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CARE Meeting; October 13, 2016 in Ridgewood NJ

Re-Evaluation of Approaches in Integrative Oncology

References and Notes for Lecture at CARE on Oct 13, 2016

These first two published papers represent information about Dr. Schachter's views on cancer strategies with many references. Each may be accessed online at the links below each one respectively and also from our website

Schachter, M. Integrative oncology for clinicians and cancer patients. *International Journal of Integrative Medicine* (2010) Vol. 2, No 1, 52-92.
http://www.schachtercenter.com/IntegrativeOncologyISIMJournal.pdf

Schachter, M. Integrating nutrition and selected controversial nutritional supplements into a cancer treatment program. *Cancer Strategies Journal* (2013) Vol.1, Issue 3, 39-47.
www.cancerstrategiesjournal.com/MichaelSchachterMDArticleSummer2013.pdf (This link incorporates corrections to the original printed version)

Summary Information of Selected Slides

- Quote by Albert Saint-Gyorgyi: ***"Discovery consists of seeing what everybody has seen, and thinking what nobody has thought".*** See: http://www.brainyquote.com/quotes/authors/a/albert_szentgyorgyi.html#ixzz1lkjiGfxS/

- A major thesis of this presentation is that ***alternative treatment protocols have the potential to be competitive if not superior to conventional treatments***. They should be considered as a ***primary,*** not merely supplementary option for treatment. They can be used for prevention.

- ***We are losing the war on cancer*** as set up by President Nixon in the early 1970's with little change or an increase in the death rate and the incidence of many cancers, as shown by comparing mortality rates from 1950 with 2005 for various diseases, including cancer.

- The understanding about the nature of cancer and cancer treatment are in the process of undergoing major changes, though for economic and social reasons, ***there is tremendous resistance to these changes. Resistance comes from pharmaceutical companies, organized medicine, insurance companies, institutes of medical education and the media.***

- ***What is cancer according to the National Cancer Institute (NCI)?*** http://www.cancer.gov/about-cancer/understanding/what-is-cancer#differences-cancer-cells-normal-cells/ Cancer is a collection of related diseases, whose cells grow uncontrollably, invade tissues and resist dying, even when old. Cancer is a ***genetic disease*** characterized by mutations in (a) oncogenes - genes that accelerate growth; (b) suppressor genes - genes that suppress growth and/or DNA repair genes.

- Since the 1950's ***the dominant theory of cancer causation*** has been that it is caused by a ***series of mutations in the specific families of genes called proto-oncogenes, suppressor genes and DNA repair genes***. This theory has dominated the thinking and drastically affected the research in cancer treatment.

- ***Bert Vogelstein MD of Johns Hopkins*** has been a major supporter of the genetic point of view and has developed treatment drugs based on this theory. His website can be accessed at: https://www.hhmi.org/scientists/bert-vogelstein
  Treatments have been largely unsuccessful, as shown in a ***NEJM 1997 study by Dr. Bailar MD, PhD.*** This study can be accessed at: http://www.nejm.org/doi/full/10.1056/NEJM199705293362206

- ***Understanding the nucleus and cytoplasm of a cell, chromosomes, genes, ploidy and mutations:***

  To understand cancer, we need a rudimentary understanding of the nucleus of a cell, the cytoplasm of a cell, chromosomes, genes and mitochondria. A gene is a segment of DNA containing the code used to synthesize a protein. A chromosome contains hundreds to thousands of genes. Every human cell contains hundreds to thousands of genes. Every human cell contains 23 pairs of chromosomes, for a total of 47 chromosomes. According to the somatic-mutation theory of cancer, abnormalities in the structure of genes brings about cancer.

  A cell consists of a nucleus and cytoplasm, which surrounds the nucleus. The cell is surrounded by a cell membrane. Within the cytoplasm are small structures called mitochondria in which chemical reactions take place ***primarily utilizing oxygen*** that results in the formation of ATP molecules, the major supplier of energy for all of the reactions that take place in the body ***(90% in normal cells)***. This process is known as oxidative phosphorylation and involves a series of biochemical reactions known as the ***Krebs Cycle*** or the tricarboxylic acid cycle and the ***electron transfer chain***.

  If there is sufficient ***damage to the mitochondria,*** cells are unable to sufficiently produce ATP molecules via the process of oxidative phosphorylation. Instead they produce ATP

molecules without oxygen, largely in the cytoplasm of the cell. This process is very inefficient and produces only ***2 ATP molecules*** from a molecule of glucose (sugar), whereas oxidative metabolism produces approximately ***32 to 38 molecules of ATP*** per molecule of sugar. Whereas normal cells produce 90% of their energy in the mitochondria, cancer cells produce only about 50% of its energy from mitochondria, the rest being formed in the cytoplasm with anaerobic metabolism (production of ATP without the use of oxygen).

- ***The ploidy*** of the nucleus refers to the number of pairs of chromosomes in the cell. ***Haploid*** refers to one set of chromosomes and ***diploid*** refers to 2 sets of chromosomes, which is what is present in the normal cell of the human nucleus of the cell. It has been known since about 1914, as described by Boveri that ***the nuclei of cancer cells are aneuploid,*** which means that ***the chromosomes of the cells are totally disorganized, with missing chromosomes, more than two of some chromosomes and what appears to be chaos in the nuclei of cancer cells.***

- Although this has been known for a very long time these differences in the nuclei of normal cells and cancer cells have been largely ignored by scientists dealing with cancer. A nice discussion of this may be found in the ***May 1, 2007 article by Peter Duesberg*** in Scientific American. See: https://www.scientificamerican.com/article/chromosomal-chaos-and-can/

- ***An alternative theory that began in the 1920s*** and has received some attention from the cancer establishment only in the last few years. This theory asserts that ***the major difference between a normal cell and a cancer cell is that cancer cells have difficulty using oxygen to produce the energy molecule (ATP), whereas normal cells are able to use oxygen without a problem.*** This principle is largely ignored by conventional oncologists. The idea was first proposed in the 1920s by Nobel Prize winning physician biochemist, ***Otto Warburg MD, PhD.*** and elaborated by him until his death in 1970. Cancer cells require many times as much glucose (sugar) molecules to produce the same amount of energy as normal cells. Excessive sugar in the bloodstream drives inflammation and drives cancer. ***Cancer cells have difficulty using oxygen as a result of damage to mitochondria and only about 50% of the energy produced by cancer cells is produced with the help of oxygen. In normal cells about 90% of ATP is produced with the help of oxygen (aerobic metabolism). Warburg also hypothesized that cancer developed as a result of low oxygen concentrations in cells.***

