Chapter 2: Emerging Risk Factors

“The Terrain is everything.” Louis Pasteur

During the mid 19th Century in France, a vigorous war of ideas raged in the upper echelons of the French scientific community. On the one hand, Louis Pasteur was developing his germ theory of disease, and on the other, Claude Bernard was focused on the “milieu interieur”, or, in his words, the constancy of the internal environment.” In other words, Bernard felt that the nourishment of the body, its ability to get rid of toxins and wastes and the strength of its immune system provided the foundations for successfully confronting both acute and chronic disease. Although Pasteur and others fought long and hard for the supremacy of the microbe theory of disease, Pasteur affected a dramatic turnaround late in life, and on his deathbed is said to have uttered, “Bernard was right. The microbe is nothing. The terrain is everything.”

We wholeheartedly agree healthy terrain is the foundation for a healthy body that can mount a strong defense against cancer. In this chapter, we’ll cover the basics of emerging risk factors for breast cancer: the ones that deal with the internal terrain as Bernard or Pasteur might today envision it. These factors include dietary and nutritional influences, toxic exposures, and the health and equilibrium of the body’s own internal systems, such as hormonal, digestive and immune system balance. We consider these risk factors to be so important that we’ve devoted entire chapters to many of them later in the book. Others we’ll just touch on briefly in this chapter.

The Standard American Diet: Your number One Risk Factor
The Standard American Diet, sometimes also referred to as the Western Dietary Pattern or SAD, is comprised of a high intake of red meat, sugar, transfats, high fructose corn syrup, artificial sweeteners and refined grains. This dietary pattern also tends have a low intake of colorful whole food fruits and vegetables.

**The High Cost of Cheap Food:**

The health of a majority of Americans is worsening as you read this. Time Magazine's August 21, 2009 article, *Getting Real about the High Price of Cheap Food* put it, “*Unless Americans radically rethink the way they grow and consume food, they face a future of ... higher health costs.*” Why? Food experts such as Michael Pollan warn us that the quality of our food supply has been on a slow decline for many decades. That is, our food has become more toxic and less nutritious. In fact, much of what we eat is not actually food at all, but what we like to call UFOs or Unidentified Food Objects. Just look at the label on a typical packaged food found on a supermarket shelf. Try to pronounce most of the ingredients and you’ll see exactly what we mean. It’s no surprise that we’re witnessing an unprecedented rise in obesity, blood sugar imbalances, autoimmune diseases and cancer in our population. (American Cancer Society. 2009)

The crux of the matter is this: fast foods, as documented by Eric Schlosser in *Fast Food Nation* and Carol Simontacchi in *Crazy Makers*, are made from the least expensive ingredients possible and loaded with chemicals, damaged fats, artificial ingredients, and flavor enhancers. Fast foods are stimulating but they are not nourishing. Many experts, including researchers from the National Cancer Institute, believe that more than 50% of cancers have a nutritional component in their etiology (Marmot, et al. World Cancer Research Fund and American Institute for Cancer...
Research. 2009). So eating a diet aimed at risk reduction is probably the most important step you can take in lowering your chances of dancing with this most unpleasant disease.

**Sick animals make for unhealthy food**

While the consumption of malnourished, pesticides-laden plants can lead to the appearance of sickly malnourished people, those same, sub-standard crops combined with excessive amounts of hormones and antibiotics leads to sick animals. Factory farmed animals are fed a steady diet of Genetically Modified (GM) corn and soy with the intent of making the cattle gain weight, and quickly. What’s more, a typical fast food or school lunch burger is not made from a single piece of beef but “meat” from a variety of sources such as trimmings and scraps of fatty wastes that are left on the slaughterhouse floor after the animals have been butchered.

The same basic practices are also applied to chicken and fish. Feeding GM soy and corn pellets to algae-loving salmon or sawdust, hormones, antibiotics, and cardboard to insect-loving chickens will surely produce sickly, malnourished animals whose meat carries along with it the drugs, pesticides and other toxins with which it is laden. You are indeed what the animal on your dinner plate ate.

