1. INTRODUCTION

Integrative oncology combines the discipline of modern science with the wisdom of traditional healing. It is an evolving evidence-based specialty that uses complementary therapies in concert with medical treatment to enhance efficacy, improve symptom control, alleviate patient distress, and reduce suffering. Many of these therapies are used to improve coping and to help patients adhere to their medical treatment program.

Integrative oncology focuses on the roles of massage and other touch therapies, acupuncture, music therapy, botanicals, meditation and other mind–body approaches, nutrition, fitness therapies, and more. Its goal is to increase the efficacy of conventional cancer treatment programs, to reduce symptoms, and to improve quality of life for cancer patients.

The therapies employed are wide-ranging. For example, botanicals from ancient Chinese medicine are being evaluated for their pharmacologic activity in enhancing the anticancer effects of chemotherapy and radiotherapy and in improving symptom control. Meditation and exercise techniques from Ayurvedic medicine are being shown in scientific studies to improve mental state and to control some adverse side effects during cancer treatment.

When used wisely in a regulated cancer care program, integrative therapies can transform the physical, emotional, and spiritual dimensions of patients’ lives and contribute to their rehabilitation following cancer treatment.

Integrative oncology is part of a wider definition of integrative health care. Integrative health care seeks—through a partnership of patient and practitioner—to treat the whole person, to assist the innate healing properties of the individual, and both to promote health and wellness and to prevent disease. It is an interdisciplinary blending of conventional medicine with complementary health care that should provide a seamless continuum of decision-making and patient-centred care. It should employ a collaborative team approach guided by consensus-building, during which the various practitioners and the patient contribute their particular knowledge and skills.

It avoids medical paternalism, but encourages evidence-based advice that is consistent with the patient’s values. It aims to provide a more effective and cost-efficient care plan by synergistically combining therapies and services in a manner that exceeds the collective effort of the individual practices 1,2.

1.1 Complementary or Alternative?

The term “complementary therapy” (or “complementary medicine”) is to be distinguished from “alternative medicine.” Historically, the two are bundled together under the term “complementary and alternative therapies” (CAM). Alternative therapies are typically promoted as viable treatment options: “alternatives” to so-called mainstream therapies such as chemotherapy, radiation, and surgery. Alternative therapies are unproved, rarely based on credible scientific rationale, and potentially harmful—especially when patients are led away from effective, proven therapies by the lure of false promises and an emphasis on a lack of adverse side effects as compared with conventional therapies (see Table 1) 3–6.

There is no alternative to scientifically evaluated, evidence-based medicine. Most patients who use unconventional therapies (all but 2%) do so to complement rather than to replace mainstream treatment 7. However, because of desperation or fear, or because of inadequate support and communication, patients may seek alternative therapies. Integrative oncology provides an opportunity to evaluate techniques that fall outside the conventional medical domains of surgery, pharmaceuticals, radiotherapy, and conventional psychological support. If proven effective and capable of adding value, then these additional techniques should be incorporated into comprehensive cancer management programs.

1.2 Making the Choice for Integrative

The Society for Integrative Oncology (SIO) was founded in 2003, and its inaugural annual conference was held in New York City in December 2004. The conference was sponsored by multiple cancer
### Table 1: Alternative therapies promoted for cancer treatment that have been researched and shown to be ineffective or to lack credible evidence

| Dietary “cures”                                                                 |
|--------------------------------------------------------------------------------|
| These “cures” falsely extend mainstream evidence of risk reduction for cancer initiation and promotion to actual treatment of cancer after it has developed. Many of the diets can cause dietary insufficiencies. Some diets involve the addition of so-called detoxification techniques (such as coffee enemas) that aim to remove unspecified “toxins” from the body. |
| - No-dairy diet                                                                   |
| - Macrobiotic diet (vegetarian diet plus minimum fish)                              |
| - Gerson diet (low salt, high potassium, massive intake of juiced fruit and vegetables, coffee enemas, injectable crude liver extract) |
| Treatment is based on the belief that cancer is a symptom of the accumulation of toxins. Research that purportedly showed a survival benefit of the Gerson regimen was flawed by nonrandomised comparisons and subgroup analysis. A more recent case series of 11 patients that included pancreatic enzymes (Gonzalez regimen) reported encouraging findings and is the basis of a randomised controlled trial. |

| Biologic treatments                                                               |
|--------------------------------------------------------------------------------|
| These invasive treatments are based on biologic extracts, often associated with fantastic claims that have not been confirmed by appropriate scientific clinical trials. (If they had been confirmed, they would already have been incorporated into the mainstream medical system.) Promoters usually provide the treatments through expensive clinics that are often offshore or in Tijuana, Mexico, where they are exempt from U.S. and Canadian regulations. |
| - Antineoplastons (Burzynski Clinic, Houston, Texas)                               |
| The active agent in this treatment was originally derived from blood and urine and is now thought to be phenylacetate. Research efforts by the Office of Alternative Medicine of the National Institutes of Health (NIH) and by the National Cancer Institute (NCI) have failed to demonstrate tumour regression. Further research by the Burzynski Institute was permitted under an investigational new drug permit. The initial report from a single-arm study of 12 patients showed a 50% response rate, but that finding has not been confirmed by a randomised controlled trial. |
| - Immunoaugmentation therapy (Burton Clinic, Bahamas)                              |
| This therapy involves subcutaneous injections of sera derived from the blood of healthy donors. Documentation of efficacy is anecdotal. |
| - Shark cartilage (William Lane)                                                    |
| Advocates of shark cartilage base their therapeutic claims on the misconception that sharks don’t get cancer and on the putative antiangiogenic properties of the cartilage. A phase I/II trial found no clinical benefit. A nonrandomised trial of cartilage extract (Neovastat: Æterna Zenatis, Québec, QC, Canada) for renal cell cancer showed a survival benefit. Two large NIH-sponsored phase III trials continue to evaluate the clinical benefits of cartilage extracts. |
| - 714-X (Cerbe, Rock Forest, Canada)                                               |
| This product is an aqueous solution that consists of camphor, salts, and alcohol. It is applied by injection into the lymphatics (often in the inguinal region). The treatment is based on a theory that emphasises the importance of “somatids” (particles claimed to be essential to life that can be seen only with the researcher’s special microscope). Evidence for any clinical efficacy is anecdotal and based on testimonials. |
| - Cancell                                                                          |
| This mixture of chemicals, including nitric acid and potassium hydroxide, claims to return cancer cells to a primitive state from which they are digested and rendered inert. |
| - Oxygen therapies                                                                 |
| In these therapies, the tumour or the entire body is infused with oxygen, thereby allegedly killing or returning cancer cells to normal. Variations include intravenous hydrogen peroxide, hyperbaric oxygen, and ozone. Theories emphasise that cancer cells thrive in a low-oxygen environment, and it is true that hypoxia can result in gene mutations that can increase metastasis. However, no randomised trials have been conducted to support these therapies. |
| - Electrotherapies                                                                 |
| Various devices are alleged to produce an electric charge that resonates with and destroys cancer cells. Magnetic or bioresonance therapies, radio-wave treatment, and Rife machines work on similar principles, sending waves of energy to resonate with cancer-cell frequencies and thus destroy tumour. |
| - Hulda Clark’s Cure for All Cancers                                               |
| On the belief that cancers are caused by parasites, toxins, and pollutants, this program of treatment aims to destroy intestinal flukes. |
| - Insulin potentiation                                                              |

| Botanical treatments                                                               |
|--------------------------------------------------------------------------------|
| This substance is a mixture of four herbs (burdock, turkey rhubarb, sorrel, slippery elm) given by a Native American healer to nurse Renee Caisse (Essiac being her name spelled backward). Despite a lack of research confirming the mixture’s value, it is promoted for all forms of cancer. |
| - Essiac (Flor-essence)                                                            |
| This mixture contains a variety of herbs (burdock, turkey rhubarb, sorrel, slippery elm) given by a Native American healer to nurse Renee Caisse (Essiac being her name spelled backward). Despite a lack of research confirming the mixture’s value, it is promoted for all forms of cancer. |
| - Laetrile (amygdalin)                                                              |
| This substance is derived from the pits of apricots. It contains cyanide, which was thought to exert antitumoural effects. It shows little anticancer activity in animals and none in human trials. A phase II study showed some toxicity, but no benefit. |

*continued*
The SIO’s mission is to educate oncology professionals, patients, caregivers, and relevant others about state-of-the-art integrative therapies, including scientific validity, clinical benefits, toxicities, and limitations. The forum that SIO provides encourages symptom control using therapies found to be beneficial. More information can be found at SIO’s Web site (www.integrativeonc.org/).