- ***Interest in Warburg's work was minimal,*** as the somatic mutational theory of cancer dominated conventional oncological thinking, research and drug research from the 1950's to the early 2000's and after Warburg's death in 1970, interest waned even further***. Robert Weinberg PhD from MIT was and is a strong advocate of the genetic cause of cancer*** and was highly critical of Warburg, considering him to be an ancient relic of the past with no relevance to cancer research. He has greatly influenced the path of conventional cancer research and drug development. He has strong ties to the pharmaceutical industry and to corporations in general. His home website is: http://www.weinberglab.wi.mit.edu/ He is the author of the influential

textbook ***The Biology of Cancer*** (2006) and made a list of 6 characteristics of cancer, leaving out perhaps the most important characteristic, which was the Warburg Effect.

- ***The champion of continued interest in Warburg was carried on by Peter L Pederson PhD,*** a brilliant scientist who began to work at Johns Hopkins in 1968. He was a protégé of the famous energetic biochemist Albert Lehninger (author of the textbook "*Principles of Biochemistry")* and continued cancer research with a strong interest in Otto Warburg's theory. Lehninger showed in 1948 that the conversion of sugar to ATP with aerobic metabolism took place in the mitochondria. Warburg explained how cancer cells differed from normal cells while Pedersen's research actually showed how cancer cells did this. ***He showed that the enzyme Hexokinase 2 (HK2), which catalyzes the reaction of glucose to glucose-6-phophate, keeping the glucose in the cancer cell, was very abundant in cancer cells, but uncommon in normal cells.*** HK2 is drastically overexpressed in cancer cells and hardly appears at all in normal cells, which use hexokinase (not hexokinase 2).

- A major contributor to this work involving HK2 in cancer cells was a scientist from Peru named ***Ernesto Bustamante PhD*** who worked under Dr. Pedersen. He showed that HK2 was located on the outer membrane of mitochondria and was involved in both aerobic and anaerobic metabolisms in cancer cells.

- Another major contributor to this work in Dr. Pedersen's laboratory was ***Richard Nakashima PhD*** who showed that HK2 was associated with a structure called the ***Voltage Dependent Anion Channel (VDAC).*** VDAC in a normal cell is involved in programmed cell death, but ***in cancer cells when it is hooked to HK2, this programmed cell death is inhibited resulting in cancer cells becoming immortal.***

- Dr. Pedersen's group also showed that ***a third structure, the ATPase enzyme, was intimately involved with HK2 and VDAC in cancer cells.*** ATPase is the enzyme that produces ATP in both normal and cancer cells. ATPase is involved in both producing ATP from glycolysis and aerobic production, which is impaired in the cancer cell. ***These 3 structures in cancer cells, the hexokinase 2 (HK2) enzyme, the Voltage Dependent Anion Channel (VDAC) and the ATPase enzyme, became the targets for the destruction of all energy production (both aerobic and glycolytic) in cancer cells.***

- Around 2005, Dr. Pedersen began to collaborate with a Korean scientist, ***Young Hee Ko Phd,*** who some had described as the most brilliant, conscientious and diligent scientist to ever work with Dr. Pederson in his laboratory. ***Young Hee Ko PhD researched the small molecule 3 bromopyruvate as a possible cancer fighter.*** This chemical, which is readily available from chemical companies like Sigma, has a chemical structure very similar to both pyruvic acid and lactic acid. Both of these chemicals are involved with glucose metabolism and are involved with the production of ATP. As sugar enters a process, which leads to the production of ATP in the

cell, both pyruvate and lactic acid are extremely important. **Lactic acid is the end product of anaerobic metabolism in cancer cells. As lactic acid accumulates in cancer cells, it lowers the pH in the cancer cell to the point which the cancer cell could be killed**. To protect itself**, the cancer cell developed lactic acid channels to allow the lactic acid to leave the cancer cells. These are not present in normal cells as they are not needed since so little lactic acid is produced in normal, non-cancerous cells.**

- Prior to working with Dr. Pedersen, Dr. Ko had done considerable research on a very simple molecule, 3-Bromopyruvate (3BP), whose structure is similar to that of lactic acid and pyruvic acid. It turns out that **BP is able to preferentially enter the cancer cells through the lactic acid channels (this is the Trojan Horse Effect**). Since normal cells do not have lactic acid channels because very little lactic acid accumulates in normal cells, 3BP does not enter normal cells at lower concentrations.

- **Once 3BP enters the cancer cell, it combines with Hexokinase 2, inactivating it and preventing it from producing glucose-6 phosphate, the energy source for cancer cells (both aerobic and anaerobic). Thus cancer cells die, but normal cells are not affected. The key here is dosage. With the concentration of 25 Micromolar, 3-BP is able to enter cancer cells, but not normal cells. The killing of cancer cells is a combo of apoptosis and necrosis.**

- During their research, Drs. Pedersen and Ko checked **several other small molecule chemicals** beside 3BP to determine how well they killed cancer cells. These included: L-Glucose, 2-Deoxy-Glucose, 5 Thio-Glucose-6-phospate, 6-Fluoro-5-Deoxy-D-Glucose, 2-Fluoro-2-Deoxy-D-Glucose, 0-Methyl-Glucose, Lyxose and Xylose. **3-Bromopyruvate was by far the best in killing cancer cells.** 3-BP is a very acidic and unstable compound; so for human use, it needs to be stabilized and buffered. Dr. Ko was able to do this and filed for a patent which involves buffering, establishing ionic strength, setting up proper osmolarity and identifying a stabilizing solvent.

- To see this whole thing in action**, view the 90-minute lecture by Dr. Pedersen at the National Cancer Institute in 2009 at: https://videocast.nih.gov/summary.asp?live=7542&bhcp=1**. His animal studies show how large cancers in small animals are completely destroyed within a few weeks and live normal lifespans while control animals die from cancer within a few weeks.