**Got rBST?**

Studies over the past decade have pointed clearly to the fact that artificial growth hormones fed to cattle have led to increasing U.S. rates of breast cancer, early puberty and obesity. (Epstein. International Journal of Health Services. 1996) (Bohlooly-Y, et al. Diabetes. January 2005) Monsanto first began selling “recombinant bovine growth hormone” (rBGH, also known as rBST in 1994. The hormone, designed to force cows to produce more milk, has been banned in
the EU, Canada, Japan, Australia, and New Zealand due to safety concerns. Nevertheless, in the U.S., Monsanto has insisted that its genetically modified growth hormone is safe. Many experts say otherwise. One area of concern is the startling rise in human blood levels of a growth hormone known as IGF-1, or Insulin Growth Factor. As toxicologist Dr. Samuel Epstein explains, consumption of animals fed growth hormones lead to excessive levels of IGF-1, a close relative of insulin, in humans. This in itself is a documented risk factor for breast cancer. (Epstein. Internal Journal of Health Services. 1996)

Dr. Susan Hankinson first sounded the alarm on IGF-1 in 1998) when her research team reported in the Lancet that among 76 pre-menopausal women whose blood levels were measured, those with IGF-1 concentrations in the highest third had almost three times the risk of breast cancer than those with levels in the lowest third. And among pre-menopausal women younger than 50, the risk of breast cancer for those with the highest levels of IGF-1 was approximately seven times higher than for women with the lowest levels. "The up to sevenfold increase suggests that the relation between IGF-1 and risk of breast cancer may be greater than that of other established breast cancer risk factors, with the exception of a strong family history of breast cancer or a high-density mammographic profile," the authors warned at the time. (Hankinson, et al. Lancet. 1998)

Given the research, we consider it prudent to strictly moderate your intake of commercial animal products to help keep this risk factor under control. Since the USDA does not require labeling of milk containing rBST, as of this writing it is safe to assume that if your milk is not organic or doesn’t clearly state the absence of rBST in it, it is reasonable to assume the cows who produced
it have indeed been treated with the hormone. The good news is that you can avoid this risk by choosing milk that is organic or labeled “rBST free.”

**Sugar and cancer: a sweet relationship**

You may already know that simple sugars and carbohydrates will cause an almost immediate rise in blood glucose levels. The problem with this scenario is that cancer cells have a voracious appetite for sugar. Nobel Prize winner Otto Warburg first discovered the connection in 1924, when his research revealed that cancer cells generate energy in a way that differs from normal cells, in a process called glycolysis. This process, he contended was so dependent on glucose that he dubbed tumors “obligate sugar metabolizers.” “Cancer, above all other diseases, has countless secondary causes. But, even for cancer, there is only one prime cause. Summarized in a few words, the prime cause of cancer is the replacement of the respiration of oxygen in normal body cells by a fermentation of sugar.” (Dr. Otto Warburg, Lecture delivered to Nobel Laureates on June 30, 1966 at Lindau, Lake Constance, Germany) Among others, Warburg observed, and that observation has not been challenged in almost a century of subsequent research, that consuming sugars and simple carbs not only raises blood glucose rapidly, but the fast, abrupt nature of this increase triggers a healthy pancreas to respond by overproducing insulin, or order to bring levels down to normal range as quickly as possible. This initially healthy response, however, can lead to very unhealthy consequences. Insulin and its close relative, insulin-like growth factor (IGF-1) are cellular growth promoters (Hadsell, Bonnette. Journal of Mammary Gland Biology and Neoplasia. 2000). So each time you flood your bloodstream with insulin you are sending a message to your tumor: grow!
It’s clear that blood glucose and insulin levels have a pronounced effect on breast cancer survival statistics, a connection that has been documented for decades. For example, a mouse study conducted in 1985 indicated that higher blood glucose levels resulted in shorter survival times in mice with breast cancer, with the response being “dose dependent.” In other words, the higher the blood glucose levels, the poorer the outcomes. (Santisteban et al. Biochemical and Biophysical Research Communications. 1985)

What’s critical to understand is that simple carbohydrates (“white” bread, rice, pasta, pastries, etc) convert to simple sugar within moments of your chewing them. Complex carbohydrates, those with intact fiber and germ release their glucose more slowly and more healthfully into the bloodstream.

