

# Cancer & Diabetes

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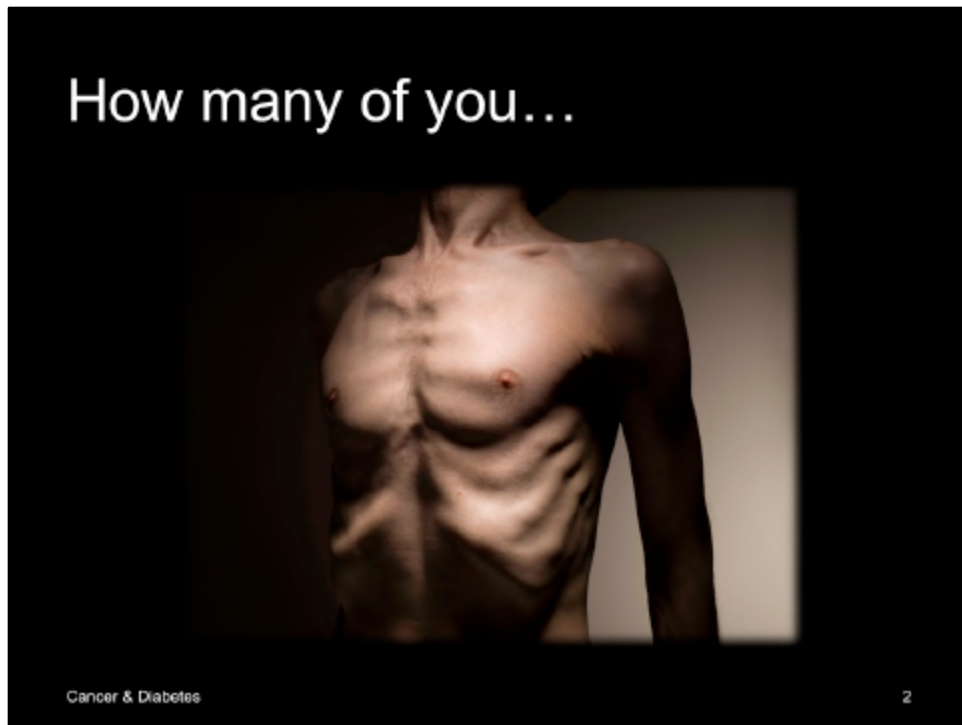
Good Evening.

As I look at you, all bright and inquisitive, looking to perhaps learn something, my mind goes to different groups of people I've addressed about health issues over the last few years.

I would like to ask you a simple question:

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By family, I means grandparents, grandchildren, first cousins, uncles, aunts, moms, dads, or children



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The response is much as I expected. Of course, if we were gathered in Africa – particularly South Africa – we would expect a very different response. So let me ask another question:

“How many of you have had diabetes or cancer, or have a family member affected by one of these two diseases?”

Now, we see the importance of “scratching where it itches.”



