building bone marrow and blood counts while reducing infections
- Protecting organs and cells throughout the body, including the liver, kidneys, heart, and gastrointestinal tract
- Increasing the antitumor/cytotoxic effects of chemotherapy and radiation therapy
- Inhibiting multidrug resistance
- Improving recovery and healing after surgery, chemotherapy, and/or radiation therapy
- Inhibiting cancer metastasis and/or reoccurrence
- Reducing levels of immune dysfunctional stress hormones (cortisol), which are associated with cancer growth

In the ETMS model, we use primary and secondary adaptogens combined with adaptogen companions in specific formulations, together with other targeted formulas. Fu Zheng therapy, discussed in chapter 6, is commonly used in traditional Chinese medicine to assist those undergoing conventional cancer therapies. Many Fu Zheng herbs are adaptogens; in China and Japan, formulas combining these herbs are considered extremely useful in reducing the side effects of conventional cancer treatment therapies and significantly enhance the quality of life and survival rate of cancer patients.[17] As an example, when Fu Zheng herbal therapy was used

as an adjuvant to radiation therapy to treat pharyngeal cancer, the five-year survival rate was twice as high (53 percent) compared to those not receiving Fu Zheng herbs (24 percent).[18] Several systematic reviews of the effectiveness of Fu Zheng medicine for cancer patients in terms of symptom management, improvement of quality of life, increase in life span, and antitumor response have found consisently significant increases in all categories.[19]

Adaptogens act as major regulators of redox cycling, enhancing oxygen efficacy while quenching and deactivating free radicals, thus reducing oxidative stress. Many of the phenolic-rich adaptogen companions, such as hawthorn leaf, flower, and berry (*Crataegus* spp.), grape seed/skin (*Vitis vinifera*), Japanese knotweed (*Polygonum cuspidatum*), and amla/Indian gooseberry (*Phyllanthus emblica*), as well as the primary adaptogens schisandra seed and fruit (*Schisandra chinensis*) and rhodiola root (*Rhodiola rosea*), and the secondary adaptogens gotu kola (*Centella asiatica*) and Fo-ti (*Polygonum multiflorum*) actually have higher concentrations of antioxidants and more elaborate antioxidant activity than vitamins and minerals do.[20]

Strategies aimed at limiting and repairing the damage attributed to oxidative stress should include a variety of adaptogens and phytopharmaceutical agents such as the phenolics resveratrol and quercetin, carotenoids such as lycopene, and isothiocyanates (sulfur-containing phytochemicals). Cruciferous vegetables, including cabbage, broccoli, and Brussels sprouts, are especially rich in glucosinolates, which are converted by plant myrosinase and gastrointestinal microflora to isothiocyanates.

Cyclophosphamide (Cytoxan) is one of the most common chemotherapeutic drugs, used treat many cancers, including breast cancer, Hodgkin's disease, lymphosarcoma, and leukemia, as well as autoimmune diseases. Cytoxan-induced bladder toxicity was reduced in animals through treatment with natural isothiocyanates, including allyl isothiocyanate, phenyl isothiocyanate, and sulforaphane. It has been shown that treatment with these isothiocyanates enhances the total white blood cell count, increases antibody-producing cells, and enhances circulating antibody titer, and also serves as an effective immune modulator.[21]

Increased serum levels of phenols, carotenoids, retinol, and total antioxidant status are associated with reductions in cancer. The biological mechanisms for cancer inhibition and regression through the use of phytopharmaceutical antioxidant nutrients are gradually becoming understood, and they appear to act via a variety of pathways. These pathways have been identified and characterized into four classes:

1. Tumor inhibition through immune cytokine activation or modulation, or through an anti-
   inflammatory mechanism
2. Stimulation of cancer-gene suppressor genes such as p53, and down-regulation or dysregulation of oncogenes such as mutant p53, PTEN, p21, p27, Bcl-2, and K-ras or H-ras
3. Inhibition of tumor angiogenesis
4. Stimulation of cellular differentiation with resultant apoptosis of neoplastic cells

Besides the direct actions that adaptogens show against cancer, they can be of great value in asthenic conditions (low vitality and systemic weakness). They may reverse the fatigue as well as other symptoms often seen in people with cancer, including depression, irritability, low blood counts, poor appetite, and sleep difficulties. They may also inhibit many of the common and potentially life-threatening complications of cancer, such as blood clots and infections.