- The **results of one set of experiment were**: 33 rats were all injected with hepatocellular carcinoma (HCC) cells. Nineteen of the 33 animals were treated with 3BP and the cancers all disappeared within 3 to 4 weeks and they all lived normal life spans. The 14 control rats all suffered with progressive advanced cancers and had to be euthanized in 3 to 4 weeks. Because Dr. Pedersen was concerned that no one would believe the results, he had an **independent radiologist do PET scans** on the animals, which confirmed the presence and then the disappearance of the cancers.

- Similar results were obtained with rabbit studies and with nude mice who were injected with transplantable cancers. 3 BP was far better and much faster and safer in these animal systems than any of the treatments currently approved by the FDA for the treatment of cancer.

- The delivery methods of 3-BP in the animal experiments include: intratumoral (IT), intra-arterial (IA), subcutaneous (SC), intraperitoneal (IP) and intravenous (IV). They all worked well. I suspect that in humans, oral or sublingual routes might also work.

- **In these studies, toxicity was favorable in that all of the animals treated with 3-BP appeared to be cured of cancer and went on to live normal lifespans.** These results are unheard of in cancer studies in animals which use other agents. No animals were lost in the studies. Dosages in the rats were 0.5 to 5 mg per Kg of bodyweight in the rats and 1.25 mg per Kg of body weight in rabbits. When 10 times the curative doses were administered to animals, there was no evidence of toxicity. The curative dosages in these studies were 200 times less than the dosages that show toxicity in other NCI studies.

- **Sadly, 3-BP is not readily available for cancer patients**, as economic and power conflicts developed over this work. There were conflicts about patents for 3BP and Dr. Ko was forced out of Johns Hopkins, as she was not given her own lab space, which prevented her from getting future grants. Court battles involving the ownership of the patent to make 3-BP safe and other issues are being carried out at present. Dr. Ko left Hopkins and set up her own lab and website at: **http://www.umbiopark.com/tenants/kodiscovery-llc.** For additional information about this story, see Dr. Dach's article at: **http://jeffreydachmd.com/2015/01/cancer-metabolic-disease-jeffrey-dach-md/**

- A recent report (August 2016) involving **the deaths of 3 cancer patients who were attending an Alternative Cancer Therapy program in Germany is thought to be due to 3-Bromopyruvate**. Here are some websites that discuss the issue of 3-BP for cancer: **http://www.sciencemag.org/news/2016/08/candidate-cancer-drug-suspected-after-death-three-patients-alternative-medicine-clinic;** **http://blogs.sciencemag.org/pipeline/archives/2016/08/17/3-bromopyruvate-what-a-mess** **https://www.ncbi.nlm.nih.gov/pubmed/26054380** **http://edzardernst.com/2016/08/fatalities-in-a-german-alternative-medicine-clinic-caused-by-3bp/**

- Although the somatic mutational theory of cancer still dominates the conventional view of cancer, cancer research and drug development, **the Warburg Hypothesis is gradually emerging as an important theory to guide cancer research and treatment.** This is evidenced by the book: ***Cancer as a Metabolic Disease (2012)* by Thomas Seyfried PhD** from Boston University. One of his excellent lectures can be viewed at: **https://www.youtube.com/watch?v=sBjnWfT8HbQ.**

- In the previously discussed lecture, Dr. Pedersen remarks that there are now plenty of cancer article that discuss the Warburg hypothesis. It is beginning to come into favor in the research world, but the average oncologist does not seem to be aware of it.

- In 2000, the somatic mutational theory of cancer was still very strong. Based on this theory, it was believed by the **somatic mutational theory of cancer promoters that an understanding of the genetic code would lead to a deep understanding of the development of cancer and to very useful treatments**. The human genome project was completed in 2003 and promoters of this theory was certain that it would be easy to find relevant sequences of genes in each common cancer that would lead to drugs that would result in a complete victory over cancer. But, unfortunately, **they were completely wrong**. No patterns could be found for different types of cancers and sequences varied not only from patient to patient with the same disease, but even among cancer cells within the same person. This makes sense if one recalls the chaos in cancer cells as reflected by aneuploidy in the nuclei of cancer cells.

- **A New Book** shows how **the less than useful theory of the somatic mutational theory of cancer fails to lead to useful treatments.** It outlines how the metabolic theory of cancer due to mitochondrial damage results in potentially useful treatments. Some of these groundbreaking treatments, like 3-bromopyrate for cancer, are discussed in detail. The book is: ***Tripping Over the Truth*** by **Travis Christofferson**. It has been promoted by Joseph Mercola MD at his website. This book develops the history of the theories of cancer theories and the treatments that followed. He concludes that only the Warburg theory offers and real hope for any progress in cancer treatment.

- **Cancer cells** are not only characterized by being unable to utilize oxygen because of damaged mitochondria, but also **develop as an adaptation to a low oxygen environment.** This adaptation develops over a long period of time and becomes irreversible. More information about this concept and how it relates to impaired oxygenation of cells via changes related to impaired cell membranes as a result of the incorporation of adulterated fatty acids from processed foods can be found in: **Brian Peskin's book "*The Hidden Story of Cancer*"**, *which is available for a fee at: **http://store.pinnacle-press.com/hidden-story-epub.html*** Also see the website: **www.PEO-Solution.com**.

- **Parent Essential Fatty Acids, Adulterated Fatty Acids and Dysfunctioning Cell Membranes:** Peskin argues that the **parent essential fatty acids (linoleic acid which belongs to the omega 6 family and alpha linolenic acid which is a member of the omega 3 fatty acids family) occupy cell membranes and attract oxygen into cells.** When they are adulterated (their structure is altered in order to make the shelf life of foods longer), the **concentration of oxygen in cells drops significantly, as much as 50%. Over time, this increases the risk of cells becoming cancerous, since a reduction to 33% over time may bring about cancer development, according to Dr. Warburg.**

Another assertion of Peskin is that **fish oil concentrate supplements are not physiologic and are greatly overused by both conventional and alternative practitioners**. One fish oil supplement contains an amount of EPA and DHA found in several fish meals and when the body is overloaded with them, the cell membranes become unstable and the oxygen content in the cells decrease. Many conventional and alternative practitioners recommend fish oil supplements to their clients because of the numerous studies that conclude that fish oils possess anti-inflammatory qualities. However, most of the anti-inflammatory studies with fish oil were short term (3 months or so) and they may operate like steroids showing great short-term effects, but bad long-term effects.