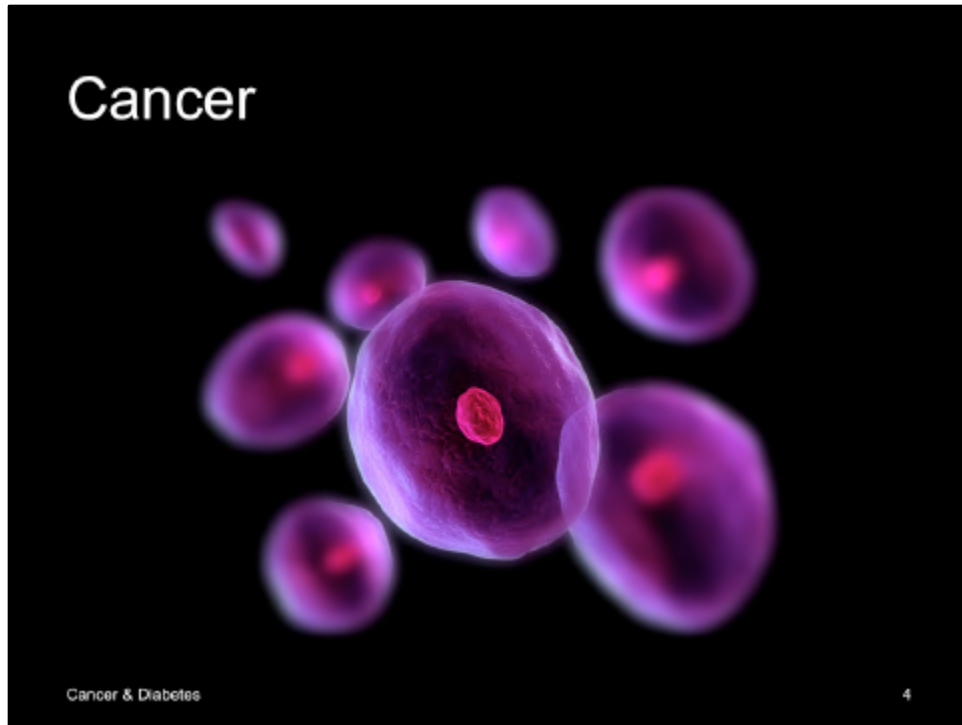
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One might question my sanity in trying to discuss two topics whose literature is so extensive, we could easily hold a month-long scientific symposium discussing the ramifications of each. Tonight, though, we have a simple and attainable goals: To distill into a simple presentation the essence of the preventive strategies you can use to prevent or reduce your risk of both. Additionally we seek to introduce you to an external source of power that will enable you to stick with the changes we might suggest .

It is also very interesting that the preventive strategy I am going to present actually covers both of these conditions. I shall endeavor to present only those concepts for which there exists a considerable body of evidence. “Evidence,” in this context, means that there is a sizeable body of information supportive of what we will present. Even here, we stratify evidence into “convincing,” “probable,” “possible,” and “inconclusive.”

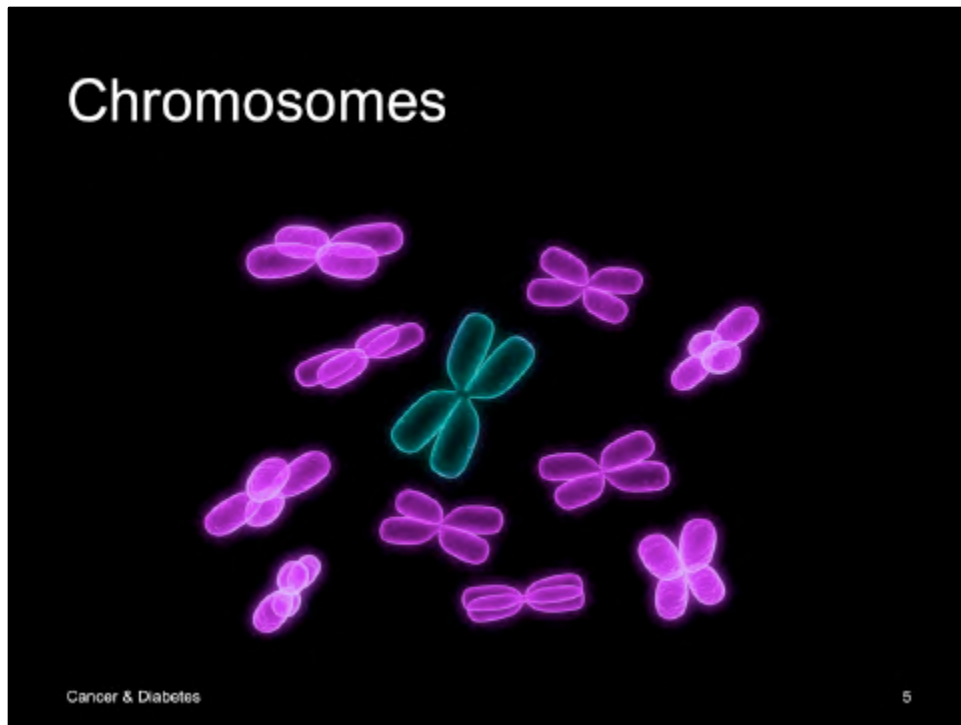
This is because not all studies are equal. In fact, some of our most “sacred cows” are probably not even worth making into hamburgers – to steal from the title of a book.

