

# CANCER—TREATMENT THROUGH THE CONTINUUM

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From the perspective of curative and preventive therapy, we have lost the war against cancer. Deaths from cancer are stable or increasing at 570,000 deaths in 2005.<sup>1</sup> One in 3 people will get cancer in his or her lifetime.<sup>1</sup> Given the average latent period of 30 years for solid tumors,<sup>2</sup> 17 million Americans are walking around with cancer that is somewhere along the continuum from initiation of a cancer cell to clinical manifestation of the disease.<sup>3</sup>

Clinical cancer care focuses almost entirely on eradicating the tumor through chemotherapy, radiation, or surgery, none of which addresses cancer early in the continuum of its natural history. Emerging novel treatments, including vaccines and immunotherapy, hold promise. But are they enough? Are we focusing on late-stage curative care and missing assessments and interventions that could change the landscape of cancer treatment and help those 17 million Americans prevent or reverse latent cancers?

In my oncology rotation in medical school, I asked my professor what percentage of cancers was related to diet and was shocked by his answer—70%.

Is there a different approach to cancer that allows for late-stage interventions but asks a different set of questions based on a different set of assumptions? Rather than asking what is the right treatment for cancer, we might ask what genetic, lifestyle, and environmental factors trigger the development of cancer and what clinical strategies we can use to alter its trajectory.

Consider this fact: 16% of all cancers are new primary cancers in patients who have had cancer, not recurrences.<sup>4</sup> This means that people who have cancer are more likely to get a second and independent cancer. Why is this so? Is it because of the toxic effects of the treatment of the first primary cancer, or is it something else? This is a compelling area for research and inquiry.

Another fertile area for inquiry and therapy might be based on an analysis of the etiology and mechanisms of cancer and how they influence the core physiological systems that determine our health. This might be called milieu therapy, or regulation therapy. Rather than treating cancer per se, might we enhance immune function and surveillance through dietary and lifestyle changes, nutrient or phytonutrient therapies? Are there mechanisms that are common to most cancers, such as inflammation, altered hormone metabolism, oxidative stress, and impaired detoxification?

With our current understanding of the mechanisms of cancer development and progression, we can reframe our treatment approach to include interventions that support the biological systems that, when dysfunctional, allow the initiation, progression, and acceleration of cancer.

The solution will come only through a systems approach. We have seen the flaws in reductionistic models of intervention, such as the CARET trials.<sup>5</sup> Hundreds of millions of dollars were spent following the reductionist model of inquiry rather than a systems approach, with predictable and, unfortunately, negative outcomes.<sup>5</sup> Epidemiological evidence that vegetable consumption reduced cancer risk led to the assumption that beta-carotene was the “active agent.” This led to trials on thousands of smokers at risk for lung cancer using doses 100 times greater than what is normally consumed. The outcome of increased cancer risk among the treatment group should not have been a surprise—giving high doses of an antioxidant in an oxygen-rich environment (the lung), heated by smoke, led to increased oxidative stress and the promotion of large amounts of reactive oxygen species, which facilitate cancer initiation and progression. A high dose of any one antioxidant can upset the equilibrium, leading to an uncontrolled free-radical chain reaction. This is what happened in the CARET study.

The lesson to be learned is not that vitamins don't prevent cancer, but that single interventions in a complex physiology are likely to fail. The future of cancer care lies not in finding the best cocktail of chemotherapeutic agents, but in customizing treatments to correct patients' individual imbalances. We must use our understanding of mechanisms of disease and physiologic and metabolic balance to design a treatment approach that uses diet, lifestyle, nutrient, phytonutrient, mind-body, and pharmacological interventions to restore normal function and optimize gene expression patterns in the key systems that modulate cancer risk.

## REFERENCES

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