Primary and secondary adaptogens combined with adaptogen companions are fundamental to any protocol designed to nourish the root system of the body.[22]

The Importance of Immunotherapy in Cancer Treatment

The importance of using adaptogens as immune-enhancing agents in cancer treatment cannot be overstated; in my experience adaptogens are absolutely essential for long-term success in the treatment of this chronic disease. There is an enormous amount of scientific data in medical journals confirming the importance of the immune system in oncology. It probably comes as no surprise that oncogenesis and immune suppression are most likely closely interlinked processes.

Cancerous cells that successfully evade the immune system's initial killing activity are able to subsequently propagate into established tumors. As they proliferate, these tumor cells may confer additional immune-evasive survival advantages to the growing neoplasm. Consequently, by the time the tumor is clinically detectable, it has developed potent immunosuppressive qualities that enable it to depress host antitumor immunity and grow undisturbed, eventually resulting in the death of the host.[23] Some plant remedies such as astragalus are not primary adaptogens (astragalus is a secondary adaptogen), yet they have immunotonic, immunostimulant, and/or immunomodulating properties. Astragalus itself is considered in traditional Chinese medicine to be a primary Spleen Qi tonic that stimulates many aspects of the immune response.[24]

Adaptogens given to cancer patients during chemotherapy improve immune recovery,[25] protect organ systems,[26] reduce side effects,[27] significantly reduce fatigue and restore energy,[28] and improve survival.[29] Adaptogens, in particular those with enhanced anabolic activity, build healthy skeletal muscle mass and provide the vital energy needed for an effective immune response. This is an often-overlooked area of need for people with cancer—until it is too late. To enhance anabolic activity, adaptogens such as rhaponticum and mumie can be combined with highly specific nutritional agents, including magnesium creatine, glutamine chelate, arginine, undenatured whey protein, and omega-3 fatty acids, with good results.

Supporting the immune system with adaptogens will improve homeostasis/allostasis, which enhances the ability of the immune system to recognize and eliminate tumor cells, a challenge that has tantalized oncologists for decades. The antitumor effect of adaptogens is the result of immunomodulation, including the activation of natural killer cells, cytotoxic T lymphocytes, macrophages, interleukin-2 and interleukin-12, and interferon-enhancing actions. Adaptogens also have the ability to suppress

experimental tumor growth, enhance tissue differentiation, improve intercellular communication, and reduce the likelihood of metastasis (the spread of cancer).[30]

Phenolic Compound Activity

Phenolic compounds found in adaptogen companions such as grapes (skin and seeds) and hawthorn (leaf, flower, and berry) suppress cancer growth or induction by impeding cell-cycle progression, inducing apoptosis, and blocking angiogenesis. These herbs inhibit cancer in many ways:

1. Preventing genetic damage by reducing the damaging effects of selective oxygen species
2. Acting as antioxidants, thus lessening the load of endocrine disruptors
3. Stimulating DNA repair mechanisms in cells that can be repaired or inducing apoptosis (programmed cell death) in cells too badly damaged to be repaired that otherwise could cause oxidative damage such as lipid peroxidation
4. Increasing oxygen utilization and fuel with fewer negative waste by-products, like lactic acid
5. Assisting in the ability to manage stress, thereby increasing vitality
6. Exerting antiestrogenic effects
7. Modulating sex hormone homeostasis
8. Inhibiting multiple drug resistance
9. Inhibiting angiogenesis through the following mechanisms:

- Suppression of basic fibroblast growth factor (bFGF)
- Suppression of vascular endothelial growth factor (VEGF)
- Inhibition of urokinase-type plasminogen activator (uPA), which is causative in the degradation of the vascular basement membrane and extracellular matrix
- Inhibition of protein kinase C (PKC)
- Inhibition of cyclooxygenase-2 (COX-2)[31]

Radiation Protection and Potentiation

Radiation therapy can cause inflammation, an increase of systemic free-radical production, and the spread of cancer.[32] Adaptogens and adaptogen companions not only shield healthy cells from radiation and protect the entire body from the lethal, long-term negative effects of radiation (including the initiation of secondary cancers or the spread of existing cancer), they actually enhance the cancer-killing effects of radiation.

Taking adaptogenic formulas can reduce the inflammatory and free-radical damage caused by radiation to healthy cells, protecting the genome from epigenetic damage (and even repairing it) andinhibiting mutations of important genes such as p53, which radiation damages. At the same time adaptogens act as selective cancer-cell radiosensitizers. They increase the cancer-killing effects of radiation through a multitude of mechanisms. Some of these include using redox

signaling pathways to potentiate the pro-oxidative, radiation-damaging effects more selectively against cancer cells, while protecting healthy cells (the innocent bystanders). The protective effects are both immediate (diminishing side effects) and long-term (reducing radiation-related fibrosis, organ system damage in the heart, lung, and thyroid, and future secondary cancers caused by the long-term DNA-damaging effects). Other mechanisms include a reduction of tumor-related hypoxia (an abnormal lack of oxygen) in and around the tumor. If the tumor is hypoxic, radiation will have little to no effect. Herbal adaptogens are able to induce selective oxidative free-radical damage. They also move blood and inhibit platelets, which cause radiation resistance. (This also reduces radiation fibrosis, which often occurs after treatment and can be very problematic.) Cancerous tumors prefer sticky, stagnant, prothrombotic blood, and herbs are excellent inhibitors of blood stasis.

Many adaptogens have been extensively researched for their beneficial effects when used in conjunction with radiation therapy. Fu Zheng therapy has demonstrated both a radioprotective and a radioenhancing effect.[33] *Panax ginseng* specifically has demonstrated a protective effect during radiation therapy in many studies[34] and has been shown to reduce cell damage caused by gamma rays, especially damage to DNA molecules, while at the same time supporting the repair or regeneration process of damaged cells.[35]

Chemoprotective Adaptogens

Most of the synthetic chemotherapeutic agents available today are immunosuppressive and cytotoxic and exert a variety of unpleasant and undesirable side effects. Adaptogens, however, decrease the toxic side effects and can help improve drug tolerance.

Botanical immunomodulators are often employed successfully as supportive or adjuvant therapy to overcome the negative effects of cytotoxic chemotherapeutic agents and to aid in the restoration of normal health. Various studies have shown that such antioxidant treatment, when combined with chemotherapy and radiation, both increased the quality of life and significantly prolonged the survival rate of cancer patients.[36]

Multidrug resistance is a major cause of cancer cells becoming resistant to chemotherapy, which severely limits its therapeutic outcome. The primary mechanism of multidrug resistance involves the efflux of anticancer drugs from cancer cells, mediated by ATP-binding cassette membrane transporters, notably the P-glycoprotein (Pgp) pump, the breast cancer resistance protein (BCRP), and the multidrug resistance-related protein 1 (MRP1). Adaptogens (all categories) are chemosensitizing in part through their inhibition of multidrug resistence.[37]

In particular, *Panax ginseng* can significantly reduce multidrug resistance by inhibiting Pgp, and it has been shown in studies to enhance the life of animals with transplanted tumors.[38] Various flavonoids, which are found in many adaptogen companions, also inhibit multidrug resistance in cancer cells.[39] *Poria cocos* (fu ling), a secondary adaptogen and important herb in adjunctive cancer treatments, recently

demonstated an ability to increase significantly the effectiveness of chemotherapy (vincristine) by reversing multidrug resistance and inducing cytotoxicity in drug-resistant cells.[40]