For an excellent Youtube audio interview of Brian Peskin, watch:
https://www.youtube.com/watch?v=Ei2wUzrXRyU

For the book, see: http://brianpeskin.com/reader-reviews.html

According to Shlomo Yehuda PhD of Israel, the ideal ratio of parent essential fatty acids of omega 6 (Linoleic Acid) to omega 3 (Alpha Linolenic Acid) is 4:1, though Peskin thinks the ratio should be somewhat lower

See: https://www.researchgate.net/publication/227141668_Essential_Fatty_Acids_and_Stress

Cell membranes require both parent omega 6 and omega 3 fatty acids, which can be obtained from organic foods or oils that are not heated. Over time, ingestion of these oils, will bring about a positive oil change in the body. In other words, a person may undergo a favorable oil change.

Adulterated fatty acids and large amounts of sugar in the diet may be two of the main reasons for high cancer rates. Foreign chemicals may also distort cell membranes and lower oxygen content, predisposing to the development of cancer.

- **Conventional Cancer Treatments are: Surgery, radiation, chemotherapy and targeted therapies. Targeted therapies use patented medications to inhibit or block biochemical pathways that play a role in cancer growth and spread.** Most generics of these medications end in “mab” (monoclonal antibodies) or “nib” small molecules. Examples are: Herceptin = Trastuzumab (a monoclonal antibody); Avastin = Bevacizumab (a monoclonal antibody); Gleevec = Imatinib (a small molecule); and Tarceva = Erlotinib (a small molecule). **The problem is that there are many pathways within a cancer and these drugs have only limited effectiveness and also have side effects.** These pathways are used in normal cells as well and strong inhibition of a pathway may cause severe side effects. Also, many of these cancer pathways can be blocked with natural substances with much less side effects.

- **Conventional oncology and the entire field of medicine and health care are driven by profits and use of expensive diagnostic tests and patentable drugs with little attention to non-patentable items like natural substances and less expensive diagnostic procedures.** It is up to the patient to research and gather all relevant information and make a decision based on this information rather than just depend upon the doctor to make the decision.

- **Downside aspects of the conventional approach to diagnosing and treating cancer and the dark side of Clinical Trials**

  The focus of conventional cancer treatment is to destroy cancer at all costs, with little emphasis on lifestyle and good nutrition. Patients are often told to avoid all nutritional supplements, as they might interfere with conventional treatment. Progress is often measured by tumor shrinkage with CT or PET scans. This is not a good measure of treatment. Both the diagnostic procedures and conventional treatment are very expensive, though mostly covered by insurance

  An excellent article that discusses the incredibly expensive cost of many of the anticancer drugs can be found in a New York Magazine article in Oct. 2013: http://nymag.com/news/features/cancer-drugs-2013-10/

  Diagnostic Procedures

  Some of the negative aspects of diagnostic procedures include: exposure to large amounts of radiation from CT scans (about 100 chest x-rays0 and PET scans (500 chest x-rays). Although these procedures are frequently used to determine the size of a tumor with the supposition that shrinking the tumor necessarily means the treatment is working, it turns out that the size of the tumor shrinkage is not a good measure for the longevity of the patient or success of the treatment (a tumor may shrink with chemotherapy or radiation therapy, but the cancer stem cells in the tumor may not be affected; so that the longevity of the patient may not be affected by the shrinkage of the tumor). Another problem with diagnostic procedures is that biopsies cause inflammation and inflammation may actually stimulate cancer growth. Frequent prostate and/or breast biopsies may contribute to the development of cancer or spread of a cancer if it is present.

  Clinical Trials

  Clinical trials are often presented to patients as a way of helping cancer patients whose options are running out. But, they do have a dark side. Almost all of them are funded by pharmaceutical companies utilizing substances that are patentable, while natural substances which may be effective and relatively inexpensive are not studied because they are not patentable and therefore are not potentially profitable. The rules surrounding the trials relate to patients having exhausted all available conventional treatments before being eligible for a trial. But, the conventional treatments of radiation and chemotherapy cause severe damage to the immune system, even though the experimental treatment may require an intact, functioning immune system for the experimental treatment to be effective. In my experience, clinical investigators often appear to be more interested in the clinical trial than in the welfare of the patient. Patients are discouraged from using natural non-harmful substance because they are told that they may interfere with the clinical trial. From my vantage point, patients generally report that they do better when they have added nutritional and lifestyle factors, including supplements to their program, compared to patients who stay away from these supportive approaches while doing a clinical trial. Rarely do I see patients in a clinical trial improve their condition as a result of participating in the clinical trial.

- **Questions that a cancer patient or representative should ask include:**
  Will survival time be increased & quality of life be enhanced?
  What risks are associated with the treatment? Consider absolute vs relative risks. Often this is misleading. If the absolute risk of cancer recurrence is 4% and the relative reduction is 50%, then the absolute reduction is 2%. Not very much, especially if there are significant side effects.
  Morbidity: What adverse side effects are associated with the treatment?
  Mortality: What is the likelihood of death associated with the treatment? and
  What is the likelihood of the development of secondary cancers from the treatment?
  The best available information should be used when making decisions and not limited to only information from clinical trials.

- **Upton Sinclair, Author of *The Jungle*, a 1906** novel revealing the harsh living conditions of immigrant workers in the meat-packing industry, once said: **"It is difficult to get a man to understand something, when his salary depends on his not understanding it."** Conventional oncology is extremely profitable for oncologists and pharma. Does this help us understand what is happening in health care today and especially with cancer?