So, let’s begin with a brief understanding of these two conditions.



**CANCER**: Not all cancer is the same. In fact, each type of cancer has its own causative factors, natural history, and response to therapy. It is generally accepted that cancer begins through a failure of regulatory processes that originate in the nucleus of a cell.

The nucleus of a cell is that package of genetic material we inherit from our parents.



There are some 46 chromosomes, each paired – so there are 23 pairs.

These are condensed strings of genetic material, or coded sequences, of DNA responsible for every one of our characteristics. The cute little upturned nose, those lustrous olive eyes, the long, fluttering eyelashes – even the muscular build of the young “Adonis” and my tendency to a pot-belly – all are influenced by our genes. There is good news, though. We are not always locked into our genetic code, because regulatory genes are often influenced by the external factors to which they are exposed. This capacity of the “environment” to influence the genetic expression is what we will be discussing.

In fact, newly-discovered and extremely exciting is a new area of “epi-genetics,” which is exploring the relationship between environmental influences upon genes and the transmissibility of such effects to our offspring. This is exciting, and offers both hope and caution – for it means that not only may we pass on the benefits of a good lifestyle, but also the handicaps of our intemperance.

# Epigenetics



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I remember a schoolmaster who, when threatening us with the cane (yes – I grew up in Medieval times!) said, “Visiting the iniquities of the fathers to the third and fourth generation.” I was pleased to be able to finish the text for him with the words, “...but showing mercy to thousands of them that love Me and keep My commandments.”

“Epi-genetics comprehended three millennia before its definition?”

# Cancer



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Cancer is the unregulated division of cells, so that the purpose of their tissue is lost, and the adhesiveness of their cohesion is reduced, permitting cells to float away in lymph, blood, across surfaces, or even by infiltration into adjacent normal tissue. This is the process of spread or metastasis.

Sometimes, the cells grow slowly, and in other situations like “wildfire.” It usually requires some ten or more genetic defects to be present in a tissue for cancer to occur. Some of the defects are in the process of cell suicide, which is called APOPTOSIS, that scavenges and trashes defective cells. Some of us inherit defects in our genetic makeup that put us at increased risk. Syndromes or constellations of genetic risk have been recognized, and very well-known genetic defects are recognized, such as breast cancer genes 1 or 2 – unimaginatively called BRCA1 and BRCA2.



Now, let's look at DIABETES.

We categorize diabetes into a few types. The interesting and common feature in all types is that glucose, which is the monosaccharide sugar we called "blood sugar," *fails* to make adequate entry into the cells.

Glucose is the principle energy source for all cells. When there is inadequate amounts of glucose for energy, cells will switch over to using fats. When fat is metabolized, it can actually provide 9 calories per gram of energy, but if the demand for energy is very large and fat is the only source of energy, the more rapid first stages of metabolism are used, and the chemicals of the latter stages accumulate. These are what we call ketones – acetic acid, hydroxybutyric acid, and acetone. They create acidosis and ketosis, and are spilled into the urine.



# Diabetes



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The key to getting glucose into the cell is a hormone called *insulin*. Insulin is made in the pancreas, and is regulated by feedback mechanisms of blood glucose levels. Low blood sugar shuts off insulin production, and stimulates glucagon secretion, which promotes an elevated blood sugar. Several other hormones, such as cortisol, may also raise blood sugar levels. These “stress” hormones influence glucose regulation. The first and most serious forms of diabetes mellitus is Type 1, which develops because the pancreatic  $\beta$  cells, which produce insulin, are destroyed. Persons with Type I diabetes require. All kinds of effort can help control diabetes, but Type I diabetes requires insulin.