Many adaptogen companions reduce the expression of the gene protein Bcl-2. In mature persons, apoptosis (programmed cell death) is necessary to accommodate the billions of new cells produced daily and to eliminate aged or damaged cells. The regulation of this process is mediated primarily by the Bcl-2 protein family. Antiapoptotic and proapoptotic members of this family work in balance to control the release of cytochrome C, a compound in mitochondrial membranes that triggers apoptosis. However, with most types of human cancers, Bcl-2 levels are elevated, blocking the release of cytochrome C and preventing apoptosis of cancer cells. High levels of Bcl-2 have been shown not only to enhance metastatic potential but also to promote resistance to anticancer treatment; they indicate a poor prognosis in many forms of cancer.

The most well-researched botanicals and compounds that are known to inhibit multidrug resistance by suppressing Bcl-2 expression are turmeric (*Curcuma longa*) and curcumin,[41] knotweed (*Polygonum cuspidatum*) and resveratrol,[42] green tea (*Camellia sinensis*) and its main polyphenol, epigallocatechin gallate (EGCG),[43] and the secondary adaptogen *Eurycoma longifolia*.[44]

Many specific nutritional agents also have been shown to prevent the toxic effects of chemotherapy. Not only do they not interfere with chemotherapy (a claim made by many oncologists but which has no basis in fact), they actually improve the cytotoxic (cancer-killing) effects of chemotherapy and prevent multidrug resistance.[45] These nutritional agents include:

Alpha lipoic acid prevents polyneuropathy caused by docetaxel and cisplatin.[46]

Glutathione (GSH) and its precursors, including N-acetylcysteine, demonstrate a protective effect during cisplatin treatment, while the combined protocol of cisplatin with reduced glutathione (the most beneficial form of GSH) increases survival in patients for a wide range of cancers.[47] GSH is a promising agent for the prevention of oxaliplatin-induced neuropathy and does not diminish the clinical activity of oxaliplatin.[48]

N-acetylcysteine (NAC) protects the heart from the cardiac toxicity of doxorubicin, according to clinical studies conducted at the National Cancer Institute.[49] NAC has also shown substantial kidney[50] and otoprotective[51] activity as well as neuroprotective effects[52] during platinum-based chemotherapy treat-ments without interfering with the cytotoxic effects of the drugs. A recent study found the combination of curcumin, EGCG-rich green tea extract, and NAC offered significant protection against cyclophosphamide-induced lung fibrosis.[53] And cys-teine has been shown to offer protection during treatment with isophosphamide, again without reducing the drug's cytotoxic effects.[54] I recommend supplementing with NAC at a dose of two grams daily during platinum-based chemotherapy, starting three to four days after the treatment and continuing up until the next treatment. I most often use a lower dose of NAC but combine it with

synergistic compounds, including isothiocynanates (phenylethyl isothiocyanate and sulforaphane), phenols, natural selenium, and of course, adaptogenic remedies. I find that when these compounds are used together they are far more effective than NAC or any single nutrient used alone for chemotherapy protection, glutathione replenishment, detoxification, and health promotion.

NADH, an essential component of enzymes necessary for many metabolic reactions in the cell, including energy production, plays a significant role in triggering biological antioxidants and in regulating the expression of membrane glycoprotein receptors. It is critically important as a mitochondrial protective agent for people undergoing cancer treatments such as chemotherapy (cisplatin) and radiation therapy.[55]

Selenium potentiates cisplatin against endometrial cancer through a mechanism that involves the inhibition of cancer telomerase activity and p53 activation.[56]

Theanine, a component of green tea, can potentiate the cytotoxic effects of doxorubicin and lower drug resistance without intensifying side effects.[57] The catechins in green tea extract have demonstrated an ability to counteract the cardiac toxicity of this drug.[58]