- **The poor results obtained by conventional oncology treatment may be partially explained by the significance of cancer stem cells, which are just beginning to be appreciated by certain elements within conventional oncology.** To understand cancer stem cells, it is important to understand stem cells. **Stem cells** are cells that are located throughout the body that are capable of becoming any of a variety of cells. When a body part is damaged, signals are sent to stem cells in the area. These signals bring about a conversion of the stem cells to the same type of cell as the damaged cells, thus repairing the damage. During embryological development of the fetus, 80% of the precursors to the ova or spermatozoa become these germ cells, which are located in the ovaries and testes respectively. **The rest of these cells (20% of them) are scattered throughout the body and become the stem cells.** This theory was first elaborated by embryologist **John Beard MD, PhD in his trophoblastic theory of cancer in 1911**. For more about this theory, see the book by the **late Nicholas Gonzalez MD: "*The Trophoblast and the Origins of Cancer*" (2010).**

- **Cancer Stem Cells** are stem cells that have gone awry and become cancerous. Cancer stem cells constitute **only 1 to 5% of the volume of solid tumors**, but they are extremely important. They are the **main reasons for failure in the treatment of cancer.** They are the **only cancer cells that metastasize.** They are generally **resistant to radiation therapy and chemotherapy** and these treatment modalities will generally **concentrate the cancer stem cells** and stimulate their growth. This is one reason that solid tumors may shrink with radiation and/or chemotherapy (as shown on CT scans and other imaging), but this shrinkage is **not well correlated with improved survival time or improved quality of life.** A quote from Daniel Haber MD, Director of the Mass General Hospital Center, reflects this view.

- **If chemotherapy and radiation do not significantly control cancer stem cell proliferation, the question is: how can cancer stem cells be controlled? Cancer stem cells are stimulated to proliferate by inflammatory processes and anti-inflammatory activities will inhibit them.** Certain prescription medication (e.g. COX 2 inhibitors like Celebrex) will inhibit inflammation and have anti-cancer properties, but many side effects**. A variety of anti-inflammatory strategies, such as an anti-inflammatory diet, low in sugar and processed foods, should inhibit cancer stem cell growth**. A variety of natural substances, such as black cumin, curcumin, broccoli extracts, vitamin D and many others have anti-inflammatory actions. Conventional oncology strategies for inhibiting cancer stem cells are focused on patented prescription medications, which have a great profit potential.

- A champion for the use of **curcumin for cancer is Bharat B Aggarwal PhD** who did research at MD Anderson for many years. His article on the many ways that curcumin deals with cancer can be found at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758121 and his book **"*Healing Spices*"** is readily available.

- **SALVESTROLS: A group of novel, relatively non-toxic substances found in *organic* fruits, vegetables and herbs that may be useful for cancer patients**.

- **Salvestrols and CYP1B1**. In the 1990's, an **enzyme known as CYP1B1** was found in cancer cells by Dan Burke PhD and his reteach group, but not in normal cells. Research showed that a variety of natural substances found in organic fruits, vegetables and herbs, which were designated **salvestrols, could combine with the CYP1B1 to form metabolites which stimulated programmed cell death** (apoptosis) in cancer cells or inhibited cancer cells in other ways. Since there was no CYP1B1 in normal cells, **they caused no harm to normal cells**. So this was a potentially beneficial approach to healing cancer. This approach does not treat salvestrols (natural substance derived from organic fruits, vegetable or herbs) as drugs and **no clinical trials have been carried out.** However, **various reports from a variety of sources, including our own experience, indicate that salvestrols may be helpful to cancer patients** and may be an important strategy to help cancer patients and possibly prevent the development of cancer, along with a variety of other strategies. Salvestrol deficiencies in typical diets probably play a role in the widespread incidence of cancer. Salvestrol deficiency may be corrected with a diet rich in salvestrols and with a supplement containing salvestrol.

  A number of studies show that the enzyme protein CYP1B1 is present in cancer cells, but not in normal cells. Two references are: Carnell, D. et al. *Int. J. Radiation Oncology Biol. Phys.* ***58****:* 500-509 (2004) and Murray et. al. Expression of CYP1B1 in biopsies and normal tissues. *Cancer Res.* 57: 1997.

- **Books about Salvestrols**:
  Schaefer, BA. *Salvestrols: Nature's Defence Against Cancer,* Acquired Intelligence Inc., Victoria, Canada, 2012.

Schaefer, BA. *Salvestrols: Journeys to Wellness*, Acquired Intelligence Inc., Victoria, Canada, 2013.

- **Inhibitors of the CYP1B1 enzyme that prevent salvestrols from working properly**: A variety of substances inhibit the CYP1B1 enzyme and therefore prevent salvestrols from working properly. Examples are: **resveratrol** in high doses (> 40 mg); **Amygdalin=Vitamin B17 = Laetrile** or sources like bitter apricot kernels (CAN'T USE WITH SALVESTROLS); **Citrus flavanone naringenin** from grapefruits; **Carbon monoxide (present in cigarette smoke**); Various **herbicides and pesticides**, such as **Roundup,** as well as many household chemicals; **Various herbs**, such as **Cannabis (components of marihuana), St. John's Wort, Ginkgo biloba, Gin Seng**; **Artificial Sweeteners**, the supplement **Calcium D Glucarate** and the drug **Metformin,** which is approved to manage diabetes, but is being used off label to help manage cancer patients

- **Synergistic Nutrients for Salvestrols:** A variety of nutrients are needed to ensure that salvestrol work well. Many of these can be derived **from a good diet and a good broad spectrum multivitamin and mineral formulation**. We frequently use a supplement called **Hardy's Daily Essential Nutrients from Nutratek**. The nutrients that are needed include: **Iron**-Check Hgb and **Ferritin**; the backbone of every cytochrome P450 Enzyme contains iron; **Magnesium**-400 mg Enhances conversion of salvestrol to metabolite that initiates apoptosis; Supports CYP1B1 activity; **Niacin or niacinamide**-100 mg twice daily-enhances conversion of salvestrol to metabolite; **Vitamin B2** (Riboflavin); **Biotin-stimulates** CYP1B1 production; **Selenium**; **Vitamin C** -helps with detoxification; **oxygen is crucial for Salvestrol**-CYP1B1 Activity (attaches to iron).