2. USE OF CAM BY CANCER PATIENTS IN NORTH AMERICA

Data on the use of CAM by patients vary according to the definition of CAM therapies.8–15. We believe that...
spirituality or prayer should not be defined as CAM. Some of the population data on CAM is inflated by including prayer.

Some studies concluded that the use of CAM is associated with depression \(16,17\); in general, however, use of CAM by cancer patients is not associated with perceived distress or poor compliance with medical treatment but with active coping behaviour \(18,19\). Nevertheless, some patients suffering psychological distress may turn to CAM in desperation \(12\).

Patients seem to consider CAM to be supplementary to standard medical methods; they see it as one way to avoid passivity and to cope with feelings of hopelessness. According to one major study, 83.3% of the population have used CAM at some time in their life \(20–22\). Use was greatest for spiritual practices (80.5%), vitamins and herbs (62.6%), and movement and physical therapies (59.2%). After excluding spiritual practices and psychotherapy, 68.7% of the population had used CAM.

A systematic review of relevant published data located 26 surveys of cancer patients from 13 countries \(14\). In the United States, the prevalence of CAM use ranged from 7% to 50%. Another systematic review found that 33% of the population in the United States had used CAM in the preceding 12 months \(23\). Recent studies in women with breast cancer and men with prostate cancer revealed use of some form of CAM in up to 53% and 25% of those two populations respectively \(24–27\). Some studies show that herbal remedies were combined with prescription medicine in 16% of the population \(13,22,28\). Overall, up to 77% of patients use CAM, including high-dose vitamins in up to 63%. Up to 72% do not inform their physician about their use of CAM \(29–31\). A study in Canada determined that 66.7% of breast cancer survivors used CAM (vitamins and minerals, green tea, herbal medicines, and dietary supplements) \(32\). Alternative practitioners (traditional Chinese medicine and acupuncture, naturopathy, chiropractic, herbal) were visited by 39.4%. Only 50% informed their physicians. In view of the published statistic that more than 100,000 deaths annually in North America are attributable to drug interactions, the potential for concealed toxicity gives cause for concern \(33\).

Given the number of patients using CAM, and especially the number combining vitamins and herbs with conventional therapies, the oncology community must improve communication, offer reliable information and education, and initiate research to determine efficacy and potential adverse effects. No longer can patients be left to the perils of dubious Web sites and publications sponsored by certain irresponsible commercial enterprises that promote and sell the products they report, often using irrelevant testimonials \(34\). After a critical mass of evidence-based data is accumulated, practice guidelines for CAM and cancer need to be developed. That task is one of the responsibilities of integrative oncology.

3. COMPLEMENTARY THERAPIES FOR SUPPORTIVE CARE

3.1 Natural Health Products (Botanicals, Vitamins, and Minerals)

The role of botanicals in enhancing the effectiveness of conventional cancer therapies and reducing adverse effects remains to be defined. However, with new regulations to establish quality and proof of efficacy, the phytochemical constituents of botanicals may have an expanding role to play in cancer treatment \(35\).

In Canada, the federal government now regulates all botanical medicines. This step was taken to ensure that all Canadians have ready access to natural health products (NHPs) that are safe, effective, and of high quality, and that freedom of choice and philosophical and cultural diversity are simultaneously respected. The regulations for NHPs have recently undergone extensive modification, and the new regulations took effect in January 2004 under the authority of the Natural Health Products Directorate of Health Canada.

Under the new regulations, all NHPs sold in Canada require product licences. The regulations set out the requirements for submitting an application for a product license, including quantity of the medical ingredients, purpose for which the NHP is intended, and safety and efficacy data that support the intended purpose. A “standards of evidence” framework is being developed to ensure that the product claims are supported by appropriate evidence that can be both scientific and traditional, depending on the type of claim being made.

Many patients entering a cancer treatment program are already self-administering herbal remedies for a variety of ailments (Table II) \(36,37\). Oncologists need to be aware of the potentially serious toxic effects of some herbal remedies (Table III) \(5\).

Historically, herbal remedies have not been formally evaluated for safety, and few have been tested for side effects, quality control, or efficacy \(38,39\). Some herbal remedies are contaminated with heavy metals that can cause serious long-term toxicity. Ayurvedic medicinal products may deliberately contain high levels of heavy metals such as lead, mercury, and arsenic \(40\).

Many botanicals interact with the hepatic cytochrome P450 (Cyp) metabolic pathways involved in drug metabolism \(37\). The levels of some drugs, including chemotherapy agents, will be increased by botanicals that inhibit Cyp. Herbal inhibitors of Cyp include proanthocyanidin (grape seed extract), ginseng, quercetin, valerian, grapefruit, goldenseal, echinacea, red clover, cat’s claw, chamomile, liquorice, rosemary, and some Chinese herbs \(41\). Conversely, Cyp inducers such as hypericin (St. John’s wort) and kava kava will reduce the activity of drugs such as indinavir, oral contraceptives, digoxin, cyclosporin, and coumadin.

A variety of natural health products require caution if taken near the time of surgery. The risk of bleeding can be increased by vitamin E, feverfew, garlic,
ginger, saw palmetto, destagnation Chinese herbs, dong quai, and ginkgo used at high doses or in combination. Ginseng can potentiate insulin and precipitate hypoglycaemia. Valerian and kava may potentiate anaesthetic and sedative drugs, and liquorice may result in hypokalaemia and cardiac arrhythmias during anaesthesia. St. John’s wort and ginseng are monoamine oxidase inhibitors (MAOIs) and may increase the toxicity of serotonin and catecholamine reuptake inhibitors such as phenelzine and various antidepressants.

The activity of chemotherapy may be reduced by free-radical scavenging (ginkgo, grape seed extract), Cyp induction (echinacea, St. John’s wort, kava, grape seed extract), and anti-oestrogen inhibition (soy, ginseng). On the other hand, chemotherapy toxicity may be enhanced by Cyp inhibition (ginseng, ginkgo, valerian). In general, no significant interactions with chemotherapy are expected with saw palmetto, black cohosh, cranberry, silymarin (milk thistle), evening primrose, or bilberry.

Antioxidants such as alpha-lipoic acid, vitamin E, ginkgo, or grape seed extract could reduce the efficacy of radiotherapy by scavenging free radicals. However, the interaction is a complex one. For example, ginkgo can also increase perfusion and oxygenation, thereby increasing radiosensitivity. On the other hand, the results of a recent randomised trial confirmed that vitamin E might reduce tumour control 43.

In general, long-term administration of vitamin E and beta-carotene do not seem to prevent cancers; in fact, they may be associated with an increased risk of death 44,45. Selenium shows more promise for cancer prevention.