# Insulin



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Banting and Best, working at the Toronto General Hospital discovered insulin and opened our understanding of diabetes.

Type II diabetes is a different animal. Here, the insulin levels are actually raised. The problem is that this insulin, though normal enough in its structure, is actually partially blocked in its action. The consequence is similar to there being inadequate or no insulin.

Insulin acts as a “pump” to pump the blood glucose into the cell, but it has other functions. Insulin works as a tissue-building hormone. This function is not inhibited by the “resistance” factors of Type II diabetes, and insulin may play a role in stimulating tissue growth. Other substances named, for example, “insulin-like growth factor” (ILGF) also stimulate cell growth.

Here is a link between cancer and diabetes that may well account for the noted increase between cancer and diabetes.

Fat cells may well produce inhibitory factors that resist the glucose pumping action of insulin, causing a need for more insulin than normal to obtain a given result. The increased insulin and ILGF then promotes development of fat cells.

## The link



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Overweight people and obese people are at increased risk of cancer.

Now, after that very skimpy introduction, we may be able to make some sense of preventive strategies. Our information comes from clinical trials that follow populations exhibiting certain behaviors. Comparisons are made that permit a numerical quantification of increased or decreased risk. Some cancers are so rare, it would take great lengths of follow-up to identify risk factors; others, like breast, colon, and prostate cancer, are much more common – but even these are not easily teased apart in regard to causation.

While a given practice may increase or decrease risk, absolute protection *is not possible*. Our discussion today, then, does not guarantee success – it only suggests risk management strategies.

# My Vegetarian Plate



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Diet does seem to be a good place to begin. The food we eat passes through our digestive tract, and has a distinct capacity to directly interact with the cells of the GI tract.

This means factors like fiber that influence “transit time,” “bowel flora,” and the intestinal “chemistry” – all potential players in cancer causation – might be expected to show relationships to bowel cancer.

Factors that offer protection to our genetic material, such as antioxidants, folic acid, vitamin D, and vitamin B<sub>12</sub> might be expected to play a protective role.

# Carcinogens



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Some factors, called “carcinogens,” are known to cause cancer. The best-known are tobacco-derived carcinogens. Alcohol and its metabolites also are felt to be carcinogens.

# Carcinogens



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Flesh foods – particularly when scorched as when barbecued – may contain significant numbers of carcinogens.

## Good food



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Flesh foods – particularly when scorched as when barbequed – may contain significant numbers of carcinogens.

Foods such as broccoli, cabbage, Brussels sprouts, or – in other words – the cruciferous vegetables, provide powerful antioxidants such as isothiocyanates, vitamin C, vitamin E, beta-carotene, and other flavonoids. Hence, the recommendation of the richly-colored fruits and vegetables.

A vegetarian diet is strongly recommended, as it has very clear-cut benefits. There may be benefits to a well-balanced vegan diet, but there is insufficient evidence to confirm that just yet.

Vitamin D, a fat-soluble vitamin, may play a very important protective role against cancer. It is obtained by sunshine, enriched foods, and in some animal products. The Adventist Health Study has shown that vegetarians, as a group, have several distinct advantages: They weigh less than meat-eating omnivores. A relationship between fruit and vegetable intake and cancer rates was demonstrated in this study.

A massive UK study, called the EPIC study, has not been able to find the relationship which begs the question as to how comparable the “UK vegetarian” and their “SDA North American vegetarian” counterparts might be.

