



# Promises: Alternative Medicine in the Era of Innovative Cancer Therapy

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## Commentary

Tumorigenesis evolves following a doctrine that is as much stochastic as it is Darwinian in nature. Consistent with this belief is the observation that a number of genetic aberrations ultimately determine cell selection, endow survival advantages and drive malignant transformation despite stringent safeguards for preserving the human genome. Equally engaging is the notion that genetic instability, random mutations and molecular heterogeneity, the antitheses of biologic order, are inherent characteristics of cancer cells. The relative simplicity of these tenets is partially reinforced by cancer research, which has led to not only the discovery of deviant proteins that participate in tumor initiation, disease progression and cancer immunity, but also the development of an expanding array of novel anticancer agents. And while decades of research has produced what is often acknowledged as incremental improvements in survival outcomes, certain advances can, in a number of instances, be considered truly revolutionary. The latter includes altering the natural histories of chronic myelogenous leukemia and multiple myeloma with molecular targeted agents [1,2] as well as the recent successes with immunotherapy in relatively chemotherapy- or cell-mediated-resistant neoplasms including melanoma and kidney cancers, or cancers involving the lung, head and neck, and bladder [3-7]. An intense effort is now being made to identify specific markers which could improve patient selection, enhance drug application and reduce avoidable treatment-related toxicities and expenditures. In spite of such innovative cancer therapy (and the hope that it carries), the reality is deaths due to the malignant diseases are second only (and a close one at that) to heart disease in the United States [8]. Indeed, among some ethnic groups such as native American Indians and Alaskans, cancer-related mortality exceeds heart disease. Furthermore, cancer statistics have magnified not only the rising incidence of and mortality from cancer, but also public frustration concerning the relatively few truly “blockbuster” advances in improving cancer survival despite the hundreds of millions of dollars expended. Moreover, information available through the media documenting progress in cancer therapy is often contradicted by personal knowledge of acquaintances who fail to survive a cancer diagnosis. The use of alternative medicines or unproven cancer treatments is, in part, borne out of the fear, negative experiences and belief that innovation alone may prolong survival but cannot cure most cancers. This brief commentary evaluates the economic, social and clinical impact of alternative medicines in cancer care. State of the art medical specialization which offers sophisticated and clinically optimal care is, ironically, also perceived as being highly impersonal, grossly technological and agonizingly bureaucratic. The emergence of alternative therapies to conventional medicine represents a social movement based on patient right, self-care and fitness, disaffection with professional bureaucracy and mistrust of organized medicine. Furthermore, the public’s attempt to insulate itself against heroic medicine is evidenced by living wills, right to die movements and more humane therapeutic alternatives. That the popularity of (and out-of-pocket spending toward) unconventional therapies appears to be more conspicuous in the treatment of cancer than any other disease is partially supported by the belief that the side effect profiles of many therapies are so noxious that many of anti-cancer agents would not be approved for human use were it not for the treatment of life-threatening diseases. Juxtaposed to this opinion is the recent finding that the annual expenditure for alternative treatments among Americans exceeds \$30 billion dollars [9]. Furthermore, the myth that only the poor, uneducated and economically deprived sought or relied on unproven or questionable cancer therapy has been repudiated [10]. In fact, the stereotypic opposite characterizes those who use unorthodox methods. Consistent with these findings is that alternative therapies require time, money, and a challenging, questioning approach to the disease. It has been estimated that 10% to 50% of cancer patients use unorthodox remedies resulting in a conservative, yet astounding, \$4 billion dollars spent yearly, a figure similar to the National Cancer Institute’s inflation-adjusted budget for 2016 [11]. These data may also prompt skeptics to wonder whether the 23% decline in cancer death rate over the

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past 25 years is due entirely to federal funding for cancer research [12]. The inability to cure substantially more cancer patients and the absence of what is often perceived as superior and less toxic therapies produced significant political pressure which resulted in diversion of enormous sums to evaluate alternative methods, often outside of the established methods for rigorous scientific review. And almost uniformly, reports of cures and remission with alternative therapeutic strategies are anecdotal (and often emotional) in nature. When carefully analyzed, early reports are victimized by study bias and results that could not be reproduced [13]. In the early 1980s, \$200 million was spent on cancer chemotherapy compared to \$2 billion spent on laetrile. Laetrile subsequently has been shown not only to produce no substantive benefit but is also a potentially dangerous compound [14]. Nonetheless, laetrile “lives”; the compound and its alter ego, vitamin (a misnomer) B17 can still be purchased (yikes!) online from Amazon or Walmart. Paradoxically, despite the almost mythical sums spent on unorthodox and often questionable cancer remedies there is no outrage regarding the cost of metabolic, megavitamin or internal detoxification therapies [15,16]. Alternative cancer therapies are societal fads. A new method captures the imagination of the American public, buoyed by the understanding that conventional therapies cannot cure most cancers. Often these unconventional methods are sophisticatedly dressed (to cure) and supported, purportedly, by modern science and technology (do no harm). In reality, unorthodox methods remain unproven and more information is available as a testimony of their lethality (cyanide toxicity, toxic megacolon, and infections). Besides economic and societal harm, Jarvis also describes the harm of omission [17]. Denial of cancer, resulting in avoidance or delay in seeking responsible therapy while pursuing alternative therapies can have a tremendous impact on treatment options and disease control. Still, cancer is a symbol of the uncertainties and limitation of modern medicine. As long as a cause-effect relationship of cancer eludes scientific explanation; as long as there is ambivalence toward the medical profession, and as long as patients have negative experiences with conventional therapies, unconventional therapies will be an attractive alternative. Today, there is a public receptive to information and embellished with a “take-charge” attitude. Cancer patients rebelling against the establishment are finding a more supportive therapeutic alliance, hearty reassurance and open communication in unorthodox treatment clinics. Here the individual’s fight to beat the unbeatable foe is glorified. The survivors become celebrities, a symbol of courage and grace which is sometimes credited with the cure. But for every survivor, there are a hundred others who were equally chivalrous yet lost the battle to cancer. A medical dogma states that there is no unproven treatment for curable diseases. When a cure for cancer is found, questionable cancer therapies will also dissipate.

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