Reduction of radiation toxicity by antioxidants and vitamins is emerging as a more promising area for research—for example, vitamin E to counteract radiation fibrosis 46 and vitamin A to counteract chronic radiation proctopathy 47. Some classes of botanicals, such as Chinese destagnation herbs, may have beneficial radiosensitising activity through a multitude of physiologic pathways that include anti-angiogenesis and anticoagulant activity 48. A randomised trial of radiotherapy plus or minus destagnation herbs for nasopharyngeal cancer demonstrated a doubling of tumour control and survival for the interventional arm 49. However, more research needs to be done on quality assurance and therapeutic gain.

Some botanicals are promising for cancer treatment: for example, PC-SPES for prostate cancer 50–53. Other emerging candidates for clinical trials include turmeric (curcumin) 54,55, maitake mushroom 56,57, and *Ganoderma lucidum* 58,59. Botanicals are often found to inhibit cancer cells by multiple pathways such as apoptosis induction, adhesion prevention, invasion reduction, and antagonism of the Cox-2 enzyme (Table IV) 60.

The herbal complex PC-SPES also illustrates the importance of quality assurance and supply from a reputable manufacturer. Originally distributed by Botanic Labs, PC-SPES consists of eight herbs, all but

| TABLE II | Top 15 self-administered botanicals 36 |
|-----------|----------------------------------|
| Rank | Name | Indication |
| 1 | Garlic | Hypercholesterolaemia |
| 2 | Ginkgo | Dementia, intermittent claudication |
| 3 | Echinacea | Prevention of common cold |
| 4 | Soy | Menopausal symptoms |
| 5 | Saw palmetto | Benign prostate hyperplasia |
| 6 | Ginseng | Physical and mental fatigue |
| 7 | St. John’s wort | Mild depression |
| 8 | Black cohosh | Menopausal symptoms |
| 9 | Cranberry | Urinary tract infection |
| 10 | Valerian | Insomnia, stress |
| 11 | Milk thistle | Alcoholic cirrhosis, hepatitis |
| 12 | Evening primrose | Premenstrual syndrome |
| 13 | Kava | Anxiety |
| 14 | Bilberry | Diabetic retinopathy |
| 15 | Grape seed | Allergic rhinitis, cardio-cancer prevention |

TABLE III | Herbal products with serious toxic effects 5 |
| Product | Expected effect | Toxic effect |
|-----------|----------------|-------------|
| Chaparral tea | Promoted as cancer treatment | Liver failure |
| Chaste tree berry | Premenstrual syndrome | Pro-dopamine activity; may potentiate antihypertensives and lithium; may potentiate diuretics and increase the risk of hypokalaemia; can interfere with and reduce the effectiveness of oral contraceptives and sex hormones |
| Coltsfoot | Expectorant | Liver failure |
| Comfrey | Digestive/lung problems; trauma and bruises | Liver thrombosis and failure |
| Jin bu huan | Sedative/analgesic | Bradycardia; hepatitis |
| Kava kava | Sedative/hypnotic | Hepatotoxicity; liver failure |
| Senna, cascara, aloe | Laxative | Hypokalaemia; arrhythmias with digitalis |
| Liquorice | Peptic ulcers/expectorant | Hypokalaemia; arrhythmias with digitalis |
| Lobelia | Antiemetic | Tachyrhythmias |
| Ma huang or ephedra | Weight loss/stimulant | Hypertension; myocardial infarction; cerebrovascular event |
| Yohimbe | Male performance enhancer | Seizures; kidney failure; death |
two from traditional Chinese medicine: *Serenoa repens* (saw palmetto), *Panax pseudoginseng* (ginseng), *Chrysanthemum morifolium* (chrysanthemum), *Ganoderma lucidum* (reishi mushroom), *Glycyrrhiza glabra* (liquorice), *Isatis indigotica* (dyer’s woad), *Rabdosia rubescens* (rubescens), and *Scutellaria baicalensis* (skullcap). Ingredients were chosen to produce multifactorial activity.

*Serenoa repens* can reduce the symptoms of benign prostatic hypertrophy. A systematic review of 18 randomised trials involving more than 2000 patients concluded that saw palmetto improves urologic symptoms and urine flow as effectively as finasteride, but with less toxicity. In *vitro* studies suggest moderate antiproliferative activity against prostate cancer cell lines. *Scutellaria* contains baicalin, a compound with known antiproliferative activity. *Ganoderma lucidum* has multiple activities that include inhibiting cell adhesion, cell migration, and cell invasion *in vitro*, and stimulation of immunity *in vivo*. Liquorice contains oestrogenic compounds that can inhibit prostate cancer.

Laboratory research supports the activity of PC-SPES against prostate cancer. Antiproliferative and pro-apoptotic effects have been demonstrated on tumour cell lines *in vitro*. In rat models, PC-SPES reduced the incidence of spontaneous tumours and the weight of implanted tumours. It also demonstrated oestrogenic activity. Phase II studies showed that prostate-specific antigen (PSA) decreased in most patients evaluated, including those with androgen-independent cancer. Significant improvements in pain and quality of life have also been reported. A phase II trial in 70 patients with prostate cancer showed a more than an 80% decline in PSA in all androgen-dependent patients, with PSA becoming undetectable in 82% of patients. At a median follow-up of 64 weeks, none of the patients had progressed. In addition, more than half of the patients with androgen-independent disease had a PSA response of more than 50%, with a median duration of 18 weeks.

Some endocrine side effects were associated with PC-SPES, including decreased libido, erectile dysfunction, gynecomastia, hot flushes, and increased thrombotic events. An NCI phase II study was planned to determine whether PC-SPES caused an increase in survival, but that study was terminated when quality assurance procedures showed that the clinical preparation, which was manufactured in China, contained diethylstilbestrol, coumadin, indomethacin, and alprazolam. Those findings prompted the U.S. Food and Drug Administration to issue a recall of PC-SPES in 2002. The manufacturers of PC-SPES, Botanic Labs, ceased operations and will no longer manufacture or market the compound. There are currently no other known North American sources of this combination botanical product.

Chinese herbs have many potential roles in the support of cancer patients. Various components in a botanical may have synergistic activities. Clinical studies from China are not usually methodologically sound, and quality control poses significant challenges, however, they indicate that specific herbs can increase immunity, reduce fatigue, improve mental alertness, and increase appetite.

### Table IV Natural health products that inhibit Cox-2 activity

| Product                  |
|--------------------------|
| Ginger                   |
| Aloe vera                |
| Epigallocatechin gallate |
| Resveratrol (red wine)   |
| Glycyrrhiza glabra       |
| Garlic                   |
| Scutellaria baicalensis  |
| Bilberry                 |
| Proanthocyanidins        |
| Panax ginseng            |
| Milk thistle             |
| Omega-3 fatty acids      |
| Green-lipped mussel      |
| Antioxidants             |
| Boswella serrata         |
| Bromelain (pineapple)    |
| Curcumin (turmeric)      |
| Quercetin (ubiquitous plant bioflavonoid) |
**3.2 Acupuncture**

Acupuncture is the stimulation of specific points on the skin using needle, pressure, electrical, or laser sources. The points are specified by traditional Chinese medicine and lie along lines called “meridians” that are alleged to transfer energy (qi). Although qi has not been defined scientifically, stimulation of acupuncture points has been found to induce neurologic reflexes that correspond with release of neuropeptides and other neurotransmitters, with modulation of cerebral blood flow, and with balancing of the autonomic nervous system.

Clinical trials are proving that acupuncture can improve some of the more common side effects of cancer and its treatment, such as nausea and vomiting, anxiety, pain, fatigue, depression, xerostomia, and hot flushes. The efficacy of acupuncture for anesthetic- and chemotherapy-induced nausea and vomiting has been proven by a series of randomised controlled trials, systematically reviewed by Vickers before 1996, and further reviewed from 1997 onward here in Tables V and VI. A Cochrane database systematic review concluded that stimulation of the Pericardium 6 acupoint is effective for postoperative nausea but not for vomiting. In 1997, the NIH issued a consensus statement supporting the efficacy of acupuncture for adult postoperative and chemotherapy-associated nausea and vomiting.

