# Herbs or Natural Products That Decrease Cancer Growth

## Part One of a Four-Part Series

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**Purpose/Objectives:** To provide evidence-based research information about 31 herbs and natural products that have shown potential in early research to decrease cancer growth or as adjuncts with cancer treatment.

**Data Sources:** Names of herbs and natural products with potential to decrease cancer growth have been selected from listings in the Natural Medicines Comprehensive Database and Lawrence Review of Natural Products–Monograph System. Information about these herbs has been found in evidence-based studies cited in references.

**Data Synthesis:** In preliminary studies, 31 herbs and natural products appear to have potential for cancer treatment.

**Conclusions:** This preliminary evidence may be useful to healthcare professionals and patients with cancer.

**Implications for Nursing:** The information in this article is designed to provide quick access for healthcare professionals working in clinical oncology. Oncology nurses who have this information can become resources for patients and other healthcare professionals.

### Key Points . . .

- Some herbs and natural products may decrease cancer growth.
- Herbs and natural products may be used as adjuvants with cancer treatment.
- Oncology nurses can become better resources for healthcare professionals and patients regarding herbs and natural products.

Preliminary evidence-based research shows that 31 herbs and natural products have potential to help individuals with cancer. Many components of these herbs and natural products are uncommon names of chemicals. This review of products is designed to help healthcare professionals become more familiar with these names. Some products show potential as adjuvants with conventional oncology treatments. Others may be used in treating the side effects of conventional treatments. Patients already may be asking nurses about these products. This review article provides evidence-based information that will help healthcare professionals be better resources for patients with cancer.

Herbal and natural products have enormous popularity as self-medication products. They are perceived as natural, green, pure, and without side effects. Furthermore, their popularity has resulted in more than 800 companies producing herbal products and collecting revenues in excess of $4.5 billion (Greenwald, 1998). As many as 89% of patients with cancer or other chronic conditions use alternative therapies, often herbal or natural products (Eisenberg et al., 1993, 1998; Montbriand, 1994a, 1995a, 1995b, 1997, 2000a), and 75% are secretive about alternative product use (Montbriand, 1994a, 1995a, 1995b, 1997, 2000a). Evidence shows that healthcare consumers' main source of information is lay sources and social groups. Lack of professional-patient communication is a sign of patients' hesitancy to ask and professionals' lack of adequate and available information (Montbriand, 2000a).

Until recently, little evidence-based information was available on interactions of herbs and natural products with diseases such as cancer or cancer treatments, prescriptions, other herbs, and laboratory tests. This information now is becoming available. Yet a recent study showed that as many as 97% of healthcare professionals lack evidence-based resources for natural products and herbs (Montbriand, 2000a, 2000b). Most

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Digital Object Identifier: 10.1188/04.ONF.E75-E90

professionals would be better resources for patients if information was succinct, evidence-based, and consolidated. Professionals have spoken of limited time for information searches and, in some cases, lack of finances to procure sources.

This article is the first of a four-part series on herbs and natural products that may decrease or increase cancer growth. Each article in the series covers a specific category. Some overlap in categories occurs because early evidence (especially in vivo and in vitro evidence) often showed contrary results. For example, fish oils are found in Part I of this series, which covers potential to decrease cancer, yet components of fish oils, vitamin A and D, are found in Part III, which is focuses on products with potential to protect against cancer growth. The same will be found for soy in Part II, which focuses on products with potential to increase cancer growth. Conversely, soy appears again in Part III. The reason this happens is because this series targets two specific groups, individuals who have cancer in parts I and II, and individuals who do not have cancer in parts III and IV. For each target group, the aim is to identify herbs and natural products with potential for or against cancer growth. For example, if a woman with breast cancer takes soy, she increases her risk of cancer growth. If a woman who does not have cancer takes soy, she protects herself against cancer. The four parts in this series are

- For patients who have cancer
  - Part I: herbs and natural products that may decrease cancer growth
  - Part II: herbs and natural products that may increase cancer growth
- For patients who do not have cancer
  - Part III: herbs and natural products that may protect against cancer growth
  - Part IV: herbs and natural products that may potentiate cancer growth.

Patients may wish to take or may already be taking natural products for cancer or other illnesses. With this information, healthcare professionals can give patients opportunities to make informed choices. These articles are an update to previous publications about herbs and alternative therapies (Montbriand, 1993, 1994a, 1999).

Do not construe this information as a suggestion to use any of these products. This information is provided in the spirit of helping healthcare professionals to give evidence-based information to patients. When a recommended dose is given, it is for a vitamin or mineral, and the amount recommended for daily use is by either the U.S. Food and Drug Administration or Health Canada. Individuals who self-medicate with a vitamin or mineral usually take these products in higher doses than recommended (Montbriand, 1994a, 1995a, 1995b, 1997, 2000a). Danger of overdoses can be avoided when healthcare professionals are aware of recommended daily doses.

This article focuses on herbs and natural products that have shown potential in early evidence-based research to decrease cancer growth or be adjuvants with conventional cancer treatment for patients who have or have had cancer. Common names and some brand names are provided. Usual doses are provided when available. Scientific names are given for each herb and natural product. The scientific name for an herb includes the genus (classification of a group with common characteristics) followed by the species (many species can be found in one genus).

For this article, names of herbs and natural products have been selected from listings in Natural Medicines Comprehensive Database (2004) and Lawrence Review of Natural Products–Monograph System (Facts & Comparisons, 2001). Evidence about these herbs has been found in the studies cited in references. Other products that interact positively with cancer may exist; however, this review includes only herbs and natural products recognized by the authors, professionals, or advisory boards of the citations mentioned earlier.

The majority of studies cited are in vitro studies, performed in glass on tissue from a living organism, or in vivo studies, performed on tissue not removed from a living organism (animal studies). Most studies have not advanced to clinical trials on humans. The few human studies cited are preliminary clinical trials. Therefore, although results seem favorable or unfavorable, treat them with caution.

**Neither the author nor publisher makes any medical claims for any of the herbs or natural products in this review or the tables. This is informational literature. Note that some of the herbs described are deadly poisons and extremely dangerous.**

Three herbs not included here are now biomedical chemotherapy (Tyler, 1994).

- *Catharanthus roseus*, also known as *Vinca rosea*, common names periwinkle, old maid, myrtle, and others, is known as chemotherapy agents vincristine sulfate (Oncovin®, Eli Lilly and Company, Indianapolis, IN) or vinblastine sulfate (Velban®, Eli Lilly and Company).
- *Podophyllum peltatum*, common name mayapple, American mandrake, or American podophyllum, is known as chemotherapy agents etoposide (VePesid®, Bristol-Myers Squibb Oncology, Princeton, NJ), and teniposide (Vumon®, Bristol-Myers Squibb Oncology).
- *Taxus brevifolia*, common name pacific yew, is the chemotherapy agent Taxol® (Bristol-Myers Squibb Oncology).

All three herbs are toxic to humans and should be avoided. Podophylum is lethal. References for these three herbs are Bisset (1994), Dial Access for Professionals (personal communication, May 1998), Duke (1987), Duke and Vasquez (1994), Facts and Comparisons (2001), and Tyler (1993, 1994).

Table 1 provides names, additional common names, some brand names, and manufacturers for all of the products reviewed and can be used as a quick reference to find the name of a product, component of a product, herb, other common names, or brand names. Some herbs and natural products have many brand names, which makes total listing prohibitive. Check with your pharmacist if you cannot find the brand name. The number of brand names found has been included in Table 1. Notice that some brands contain only one ingredient; for example, astragalus is the only ingredient in the brand named Astragalus (Nature's Way Boynton Beach, FL). Other brand names, signified with a "b," indicate that the brand contains other herbs, natural products, or components of products besides the ingredient of interest. Products with single components or ingredients should be favored because each additional ingredient adds the potential for additional side effects. In many cases, brands with numerous ingredients do not contain as much of the component desired. Notice also the safety concern with some products, particularly those with animal material as ingredients.