- **Evidence for Benefits of Salvestrols:** There are no clinical trials or controlled studies; but there are reported and documented case histories. There are case studies, reported in 3 journal articles by Brian Schaefer, as well as informal case reports given to developers of Salvestrol, especially from New Zealand. 21/23 children and adolescent with advanced cancers stable or improved over the last few years; There are also new reports from China, though the hospital in China that used salvestrols is now closed; Our own case reports. **Many of our patients who use salvestrols, along with other strategies, appear to be doing very well.**

- **Salvestrol Point System** is based on selectivity of action of salvestrols. A good diet contains about 300 points of salvestrol, whereas each capsule contains 2000 Points. Dosage depends upon the severity of the condition with 1 capsule daily for prevention and about 8 capsules daily for stage IV advanced cancers. Dosages may be adjusted depending upon the patient's clinical significance and financial issues.

Published papers about Salvestrols

- Burke, Dan. Evidence that CYP1B1 is a Universal Tumour Marker, *Unpublished Paper with 18 published peer reviewed references.* Access at: http://www.salvestrolen.nl/ResearchItem.asp?IDResearch=42

- Schaefer BA, Tan HL, Burke MD and Potter GA. Nutrition and Cancer: Salvestrol Case Studies, *Journal of Orthomolecular Medicine*, First Quarter 2007, Volume 22, Number 4.https://secure.salvestrol.ca/secure/doc/jom_Schaefer2007CaseStudy.pdf
- Schaefer BA, Dooner C, Burke MD, and Potter, GA. *Journal of Orthomolecular Medicine, Volume 25, Number 1, 2010.* https://secure.salvestrol.ca/secure/doc/jom_Schaefer2010CaseStudy.pdf
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- ***Note that Professional Caregivers and Science Researchers may access many more articles on CYP1B1 and Salvestrols by calling (250) 483-3640 and speaking to Cassandra. By telling her your credentials and telling her you heard about Salvestrol in one of my lectures, you can request a User Name and Password. Then go to website: www.salvestrol.ca; Click on Practitioner website. A variety of articles and videos on this subject can then be accessed.***

- **Amygdalin, Laetrile and Vitamin B17 are synonymous**. **From about 1975 through 1912, most of our cancer patients used amygdalin after purchasing it themselves from sources in Mexico**. In 2012, many of our patients began to use salvestrols, but some still are taking amygdalin. Amygdalin is a natural cyanide containing substance that if found in bitter apricot kernels and other foods. An old Youtube video called World Without Cancer can be viewed at: **https://www.youtube.com/watch?v=QeYMduufa-E** It contains a great deal of information about amygdalin. The amygdalin molecule consists of 2 sugars bound to two potentially toxic substances (benzaldehyde and cyanide). In the presence of an enzyme found in cancer cells, but low in normal cells, the two sugar molecules are removed and cyanide and benzaldehyde are released in the cancer cells, causing damage or death to these cells. Because amygdalin inhibits the CYP1B1 enzyme, it cannot be used when salvestrols are being used.

- **Schachter Center Approach**: **Our approach differs from the conventional approach to treating cancer or even attempts by conventional oncology to include some modalities outside of conventional treatment in the approach to the cancer patient.** The Cancer Treatment Centers of America promotes this latter approach (accepting conventional treatment as a given), but largely focuses on using conventional therapy with the alternative approaches primarily being used to reduce the adverse effects of the conventional treatments.

- **During our assessment of the patient**, we try to evaluate the patient as a person with attention paid to strengths and weaknesses, support or lack of it from family, friends and caregivers, assessment of the diagnosis, what conventional treatment has been done and the current program. Dental issues and structural issues will be assessed in some cases, but priorities must be set. We help patients assess conventional treatment options and do a general medical

history, physical examination, lab tests and overall status. Assessment of the patient's ability to make changes and what is possible under the current situation. Dietary changes are the cornerstone for many patients and we emphasize avoiding processed foods, containing sugars, starches and chemicals. For many, avoidance of gluten-containing food is helpful. We try to help patients get off prescription and OTC drugs when possible. Various lifestyle changes, such as exercise, sleep patterns, management of stress is addressed. Oral nutritional supplements are used and frequently, IV infusions of Vitamin C or alpha lipoic acid are recommended. Whenever possible, we recommend that dental issues be addressed and relatively non-toxic approaches, such as acupuncture, chiropractic, physical therapy to reduce pain and promote the body's ability to deal with cancer or other challenges.

- **Regarding the diet, there are both points of agreement and controversial** issues among clinicians that stress dietary suggestions for cancer patients. **The points of agreement include**: (1) avoiding processed food and refined carbohydrates as much as possible; (2) Avoid foods containing artificial chemicals, artificial sweeteners and various additives: (3) Avoid adulterated fats; (4) Use organic foods whenever possible; (5) Some raw vegetables should be included; (6) Drink pure water free of fluoride, chlorine and other additives and impurities.

- **Areas of controversy include**: (1) Relative amounts of proteins, fats and carbohydrates; (2) how much of diet should be vegetables and how much fruit; (3) How much fruit should be allowed (for example, a ketogenic diet would allow no fruits). At our Center, we try to individualize the program and not be excessively rigid. Likes and dislikes are considered.

Characteristics of Cancer Patients Who Survive Longer than Predicted by Conventional Oncologists

- In her book, ***"Radical Remission: Surviving Cancer Against All Odds",*** **Kelly Turner PhD** outlines the characteristics of cancer patients who move onto long term survival. *While* at U. of CA Berkeley getting a PhD as a social worker who counseled cancer patients, Dr. Turner found a patient with a "spontaneous remission". She was shocked to learn no one was studying "spontaneous remissions". Spontaneous remissions occur without help from conventional CA treatment. She says that she learned of 1000 spontaneous remission cases in the medical literature, but no one seemed to be asking these patients what they had done prior to the development of the spontaneous remission.

- Kelly Turner decided to study this. She took a 10- month trip to 10 countries to interview healers who had treated cancer patients that then went on to develop a spontaneous remisssion; she interviewed 20 survivors and then 80 more.

- **She found 9 characteristics of so-called spontaneous remissions***:* (1) Radically changing your diet; (2) Taking control of your health; (3) Following your intuition; (4) Using herbs and supplements; (5) Releasing suppressed emotions; (6) Increasing positive emotions; (7) Embracing social support; (8) Deepening your spiritual connection; (9) Having strong reasons for living.