Some patients still suffer chemotherapy-related nausea and vomiting despite modern pharmacological interventions. Although some negative studies exist (possibly related to poor technique or inappropriate patient selection), acupuncture is a viable adjunct to drugs for controlling postoperative or chemotherapy- and radiotherapy-induced nausea or vomiting. It can be conveniently administered using devices such as the Codetron (EHM Rehabilitation Technologies, Toronto, ON, Canada) or ReliefBand (Abbott Laboratories, Abbott Park, IL, U.S.A.) to deliver transcutaneous electrical stimulation at specific acupoints. However, a more recent study did not support the hypothesis that acustimulation bands are efficacious as an adjunct to pharmacologic antiemetics for control of chemotherapy-related nausea in female breast cancer patients.

Acupuncture may also be used to reduce anxiety prior to procedures. Randomised controlled trials have confirmed that acupuncture is effective for some types of cancer-related pain. A phase II study of acupuncture in patients suffering post-chemotherapy fatigue at Memorial Sloan–Kettering Cancer Center (MSKCC) in New York showed a clinically important degree of improvement. Acupuncture may also alleviate depression. Three phase II studies have indicated a partial reversal of xerostomia or dry mouth secondary to radiotherapy. Studies of acupuncture for hot flushes secondary to hormonal therapies and menopause are promising. Phase II trials of acupuncture for fatigue and hot flushes are in progress at MSKCC and for xerostomia at the Juravinski Cancer Centre (Hamilton, ON, Canada). Further indications for acupuncture and Chinese medicine for cancer patients are reviewed elsewhere.

**3.3 Mind–Body Therapies**

The psychosomatic connection between distress and physical illness and the effects of physical illness on mental suffering are increasingly being recognised. However, the proposal that mental distress may cause cancer or its relapse is not proven. Currently, no level of evidence that psychological interventions can increase survival (apart from indirect effects such as increased adherence to conventional therapies) has been found. Mind–body therapies certainly can help with coping and with reduction of symptoms, smoothing the patient’s path through conventional therapies, reducing pain, and increasing quality of life. Mind–body interventions aim to utilise the reciprocal relationship between body and mind to help patients relax, reduce stress, and relieve symptoms associated with cancer and cancer treatments.

Several randomised trials have shown effects of hypnosis on pain, anxiety, depression, and mood in newly diagnosed cancer patients. On the other hand, a recent randomised trial of hypnosis on non-selected patients undergoing radiotherapy showed no influence on anxiety or quality of life. Selection of appropriate patients seems to be necessary.

Trials have generally found hypnosis and relaxation training to be beneficial against chemotherapy-induced nausea, although some studies showed no differences. Mindfulness meditation improves...
mood and reduces stress during cancer treatment. Tibetan yoga improves sleep. Chanting the rosary prayers or yoga mantras may induce relaxation. Expressive art therapy may improve coping skills.

Professional musicians who are also music therapists are trained to deal with both the psychosocial and clinical issues faced by patients and family members. Music therapy is particularly effective in the palliative care setting, with randomised trials indicating benefit for reducing anxiety, depression, and pain. Immunity may also be increased. A randomised controlled trial at MSKCC concluded that music therapy is a non-invasive and inexpensive intervention that appears to reduce mood disturbance in patients undergoing high-dose therapy with autologous stem cell transplantation. Several randomised trials suggest that massage reduces anxiety. In a high-quality trial, massage was found to be superior to the control treatment in reducing anxiety, nausea, and fatigue, and in improving general well-being. Immunity may also be increased.

A randomised controlled trial at MSKCC concluded that music therapy is a non-invasive and inexpensive intervention that appears to reduce mood disturbance in patients undergoing high-dose therapy with autologous stem cell transplantation. Several randomised trials suggest that massage reduces anxiety. In a high-quality trial, massage was found to be superior to the control treatment in reducing anxiety, nausea, and fatigue, and in improving general well-being. Immunity may also be increased.

### 3.4 “Energy” Therapies

We mention energy therapies here because of their increasing popularity in some health care institutions. The practitioners’ theory is that they manipulate an energy field around the patient. This energy field has never been detected by objective scientific methodology.

The effectiveness of the so-called energy therapies is controversial. Studies are complicated by various confounding factors, so that the underlying process by which the therapist entrains the patient into a relaxed state is unclear. Nevertheless, there are published reports of therapies such as therapeutic touch (which, unlike massage, does not use actual touch), Reiki, and polarity therapy influencing the autonomic nervous system, affecting biologic markers and inducing relaxation, reducing anxiety, pain, and fatigue were significantly reduced.

In the United Kingdom, aromatherapy is often used for relaxation and coping with medical procedures. The smell of lavender seems to reduce anxiety through the olfactory nerves.

### TABLE V Evidence for acupuncture in the treatment and prevention of postoperative nausea and vomiting, 1997 – 2005

| Study                      | Acupuncture technique     | Patients (n) | Comparator                  | Outcome |
|----------------------------|----------------------------|--------------|-----------------------------|---------|
| Al-Sadi et al. 1997        | Needle                     | 81           | Sham                        | Pos     |
| Schlager et al. 1998       | Laser                      | 40           | Sham                        | Pos     |
| Sonri et al. 2001          | Needle                     | 90           | Ondansetron                 | Equivalent |
| Kotani et al. 2001         | Needle                     | 175          | Sham                        | Pos     |
| Wang and Kain 2002         | Needle                     | 187          | Droperidol                  | Equivalent |
| White et al. 2002          | ReliefBand (transcutaneous electrastimulation) | 120         | Ondansetron                 | Equivalent |
| Alkaissi et al. 2002       | Acupressure                | 410          | Sham                        | Pos     |
| Kim et al. 2003            | Auricular                  | 100          | Sham                        | Pos     |
| Streitberger et al. 2004   | Needle                     | 220          | Sham                        | Pos     |
| Butkovic et al. 2005       | Laser                      | 120          | Metoclopramide              | Equivalent |

### TABLE VI Evidence for acupuncture in the treatment and prevention of chemotherapy-induced nausea and vomiting, 1997 – 2005

| Study                      | Acupuncture technique     | Patients (n) | Comparator                  | Outcome |
|----------------------------|----------------------------|--------------|-----------------------------|---------|
| Shen et al. 2000           | Needle (electrostimulation) | 104          | Placebo (all subjects received ondansetron) | Pos     |
| Josefson and Kreuter 2003  | Needle (auricular)         | 39           | All subjects received ondansetron | Pos     |
| Treish et al. 2003         | ReliefBand (transcutaneous electrastimulation) | 49         | Placebo (all subjects received ondansetron) | Pos     |
| Streitberger et al. 2003   | Needle                     | 80           | Placebo (all subjects received ondansetron) | Neg     |
| Roscoe et al. 2005         | Acupressure band           | 96           | Sham                        | Neg     |
|                            |                            |              | Reference                   | Neg     |
pain\(^{189}\), and having a positive influence on cancer-related fatigue and health-related quality of life\(^{190}\). The quality of these outcome studies is generally poor, and they lack scientific validity. Confounding variables include awareness of the practitioner, the patient’s belief system, actual touching (which occurs in Reiki and polarity therapy), and subtle environmental influences such as background music.

### 4. AN ACADEMIC FUTURE FOR INTEGRATIVE ONCOLOGY

Not all mainstream physicians are pleased with CAM, with current efforts to integrate CAM with mainstream medicine, or with a separate NIH research entity for “alternative” medicine\(^{191–194}\). Alternative medicine is a quintessential example of the sociopolitical force behind medical change. However, as this brief review demonstrates, evidence is increasing that some complementary therapies help cancer patients cope and also reduce adverse effects of conventional therapies. Appropriate scientific methodology is “sorting the wheat from the chaff” and preventing the proverbial “throwing out the baby with the bathwater.” Further challenges include developing practice guidelines, performing economic evaluations, and determining whether an integrative oncology program provides added value to a comprehensive cancer centre. It is essential that programs incorporate evaluation practices such as audit and randomised controlled trials.