We’ll discuss much more on sugar, insulin and cancer in Chapter 6.

**Time for an Oil Change?**

Fats and oils have an intimate relationship with cancer as they are either promoters or inhibitors of inflammation, a topic that we will discuss in detail in chapters 3 and 9. The nature of fats and oils changed dramatically about 50 years ago, when processed foods started coming into their own as a mainstay of the American diet. During those years, food manufacturers started looking for a way to preserve the shelf life of processed foods, and supermarket fats and oils as well as home and industrial cooking oils and fats. Very quickly, genuine fats became factory fats. That is, they were replaced with hydrogenated trans fats, a new, lab-created “fake” fat that was completely foreign to the human body. So what happens when you actually eat this stuff?
Because trans fats are similar in chemical composition to real fats, your body believes they are real, and uses them in all the places that real fats are designed to go – especially, the precious cell membrane. In the words of diet guru Sally Fallon, your cells become partially hydrogenated!

Why is this problem? Because our cell membranes are comprised of fat. And because all nutrients and waste products must pass through this vital cellular gatekeeper, we cannot afford to have cell membranes that become rigid and hard, inhibiting the smooth exchange of nutrients and waste products. Trans fats will do this to our cells, and for this reason, they are critical to avoid.

We’ll talk a great deal more about fats that are friends and fats that are foes in Chapters 3 and 6.

**America's Other Drinking Problem**

We’re told that our water is among the purest in the world, but a closer looks reveals a startlingly different story.

Clean water is the only liquid the body actually needs; it is vital to health and to life, and nothing can replace it. Opinions vary as to how much we need each day (48-64 ounces by most accounts) but need it we do, whether it comes from our food, our tap, or from bottles. In 2008 the Environmental Working Group (EWG) - disclosed that more than 260 contaminants were detected in tens of thousands of samples of tap water, many of them petrochemicals and their byproducts. (Environmental Working Group, 2009) More than half of the contaminants - 141 - were unregulated. Of these unregulated toxins, The EWG has concluded that 53 are linked to cancer, 41 to reproductive toxicity, 36 to developmental toxicity and 16 to immune system damage. For others, no health information seems to exist at all.
Called a “ticking time bomb” by the Environmental Protection Agency (EPA) itself, we believe that pollution of our water may be one more reason for the ever-growing cancer epidemic in our country. We’ll provide tips on locating and filling up on healthy drinking water in Chapter 4.

**Nutritional Deficiencies and Efficiencies: when food isn’t enough**

A well nourished body boasts a thriving community of healthy cells, and healthy cells are more resistant to oxidative stress and DNA damage, two factors that increase the chances of them becoming cancerous. Well nourished cells are also capable of communicating with one another more effectively. In this way, they help to keep each other in line, making sure that all cells are working together as a coordinated community. What’s more, healthy cells know that when they are damaged or worn out it’s time for them to die in an orderly process known as apoptosis.

As much as we advocate the use of whole, nutrient-dense food as a foundation for wellness and cancer prevention, there are many instances when the purest, freshest proteins, fats, carbohydrates and phytonutrients from food simply aren’t enough. We can lay the blame on depleted soil producing less nutritious crop yields, on toxins in our environment, on endocrine disrupting chemicals that throw our hormones out of balance, or on digestive issues that prevent us from absorbing and utilizing the nutrients available in the food we do eat. Indeed, all of these factors share some of the responsibility because they all lead to a state of nutrient depletion which in turn, leads to a state of diminished health. That’s where targeted nutritional supplementation comes in.
Vitamin D, iodine and selenium are just three nutrients that have been shown to play a dominant role in cellular and immune health. Copper and iron, in excess, on the other hand, have demonstrated the capacity to augment cancer’s progression. We’ll take a closer look at the relationship of specific nutrients to the risk of breast cancer occurrence or recurrence in Chapters 5 and 12.

**Immune Capability**

One way of reducing your risk for breast cancer occurrence or recurrence is by having a healthy immune system. A healthy immune system recognizes unhealthy cells and destroys them. Cancer, however, is exceedingly cunning in its ability to evade immune surveillance, secreting chemicals designed to camouflage itself and confuse our cell defenders. Think of it like a Trojan horse that cloaks itself in a devious array of disguises to throw your immune system off track.