- As I mentioned previously, when I mentioned the Cancer Treatment Centers of America, the concerns I have about integrative oncology are**: Conventional oncology is taken as a given and nutrition and various other non-toxic therapies are seen only as a way of reducing adverse effect of conventional treatment. Another good example of this approach** can be found in a book by highly regarded **integrative oncologist Keith Block MD, *Life Over Cancer*. See: https://www.amazon.com/Life-Over-Cancer-Integrative-Treatment-ebook/dp/B0013TPWNW?ie=UTF8&btkr=1&redirect=true&ref_=dp-kindle-redirect** I am critical of this view and believe rather than just focusing on the question: Will the alternative treatments interfere with the results of conventional treatment (which are not very good), I think we should be asking**: "Will the conventional treatment make the results of alternative therapies worse?**" I think it is likely that they will. So my heretical suggestion is that patients might consider seeing how well they do with an intensive alternative program before engaging in a conventional program that is bound to have severe and sometimes irreversible adverse effects. **An example of one of our patients who did this is a woman with lung cancer who had one lobe of her lung removed**, but then refused offered radiation and chemotherapy and even the many scans that were offered. She is living and well 9 years after the diagnosis of non-small cell cancer of the lung with possible metastases, using only alternative treatments. A question that needs to be asked is: how well would she have done if she followed all of the suggestions made to her by conventional oncologists?

- **Questioning Conventional Protocols; example routine use of radiation therapy for all women with stage I breast cancer after a lumpectomy:** With each breast cancer patient, we help the woman to make decisions which make sense. One routine procedure which does not make much sense to me is the routine use of radiation therapy after a lumpectomy for stage I breast cancer. Although studies indicate that with radiation to the breast area after a lumpectomy, there is a **reduced risk for cancer recurrence in the same breast**, there is **no evidence that women receiving this radiation experience on the average (1) longer survival statistics, (2) reduced regional metastases or (3) reduced distant metastases.** Also, radiation causes damage to tissue being radiated with resulting arm swelling with armpit lymph node radiation, heart damage in some cases, lung damage in some cases. Also, they may have an increased risk of another malignancy several years later (e.g. lung cancer). These facts are generally not emphasized to women. As I discuss this with women, I have yet to find one who knows these facts. **Frequently, once they learn of them, they decided to forego breast cancer radiation and concentrate on the approach discussed in this lecture.**

    - **Combining conventional and alternative cancer therapies in Specific Patients.** We have a few cases where the alternative approach was not sufficient, but combining it with conventional treatment was beneficial. **One example is a 52-year-old woman suffering from chronic lymphocytic leukemia.** She did not want any conventional treatment, but went wholeheartedly into an alternative program, including extensive oral supplements, IV vitamin C

drips, low dose naltrexone. After two years of this intensive program, she felt good, had no signs of adverse effects of the treatment, **but the disease was not being controlled**. She required frequent blood transfusion. She finally agreed to see an oncologist to add conventional chemotherapy. **After adding this while continuing her alternative treatment program, she immediately stopped needing blood transfusions and after several months of treatment, she was able to stop and just continue the alternative program, in apparent remission**. **A second man around age 70** with **metastatic lung cancer to bones and receiving conventional treatment sought to add nutritional supplements and vitamin C drips**. His CEA cancer marker was over 300 when he started. The combination program resulted in a drop in his CEA to below 5 (normal) and functioning at a high level with minimal side effects from the conventional treatment.

- **Routine procedures at the Schachter Center, generally not done at Conventional Cancer Treatment Centers include:** check 25 Hydroxy D for vitamin D status; Random Urine Iodine to check iodine status, as many patients are not getting enough iodine; optimize fat soluble vitamins D, A and K2 (MK4); monitor bone density with a simple finger screening tests which can be checked frequently at low cost and very tiny amounts of radiation; use of a well-balanced broad spectrum vitamin and mineral formula; probiotics are frequently recommended.

- At the Schachter Center, IV infusions of vitamin C (50 or 60 grams) or possibly IV hydrogen peroxide therapies or possibly IV Alpha Lipoic Acid. We use a variety of natural supplements, individualized for maximum benefits: These might include: Salvestrols, balanced vitamin and mineral formulas, optimized vitamins C, D, A, K2 (MK4 form only), Beljanski formulas, proteolytic enzymes, probiotics, iodine, amygdalin (B17, Laetrile: only if Salvestrols not used), curcumin, CoQ10, broccoli sprout extracts, Avemar and others. Attempt to individualize and recommend what patient can handle.

- **Vitamin D and Cancer: Endemic deficiency**. **Low levels of vitamin D are associated with an increased risk of a variety of cancers. Best marker for deficiency is 25 Hydroxy D level** and we check this on all patients. For Cancer patients our goal is; 60 to 80ng/ml and sometimes up to 100ng/ml. For prevention of cancer, our goal is at least 50ng/ml. See videos: http://www.youtube.com/watch?v=3GM0CnO6-ds (The Dinomit theory of cancer; How vitamin D reduces the incidence of cancer by Cedric Garland PhD) and http://www.youtube.com/watch?v=-Za2H5oTXJY (Robert P Heaney MD on the Diagnosis and Treatment of Vitamin D deficiency). Vitamin D and D receptor play a role in Macrophage Activating Factor (GcMAF) and the Innate Immune System's attack on cancer cells. For a good discussion about GcMAF, see Dr. Jeffrey Dach's article at: : https://truemedmd.com/2013/06/cancer-immunotherapy-with-macrophage-activating-factor/ **An excellent well referenced review of "Vitamin D and Chronic Illness" can be found at:** http://restorativemedicine.org/journal-viewer/?a=aHR0cDovL3d3dy5yZXN0b3JhdGl2ZWZvcm11bGF0aW9ucy5jb20vVml0YW1pbi1ELWF

uZC1NYWpvci1DaHJvbmljLUlsbG5lc3M_ZnJhbWVDb250ZW50PTE&w1=650&h1=20000&t=Vitamin%20D%20and%20Major%20Chronic%20Illness

- **Vitamin D Needs to be balanced with vitamin A, as they work as a team** and vitamin K2 (**I prefer MK4**, rather than MK7, which is present in most supplements).
  An excellent review of "The Anticancer Effects of Vitamin K" in the *Alternative Medicine Review* in 2003 can be found at:
  https://www.researchgate.net/publication/10591470_The_anticancer_effects_of_vitamin_K.
  We prefer vitamin K2 (MK4) over MK7, though MK7 if found in most nutritional supplements. There is evidence for **MK4** (rather than MK7) for **osteoporosis in Japanese studies at dosages of 15 mg 3 times a day** and **in vitro and anecdotal studies for MK4 for cancer is stronger.** For basic information about MK4 and MK7, see: **https://en.wikipedia.org/wiki/Vitamin_K**

- **Attention to Iodine status**: Measure random urine iodine and make sure iodine present in program. See the sections on iodine in my 2 published papers mentioned at the beginning of these notes.