**Table 1. Common and Brand Names of Herbs and Natural Products With Potential to Decrease Cancer Growth or for Use as an Adjuvant With Cancer Treatments: Common and Brand Names**

| Herb or Natural Product | Brand Name and Manufacturer or Other |
|---|---|
| **Astragalus**<br>Other names: astragali, beg kei, bei qi, buck qi, huang qi, huang qi, hwanggi, membranous milk vetch, milk vetch, Mongolia milk, ogli | Astragalus (Nature's Way)[a]<br>Astragalus (Jamieson)[a]<br>C + Herbs (Jarrow Formulas)[b]<br>Femfocus—Herbal Female Complex (Solgar)[b]<br>120 brand names found |
| **Beta glucan**<br>Other names: beta glycans, gifolan (GRN), lentinan, PGG glucan, poly-(1-6)_beta-D-glucopyranosyl-(1-3)-beta-D-glucopyranose, schizophyllan (SPG), SSG, yeast-derived beta glucan | Beta Glucans (Natrol)[b]<br>Beta 1,3 Glucans (Solgar)[b]<br>Soy Essentials (Health From The Sun)[b]<br>XTEND-LIFE Total Balance (Xtend-Life Nutaceuticals Inc.)[b,c]<br>17 brand names found |
| **Baikal skullcap**<br>Other names: huang qin, huangqum, ogon, skullcap, scute, wogon | Earthmends Breast Health Program (Cancer Wellness Institute)[b]<br>Earthmends Prostate Health Program (Cancer Wellness Institute)[b]<br>Sino-Lung Res-Q (Nutri-Quest)[b]<br>Snooze (Pacific BioLogic)[b]<br>90 brand names found |
| **Calcium D-glucarate**<br>Other names: calcium glucarate, D-glucarate | Breast Care System-3 (Natrol)[b]<br>Healthy Cells Prostate (PhytoPharmica)[b]<br>Total Life Care Nutrition System for Men (Rexall—Sundown)[b]<br>7 brand names found |
| **Cat's claw**<br>Other names: griffe du chat, life-giving vine of Peru, samento, U a de gato | Cat's Claw (Olympian Labs)[a]<br>Cat's Claw (Nature's Way)[b]<br>Cat's Claw 5000 (Now)[b]<br>Cat's Claw Caplet (Leiner Health Products)[b]<br>Cat's Claw Defense Complex (Source Naturals)[b]<br>56 brand names found |
| **Cesium**<br>Other names: caesium, cesium-137, cesium chloride, CsCl, high pH therapy | Colloidal Minerals (Progressive Labs)[b]<br>Solu-Min (Aspen Group, Inc.)[b]<br>Coraladvantage Coral Calcium (Advanced Nutritional Innovations)[b]<br>6 brand names found |
| **Chlorophyll**<br>No other names | BarleyGreen Premium (AIM USA)[b]<br>Earthrise Spirulina-Vegi-Capsules (Earthrise Nutritionals, Inc.)[b]<br>#405 BLDB Blood Builder (Systemic Formulas)[b,c]<br>#428 DSIR Digestant Internal Regenerator (Systemic Formulas)[b,c]<br>74 brand names found |
| **Chrysin**<br>Other names: 5, 7-dihydroxyflavone, flavone X, flavnoid, galangin flavanone | Chrysin (ProLab)[a]<br>Chrysin—Metabolic Response Modifiers (Metabolic Response Modifiers)[a]<br>17 brand names found |
| **Cordyceps**<br>Other names: caterpillar fungus, Cs-4, dong chong xia cao, hsia ts'ao tung ch'ung, vegetable caterpillar | Cordyceps (Metabolic Response Modifiers)[a]<br>Cordyceps [Caterpillar Fungus] (Olympia Nutrition)[a]<br>Cordyceps Power 800mg (Planetary Formulas)[b]<br>Cordyceps With Siberian Ginseng (Natrol)[b]<br>33 brand names found |
| **Coriolus mushroom**<br>Other names: boletus versicolor, coriolus, kawaratake, krestin, polyporus versicolor, polysaccharide peptide, polysaccharide-K, polystictus vesicolor, PSK, PSP, turkey tail, yun-zhi (cloud mushroom) | VPS Coriolus Virsicolor (JHS Natural Products)[a]<br>10 Mushroom Combination (Olympia Nutrition)[b]<br>Reishi 5 (New Chapter, Inc.)[b]<br>Immune Builder (JHS Natural Products)[b]<br>Ten Mushroom Combination (Smart Basics)[b]<br>5 brand names found |

*(Continued on next page)*

[a] This herb or natural product is the only ingredient in this brand.
[b] This brand is an example of a product where this herb or natural product is included along with other herbs and products. Monitor for all possible side effects of all ingredients in these products.
[c] Safety of this product is a concern. The product contains animal material, possibly diseased animals that may harbor bovine spongiform encephalopathy (BSE or mad cow disease).

**Table 1. Common and Brand Names of Herbs and Natural Products With Potential to Decrease Cancer Growth or for Use as an Adjuvant With Cancer Treatments: Common and Brand Names *(Continued)***

| Herb or Natural Product | Brand Name and Manufacturer or Other |
|---|---|
| **Diindolylmethane**<br>Other names: DIM | Indolplex (PhytoPharmica)[a]<br>Indole Pro (MMS Pro)[b]<br>2 brand names found |
| **European mistletoe**<br>Other names: all-heal, birdlime mistletoe, devil's fuge, drudenfuss, eurixor, helixor, hexenbesen, iscador, isorel, leimmistel, mistlekraut, mistletoe, visci, visci albi herba | #402 Arta Arthro Support (Systemic Formulas)[b,c]<br>Herbal Insomnia Tablets (Life Brand)[b]<br>D-MNS (Dial Herbs)[b]<br>Wild Rose Nerve Formula (Dial Herbs)[b]<br>6 brand names found |
| **Fish oils**<br>Other names: fish liver oil, omega fatty acids. Not the same as cod liver oil, DHA, EPA, and shark liver oil | Atkins Essential Oils (Atkins Nutritionals, Inc.)[b]<br>Cod Liver Oil (A-2500, D-270) Sundown Vitamins (Rexall—Sundown)[b]<br>EFA Heart Formula (Health From The Sun)[b]<br>Ultra 30/20 Fish Oil (Health From The Sun)[b]<br>40 brand names found |
| **Gamma linoletic acid**<br>Other names: gamolenic acid, GLA | GLA is the active medicinal component of herbs such as evening primrose and borage.<br>Arthritis Guardian (Clinicians Choice)[b]<br>Bio-EFA Borage Oil 90 (Health From The Sun)[b]<br>Borage Oil (Sundown Vitamins)[b]<br>Evening Primrose Oil (Health From The Sun)[b]<br>Holista Evening Primrose Oil (Holista)[b]<br>66 brand names found |
| **Glossy privet**<br>Other names: Chinese privet, dongqinzi, ligustrum, nu zhen zi, nuzhenzi, privet, tro ne de Chine, trueno, white waxtree | Immune-Action (Nature's Plus)[b]<br>Immune System (Nutrivention)[b]<br>Resist (Pacific BioLogic)[b]<br>Green Tea Remedy (Puritan's Pride)[b]<br>Herpancacine (Diamond Formulas)[b]<br>Ying-Yang Secret of Longevity (Flora, Inc.)[b]<br>Hua Fo (Shen Long Co.) This product was recalled by Health Canada in 2002 because a drug similar to Viagra® (Pfizer, New York, NY) was discovered in hua fo.<br>14 brand names found |
| **Glutamine**<br>Other names: GLN, glutamate, glutamic acid, glutaminate, L-glutamic acid | Glutamine Fuel Capsules (TwinLab)[a]<br>#12 B Brain (Systemic Formulas)[b,c]<br>#18 Ds Digestive Stabilizer (Systemic Formulas)[b,c]<br>Acetabolan (Muscletch)[b]<br>#17 D Digestive (Systemic Formulas)[b,c]<br>#428 DSIR Digestant Internal Regenerator (Systemic Formulas)[b,c]<br>417 brand names found |
| **Gossypol**<br>Other names: cottonseed oil | AfterFXBar—Bavarian Mint (Nutripeck)[b]<br>Alpha-Lipoic Acid (Sundown Vitamins)[b]<br>Chewable Calcium With Vitamin D (Nature's Bounty)[b]<br>10 brand names found |
| **Gotu kola**<br>Other names: brahma-buti, centella, gotu cola, hydrocotyle, idrocotyle, Indian pennywort, Indian water navelwort, marsh penny, talepetraka, tsubo-kusa, white rot | Gotu Kola (Nature's Way)[a]<br>Gotu Kola (Olympian Labs)[a]<br>Gotu Kola (Now)[b]<br>AM Plus (Brain 111 Formula) (Alpha Zebra)[b]<br>Brain Booster (Optimum Nutrition)[b]<br>Brain Fuel II (Futurebiotics)[b]<br>129 brand names found |