A consortium of academic health centres for integrative medicine aims to transform medicine and health care through scientific studies, new models of clinical care, and innovative education programs that integrate biomedicine, the complexity of human beings, the intrinsic nature of healing, and the rich diversity of therapeutic systems\(^{195}\). Many North American medical schools now have introductory courses on CAM, and universities are providing postgraduate education. In the United States, Congress initiated the National Center for Complementary and Alternative Medicine with a mandate to fund research programs. The NCI has an Office of Cancer Complementary and Alternative Medicine that provides added access to CAM. Service and some funding for research. Mainstream medical journals are increasingly publishing high-quality studies of CAM therapies. Scholarly journals such as Focus on Alternative and Complementary Medicine provide critical reviews of published studies on CAM. The Society for Integrative Oncology will be publishing its own peer-reviewed journal that will focus on high-quality research and reviews. On its own Web site, MSKCC provides guidelines for integrative oncology, including a resource for herbs and botanicals. In addition, the M.D. Anderson Cancer Center and the British Columbia Cancer Centre also provide Internet resources. Table VII lists the Internet addresses of these credible Web sites. Further database information on useful complementary therapies used in integrative oncology may be found in the book PDQ Integrative Oncology\(^{196}\).

### 5. IMPLICATIONS FOR ONCOLOGISTS

Many cancer patients are using CAM therapies\(^{8–16}\). Patients appear increasingly willing to discuss the use of these remedies, especially when asked by their oncologists. To encourage open communication about CAM use by their patients, oncologists should be knowledgeable about the most commonly used remedies, or at least be able to direct patients to reliable sources of information and to help them avoid bogus sources\(^{34}\). In a receptive, evidence-based atmosphere, patients should be advised to avoid questionable alternatives. Many unproved alternatives are promoted in very appealing and convincing fashions. Brushing the topic aside categorically without open discussion may not dissuade use by the patient.

On the other hand, complementary therapies that help manage pain, nausea, fatigue, anxiety, and other symptoms should be integrated into the patient’s overall care. In some cases, patients feel that the problems they perceive as important fail to receive sufficient attention. When complementary therapies are integrated into an evidence-based program of supportive care, those therapies can improve patients’ quality of life, may increase satisfaction, and can strengthen the physician–patient relationship.

---

**Table VII** Credible Web sites for evaluation of complementary and alternative (CAM) therapies for cancer patients

| Organisation | Web site |
|--------------|----------|
| Consortium of Academic Health Centers for Integrative Medicine | www.imconsortium.org |
| National Center for Complementary and Alternative Medicine | nccam.nih.gov |
| NCI Office of Cancer Complementary and Alternative Medicine (OCCAM) | www.cancer.gov/cam/ |
| Focus on Alternative and Complementary Medicine (FACT) | www.ex.ac.uk/FACT/about.htm |
| Society for Integrative Oncology | www.integrativeonc.org/ |
| Memorial Sloan Kettering Cancer Center | www.mskcc.org/abouttherbs |
| MD Anderson Cancer Center | www.mdanderson.org/departments/CIMER/ |
| BC Cancer Centre | www.bccancer.bc.ca/PPI/UnconventionalTherapies/EvaluatingAlternativeComplementaryTherapyInformation.htm |

---

**Note:** The table includes credible Web sites for evaluating CAM therapies, including those from academic centers and research entities. These sites provide critical reviews of published studies on CAM and are valuable resources for oncologists and patients.
Anticancer technology is extremely important, but it needs to be softened. Integrative oncology is humanistic and empathetic, but it is also scientific. In addition to providing support, some botanicals may effectively treat symptoms and prevent complications, avoiding certain adverse effects of the more potent drugs. Such may be the case for black cohosh, used for menopausal symptoms and the prevention of osteoporosis. Other evidence-based and quality-assured botanicals and their derivatives are in the pipeline.

We believe that integrative oncology will provide added value to standard cancer treatment. The aim of integrative oncology should be one medicine, not alternatives; it should be patient-focused; it should be evidenced-based; and it should provide the best care for cancer cure and prevention, for symptom control, and for quality of life.