- **Beljanski Products: Real Build**-May help to increase platelets and all types of white blood cells, especially when patients receiving chemotherapy or radiation**; Gingko V**: May offer some protection against abnormal scar tissue formation; **Pao Pereira** some evidence of anti-cancer properties and crosses the blood brain barrier; **Rauwolfia vomitoria**-evidence of anti-cancer properties, especially in hormone sensitive cancers. See: www.natural-source.com for more information about the products and also the sections on Beljanski in my two published papers cited at the beginning of this document, which may be accessed at our website.

- **Fermented wheat germ products** may be beneficial for cancer patients. The development of these products were **inspired by the late Nobel Prize Winner, Dr. Albert Szent-Gyorgi**. These products have multiple actions against cancer and support of normal cells. Their actions include: Inhibition of glycolysis and enhancement of aerobic metabolism in normal cells; favorable modulation of the immune system; induction of apoptosis in cancer cells; anti-angiogenesis in cancer cells; inhibition of metastases and cancerous DNA synthesis. See www.avemar.com for numerous studies on the anticancer effects of fermented wheat germ products. An offshoot of the original product is Metatrol, which eliminates gluten, but contains the ingredients that are active against cancer. Only 2 capsules daily are recommended for cancer patients less than 200 lbs and previous limitations concerning not taking them with other medications or supplements have been eliminated. For more information on Metatrol, see: http://www.metatrol.com/ for the newest product Metatrol.

- **Vitamin C has numerous anti-cancer properties.** These include: Improved immune system function with the stimulation of lymphocyte production, stimulation of collagen formation necessary to wall off tumors; inhibition of hyaluronidase to keep ground substance intact and preventing metastases; inhibition of oncogenic viruses; corrections of C deficiency commonly

seen in cancer patients, enhanced healing of surgical wounds, enhanced anticancer effects of certain chemotherapeutic agents; prevention of free radical damage; production of hydrogen peroxide which may help to kill cancer cells by forming the hydroxyl radical in cancer cells because they lack catalase; neutralization of many cancer producing substances.

- **Cameron and Pauling showed in the 1970's that 10 grams daily of oral vitamin C given to terminal cancer patients extended their lives by more than 4 times.** Charles Moertel MD of the Mayo Clinic claimed he replicated the Cameron and Pauling studies and said that Vitamin C was useless for cancer. He and Pauling argued with each other in the New England Journal of Medicine with Pauling clearly showing that Moertel hadn't replicated their studies at all. Nevertheless, Moertel and the Mayo Clinic's view has strongly influenced the current view of conventional oncology that vitamin C is not useful.

  Large doses of oral vitamin C can be very helpful to cancer patients as seen in this paper by Stephen Hickey PhD:
  https://www.csom.ca/wp-content/uploads/2013/03/Vitamin-C-and-Cancer-Is-There-A-Use-For-Oral-Vitamin-C-28.1.pdf

  This is also elaborated in another paper:
  http://www.peakenergy.com/news/VitaminC_Cancer_w_Comments.pdf.

  Also, check-out the website of the Vitamin C Foundation at:
  http://vitamincfoundation.org/alerts.php

- **Low Dose Naltrexone (LDN) to help improve immune functioning** (dose 1.5 mg to 4.5 mg at bedtime) was developed by **Bernard Bihari MD (1930-2010)** and has been used to help patients with a wide variety of cancers and a variety of autoimmune disorders. This is a much lower dose than that of the FDA approved Naltrexone of 50 mg. Effects include: stimulation of the productions of opioid receptors; enhancement of natural killer cells; increased longevity in AIDS patients; strong anti-cancer effects. There are many testimonials relating to benefits found in autoimmune conditions, such as Crohn's disease and multiple sclerosis. Information about LDN can be found at a number of websites, including: http://www.lowdosenaltrexone.org/, *www.ncbi.nlm.nih.gov*, http://www.drwhitaker.com/what-is-low-dose-naltrexone/and http://www.lowdosenaltrexone.org/gazorpa/interview.html

- **Bert Berkson MD, PhD** who currently had a practice in New Mexico has developed protocols for the treatment of cancer and liver disease. In the early, 1970's, Dr. Berkson successfully treated mushroom poisoned patients, who were thought to be terminal. Dr. Berkson's protocols for the treatment of liver disease and metastatic pancreatic cancer to the liver involves the use of IV and oral alpha lipoic acid, low dose naltrexone, oral ALA, selenium, milk thistle and B vitamins. A summary of his work can be found in the Townsend Newsletter in 2007:
  http://www.townsendletter.com/Dec2007/alphalipo1207.htm
  This article includes a description of several pancreatic cancer patients with liver metastases that showed long-term survival.

- **New Possibility:** **Exciting clinic in Budapest Hungry. Technology allows for increasing oxygen in tissues with 3 oxygen baths daily**. Anecdotal reports of advanced cancer patients that have improved significantly after staying at Center for weeks to months. Relatively inexpensive; See http://www.kaqun.eu/products-services/bath-therapy;
  May be coming to NYS in the future. A facility recently opened (late 2016) in Las Vegas Nevada.

Dr. Schachter disagrees with the principle of the National Cancer Institute that: "Unproven products or practices should not be used to replace or delay conventional medical treatment for cancer" because the conventional treatments are largely unsuccessful and toxic and less "proven" therapies may have the potential to improve patients significantly and have less toxic side effects.

A big question that needs to be asked is: How far can we go with minimal use of conventional cancer therapy?