*(Continued on next page)*

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**Table 1. Common and Brand Names of Herbs and Natural Products With Potential to Decrease Cancer Growth or for Use as an Adjuvant With Cancer Treatments: Common and Brand Names *(Continued)***

| Herb or Natural Product | Brand Name and Manufacturer or Other |
|---|---|
| **Graviola**<br>Other names: Brazillian cherimoya, Brazillian paw paw, corossolier, durian benggal, guanavana, soursop | Amazon A-P (Raintree Nutrition, Inc.)[b]<br>Amazon Prostate Support (Raintree Nutrition, Inc.)[b]<br>Amazon Calm Support (Raintree Nutrition, Inc.)[b]<br>6 brand names found |
| **Honey**<br>Other names: honig, mel, miel blanc | Pasteurized honey, any brand for external use<br>52 brand names found for oral use |
| **IP-6**<br>Other names: fytic acid, insitol hexaphosphate, phytic acid | IP6 Capsule (Jarrow Formulas)[b]<br>Cell Forte with IP-6 (Enzymatic Therapy)[b]<br>Women's Prime Multi (Swanson)[b]<br>9 brands found |
| **L-arginine**<br>Other names: arg, arginine, arginine HCl, arginine hydrochloride, L arginine, L-arginine HCl, L-arginine-HCl, L-arginine hydrochloride | Amino 1000 (Puritan's Pride)[b]<br>Arginine and Ornithine—Olympian Labs (Olympian Labs)[b]<br>Arginine Ultra (FreeLife International)[b]<br>ArginMax for Women (Daily Wellness Co.)[b]<br>DHEAX (HealthWatchers System)[b]<br>XTEND-LIFE Total Balance (Xtend-Life Nutraceuticals Inc.)[b,c]<br>134 brand names found |
| **Magnesium**<br>Other names: magnesium sulfate, magnesium asparatate, magnesium carbonate, magnesium citrate, magnesium gluconate, magnesium hydroxide | Magnesium sulfate (IV used by a physician)<br>1762 brand names found |
| **Marijuana**<br>Other names: cannabis, grass, hash, hashish, hemp, kif, mariguana, marihuana, pot, weed | Marinol® (prescription drug) (Sanofi-Synthelabo)[a]<br>Medicinal marijuana (usually inhaled) is available through permission of a physician and government approval in Canada and some states in the United States.<br>No brand names found |
| **Malatonin**<br>Other names: MEL, MLT, pineal hormone | Melatonin 3 mg (TwinLab)[a,c]<br>Appleheart Melatonin (Appleheart)[a,c]<br>Melatonin (Olympian Labs)[a,c]<br>Superior Melatonin (Nutraceutical Sciences Institute)[a]<br>Ester-C Nighttime Formula (Natrol)[b,c]<br>Knock Out (Schiff)[b]<br>Melatonin 500 mcg (Nature's Way)[b,c]<br>Mannatonin (Mannatech)[b,c]<br>35 brand names found |
| **Selenium**<br>Other names: L-selenomethionine, selenite, selenium dioxide, selenized yeast | Selenium (Source Naturals)[a]<br>Selenium 100 mcg (Jamieson)[a]<br>Selenium 50 mcg (Jamieson)[a]<br>#41 GT Thymus (Systemic Formulas)[b,c]<br>#31 GA Adrenal (Systemic Formulas)[b,c]<br>50+ (Futurebiotics)[b]<br>XTEND-LIFE Total Balance (Xtend-Life Nutraceuticals Inc.)[b,c]<br>598 brand names found |
| **Squalamine**<br>Other names: spiny dogfish shark | No brand names found |
| **Theanine**<br>Other names: gamma-glutamylethylamide, L-theanine | Theanine is the major amino acid in green tea.<br>Knock Out (Schiff)[b]<br>Evolution 2—Element III (Viogenix Corp.)[b] |

*(Continued on next page)*

[a] This herb or natural product is the only ingredient in this brand.
[b] This brand is an example of a product where this herb or natural product is included along with other herbs and products. Monitor for all possible side effects of all ingredients in these products.
[c] Safety of this product is a concern. The product contains animal material, possibly diseased animals that may harbor bovine spongiform encephalopathy (BSE or mad cow disease).

**Table 1. Common and Brand Names of Herbs and Natural Products With Potential to Decrease Cancer Growth or for Use as an Adjuvant With Cancer Treatments: Common and Brand Names *(Continued)***

| Herb or Natural Product | Brand Name and Manufacturer or Other |
|---|---|
| | Norexin (Biotech Corp.)[b]<br>3 brand names found<br>Green tea contains 1%–3% of theanine; therefore, green tea products may contain less theanine than the above three products.<br>Green tea brands:<br>Imperial Green Tea (Jamieson)[b]<br>Green Tea Remedy (Puritan's Pride)[b] |
| **Thymus extract**<br>Other names: predigested thymus extract, thymus acid lysate derivative, thymus-derived polyp eptides | #101 ACP Vitamin ACP (Systemic Formulas)[b,c]<br>#39 Gf Thyroid (Systemic Formulas)[b,c]<br>#428 DSIR Digestant Internal S Liver Stimulant (Systemic Formulas)[b, c]<br>#80 R Lung (Systemic Formulas)[b] (homeopathic product)<br>AllerPlus (PhytoPharmica)[b,c]<br>Aspen—Imun-Comp (Aspen Group, Inc.)[b,c]<br>Atri CU-Chelate (Atrium Inc.)[b,c]<br>GSC (Glandular Stress Complex) (Progressive Labs)[b,c]<br>Children Immu-C (Nutri-Quest)[b,c]<br>55 brand names found |
| **Tiratricol**<br>Other names: triac, triodothyroacetic acid | Triax (Syntrax Innovations)[b]<br>This brand name was the only one found. The U.S. Food and Drug Administration has issued recalls on all products containing tiratricol. |
| **Transfer factor**<br>Other names: bovine dialyzable leukocyte extract, bovine transfer factor, dialyzable leukocyte extract, DLE, human dialyzable leukoctyle extract, human transfer factor, TF, TFd | Human-derived transfer factor was used for specific cases of childhood lymphocytic leukemia. Bovine derived transfer factor brands:<br>Transfer Factor Plus (4 Life)[b,c]<br>Formula 560 (Immunity Today, LLC.)[b,c]<br>Wellness Cell Response (Source Naturals)[a]<br>3 brand names found |

[a] This herb or natural product is the only ingredient in this brand.
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[c] Safety of this product is a concern. The product contains animal material, possibly diseased animals that may harbor bovine spongiform encephalopathy (BSE or mad cow disease).