6. REFERENCES

1. Boon H, Verhoef M, O’Hara D, Findlay B. Integrative healthcare: arriving at a working definition. Altern Ther Health Med 2004;10:48–56.
2. Boon H, Verhoef M, O’Hara D, Findlay B. From parallel practice to integrative health care: a conceptual framework. BMC Health Serv Res 2004;4:15.
3. Burton Goldberg Group. Alternative Medicine: The Definitive Guide. Puyallup, WA: Future Publishing; 1993.
4. Cassileth BR. Complementary and alternative cancer medicine. J Clin Oncol 1999;17:44–52.
5. Cassileth BR. Vickers AJ. Complementary and alternative therapies. Urol Clin North Am 2003;30:369–76.
6. Cassileth BR, Deng G. Complementary and alternative therapies for cancer. Oncologist 2004;9:80–9.
7. Druss BG, Rosenheck RA. Association between use of unconventional therapies and conventional medical services. JAMA 1999;282:651–6.
8. Schraub S. Unproven methods in cancer: a worldwide problem. Support Care Cancer 2000;8:10–15.
9. Weiger WA, Smith M, Boon H, et al. Advising patients who seek complementary and alternative medical therapies for cancer. Ann Intern Med 2002;137:889–903.
10. Adams J, Sibbritt DW, Easthope G, et al. The profile of women who consult alternative health practitioners in Australia. Med J Aust 2003;179:297–300.
11. Chrysal K, Allan S, Forgesson G, et al. The use of complementary/alternative medicine by cancer patients in a New Zealand regional cancer treatment centre [abstract]. NZ Med J 2003;116:U296.
12. Lee MM, Chang JS, Jacobs B, et al. Complementary and alternative medicine use among men with prostate cancer in four ethnic populations. Am J Public Health 2002;92:1606–9.
13. Eisenberg DM, Davis RB, Ettner SL, et al. Trends in alternative medicine use in the United States, 1990–1997: results of a follow-up national survey. JAMA 1998;280:1569–75.
14. Ernst E, Cassileth BR. The prevalence of complementary/alternative medicine in cancer: a systematic review. Cancer 1998;83:777–82.
15. Ni H, Simile C, Hardy AM. Utilization of complementary and alternative medicine by United States adults: results from the 1999 national health interview survey. Med Care 2002;40:353–8.
16. Burstein HI, Gelber S, Guadagnoli E, et al. Use of alternative medicine by women with early-stage breast cancer. N Engl J Med 1999;340:1733–9.
17. Ganz PA, Desmond KA, Leedham B, et al. Quality of life in long-term, disease-free survivors of breast cancer: a follow-up study. J Natl Cancer Inst 2002;94:39–49.
18. Vickers AJ, Cassileth BR. Unconventional therapies for cancer and cancer-related symptoms. Lancet Oncol 2001;2:226–32.
19. Söllner W, Maislinger S, DeVries A, et al. Use of complementary and alternative medicine in the United States, 1990–1997: results of a follow-up national survey. JAMA 1998;280:1569–75.
20. Abu-Realh MH, Magwood G, Narayan MC, Rupprecht C, Suraci M. The use of complementary therapies by cancer patients. Nursingconnections 1996;9:3–12.
21. Eisenberg DM, Kessler RC, Foster C, et al. Unconventional medicine in the United States. N Engl J Med 1993;328:246–52.
22. Richardson MA, Sanders T, Palmer JL, Greisinger A, Singletary SE. Complementary/alternative medicine use in a comprehensive cancer center and the implications for oncology. J Clin Oncol 2000;18:2505–14.
23. Cassileth BR. Complementary therapies: the American experience. Support Care Cancer 2000;8:16–23.
24. DiGianni LM, Garber JE, Winer EP. Complementary and alternative medicine use among women with breast cancer. J Clin Oncol 2002;20:348–58.
25. Nava MO, Phan J, Vaghan C, et al. An assessment of the utilization of complementary and alternative medicine in women with gynecologic or breast malignancies. J Clin Oncol 2004;22:671–7.
26. Steigenga SK, Occhpinti S, Gardiner RA, Yaxley J, Heathcote P. A prospective study of the use of alternative therapies by men with localized prostate cancer. Patient Educ Couns 2004;55:70–7.
27. Wilkinson S, Chodak GW. Critical review of complementary therapies for prostate cancer. J Clin Oncol 2003;21:199–210.
28. Kaufman D, Kelly J, Rosenberg L, et al. Recent patterns of medication use in the ambulatory adult population of the United States. JAMA 2002;287:337–44.
29. Cassileth BR, Lusk EJ, Strouse TB, et al. Contemporary unorthodox treatments in cancer medicine: a study of patients, treatments, and practitioners. Ann Intern Med 1984;101:105–12.
30. Klepser T, Doucette W, Horton H, et al. Assessment of a patient’s perceptions and beliefs regarding herbal therapies. Pharmacotherapy 2000;20:83–7.
31. Lippert MC, McClain R, Boyd JC, et al. Alternative medicine use in patients with localized prostate cancer treated with curative intent. Cancer 1999;86:2642–8.
32. Boon H, Stewart M, Kennard MA, et al. Use of complementary/alternative medicine by breast cancer survivors in Ontario: prevalence and perceptions. J Clin Oncol 2000;18:2515–21.
33. Lazarou J, Pomeranz BH, Corey PN. Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies. JAMA 1998;279:1200–5.
34. Schmidt K. CAM and the desperate call for cancer cures and alleviation. What can websites offer cancer patients? Complement Ther Med 2002;10:179–80.
35. Gray C. Natural health products get own directorate at Health Canada. CMAJ 2000;163:77.
36. Blumenthal M. Herbs continue slide in mainstream market: sales down 14 percent. HerbalGram 2003;58:71.
37. Spareboom A, Cox MC, Acharya MR, Figg WD. Herbal remedies in the United States: potential adverse interactions with anticancer agents. J Clin Oncol 2004;22:2489–503.
38. Drew AK, Myers SP. Safety issues in herbal medicine: implications for the health professions. Med J Aust 1997;166:538–41.
39. Foster BC, Arnason JT, Briggs CJ. Natural health products and drug disposition. Annu Rev Pharmacol Toxicol 2005;45:203–26.
40. Saper RB, Kales SN, Paquin J, et al. Duration of radiation effect by curcumin and its implications for cancer therapy. Curr Cancer Drug Targets 2005;5:117–29.
41. Foster BC, Vandenhoek S, Tang R, Budzinski JW, Krantis A, et al. Antioxidant supplements for prevention of gastrointestinal cancers: a randomized controlled trial. JAMA 2005;293:203–26.
42. Ha SW, Yi CJ, Cho CK, Cho MJ, Shin KH, Park CI. Enhancement of radiation effect by Ginkgo biloba extract in C3H mouse fibrosarcoma. Radiother Oncol 1996;41:163–7.
43. Bairati I, Meyer F, Gélinas M, et al. Natural health products in treatment of nasopharyngeal carcinoma: a prospective randomized trial on 188 cases. Int J Radiat Oncol Biol Phys 2000;48:1–8.
44. Wang S, Zheng Z, Weng Y, et al. Angiogenesis and anti-angiogenesis activity of Chinese medicinal herbal extracts. Life Sci 2004;74:2467–78.
45. Wang S, Zheng Z, Weng Y, et al. Angiogenesis and anti-angiogenesis activity of Chinese medicinal herbal extracts. Life Sci 2004;74:2467–78.
46. Wang S, Zheng Z, Weng Y, et al. Angiogenesis and anti-angiogenesis activity of Chinese medicinal herbal extracts. Life Sci 2004;74:2467–78.
47. Wang S, Zheng Z, Weng Y, et al. Angiogenesis and anti-angiogenesis activity of Chinese medicinal herbal extracts. Life Sci 2004;74:2467–78.
48. Wang S, Zheng Z, Weng Y, et al. Angiogenesis and anti-angiogenesis activity of Chinese medicinal herbal extracts. Life Sci 2004;74:2467–78.
49. Wang S, Zheng Z, Weng Y, et al. Angiogenesis and anti-angiogenesis activity of Chinese medicinal herbal extracts. Life Sci 2004;74:2467–78.
50. de la Taille A, Hayek OR, Buttyan R, et al. Effects of a phytotherapeutic agent, PC-SPES, on prostate cancer: a preliminary investigation on human cell lines and patients. BJU Int 1999;84:845–50.
51. DiPaola RS, Zhang H, Lambert GH, et al. Clinical and biologic activity of an estrogenic herbal combination (PC-SPES) in prostate cancer. N Engl J Med 1998;339:785–91.
52. Hsieh T, Chen SS, Wang X, et al. Regulation of androgen receptor (AR) and prostate specific antigen (PSA) expression in the androgen-responsive human prostate LnCaP cells by ethanolic extracts of the Chinese herbal preparation, PC-SPES. Biochem Mol Biol Int 1997;42:535–44.
53. Tiwari RK, Geliebter J, Gariakapty VP, et al. Anti-tumor effects of PC-SPES, an herbal formulation in prostate cancer. Int J Oncol 1999;14:713–19.
54. Khafif A, Hurst R, Kyker K, Fliss DM, Gil Z, Medina JE. Curcumin: a new radio-sensitizer of squamous cell carcinoma cells. Otolaryngol Head Neck Surg 2005;132:317–21.
55. Karunagaran D, Rashmi R, Kumar TR. Induction of apoptosis by curcumin and its implications for cancer therapy. Curr Cancer Drug Targets 2005;5:117–29.
56. Fullerton SA, Samadi AA, Torkerelis DG, et al. Induction of apoptosis in human prostatic cancer cells with β-glucan (maitake mushroom polysaccharide). Molec Urol 2000;4:7–13.
57. Kodama N, Komuta K, Nanba H. Can maitake MD-fraction aid cancer patients? Altern Med Rev 2002;7:226–9.
58. Slikova V, Valachovicova T, Jiang J, Sliva D. Ganoderma lucidum inhibits invasiveness of breast cancer cells. J Cancer Integrat Med 2004;2:25–30.
59. Sliva D. Ganoderma lucidum (Reishi) in cancer treatment. Integr Cancer Ther 2003;2:358–64.
60. Wallace JM. Nutritional and botanical modulation of the inflammatory cascade: eicosanoids, cyclooxygenases, and lipoxigenases as an adjunct in cancer therapy. Integr Cancer Ther 2002;1:7–37.
61. Wilt TJ, Ishani A, Mac DR, et al. Saw palmetto extracts for treatment of benign prostatic hyperplasia: a systematic review. JAMA 1998;280:1604–9.
62. Goldmann WH, Sharma AL, Currier SJ, et al. Saw palmetto berry extract inhibits cell growth and COX-2 expression in prostatic cancer cells. Cell Biol Int 2001;25:1117–24.
63. Motoo Y, Sawabu N. Antitumor effects of saikosaponins, baicalin on human hepatoma cell lines. Cancer Lett 1999;86:91–5.
64. Furasawa E, Chou SC, Furasawa S, et al. Antitumor activity of Ganoderma lucidum, an edible mushroom, on intraperitoneally implanted Lewis lung carcinoma in syngeneic mice. Phytother Res 1992;6:300–4.
65. Gao B, Yang GZ. Effects of Ganoderma aplannatum polysaccharide on cellular and humoral immunity in normal and sarcoma 180 transplanted mice. Phytother Res 1991;5:134–8.
66. Tamir S, Eizenberg M, Somjen D, et al. Estrogen-like activity of glabrene and other constituents isolated from licorice root. J Steroid Biochem Mol Biol 2001;78:291–8.
67. de la Taille, Buttyan R, Hayek O, et al. Herbal therapy PC-SPES: in vitro effects and evaluation of its efficacy in 69 patients with prostate cancer. J Urol 2000;164:1229–34.
68. Oh WK, George DJ, Hackmann K, et al. Activity of the herbal combination, PC-SPES, in the treatment of patients with androgen-independent prostate cancer. Urology 2001;57:122–6.
69. Pfeifer BL, Pirani JF, Hamann SR, et al. PC-SPES, a dietary supplement for the treatment of hormone-refractory prostate cancer. BJU Int 2000;85:481–5.
70. Small EJ, Frohlich MW, Bok R, et al. Prospective trial of the herbal supplement PC-SPES in patients with progressive prostate cancer. *J Clin Oncol* 2000;18:3595–603.