When your army of T cells, phagocytes and Natural Killer (NK) cells – the specific cells that fight cancer - is well nourished, and well rested, your immune system has a better chance of mounting a swift and strong response to cancerous cells before they can multiply and become dangerous.

One of the greatest risks to immune health, and one that we *can* completely control, again involves the intake of sugar and refined carbohydrates. Excess sugar depresses immunity. This was shown as far back as the 1970’s when subjects ingesting 75 to 100 grams of a sugar solution (about 20 teaspoons of sugar, or the amount that is contained in two average 12-ounce sodas) showed a dramatic drop in neutrophil count, a measure of white blood cell activity. This plunge happened within 15 minutes of eating a high glycemic meal and though the immune suppression
was most noticeable two hour post-ingestion, the effect was still evident five hours after eating.  
(Sanchez et. al, 1973)

We’ll delve more into this and other factors affecting immune health in Chapter 7.

**Inflammation stokes the fire**

A fire can spread quickly and devastatingly, or it can spread slowly, making it easier for fire fighters to subdue.  Inflammation is the fire in cancer’s growth and spread.

In a healthy body, inflammation represents a protective response to an emergency such as invasion by a bacterium, virus, or parasite.  Inflammation is our time tested process that initiates the body’s innate healing process  - a life saving response to wounds and infections that might not heal without it.

An inflammatory state can become chronic, however, and this is when it causes problems.  The very inflammatory chemicals that are used to heal wounds can promote cancer growth.  One way in which this happens is when white blood cells rush to the site of an injury, initating the development of new blood vessels  in a process known a angiogeneis.  What’s more, inflammation seems to play a variety of roles in all phases of cancer: its initiation, promotion and invasion.  (Sgambato, Cittadini, European Review for Medical and Pharmacological Sciences. 2010)
Fortunately, we are well aware of several natural anti-inflammatory foods and nutrients. Quercetin, a bioflavonoid phytonutrient, found in apples, onions and tea, curcumin, ginger and Omega 3 fatty acids are among the best. Likewise, sunlight which allows the body to make vitamin D is a natural antioxidant and anti-inflammatory.

Identifying and eliminating food sensitivities is another key to alleviating undue inflammation. By finding out what your particular food sensitivities are you can avoid foods that are provocative to your system. This is one key to taming the inflammation beast, and we’ll discuss several others in Chapter 9.

**Managing Hormones Gone Astray**

All women manufacture a variety of estrogens throughout their lifetime. Before menopause, these estrogens are produced in the ovaries. After menopause they are still made, albeit in smaller amounts, by the adrenal glands and by adipose (fat) tissue. Women who are overweight have more adipose tissue, therefore they produce more estrogen. What’s more, these estrogens do not distribute themselves evenly around the body. In menopausal and post-menopausal women, excessive levels of estradiol, the most dominant estrogen, commonly accumulate in breast tissue, creating additional risk for estrogen dependent tumors.

*The real crux of the matter, however, is not how much estrogen we have, but how we metabolize the estrogens that we produce.* An imbalance of estrogens in the body can actually set the stage for cancer initiation and promotion, particularly in post-menopausal women. Depending on our diet, our liver’s detoxification abilities, and the quantity and quality of healthy flora in our gut,
we can safely metabolize and excrete excess estrogen in the form of the healthful estrogen metabolite called 2-hydroxyestrone, or we can recycle a more toxic, rogue estrogen metabolite known as 16-alpha-hydroxyestrone. (Muti P, et al. Epidemiology. 2000) (Eliassen, et al. Cancer Epidemiology Biomarkers and Prevention. 2008) We’ll look into these distinctions in Chapter 8 where we’ll be talking to Dr. Jonathan Wright, one of the world’s experts on female hormones.

**The breast cancer/iodine connection**

One of the hot topics in the treatment of all breast disease, including cancer, is iodine. While we’ll go into this in more detail in Chapter 11, let’s take a quick look at some quick facts here.