## Herbs and Natural Products With Potential to Decrease Cancer Growth or as Adjuvants

**Astragalus**, with a scientific name of *Astragalus membranaceu,* is an herb used in self-medication with conventional therapies for breast, cervical, and lung cancer. Astragalus seems to enhance the immune system, especially in cases of deficiency, by restoring suppressed T cell function (Chu, Wong, & Mavligit, 1988; Sun et al., 1983). Doses of 1-30 g per day seem to be typical, but Upton (1999) indicated that doses greater than 28 g might cause immunosuppression. See Table 2 for the alert list of herbs and natural products with toxic effects.

**Beta glucans** has scientific names of *1-3, 1-6-beta-glucan, beta-1,3-D-glucan, and beta-1-6,1,3-beta-glucan*. Individuals self-medicate with beta glucans for various conditions such as diabetes, cancer, HIV and AIDS, the common cold, influenza, and allergies (Natural Medicines Comprehensive Database, 2004). Beta glucans stimulates the body's macrophage phagocytosis of tumor cells, increases the cytotoxicity of natural killer cells, and stimulates tumor necrosis factor and the release of interleukin-1 (Arinaga et al., 1992; Muller et al., 1996; Penna, Dean, & Nelson, 1996; Ross, Vetvicka, Yan, Xia, & Vetvickova, 1999). Beta glucans seems to allow phagocytosis (of cancer cells) to occur. Yeast-derived beta glucans seems well tolerated orally (Nicolosi et al., 1999). Beta glucans has been used in doses of 7.5 g twice daily added to juice (Nicolosi et al.).

**Balkal skullcap** has a scientific name of *Scutellaria baicalensis*. Self-medication of balkal skullcap often is for treatment of prostate cancer or respiratory infections (Huang, 1999). Findings suggest that this herb inhibits tumor growth and carcinoma cell proliferation (Huang). Although Huang considers balkal skullcap to be relatively nontoxic, Bruneton (1999) recorded several cases that associated the herb with hepatotoxicity. A typical dose is 6-15 grams, toasted to moderate the effect (Bensky, Gamble, & Kaptchuk, 1996).

**Calcium-D glucarate**, with a scientific name of *D-glucaro-1,4-lactone (1,4 GL)*, is used by individuals to prevent breast, prostate, and colon cancer and to remove body toxins. Calcium-D glucarate seems to decrease circulating estrogen. Patients with breast or prostate cancers may benefit from this action. In vitro studies also have shown that D-glucarate decreases tumor cell proliferation (Curley, Humphries, Koolemans-Beynan, Abou-Isaa, & Webb, 1994). In animal studies, dietary glucarate inhibited beta-glucuronidase activi-

**Table 2. Herbs and Natural Products That Have Toxic or Negative Side Effects**

| Herb or Natural Product | Adverse Reaction or Toxicity |
|---|---|
| Astragalus | Doses over 28 grams might cause immunosuppression. |
| Balkal skullcap | Skullcap implicated as the cause in several cases of hepatotoxicity |
| Cat's claw | Adverse effects include headache, dizziness, and vomiting |
| Cesiun | High exposure to Cesium can result in burns and death |
| European mistletoe | Mistletoe is a poisonous plant |
| Fish oils | Many side effects are associated with this product, and it may cause cancer. |
| Gamma linolenic acid (borage) | Only Borage products that are labeled with "UPA free" are safe. |
| Gossypol | Gossypol is considered unsafe because of its potential toxicity. |
| Graviola | Parkinson's disease like movements may result from oral ingestion of graviola. |
| Magnesium (intravenous) | Magnesium is fatal in large doses. Many interactions with drugs, herbs and supplements, and diseases or conditions make the oral self-medication of this mineral prohibitive. Finding suggests usefulness of only intravenous doses. |
| Marijuana | In inhaled form, marijuana damages the lung tissue. |
| Melatonin | Melatonin has many side effects. |
| Selenium | Selenium can cause acute toxicity. |
| Thymus extract | Products with thymus extract may be contaminated by bovine spongiform encephalitis (mad cow disease). |
| Tiratricol | Individuals who have normal thyroid function should not take Tiratricol. |
| Transfer factor | Bovine-derived products may be contaminated by bovine spongiform encephalitis (mad cow disease). Benefits are only known in childhood leukemia, using human-derived transfer factor. |

ties, inhibiting mammary tumor development. Normally, in the intestine the bacterial enzyme beta-glucuronidase breaks the estrogen-glucuronide bond, allowing estrogen to be reabsorbed (Natural Medicines Comprehensive Database, 2004). Beta-glucuronidase seems to be increased in the body systems of patients with hormone-dependent breast or prostate cancer. Calcium-D glucarate inhibits beta-glucuronidase, decreasing the reabsorbed estrogen and decreasing circulating estrogen (Heerdt, Young, & Borgen, 1995; Walaszek et al., 1997). No adverse reactions or typical doses have been reported (Natural Medicines Comprehensive Database). Calcium glucarate is not the same substance as calcium gluconate.

**Cat's claw** has scientific names of *Uncaria guianensis*, or *Uncaria tomentosa*. People self-medicate with cat's claw for many conditions, including peptic ulcers, colitis, leaky bowel syndrome, herpes infections, and especially urinary tract cancer (Natural Medicines Comprehensive Database, 2004). Although cat's claw does not appear to be cytotoxic to normal cells, in preliminary tests it appeared to induce tumor cell death and inhibit proliferation of leukemia and lymphoma cells (Piscoya et al., 2001; Sandoval, Charbonnet, & Okuhama, 2000; Santa Maria et al., 1997). Adverse reactions to cat's claw include headache, dizziness, and vomiting (Piscoya et al.). A typical dose for osteoarthritis of the knee is 100 mg of a freeze-dried aqueous extract of cat's claw (Piscoya et al.).

**Cesium** has the scientific names of *Cesium, Cs*, and *atomic number 55.* Individuals self-medicate with cesium to treat cancer and depression. In preliminary research, Sartori (1984) found no response when cesium was given alone to 50 patients over a period of three years. When cesium was given along with minerals such as magnesium, potassium, and selenium and some vitamins and chelating agents, the patients experienced a 50% recovery from primary breast, colon, prostate, pancreas, lung, and liver cancer and lymphoma, Ewing sarcoma of the pelvis, and adenocancer of the gall bladder. As seen in Table 1, the examples of brands all contain other minerals or vitamin substances. Before taking additional products such as vitamins and minerals with cesium, patients should be cautioned to review all side effects. Sartori indicated that the typical dosage is 6-9 g divided into three doses daily. High exposure to cesium can result in burns to body tissue and death (Environmental Protection Agency, 2002). Side effects include nausea, diarrhea, anorexia, and tingling of the lips, hands, and feet (Neulieb, 1984).

**Chlorophyll** has scientific names of *Chlorophyll a, Chlorophyll b, Chlorophyll c, or Chlorophyll d.* Individuals use chlorophyll to reduce colostomy odor and for bad breath, constipation, detoxification, and wound healing. Medicinal activities of chlorophyll contained in silkworm excreta have been recognized by Far Eastern healthcare practitioners. Recent research has confirmed that chlorophyll extracted from silkworm excreta appears to have a cytotoxic effect on cancer cells (Dai et al., 1992; Lee, Park, Kim, Han, & Hahn, 1990). Leung and Foster (1996) indicated that commercial sources of chlorophyll are derived from alfalfa (scientific name *Medicago sativa*) and silkworm excreta. None of the 74 brands found listed chlorophyll extracted from silkworm excreta as an ingredient. Advertisements for barley green products indicate that the chlorophyll is from barley plants. No adverse side effects of chlorophyll or typical dose are reported.