Vitamin E succinate (a dry form of vitamin E) prevents cisplatin-induced toxicity without interfering with its antitumor efficacy.[59] It also protects healthy cells from radiation therapy while increasing the damaging effects to cancer cells.[60] Vitamin E succinate not only reduces the toxicity of several chemotherapies, it also inhibits multidrug resistance through a mechanism involving P-glycoprotein inhibition.[61]

Adaptogens as Modulators of Multiple Cancer-Related Inflammatory Pathways

Although inflammation is an essential response to injury or infection, chronic inflammation is harmful and causes tissue damage. Cancer and inflammation come together from both sides; inflammation causes and promotes cancer, and cancer (i.e., "cancer energy") creates inflammation.[62] In fact, cancer cells play an active part in stimulating bone marrow–derived cells to create a microenvironment—the "pre-metastatic niche"—that is favorable for growth and metastasis.[63] The main way they are able to do this is by up-regulating inflammatory pathways by stimulating production of interleukin-6 (IL-6) and tumor necrosis factor–alpha (TNF-α).[64]

Cancer cells are genetically diverse, evolving and becoming smarter. They contain a range of mutations, which include both "drivers" that actively promote cancer and "passengers" that may not confer a selective advantage to a growing tumor but are nonetheless commonly found either assisting the drivers or resulting because they happen to be with the drivers,[65] perhaps just as innocent bystanders.

One of the main drivers is the transcription protein nuclear factor–kappa B (NF-κB), a major inducer of inflammation as well as multiple other pathways to cancer development, growth, invasion, and resistance. NF-κB has emerged as a factor in the regulation of many important processes, including the immune response, the

inflammatory response (NF-κB activates immune/inflammatory responses, while glucocorticoids reduce immune/inflammatory responses), apoptosis (suppression of NF-κB leads to an increase cancer-cell apoptosis), and cell proliferation (NF-κB is involved in the induction of cyclin D1, a gene involved in the activation of the G1/S transition stage of the cell cycle).

Botanicals and their active compounds are effective multitaskers in that they can suppress chronic inflammation, perhaps specifically suppressing one pathway, but most likely by regulating and gently moving multiple pathways. For example, often a mutation in the tumor suppressor gene PTEN (phosphatase and tensin homologue) is one of the likely drivers that activate NF-κB and a host of other cooperative pathways in cancer development and progression.[66] Adaptogens down-regulate NF-κB, which reduces cancer cell proliferation and potentiates other therapies, including chemotherapy and radiotherapy.[67] For example, a recent study found that suppressing NF-κB significantly increased the effectiveness of gemcitabine (a nucleoside analogue used as chemotherapy) against pancreatic cancer cells.[68] Another study concluded that NF-κB is strongly overexpressed in chronic lymphocytic leukemia and acute myelogenous leukemia.[69] Inhibition of NF-κB in patients with chronic lymphocytic leukemia being treated with fludarabine (a chemotherapy drug used in the treatment of hematological malignancies such as leukemia) enhanced the effect of the drug even in cases of fludarabine resistance.[70] And other research showed that the inhibition of NF-κB resensitizes cells to Rituxan (used in combination with other cancer medicines to treat non-Hodgkin's lymphoma) in formerly Rituxan-resistant cases.[71]

Many botanical compounds are potent regulators of NF-κB: the curcuminoids in turmeric;[72] the catechins (EGCG) in green tea;[73] resveratrol, from *Polygonum cuspidatum;*[74] the ginsenosides in ginseng;[75] gomisin, from schisandra;[76] glycyrrhizic acid in licorice; and *Panax notoginseng* saponins. Notably, licorice (*Glycyrrhiza glabra* and other species) increases overall vitality while it moderates and harmonizes the characteristics of other plants to bring a formula together energetically. Because of this action, in traditional Chinese medicine (TCM) licorice is considered to be a synergist and is used in many classic formulas as a supporting and harmonizing agent. It also possesses anti-inflammatory and anticancer actions. Licorice extract has been shown to suppress the activities of LOX-5 and COX-2, key enzymes in the formation of proinflammatory eicosanoids from arachidonic acid, along with the activities of NF-κB.[77]