In the case of fiber intake, early studies did not show the cancer-reducing action of

# A few specific cancers and correlations



# Colon cancer



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**Colon Cancer:** Persons who eat meat have about 3.6 times the incidence of colon cancer *vis-à-vis* the vegetarian. This is a very significant finding. It may well be fiber-mediated, because meat-eating people who then add four servings of legumes per week to their diet are noted to have a much-reduced risk of colon cancer.

## Breast cancer



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**Breast Cancer:** Though some studies did suggest a relationship with animal fat intake, these have not been replicated, and the general consensus is that we do not have sufficient data to opine about dietary risk factors.

# Prostate cancer



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**Prostate Cancer:** Dietary correlates are generally lacking. Sunshine and vitamin D levels may play some role, and cooked tomatoes may offer some protection through their lycopene concentrations.

# Lung cancer



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**Lung Cancer:** Though specifically linked to smoking, in the majority of cases is reduced in those taking lots of fresh fruit – but increased in those taking supplements of beta-carotene.

Obesity, alcohol, and tobacco  
are major players in  
raising cancer potential.

## Whole foods



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In general, I would strongly recommend the use of “*whole*” foods. Refinement, so called, is in general damaging to the benefit of the food. Whole foods are digested more slowly, give a greater sense of satiety, and are associated with lower glycemic indices (that’s blood sugar-raising effects).

Fats deserve special attention, because not only do they cause effects Dr. Landless will discuss tomorrow night, but they contain double the calories per gram of protein or carbohydrates. They contribute to obesity and, consequently, to the risks of both diabetes and cancer.

Of course, balance is essential, and we do need some fats to give us our fat-soluble vitamins. Dr. Landless will expand on that tomorrow.

## Healthy fats



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Limited amounts of *oils*, especially ones containing Omega 3 like olive oil. Sunflower, flax, and canola oils are good in normal amounts.

## Drawing it together



So, let me try to draw this together.

Some foods – e.g. fruits and vegetables and whole grains provide fiber, and phytochemicals that have protective effects against both cancer and diabetes.

This is a quantitative effect, requiring us to eat *good* quantities of these foods. Meat-eaters will find it difficult to ingest sufficient of these foods.



## Drawing it together



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Whole or unrefined foods not only contain more natural protective elements, but provide fiber. Such foods do not shoot up the blood sugar with a see-sawing effect on insulin and blood glucose. They are to preferred in managing diabetes and also in reducing cancer risk.

## Drawing it together



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Exercise is known to lower cancer risk and diabetes risks – possibly through its weight-reducing actions. It both burns calories and raises the basal metabolic rate. Aim for 45 minutes every day of aerobic type exercise that includes a light sweat, plus 10 to 15 minutes of weight-resistant training for optimal results.

## Drawing it together



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If overweight, plan to reduce your weight. Don't go bananas, trying to lose 50 or 60 pounds in two months. Plan a slow, gradual, and sustainable weight loss by a sustainable eating and exercise program. A 5- to 10-pound weight loss might result in a 25 to 40 percent improvement in blood sugars and other indicators of health.

## Drawing it together



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Always get adequate rest – this reduces stress and its associated hormones.

## Drawing it together



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It is so elementary, yet so often ignored – avoid tobacco and alcohol. Both of these are carcinogenic, and alcohol stresses the body’s metabolism. “Beer bellies” are indicators of the “metabolic syndrome” – which includes diabetes.

## Drawing it together



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Eat breakfast every day. people who eat within two hours of awaking have better weight control, with its reduced propensity to both cancer and diabetes.

## Drawing it together



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Get enough sunshine to boost your vitamin D and its protective effects. If you are not able to do this, get onto a routine supplement of 1,000 to 2,000 international units per day.

## Drawing it together



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Drink sufficient water to match your thirst, plus another third. This dilutes out the urinary waste products, ensures frequent bladder emptying, with lowered concentration of potential bladder carcinogens.



## Drawing it together



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Enjoy positive relationships.  
With our Heavenly Father.  
With each other.  
Peace and contentment pays off in health dividends.