**Chrysin,** also this products scientific name, is used to self-medicate to prevent cancer and treat conditions such as anxiety, inflammation, and impotence (Natural Medicines Comprehensive Database, 2004). Chrysin occurs naturally in plants such as passionflower and silver linden and in bee honey and propolis (Galijatovic, Otake, Walle, & Walle, 1999). Preliminary research has shown that the presence of chrysin appears to reduce the bioavailability of dietary carcinogens (Galijatovic, Walle, & Walle, 2000; Galijatovic, Otake, Walle, & Walle, 2001). Chrysin also seems to act in a similar fashion as breast cancer drugs anastrozole and letrozole, decreasing estrogen synthesis (Jeong, Shin, Kim, & Pezzuto, 1999; Kao, Zhou, Sherman, Laughton, & Chen, 1998). Chrysin may have a future use in cancer drug therapy. No toxic effects have been recorded. Manufacturers suggest various dosages for chrysin, but none has been tested on humans.

**Cordyceps** has a scientific name of *Cordyceps sinensis*. *Cordyceps sinensis* is a Chinese medicine, a fungus parasite that lives on caterpillars in China's high mountain region. For commercial products, cordyceps cells are propagated in laboratories (Robbers & Tyler, 1999). Patients self-medicate with cordyceps for numerous conditions, including lethargy, chronic bronchitis, kidney disorders, male sexual dysfunction, anemia, liver dysfunction, and dizziness, and to increase en-

ergy (Robbers & Tyler). Preliminary evidence suggests that cordyceps might be cytotoxic to cancer cells (Bok, Lermer, Chilton, Klingeman, & Towers, 1999; Kuo et al., 1994; Kuo, Tsai, Shiao, Chen, & Lin, 1996), especially lung carcinoma (Nakamura et al., 1999) and melanoma (Xu, Peng, Chen, & Chen, 1992). No adverse effects have been reported (Natural Medicines Comprehensive Database, 2004). Zhu, Halpern, and Jones (1998) used a dose of 3 g daily.

**Coriolus mushroom** has the scientific name of *Coriolus versicolor*, synonymous with *Trametes versicolor*. Healthcare professionals may find individuals using coriolus mushroom to alleviate side effects of chemotherapy or radiation treatments or to improve the effects of chemotherapy. The plant shows antitumor and immunomodulating effects (Dong, Kwan, Chen, & Yang, 1996; Dong, Yang, & Kwan, 1997; Harada et al., 1997; Kanoh et al., 1994; Kim, Kacew, & Lee, 1999; Kobayashi, Matsunaga, & Oguchi, 1995; Maehara et al., 1993; Mizutani, & Yoshida, 1991; Ng, 1998; Tsukagoshi et al., 1984; Wang, NG, Liu, Ooi, & Chang, 1996). Coriolus mushroom contains several polysaccharides, including polysaccharide-K (PSK and krestin), that have been used in Japan as biologic response modifiers in cancer chemotherapy treatments (Harada et al.; Hayakawa et al., 1997; Maehara et al.; Morimoto et al., 1996; Nakazato, Koike, Saji, Ogawa, & Sakamoto, 1994; Nio et al., 1992; Sugimachi, Maehara, Ogawa, Kakegawa, & Tomita, 1997; Toi et al., 1992). Although no reports of adverse effects from coriolus mushroom have been noted (Mizutani & Yoshida; Ng), patients receiving PSK adjunctly with chemotherapy have experienced nausea, leukopenia, and liver function impairment (Nakazato et al.). This might be from the chemotherapy (Natural Medicines Comprehensive Database, 2004). As an adjuvant, 3 g of PSK has been used daily (Morimoto et al.; Nio et al.; Toi et al.; Yokoe et al., 1997).

**Diindolylmethane** has a scientific name of *3,3'-Diindolylmethane*. Individuals use it to prevent breast and uterine cancers. According to Balk (2000) and Riby, Chang, Firestone, and Bjeldanes (2000), the typical American diet contains 2-24 mg of diindolylmethane daily. Several researchers agreed that diidolylmethane has estrogen receptor agonist and antagonistic activities, making it potentially useful against breast cancer cells (Chen, McDougal, Wang, & Safe, 1998; Chen Safe, and Bjeldanes, 1996; McDougal, Sethi Gupta, Ramamoorthy, Sun, & Safe, 2000; Riby et al.). All of the studies mentioned were very preliminary in vivo findings. Toxic effects and typical doses were not reported.

**European mistletoe** has a scientific name of *Viscum album* and is grouped as American *Phoradendron serotinum*. Recent studies have indicated that European mistletoe has a toxic effect on certain tumors and carcinoma (Bisset, 1994; Duke, 1987; Schulz, Hansel, & Tyler, 1998). Other researchers, in randomized, controlled trials and one in vivo research study, found no indication for adjuvant use of mistletoe for patients with cancer (Friess et al., 1996; Steuer-Vogt et al., 2001; Timoshenko, Cherenkevich, & Gabius, 1995). Yet, other researchers believe that European mistletoe has possibilities as a biologic response modifier, stimulating the immune system and exerting cytotoxic effects (Natural Medicines Comprehensive Database, 2004).

Despite well-known toxicity of mistletoe, this herb continually finds its way into alternative remedies (Facts and Comparisons, 2001). Individuals self-medicate with European mistletoe to treat cancer and reduce side effects of chemotherapy and radiation. Oral use can cause vomiting, diarrhea, internal cramps, hepatitis (Harvey & Colin-Jones, 1981; Micromedex Healthcare Series, 2003), hypotension, contraction of the pupil, uncontrollable movement of the eyeball, seizures, coma, and death (Blumenthal et al., 1998; Gruenwald, Brendler, & Jaenicke, 1998; Newall, Anderson, & Philpson, 1996). No typical dose has been reported. Avoid using this poisonous herb.

**Fish oils** have scientific names of *N-3 fatty acid, N-3polyunsaturated fatty acids* and others. Self-medication with fish oils usually is for such conditions as cancer, heart disease, Crohn disease, and lung disease. Individuals who take fish oils have high levels of the omega-3 fatty acids in their erythrocytes. These fatty acids seem to decrease rates of prostate cancer (Terry, Lichtenstein, Feychting, Ahlbom, & Wolk, 2001) and prolong cancer remissions (Ogilvie et al., 2000). Ogilvie et al. also found that fish oils decrease production of lactic acid in tumor cells. Lactic acidosis is a marker of unfavorable metabolism caused by many cancers.

However, if individuals have familial adenomatous polyposis and use fish oil extensively, they put themselves at greater risk of developing cancer (Akedo et al., 1998). Fish oils contain other well-known components such as vitamins A and D and omega-3 fatty acids. Chronic or high use of vitamin A can cause blood cell changes and liver damage; high doses of vitamin D can cause irreversible damage and calcification of soft tissues, such as the liver and kidneys (Health and Welfare Canada, 1990; Montbriand, 1994a; Yetiv, 1988). Although the mechanism is unknown, fish oils are known to reduce body vitamin E levels (Meydani & Dinarello, 1993). Fish oils used concomitantly with anticoagulant or antiplatelet herbs or drugs increase the risk of bleeding (Brinker, 1998; Martindale, 1999; Newall et al., 1996; Sirtori et al., 1998). Vitamin A and D (components of fish oil) will be covered in Part III of this series. Part III focuses on products that protect against cancer. Healthcare professionals may find individuals using fish oils in high doses, but doses of 3 g or less per day generally are well tolerated (Natural Medicines Comprehensive Database, 2004). Higher doses can cause belching, halitosis, and heartburn (Belluzzi et al., 1994; Pheatt, 1998).