Adaptogens Used in Cancer Therapies

In the field of cancer research, herbal adaptogens can play a pivotal role in cancer prevention and treatment, either by inhibiting carcinogenesis or by stabilizing or reversing premalignant conditions. Herbs that fall under the category of adaptogens tend to be diverse in their actions and require time to invoke their therapeutic effects. During active cancer, adaptogens are important for assisting the body in coping with the disease and for increasing the body's ability to withstand many of the negative effects of conventional cancer therapies, such as surgery, chemotherapy, and

radiation. Adaptogens can be of great value for vital restoration and for help with recovery from asthenia, a common state of low vitality, chronic fatigue, and depression that is often seen in a person who has, or has had, cancer. Adptogens not only significantly help to reduce cancer incidence and cancer reoccurrence, they can also help with many of the health issues that challenge people with cancer, including depression, anxiety, irritability, fatigue, sleep difficulties, poor digestion, and loss of libido and sexual performance.

Curcumin inhibits all three stages of carcinogenesis—initiation, promotion, and progression—in part through the inhibition of NF-κB. Curcumin potentiates the antitumor effects of the chemotherapy agent gemcitabine in pancreatic and bladder cancer by suppressing proliferation, angiogenesis, and NF-κB and down-regulating resistant gene proteins and growth factors, some of which include cyclin D1, vascular endothelial growth factor (VEGF), COX-2, and c-Myc and Bcl-2 expression. A small human trial showed that oral curcumin is well tolerated and despite its limited absorption has biological activity in some patients with pancreatic cancer.[78] Curcumin inhibits head and neck cancer by down-regulating NF-κB.[79] It enhances cytotoxicity of chemotherapeutic agents in prostate cancer cells by inducing p21 (WAF1/CIP1) expressions and suppressing NF-κB activation.[80] Curcumin inhibits VEGF-mediated angiogenesis in human intestinal microvascular endothelial cells through COX-2, NF-κB, and MAPK inhibition[81] and blocks TNF-alpha from activating NF-κB at multiple sites.[82] (See the "turmeric" monograph for more on curcumin and cancer.)

Notoginseng (*Panax notoginseng*), also called tienchi ginseng, is a close relative of *Panax ginseng* and a secondary adaptogen. TCM practitioners have called notoginseng "the miracle root for the preservation of life." It has been used for different medicinal purposes, including pain relief. *Panax notoginseng,* although used to stop bleeding, is also one of the best herbs to promote blood flow and to inhibit platelet aggregation and thrombosis. *Panax notoginseng* possesses potent anti-inflammatory and antitumor effects by down-regulating NF-κB and TNF-α.[83]

Reishi (*Ganoderma lucidum*) powdered extract: Reishi's Mandarin name, *ling zhi,* is literally translated as "spiritual mushroom." This venerable plant has been used in TCM for at least two thousand years. It is a chief secondary adaptogen as well as a primary herb used in cancer therapies. It is known to increase longevity and is highly regarded as an elixir of immortality. The reishi mushroom contains compounds including polysaccharides, polysaccharide peptides, nucleosides, triterpenoids, alkaloids, and compound structures yet to be identified, all contributing to the immune-modulating effects that give it its reputation as a host defense potentiator.[84] Reishi powdered extract has been shown to inhibit NF-κB and the activator protein AP-1, which in turn results in the inhibition of the expression of urokinase-type plasminogen activator and its receptor. Reishi powdered extract also suppresses cell adhesion and cell migration of highly invasive breast and prostate cancer cells, suggesting its ability to reduce tumor invasiveness.[85]