71. Lock M, Loblaw DA, Choo R, et al. Disseminated intravascular coagulation and PC-SPES: a case report and literature review. *Can J Urol* 2001;8:1326–9.

72. Schiff JD, Ziecheck WS, Choi B. Pulmonary embolus related to PC-SPES use in a patient with PSA recurrence after radical prostatectomy. *Urology* 2002;59:444.

73. Weinrode MC, Montgomery B. Acquired bleeding diathesis. *Can J Urol* 2001;8:4503–4.

74. Sovak M, Seligson AL, Konas M, et al. Herbal composition PC-SPES for management of prostate cancer: identification of active principles. *J Natl Cancer Inst* 2002;94:1275–81.

75. Tang JL, Zhan SY, Ernst E. Review of randomized controlled trials of traditional Chinese medicine. *BMJ* 1999;319:160–1.

76. Vickers A. Botanical medicines for the treatment of cancer: rationale, overview of current data, and methodological considerations for phase I and II trials. *Cancer Invest* 2002;20:1069–79.

77. Beinfield H, Korngold E. Chinese medicine and cancer care. *Can J Urol* 1998;4:429–57.

78. Cohen I, Tagliaferri M, Tripathy D. Traditional Chinese medicine in the treatment of chemotherapy-induced stomatitis in children. *Cancer Treat Rev* 2002;28:1247–67.

79. Wang M, Guilbert LJ, Ling L, et al. Immunomodulating activity of CVT-E002, a proprietary extract from North American ginseng (*Panax quinquefolium*). *J Pharm Pharmacol* 2001;53:1515–23.

80. Block I, Mead MN. Immune system effects of echinacea, ginseng, and astragalus: a review. *Integr Cancer Ther* 2003;2:247–67.

81. Wang M, Guilbert LJ, Ling L, et al. Immunomodulating activity of CVT-E002, a proprietary extract from North American ginseng (*Panax quinquefolium*). *J Pharm Pharmacol* 2001;53:1515–23.

82. McElhaney JE, Gravenstein S, Cole SK, et al. A placebo-controlled trial of a proprietary extract of North American ginseng (CVT-E002) to prevent acute respiratory illness in institutionalized older adults. *J Am Geriatr Soc* 2004;52:13–19.

83. Zhu JS, Halpern JM, Jones K. The scientific rediscovery of an ancient Chinese herbal medicine. *Conylceae sinensis* (part I). *J Altern Complement Med* 1998;4:289–303.

84. Zhu JS, Halpern JM, Jones K. The scientific rediscovery of a precious ancient Chinese herbal medicine. *Conylceae sinensis* (part II). *J Altern Complement Med* 1998;4:429–57.

85. Oberbaum M, Yaniv I, Ben-Gal Y, et al. A randomized, controlled clinical trial of the homeopathic medication Traumeel S in the treatment of chemotherapy-induced stomatitis in children undergoing stem cell transplantation. *Cancer* 2001;92:684–90.

86. Kaptchuk TJ. Acupuncture: theory, efficacy, and practice. *Ann Intern Med* 2002;136:374–83.

87. Han JS. Acupuncture neuropeptide release produced by electroacupuncture treatment of different frequencies. *Trends Neurosci* 2003;26:17–22.

88. Shen J. Research on the neurophysiological mechanisms of acupuncture: review of selected studies and methodological issues. *J Altern Complement Med* 2001;7(suppl 1):S121–7.

89. Foster JM, Sweeney BP. The mechanisms of acupuncture analgesia. *Br J Hosp Med* 1987;38:308–12.

90. Haker E, Eggekvist H, Bjerring P. Effect of sensory stimulation (acupuncture) on sympathetic and parasympathetic activities in healthy subjects. *J Auton Nerv Syst* 2000;79:52–9.

91. Vickers AJ. Can acupuncture have specific effects on health? A systematic review of acupuncture antiemesis trials. *J R Soc Med* 1996;89:303–11.

92. Al-Sadi M, Newman B, Julious SA. Acupuncture in the prevention of postoperative nausea and vomiting. *Anaesthesia* 1997;52:658–61.

93. Schlager A, Offer T, Baldissera I. Laser stimulation of acupuncture point P6 reduces postoperative vomiting in children undergoing strabismus surgery. *Br J Anaesth* 1998;81:529–32.

94. Somri M, Vaida SJ, Sabo E, et al. Acupuncture versus ondansetron in the prevention of postoperative vomiting. A study of children undergoing dental surgery. *Anaesthesia* 2001;56:927–32.

95. Kotani N, Hashimoto H, Sato Y, et al. Preoperative intradermal acupuncture reduces postoperative pain, nausea and vomiting, analgesic requirement, and sympathoadrenal responses. *Anesthesiology* 2001;95:349–56.

96. Wang SM, Kain ZN. P6 acupoint injections are as effective as droperidol in controlling early postoperative nausea and vomiting in children. *Anesthesiology* 2002;97:359–66.

97. White PF, Issioui T, Hu J, et al. Comparative efficacy of acustimulation (ReliefBand) versus ondansetron (Zofran) in combination with droperidol for preventing nausea and vomiting in children undergoing strabismus surgery. *Br J Anaesth* 1998;81:529–32.

98. Price E, Eversson K, Johnsson VA, Ofenbartl L, Kalman S. P6 acupressure may relieve nausea and vomiting after gynecological surgery: a effectiveness study in 410 women. *Can J Anaesth* 2002;49:1034–9.

99. Kim Y, Kim CW, Kim KS. Clinical observations on postoperative nausea and vomiting. *Anaesthesia* 2002;57:59–66.

100. Al-Sadi M, Newman B, Julious SA. Acupuncture in the prevention of postoperative nausea and vomiting. *Anaesthesia* 2002;57:658–61.

101. Alkaissi A, Eversson K, Johnsson VA, Ofenbartl L, Kalman S. P6 acupressure may relieve nausea and vomiting after gynecological surgery: a effectiveness study in 410 women. *Can J Anaesth* 2002;49:1034–9.

102. Kim Y, Kim CW, Kim KS. Clinical observations on postoperative vomiting treated by auricular acupuncture. *Am J Chin Med* 2003;31:475–80.

103. Stenström RG, Diefenbacher M, Bauer A, et al. Acupuncture compared to placebo-acupuncture for postoperative nausea and vomiting prophylaxis: a randomised placebo-controlled patient and observer blind trial. *Anaesthesia* 2004;59:142–9.

104. Butkovic D, Toljan S, Matolic M, Kralik S, Radesic L. Randomized controlled trial of Siberian ginseng for chronic fatigue. *Psychol Med* 2004;34:51–61.