**Gamma linolenic acid** (GLA) has a scientific name of *(ZZZ)-Octadeca-6,9,12-trienoic acid*. Self-medication with GLA often is for rheumatoid arthritis, premenstrual syndrome, or enhancement of hormonal breast cancer treatment (tamoxifen). For women with estrogen-sensitive breast cancers, GLA can hasten the response of tamoxifen (Kenny et al., 2000). GLA is found in two herbs: oil of primrose (*Oenothera biennis*) and borage (*Borago officinalis*). According to Facts and Comparisons (2001), evening primrose oil is available in oil-filled capsules and tablets. Stability of the tablets is unknown. Some capsules are adulterated and biologically useless, containing either soy or safflower oil. The FDA named evening primrose oil an unapproved food additive (Tyler, 1994). Some borage contains unsaturated pyrrolizidine alkaloids (UPAs) that are toxic in even minute amounts, according to Tyler (1994). Therefore, only borage products labeled UPA-free are safe. Even when borage is used in therapeutic amounts, UPA can be in toxic levels (Fetrow & Avala, 1999). GLA also may prolong bleeding time (Guivernau, Meza, Barja, & Roman, 1994). Natural Medicines Comprehensive Database (2004) reported use of daily doses of 1.6 g and 360 mg.

**Glossy privet** has a scientific name of *Ligustrum lucidum*. This herb often is used to reduce side effects of chemotherapy and improve immune function. The Chinese use the fruit of glossy privet to clinically treat leukopenia (Leung & Foster, 1996). However, Khoo and Ang (1995) refuted this practice, finding that glossy privet did not induce any effects on leukopenia in a study conducted on Wistar rats. Conversley, Lau, Ruckle, Botolazzo, and Lui (1994) found that glossy privet fruit had potential to inhibit growth of renal cell carcinoma. No adverse reactions are reported for glossy privet, and a common dose is 5-15 g of powdered berries per day (Natural Medicines Comprehensive Database, 2004). Notice the warning about the recall in Table 1.

**Glutamine** has a scientific name of *L-(+)-2-Aminoglutarmic acid*. Self-medication with glutamine often is for reducing side effects of chemotherapy, such as mucositis, diarrhea, and neuropathy. Other self-medication is for the purpose of protecting the immune and gut barrier function in patients with esophageal cancer or those undergoing radiochemotherapy.

Patients with cancer are thought to have reduced glutamine levels (Morlion et al., 1998). Normally, gastrointestinal cells divide rapidly; therefore, when receiving chemotherapy, these cells are very susceptible to cytotoxic effects. Giving glutamine along with chemotherapy and radiation seems to prevent gastrointestinal toxicity by maintaining viability of gastrointestinal tissues (Morlion et al.). However, researchers are suspicious that rapidly growing tumors may take up glutamine and tumor growth may be stimulated. Preliminary research does not confirm this suspicion; early findings have shown a reduction in tumor growth (Bozzetti et al., 1997; Miller, 1999). IV glutamine was well tolerated in clinical studies (Natural Medicines Comprehensive Database, 2004). Various swish-and-swallow regimens have been used to treat adverse symptoms of chemotherapy and radiochemotherapy; see references for regimens (Anderson et al., 1998; Cockerham, Weinberger, & Lerchie, 2000; Noyer et al.,1998; Rubio, Cao, Hutchins, Westbrook, & Klimberg, 1998; Scolapio et al., 1997; Shabert, Winslow, Lacey, & Wilmore, 1999; Yoshida et al., 1998).

**Gossypol**, also known as cottonseed oil, has a scientific name of *Gossyplum hirsutum* or *Gossypium herbaceum.* Used as a male contraceptive, gossypol also is used for metastatic carcinoma of the endometrium or ovary and HIV. Preliminary in vivo and in vitro studies have suggested that glossypol has cytotoxic and antitumor properties on many cytosolic and mitochondrial enzyme systems, the very systems that are fundamental for tumor cell growth, including melanoma, endometrial, colon, lung, prostate, breast, brain, and adrenocortical cancer (Coyle, Levante, Shetler, & Winfield, 1994; Gilbert, O'Reilly, Chang, Lin, & Brueggemeier, 1995; Liang et al., 1995; Shidaifat et al., 1996; Wu, 1989). No typical dose is available for the treatment of cancer. Self-medication with gossypol is considered unsafe because of its potential toxicity (Facts and Comparisons, 2001).

**Gotu kola** has a scientific name of *Centella asiatica*, synonymous with *Hydrocotyle asiatica.* Self-medication with gotu kola often is for improving memory or for urinary tract infection, jaundice, diarrhea, diabetes, and other conditions. In early studies on animal tissue, gotu kola exhibited cytotoxic and antitumor properties. Notably, gotu kola appears to be selective in toxicity, leaving normal lymphocytes unharmed (Babu, Kuttan, & Padikkala, 1995). In addition, Babu et al. found that gotu kola increased the life span of tumor-bearing mice. Gotu kola usually is tolerated well when used in typical doses of 600 mg of dried leaves three times a day (Gruenwald et al., 1998). A side effect is photosensitivity (Newall et al., 1996); therefore, individuals using gotu kola are advised to wear sunscreen and clothing to prevent sunburn.

**Graviola** also is known by its scientific name, *Annona muricata.* Individuals use graviola for cancer and herpes. Graviola also is used as an antibiotic or sedative. The important class of medicinal components found in graviola is acetogenins. Acetogenins are found in the fruit, seeds, leaves, and bark of the graviola plant. Preliminary research by Oberlies, Chang, and McLaughlin (1997) showed that acetogenins block production of adenosine triphosphate, which inhibits the pump that removes cancer drugs from the cell, allowing chemotherapy to be more effective. Furthermore, Oberlies et al.'s research suggests that acetogenins may have chemotherapeutic potential, especially against cancer that are resistant to multiple drugs. Parkinson disease-like movements may result from oral ingestion of graviola (Lannuzel et al., 2002). No typical dose is available.

**Honey** has a scientific name of *Apis mellifera.* Topically, honey is used to hasten healing of skin wounds, ulcerations, and burns. During surgery, cancer cells can be seeded into the margins of incisions, resulting in tumor growth in the surgical wound. Hamzaoglu et al. (2000) implanted cancer cells into neck wounds of 60 BALB/c strain mice, then divided the mice into two groups. A marked decrease in wound cancer tumors were found in the group of mice that had surgical wounds coated with honey pre- and postoperatively. Although this finding may have some application in human surgery, sterile technique is important. Honey is known to have antibacterial and antifungal properties (Efem, 1988; Postmes, van den Bogaard, & Hazen, 1993), yet surgical wounds need to be kept scrupulously clean. All oral, brand-name products found have additional ingredients, making the use of liquid content from oral capsules inappropriate for external use.

**IP-6** has a scientific name of *Inositol hexaphosphate*. Individuals self-medicate with IP-6 to prevent cancer, increase white blood cells, prevent heart attacks, treat kidney stones, and enhance the immune system (Natural Medicines Comprehensive Database, 2004). IP-6 has demonstrated anticancer activities in breast, colon, liver, and prostate cancers, as well as experimental tumors (Challa, Rao, & Reddy, 1997; Saied & Shamsuddin, 1998; Shamsuddin & Vucenik, 1999; Shamsuddin & Yang, 1995; Thompson & Zhang, 1991; Vucenik, Zhang, & Shamsuddin, 1998). No adverse reactions have been noted. A dose of 500 mg-2 g twice daily has been used to prevent cancer and 5-8 g daily to treat existing cancer; however, these are not recommended or typical doses (Natural Medicines Comprehensive Database).

**L-arginine** has a scientific name of *2-amino-5-guanidinopentacoic acid*. Individuals self-prescribe this product as an adjunct to chemotherapy for breast cancer and for a variety of conditions such as the common cold, cachexia (especially patients with AIDS), male infertility, and migraine headaches. L-arginine is an essential amino acid necessary for protein synthesis. Early evidence indicates that it may modify immune system function and potentiate tumor cell response to

anticancer drugs, thereby reducing the immunosuppressive effects of chemotherapy agents (Brittenden et al., 1994). Adverse effects include abdominal pain and bloating (McKevoy, 1998); diarrhea; gout (Brittenden et al.; Rector et al., 1996); decreased platelet count; elevation of blood urea nitrogen, serum creatine, and creatinine (McKevoy); and allergic reactions or airway inflammation (McKevoy; Takano et al., 1998). L-arginine has caused necrosis of veins and superficial phlebitis (McKevoy; Tenebaum, Fisman, & Motro, 1998). Clinical studies have used doses ranging from 2-5 g three times a day (Hambrecht et al., 2000; Rector et al., 1996; Watanabe, Tomiyama, & Doba, 2000).