Ursolic acid is a triterpenoid compound found in holy basil (*Ocimum sanctum*), which is also known by the name *tulsi* and is considered an adaptogen as well as a sacred plant. Ursolic acid is also found in sage, rosemary, apples, prunes, and cranberries. It inhibits cancer through multiple mechanisms, including down-regulation of NF-κB. It is able to inhibit several key steps of angiogenesis and exerts an antiproliferative effect as well. Holy basil and rosemary also contain such synergistic compounds as carnosol, rosmarinic acid, apigenin, eugenol, cirsilineol, and cirsimaritin, all of which, along with ursolic acid, demonstrate potent redox/antioxidant enhancement effects as well as the ability to inhibit cancer-inducing COX-2 expression.[86] As well, carnosol acts as an antioxidant and anticarcinogen and has been shown to inhibit cancer-inducing NF-κB and other procancerous pathways.[87] Rosmarinic acid also demonstrated the ability to suppress cancer and down-regulate inflammation via COX-2 suppression.[88]

Individual Treatment Plan

Once I have decided which adaptogenic formulas to use for a particular case of cancer treatment, I consider the addition of specific herbs that address the person's constitution and current symptoms. Another important consideration is dosage. Many natural compounds such as curcumin, grape seed and skin extract, green tea extract, and resveratrol require high dosages to have a therapeutic effect. For example, a therapeutic daily dosage for curcumin (95 percent curcuminoids) is 2,500 to 3,500 milligrams; for green tea extract (40 to 50 percent epigallocatechin-3-gallate, or EGCG) it is 2,000 to 3,000 milligrams; and for resveratrol it is between 300 and 500 milligrams. For cancer prevention (as contrasted with therapeutic dosages), appropriate dosages are approximately 10 to 20 percent of these ranges.

The Benefits of Adaptogens in Integrative Oncology

- Increase the body's immune response against cancer
- Improve the overall health of the patient and the functioning of the vital organs
- Reduce fatigue
- Increase nutrient utilization and protein synthesis (anticatabolic activity) and improve lipid and glucose energy efficiency
- General antitoxic/antioxidant, systemic protection for the kidneys, liver, heart, bone marrow, and adrenal glands
- Retard the development of cancer and cancer metastases
- Increase tolerability of radiation treatment, prevent radiation sickness, protect against side effects of raditation, and enhance effectiveness of radiation
- Increase tolerability and effectiveness of chemotherapy and biological therapy
- Improve immune system recovery
- Inhibit multidrug resistance (inhibiting Pgp, reducing the expression of NF-κB, AP-1, p53, and Bcl-2)[89]

Within ETMS, specifically branch 3 of this model, the targeting of multiple cellular pathways with phytonutrients often involves the use of super-concentrated botanical extracts. Branch 3 assesses and targets the biological terrain in terms of the modern scientific understanding of the molecular biology of cancer, as well as the pharmacological influences of natural compounds on cancer at the molecular, biological, and genomic level. At the same time it recognizes that the cancer energy (tumor) interacts with and affects both the person (represented by branch 1) and his or her relationship to the environment and exogenous stressors (represented by branch 2). This "hybrid" interactive characterization of branch 3 as a biological terrain is therefore much more than the interface of the biology of plants and cancer at the molecular level; it is simultaneously a redefinition of traditional herbal medicine and a methodology for refining the botanical elements in oncology protocols. It is the driving force of ETMS therapeutics in clinical practice. This revisiting of herbal medicine is unique to the ETMS approach and makes it possible to incorporate botanicals seamlessly and synergistically with modern oncology methods in precise, scientifically guided, but until now unexplored ways.

Having been involved with thousands of people challenged by cancer, I have learned that each person's journey is unique, with each person having many issues and expressions of the disease that are different from any other person's. Moreover, each person presents myriad symptoms and a unique set of genetic factors that must be considered at every stage of the healing process, and therefore the treatment plan must change accordingly. This is why a wholistic approach is so important and relevant—because it allows us to develop an understanding of the uniqueness of the person in order to build a relationship that will play a critical role in facilitating healing.

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