105. Shen J, Wenger N, Glaspy J, et al. Electroacupuncture for control of myeloablative chemotherapy-induced emesis: a randomized controlled trial. *JAMA* 2000;284:2755–61.

106. Josefson A, Kreuter M. Acupuncture to reduce nausea during chemotherapy treatment of rheumatic diseases. *Rheumatology* 2003;42:1149–54.
of the ReliefBand as an adjunct to standard antiemetics in patients receiving moderately-high to highly emetogenic chemotherapy. Support Care Cancer 2003;11:516–21.

108. Streitberger K, Friedrich–Rust M, Bardenheuer H, et al. Effect of acupuncture compared with placebo-acupuncture at P6 as additional antiemetic prophylaxis in high-dose chemotherapy and autologous peripheral blood stem cell transplantation: a randomized controlled single-blind trial. Clin Cancer Res 2003;9:2538–44.

109. Roscoe JA, Matteson SE, Morrow GR, et al. Acustimulation wrist bands are not effective for the control of chemotherapy-induced nausea in women with breast cancer. J Pain Symptom Manage 2005;29:376–84.

110. Lee A, Done ML. Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting. The Cochrane Database of Systematic Reviews. In: The Cochrane Library, Issue 2. Chichester, UK: John Wiley & Sons: 2005. [CD003281]

111. Mayer DJ. Acupuncture: an evidence-based review of the clinical literature. Anna Rev Med 2000;51:49–63.

112. Grunberg SM, Deuson RR, Mavros P, et al. Incidence of chemotherapy-induced nausea and emesis after modern antiemetics: perception versus reality. Cancer 2004;100:2261–8.

113. Chernyak GV; Sessler DI. Perioperative acupuncture and effects of auricular acupuncture for cancer pain. J Pain Symptom Manage 2000;19:81–2.

114. Ernst E, Pittler MH. The effectiveness of acupuncture in treating acute dental pain: a systematic review. Br Dent J 1998;184: 443–7.

115. Melchart D, Linde K, Fischer P, et al. Acupuncture for idiopathic headache. The Cochrane Database of Systematic Reviews. In: The Cochrane Library, Issue 1. 2001. [CD0001218]

116. Ernst E, Pittler MH. The benefit from whole body acupuncture in major depression. J Altern Complement Med 2004;10:1083–91.

117. Sagar SM, Wong R. Chinese medicine and supportive cancer care: a model for an evidence-based, integrative approach. Evid Based Integr Med 2003;1:11–25.

118. Wynn A, Done ML. Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting. The Cochrane Database of Systematic Reviews. In: The Cochrane Library, Issue 2. Chichester, UK: John Wiley & Sons: 2005. [CD003281]
146. Cunningham AJ, Phillips C, Stephen J, Edmonds C. Fighting for life: a qualitative analysis of the process of psychotherapy-assisted self-help in patients with metastatic cancer. *Integrat Cancer Ther* 2002;1:146–61.

147. Richardson JL, Shelton DR, Krailo M, et al. The effect of compliance with treatment on survival among patients with hematologic malignancies. *J Clin Oncol* 1990;8:356–64.

148. Goodwin PJ, Leszcz M, Ennis M, et al. The effect of group psychosocial support on survival in metastatic breast cancer. *N Engl J Med* 2001;345:1719–26.

149. NIH Technology Assessment Panel. Integration of behavioral and relaxation approaches into the treatment of chronic pain and insomnia. *JAMA* 1996;276:313–18.

150. Sellick SM, Zaza C. Critical review of five nonpharmacologic strategies for managing cancer pain. *Cancer Prev Control* 1998;2:7–14.

151. Bindemann S, Soukop M, Kaye SB. Randomised controlled study of relaxation training. *Eur J Cancer* 1991;27:170–4.

152. Bridge LR, Benson P, Pietroni PC, et al. Relaxation and imagery in the treatment of breast cancer. *BMJ* 1988;297:1169–72.

153. Walker LG, Walker MB, Ogston K, et al. Psychological, clinical and pathological effects of relaxation training and guided imagery during primary chemotherapy. *Br J Cancer* 1999;80:262–8.

154. Stalpers LJ, da Costa HC, Merbis MA, et al. The effect of group music on mood and symptoms of stress in cancer outpatients: 6-month follow-up. *Support Care Cancer* 2005;13:499–506.

155. Vasterling J, Jenkins RA, Tope DM, et al. Cognitive distraction and relaxation training for the control of side effects due to cancer chemotherapy. *J Behav Med* 1993;16:65–80.

156. Morrow GR, Morrell C. Behavioral treatment for the anticipatory nausea and vomiting induced by cancer chemotherapy. *N Engl J Med* 1982;307:1746–80.

157. Ahles TA, Tope DM, Pinkson B, et al. Aromatherapy and massage for symptom relief in patients with cancer. The Cochrane Database of Systematic Reviews. In: The Cochrane Library, 2004;10:223–8.

158. Hazel J, Mitchell L, Street A, et al. Aromatherapy for life: a qualitative analysis of the process of psychotherapy-assisted self-help in patients with metastatic cancer. *Integrat Cancer Ther* 2002;1:146–61.
186. Wardell DW, Engebretson J. Biological correlates of Reiki touch healing. *J Adv Nurs* 2001;33:439–45.
187. Lafreniere KDA, Mutus B, Cameron S, *et al.* Effects of therapeutic touch on biochemical and mood indicators in women. *J Altern Comp Med* 1999;5:367–70.
188. Cox C, Hayes J. Physiologic and psychodynamic responses to the administration of therapeutic touch in critical care. *Complement Ther Nurs Midwifery* 1999;5:87–92.
189. Olson K, Hanson J, Michaud M. A phase II trial of Reiki for the management of pain in advanced cancer patients. *J Pain Symptom Manage* 2003;26:990–7.
190. Roscoe JA, Matteson SE, Mustian KM, Padmanaban D, Morrow GR. Treatment of radiotherapy-induced fatigue through a nonpharmacological approach. *Integr Cancer Ther* 2005;4:8–13.
191. Tannock IF, Warr DG. Unconventional therapies for cancer: a refuge from the rules of evidence? *CMAJ* 1998;159:801–2.
192. Dossey L. The right man syndrome: skepticism and alternative medicine. *Altern Ther Health* 1998;4:12–9,108–14.
193. Dossey L. Blindsided: criticism of CAM from an unexpected source. *Altern Ther Health Med* 2000;6:82–5.
194. Dossey L. You people: intolerance and alternative medicine. *Altern Ther Health Med* 1999;5:12–7,109–12.
195. Kligler B, Maizes V, Schachter S, *et al.* Core competencies in integrative medicine for medical school curricula: a proposal. *Acad Med* 2004;79:521–31.
196. Cassileth B, Deng G, Vickers A, Yeung S. *PDQ Integrative Oncology: Complementary Therapies in Cancer Care.* Hamilton, ON: BC Decker; 2005.
197. Viereck V, Emons G, Wuttke W. Black cohosh: just another phytoestrogen? *Trends Endocrinol Metab* 2005;16:214–21.
198. Utian WH, Lederman SA, Williams BM, *et al.* Relief of hot flushes with new plant-derived 10-component synthetic conjugated estrogens. *Obstet Gynecol* 2004;103:245–53.

**Correspondence to:** Stephen M. Sagar, Juravinski Cancer Centre and McMaster University (Department of Medicine), 699 Concession Street, Hamilton, Ontario L8V 5C2.

**Email:** stephen.sagar@hrcc.on.ca

* Juravinski Cancer Centre and McMaster University (Department of Medicine), Hamilton, Ontario, Canada.
† Integrative Medicine Service, Memorial Sloan–Kettering Cancer Center, 1275 York Avenue, H13, New York, New York 10021 U.S.A.