**Magnesium** is a mineral with a scientific abbreviation of *Mg* and atomic number 12. This mineral is used to prevent or treat hypomagnesemia. Other self-medication use is for constipation, asthma symptoms, heart conditions, premenstrual syndrome, leg cramps, and other conditions. Crosby, Wilcock, and Corcoran (2000) studied the safety, tolerability, and efficacy of IV doses of magnesium sulfate when given to 12 patients with cancer who responded poorly to morphine for their neuropathic pain. A single dose of 500 mg-1 gram seemed to relieve neuropathic pain for a period of at least four hours. This finding may be of use to clinicians. However, oral self-medication with magnesium for pain is not advisable because this mineral is fatal in large doses. Magnesium also interacts with numerous drugs, herbs, supplements, and diseases or conditions, making self-medication with this mineral prohibitive.

**Marijuana** has a scientific name of *Cannabis sativa*. In vitro studies of components of marijuana indicate a potential to inhibit human breast cancer cells and produce tumor eradications (Galve-Roperh et al., 2000). In experiments introducing marijuana to malignant brain tumors, Galve-Roperh et al. also found that survival of animals was increased significantly. Medicinal use of marijuana (inhalation, usually three or four "joints" [cigarettes] per day) for cancer and AIDS is reported to decrease pain, relieve nausea and vomiting induced by chemotherapy, and stimulate appetite; however, no research substantiates the efficacy of these claims. Regular smoking of three to four joints of marijuana per day is reported to cause as much histologic damage as smoking 20-22 tobacco cigarettes per day (Johnson, Smith, Morrison, Laszlo, & White, 2000). The cannabinoid in marijuana considered potentially useful is tetrahydrocannabinol (THC). Delta-9-TCH (chemical name) Marinol® (Sanofi-Synthelabo Canada Inc., Markham, Ontario) and nabilone (a synthetic creation of THC) (Cesamet®, ICN Canada Ltd., Montreal, Quebec) are the prescription products used in treatment of cancer chemotherapy-induced nausea and vomiting; typical dosage is 5-15 mg every 2-4 hours (Micromedex Healthcare Series, 2003).

**Melatonin** has a scientific name of *N-acetyl-5-methoxytryptamine*. Individuals use melatonin for cancer of the breast, brain, lung, prostate, head, neck, and gastrointestinal tract. Melatonin is also used for jet lag, insomnia, nicotine withdrawal, headache, hypertension, and other conditions. Melatonin can decrease the incidence of cytokine-induced hypotension for patients with cancer. Interleukin-2 and tumor necrosis factor are examples of cytokines (Lissoni et al., 1996a). Quick-release melatonin may be beneficial in decreasing potential sleep disorders associated with conditions such as thrombocytopenia induced by chemotherapy or interleukin-2 (Bregani et al., 1995; Micromedex Healthcare Series, 2003; Lissoni et al., 1995, 1996b, 1999). Furthermore, melatonin is beneficial in stabilizing disease for adults with solid tumors who do not respond to treatments or cannot receive treatments (Micromedex Healthcare Series; Lissoni et al., 1991, 1994a). When used concomitantly with interleukin-2, melatonin seems to improve survival for patients with advanced solid tumors of the breast, gastrointestinal tract, kidney, liver, and lung and melanoma (Micromedex Healthcare Series; Lissoni et al., 1994b, 1994c). The same seems to be true when melatonin is used concomitantly with triptorelin pamoate for prostate cancer, radiotherapy for glioblastoma, and interferon for renal cell cancer (Micromedex Healthcare Series).

Adverse effects of melatonin are headaches, transient depression, daytime fatigue and drowsiness, dizziness, abdominal cramps, and irritability (Micromedex Healthcare Series, 2003; Wagner, Wagner, & Hening, 1998). Melatonin also reduces alertness (Dollins et al., 1993, Micromedex Healthcare Series). Commercially available melatonin usually is synthesized in laboratories. Avery, Lenz, and Landis (1998) cautioned against use of animal sources of melatonin because of possible contamination. A clinical study under way in France is investigating sleep properties of Circadin (melatonin), and Neurim Pharmaceutical Labs [Montreal, Canada] is applying for prescription drug approval of Circadin in Canada and Europe (Natural Medicines Comprehensive Database, 2004). Although an optimal safe dose has not been established, 20-50 mg along with radiation or chemotherapy has been used for cancer treatment (Brzezinski, 1997; Micromedex Healthcare Series, 2003).

**Selenium** also is known by its scientific names: selenium, Se, and atomic number 34. Individuals use selenium to treat HIV and AIDS and prevent cancer, heart disease, osteoarthritis, infertility, and gray hair. The actions of enzymes, regulated by selenium (an antioxidant), are hypothesized to protect against cancers (Natural Medicines Comprehensive Database, 2004). Dietary deficiency of selenium has been linked to cancer, and epidemiologic evidence now is showing the benefits to patients with prostate cancer when they use selenium supplements (Aaseth, Haugen, & Forre, 1998; Nelson, Reid, Duffield-Lillico, & Marshall, 2002). Good food sources of selenium are crab, liver, fish, poultry, and wheat. Natural selenium levels are in soil, although they vary throughout the world (Rayman, 2000). Health and Welfare Canada (1990) indicated that North American diets have adequate amounts of this trace metal and that further supplementation is not only unnecessary but also risky because of the potential for toxicity. Adverse effects of selenium include nausea, vomiting, fatigue, hair loss, white horizontal streaks on fingernails, and a metallic taste (Ellenhorn, 1997). A typical dose taken for cancer prevention is 200 mcg per day (Clark et al., 1996; Rayman).

**Squalamine** has a scientific name of *Squalus acanthias*. Healthcare professionals may find patients using squalamine as an antibiotic or a treatment for solid tumors. Squalamine shows promise for possible treatment of pediatric solid tumors (Sills et al., 1998), as well as potential benefit when used concomitantly with chemotherapy (Williams et al., 2001). Originally isolated from shiny dogfish shark liver and stomach tissue, squalamine now is made synthetically. This product is not the same as shark cartilage from hammerhead shark, shiny dogfish shark, and other shark species. Neither adverse reactions nor

typical doses are reported for squalamine (Natural Medicines Comprehensive Database, 2004).

**Theanine** has a scientific name of *5-N-ethylglutamine*. People self-medicate with theanine because they believe it enhances the effect of chemotherapy. Interest in using theanine as an adjuvant with cancer treatment was initiated because theanine increases doxorubicin and adriamycin in tumors that block cancer drug efflux from tumor cells. This is especially important in drug-sensitive and multidrug-resistant tumors (Sadzuka, Sugiyama, Miyagishima, Nozawa, & Hirota, 1996; Sadzuka, Sugiyama, & Sonobe, 2000; Sugiyama, Sadzuka, Tanaka, & Sonobe, 2001; Sugiyama & Sadzuka, 1998). Theanine is a major amino acid found in green tea (Natural Medicines Comprehensive Database, 2004). Green tea also appears in Part III of this series of articles because it has properties that seem to protect humans against cancer. Here, the discussion focuses on theanine (one component of the tea), which appears to have potential in cancer treatment. Side effects and typical doses for theanine are not available.