**Iodine and breast tissue**

According to David Brownstein, M.D., and author of *Iodine: Why you need it, why you can’t live without it*, iodine is one of our most essential nutrients for breast health. In fact, decades of work have painstakingly been undertaken confirm this protective role. It is believed that iodine does its work through modulation of gene expression and estrogen containment while remaining intimately involved in regulating the cell cycle, including the process of division and replication, and apoptosis, the process of normal cell death. (Brownstein, 2009)

From epidemiological studies we learn that iodine deficiency is linked to a higher rate of goiter and breast cancer, undoubtedly, because iodine exerts the lion’s share of its effect in both thyroid and breast tissue. Conversely, high levels of iodine intake are associated with less goiter and breast cancer. Japan, for instance, has the highest dietary intake of iodine (approx. 13 mg per day), and the lowest rates for goiter and breast cancer. Interestingly, when Japanese women
move to America and consume the same amount of iodine as American women, their breast
cancer rates increase. (American Cancer Society. 2002)

Unfortunately, a large percentage of the female population in the U.S. appears to be deficient in
iodine. How can this be when our salt shakers are brimming with iodized salt?

Americans also consume three other chemicals in large amounts that compete for absorption
with iodine – and usually win. These chemicals are fluoride, chlorine and bromide. We’ll talk
more about these “iodine disrupting” chemicals in Chapter 11, and what you can do to make sure
that your breasts have enough iodine to confer the maximum degree of breast cancer protection.

**Gut and liver health**

Several theories of cancer development emphasize the concept of “total load”, or the cumulative
amount of toxins your body is challenged to neutralize on a day to day basis. When this load gets
too heavy to carry, the liver, our primary detoxification factory, can no longer keep up with the
job of clearing out waste products. As the wastes continue to build, these wastes recirculate and
damage first our cells, then, the DNA inside our cells..

By supporting a healthy liver and a healthy intestines, another major organ of detoxification and
elimination, we help to move toxins through and out of the body, minimizing toxic overload and
excessive DNA damage. A healthy liver is also critical in detoxifying human estrogens and
foreign estrogen compounds called xenoestrogens that can initiate and accelerate breast cancer
and Control. 2004) This is what we call good cellular housekeeping.
Cruciferous vegetables, curcumin (from the spice turmeric), beets, and carotenoids found in carrots, tomatoes, oranges and many other fruits and vegetables are particularly good at supporting the liver in breaking down these toxic additives, pesticides, hormones and other poisons that can threaten our health.

The liver is an organ with awesome executive responsibility; treat it well and it will take care of you, too. More on this in Chapter 12.

**CAT scans and other sources of radiation**

Two research studies were recently published, which revealed that CT scans deliver far more radiation than previously believed. (Redberg. Archives of Internal Medicine. 2009) One NCI study, in fact, found that patients undergoing the scans may be exposed to up to four times more radiation than previously estimated. This came to the attention of the public in an article in the 12/14/2009 issue of *USA Today* Researchers studying 1119 patients at four San Francisco-area hospitals concluded that one CT scan could expose a patient to as much radiation as 74 mammograms or 442 chest X-rays. (Smith-Bindman, et al. Archives of Internal Medicine. 2009) (Bullard. Academic Emergency Medicine. 2008)

It’s also worth noting that, although controversial at the time of this writing, some experts believe that yearly mammography screening may also confer additional risk from radiation with insufficient benefit to certain groups of women. These concerns spurred The U.S. Preventive Services Task Force (USPSTF) to recommend sweeping changes in its breast cancer screening guidelines in 2010, in a controversial move advocating for less frequent mammograms.
We believe that appropriate screening can be a life saving procedure. The choice of which forms of diagnostic screening to undergo is a critically important one, and a highly personal decision that must be weighed carefully with your doctor against all known risks of such procedures.

While we don’t actively support one form of screening over another (in fact they are often most powerful in combination), we do support the importance of educating yourself as to the risks and benefits of each procedure you chose to undertake, and to discuss this risk/benefit ratio with your health care practitioner.

**Nurturing your terrain**

As we pointed out at the beginning of this chapter, the internal terrain that you create within your body is one of the most critical factors that will influence the course of breast disease whether it is benign or cancerous. And with that, we’ll turn our attention to the specifics of managing that terrain.