**Thymus extract** has no scientific name, but this product goes under many names such as thymomodulin, thymosin, thymus complex, thymus-derived polypeptides, and others. Individuals may self-medicate with this product to maintain their white cells while receiving chemotherapy or radiation. Limited human studies suggest that thymus extract may prevent cystitis, conjunctivitis, stomatomucositis, and myelotoxicity for patients with breast cancer who are undergoing chemotherapy (Iaffaioli et al., 1988–89). No adverse effects have been reported, but concerns have been expressed about possible contamination of thymus products derived from sick animals when collecting raw bovine thymus glands in slaughterhouses. Some thymus glands may harbor bovine spongiform encephalopathy (BSE) and mad cow disease (Murray, 1996). Almost all brands for thymus in Table 1 have this warning. According to Murray, a typical daily dose is 750 mg of crude thymus polypeptide fraction.

One brand of thymus extract is a homeopathic product. This means that the thymus extract has been through many dilutions with water or another liquid. Most homeopathic products have little or no active ingredients and, therefore, no pharmacologic effects, drug interactions, or toxic effects.

**Tiratricol** has a scientific name of *3,3',5-triiodothyroaceic acid*. Individuals with thyroid cancer may self-medicate with this product, and some may use it as a thyroid supplement. Two research groups found positive results with supplementary use of tiratricol for differentiated thyroid cancer, effective in minimizing serum thyrotrophin concentration (Jaffiol et al., 1995; Mueller-Gaertner & Schneider, 1988). On the other hand, Mechelany, Schlumberger, Challeton, Comoy, and Parmentier (1991) determined that no justification existed for using tiratricol as a supplement in treatment of patients with thyroid cancer. The former studies performed tests with 127 and 25 patients with differentiated thyroid cancer, respectively, and the latter study did tests on 22 patients. In clinical trials, doses of 10-24 mcg twice daily were used initially. This dose then was titrated to less then 0.1 mU/l (Sherman & Ladenson, 1992). The FDA (2000) indicated that tiratricol is not a dietary or thyroid supplement. Individuals with normal thyroid function should not use tiratricol. The state of Missouri has embargoed tiratricol by distributors, and the FDA (2000) has issued recalls on other tiratricol products. Patients with differentiated thyroid cancer who are interested in tiratricol should discuss the product with an oncologist.

**Transfer factor** is the most common and the only scientific name of this natural product. Individuals use this product for infectious diseases, whether they are immunocompetent or immunocompromised. When prepared and derived from human donors with varicellazoster antibodies, transfer factor seems to protect children who have acute lymphocytic leukemia and no immunity to varicellazoster (Steele, Myers, & Vincent, 1980). Steele et al.'s study was a double-blind trial with 31 patients. Although the use of transfer factor from bovine sources seems to be safe (Fudenberg, 1989), concern exists that bovine-derived transfer factor may contain BSE when it is collected from cows originating from countries where BSE has been reported. However, considering bovine derivatives for treatments seems useless because only human-derived transfer factor was found useful in protecting patients with childhood lymphocytic leukemia. For Steele et al.'s study, a single subcutaneous dose of human-derived transfer factor, specific for varicella, 100 million lymphocyte equivalents per 7 kg of body weight was used.

## Conclusion and Implications

This review paper provides information on 31 herbs and natural products with potential to decrease growth of cancers or be used adjunctly with cancer treatments for patients who already have or have had cancer. Through awareness of herb and natural product properties, healthcare professionals, especially nurses, can play significant clinical roles as resources. Nurses are often liaisons between patients and doctors or pharmacists, especially when patients discretely inquire whether a nurse knows about an herb or natural product. With information from this series, nurses can initiate discussion with healthcare colleagues to determine whether patients may benefit from taking a specific herb or natural product.

First, scientific names of natural products and herbs have been included in this article along with common names. According to Tyler (1996), healthcare professionals and consumers should be encouraged to check products for the correct scientific name and spelling. Some contaminants have been found in consumer products; therefore, careful spelling and inclusion of the scientific name may indicate some degree of manufacturer integrity in including only the ingredients specified.

Typical dosages have been included in this article when possible, allowing healthcare professionals to critically assess amounts taken by patients. These doses are not recommended doses. Keep in mind that herbs (capsules or tablets) are powder or crushed forms of whole plants. The quality and quantity of any medicinal components in an herbal product can vary considerably according to the growing conditions; quality of the soil, seed, bulb, plant, or product; and reputability of the manufacturer. The FDA (2003) has grappled with the issues of labeling supplement products. Although consumers now find amounts of ingredients on product labels, the issue of how much medicinal component contained in an herbal product remains the same. For example, when a product lists an amount of borage, the medicinal element named gamma-linolenic acid is only one chemical in the whole borage plant; therefore, the amount of

gamma linolenic acid is shared with numerous other chemicals in the total weight or volume given for borage on the label. On the other hand, if an amount of gamma-linolenic acid is given, the amount can be considered a specific amount of gamma-linolenic acid in the product. All prescriptions and some herbal or natural products have drug identification numbers (DINs), guaranteeing that the specified medicinal components will be present. For example, Tanacet 125® (Ashbury Biologicals/Herbal Laboratories, Toronto, Ontario, Canada) contains the medicinal part (tanacet) of the herb feverfew (scientific name *Tanacetum partheniu*) that has been used for headaches. Tanacet 125 has a DIN, meaning it is quality-controlled and the product will contain an exact amount of tanacet. If a consumer buys the herb feverfew, the amount of tanacet in the crushed plant is not known. Healthcare professionals should encourage consumers to examine all health products to determine if a DIN is provided, if the scientific name is given and spelled correctly, and if the manufacturer gives an address and expiration date.

Second, all herbs and natural products mentioned in this article interact positively with cancer or cancer treatments. Some also can interact with other herbs or prescriptions such as anticoagulants. The latter interactions, negative or positive, must be passed on to patients and other healthcare professionals.

Third, some of the herbs and natural products mentioned in this article have no adverse effects, such as coriolus mushroom, whereas others in high doses are considered unsafe, such as cesiun, or toxic, such as European mistletoe. Still others, such as thymus extract and transfer factor, may be contaminated by BSE. Most patients would appreciate having information of this type, allowing them to make decisions about decreasing or discontinuing their doses. Table 2 provides an alert to readers about risks in using herbs and natural products in this article.

Fourth, some patients experiment with identifying and using herbs found in the wild. This can be dangerous. For example, mistaken identification of mushrooms can lead to lethal outcomes because many mushrooms are poisonous yet appear similar to benign species. Herbs also are difficult to identify. For example, wild parsley is very similar in appearance to water hemlock. The former is benign, but the latter is extremely poisonous. Consumers also make their own concoctions from scavenged herbs without realizing the potential dangers. Plants are a conglomeration of many chemicals, some medicinal, others poisonous. For example, Native Americans have used the inner bark of elderberry as a medicinal tea; however, the stems and berries of the same plant contain cyanide (Facts and Comparisons, 2001). Encourage patients to disclose their innovative experiments. Mention these potential dangers to patients.

Many consumers choose to take natural preparations, regardless of the source of information. Even though healthcare professionals may indicate that information about a certain product is from evidence-based studies, consumers may say their lay information also is from reliable studies. The alternative system often indicates that their herbs and healthcare products are endorsed by "cutting edge research"; however, the research is not in published or refereed medical, pharmacy, or nursing journals. Professionals should not feel disheartened if patients seem to pay little or no attention to their well-meaning efforts. When information is given in a nonbiased manner by sincere professionals, patients tend to respect their opinions. If they initially disregard that information, later pondering often initiates second thoughts about their self-medication efforts. The author's experience has been that consumers and patients appreciate information from healthcare professionals. They also want professionals to treat them as partners in health care. Patients with cancer have made special efforts to tell the author how they appreciate information, no matter how technical, because they often wonder whether professionals are keeping information from them. Providing patients with technical information demonstrates that they are not receiving just a vernacular version. Patients and consumers want opportunities for informed choices. Healthcare professionals can be the informed resources.

*The author acknowledges with thanks the continuing support of Carl D'Arcy, MD, director of applied research/psychiatry at the University of Saskatchewan in Canada.*

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