

Dear Functional Medicine Discussion Group Members:

Once again, we had another great Functional Medicine Discussion Group meeting on April 20, 2017 on **Cancer and Nutrition** with **Dr. Nalini Chilkov**. The microphone from my video camera did not work for the second month in a row, but I did capture the first hour or so on my iPhone, which allowed me to write up this summary, but the quality was not good enough to post a video on YouTube. Alas, the downside of doing it yourself with a limited budget. Next month I will hopefully be armed with improved audio equipment. We thank **Metagenics**, once again, for sponsoring the food and the venue, and for having supported our group since we started. Thanks to all our members who participated in the meeting. Our next meeting will be **Thursday, May 25** at 6:30 at the Santa Monica Library at 601 Santa Monica Blvd. and **James Maskell** will lead a discussion on **Creating a Successful Functional Medicine Practice**. Please email me if you will be able to attend and place **Maskell RSVP** in the subject line. I will send out the official invite in a week or so. If you are not already a member, please join our **closed Facebook page, Functional Medicine Discussion Group of Santa Monica**. Also, please check out my podcast, **Rational Wellness**, on iTunes <https://itunes.apple.com/us/podcast/rational-wellness-podcast/id1191232372?mt=2> or YouTube <https://youtu.be/GlqFBDVnawU> .

Sign up for Dr. Chilkov's exciting new Foundations of Integrative Oncology practitioner training program at a special introductory fee to become more proficient at working with cancer patients, <http://www.aiiore.com/courses/>

In my introductory remarks, I mentioned a few Metagenics products that might have some relevance for the topic of cancer and nutrition, including **SulforaClear** and the **Phytomulti**, not that Metagenics is making any claims that these products have any anti-cancer properties. SulforaClear is a broccoli seed extract product that contains concentrated amounts of sulforaphane glucosinolate in combination with myrosinase from broccoli floret and sprout powder. Myrosinase is the enzyme needed to convert the sulforaphane glucosinolate into sulforaphane, the active ingredient. This sets this supplement apart from other broccoli seed products.

Phytomulti is Metagenics quality multivitamin that not only contains all the vitamins in the forms that they will be best absorbed, including methyl B vitamins, but it also contains a nice blend of phytonutrients, including choline, inositol, lycopene, zeaxanthin, lutein, resveratrol, citrus bioflavonoids, green coffee bean, pomegranate, grape seed extract, blueberry, green tea extract, watercress, cinnamon, rosemary, and artichoke leaf extract, among others.

Dr. Nalini Chilkov titled her presentation, **The Deadly Link Between Insulin Resistance, Obesity, Carcinogenesis and Metastatic Progression Nutraceutical and Phytochemical Interventions**. In other words, if you are fat and eat a lot of sugar, you will more likely get cancer.

I then introduced Dr. Chilkov: Dr. Nalini Chilkov, L.Ac., O.M.D. as a leading edge authority and pioneer in the field of Integrative Cancer Care, Cancer Prevention and Immune Enhancement. She is the Founder of the **American Institute of Integrative Oncology** and **IntegrativeCancerAnswers.com** and the author of the number one bestselling book “**32 Ways to Out Smart Cancer: How to Create A Body Where Cancer Cannot Thrive.**” Dr. Chilkov brings over 30 years of clinical experience, combining the best of Functional Medicine and Oriental Medicine.

Dr. Chilkov said that she wants Functional Medicine practitioners to feel comfortable working with people whose lives have been touched with cancer. She feels that it's important for front line clinicians to be able to answer questions from cancer patients and cancer survivors. As Functional Medicine practitioners, we can be great resources for these patients. She explained that she chose the specific topic that she did because metabolic syndrome, insulin resistance, and obesity are an epidemic and many clinicians don't know that this population has a 40% increased risk of cancer and cancer recurrence. These metabolic factors are not being dealt with by the oncologists. And whether we address it or not, we all have patients who are dealing with or have dealt with cancer in the past. There is an interesting study showing that primary care physicians don't know much about how to deal with these patients. And dealing with cancer patients is not even taught very much in Functional Medicine courses. There is now a shortage of oncologists and the way medicine is going in America, oncologists will have a short term, urgent care relationship with the patient and then the patient will get turned back to the primary care provider who doesn't know much about the health side of the cancer equation. They should get referred back to Functional Medicine doctors at that point, since we can address the overall health and lifestyle factors that can help their bodies to resist cancer recurrence.

Dr. Chilkov prefers to break the cancer journey into different phases. This helps the patient who is typically overwhelmed. First she likes to focus on helping the patient get through their treatment. Then, when the patient is done with treatment, we will talk about your recovery. The needs of the patient change from when they are first diagnosed; to when they are undergoing treatment and suffering side effects; when they are recovering after their treatments; and then when they are told by their oncologist that their treatment is done with and there are typically no aftercare recommendations. This is because cancer is treated as a short term, urgent care treatment plan. But it is really a lifestyle to be healthy if you have cancer risk. And you have to live differently if you don't want to have a cancer recurrence. Which is where Functional Medicine practitioners can come in.

There is also a large portion of patients who are stage III and IV who are living with cancer as a chronic illness. They are not cancer free, but they might live a long time and we want to give them a good quality of life.

Dr. Chilkov said that Functional Medicine practitioners have the toolbox to change outcomes and transform prognosis. A lot of the things we do can enhance oncology treatments, since we can do things that are synergistic or allow the patient to complete their treatments, since we can help to manage their side effects. We can provide the patient with a health model that does not exist in oncology, which is a disease model. Dr. Chilkov recommends reaching out to oncologists and try to develop relationships

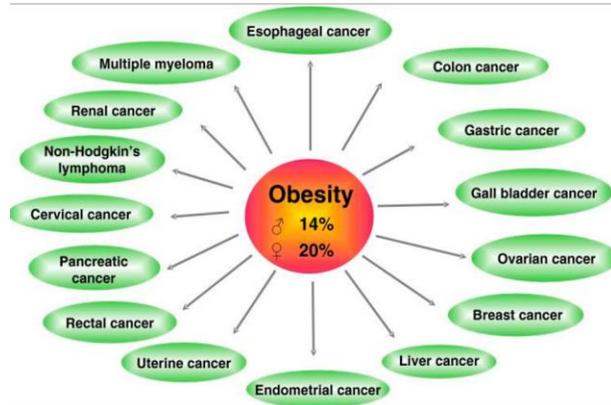
with them, so you can become a respected part of the care team. The focus for us as Functional Medicine doctors is to look at the tumor microenvironment in the patient's body that can change signaling and the expression of their genes. We have nutraceutical and botanicals that can turn oncogenes off and turn tumor suppressor genes on. We want to create an environment that is not hospitable to the development, the proliferation, or the spread of cancer. When you develop your plan for your patient you want to think about all the niches or the spokes on the wheel. Besides regulating blood sugar and reducing obesity, we have reducing oxidative stress, controlling inflammation, inhibiting angiogenesis, enhancing detoxification, resolving any chronic infections, modulating the immune system, managing blood clotting, and promoting apoptosis and natural cell death. All of these things can inhibit tumor growth/regrowth and metastasis.

Dr. Chilkov focused on one aspect of cancer care in this presentation, which is the relationship between metabolic syndrome, obesity, diabetes, and cancer. There's a relationship between diabetes and obesity that we are familiar with, but we may not know that tumor cells have more receptors for Glute 4, insulin like growth factor, and insulin. In a high insulin environment, you get more growth signaling to tumor cells than to normal cells. Adipose tissue also encourages a lot of growth signaling. Adipose tissue is pro-inflammatory and has a lot of aromatase, which leads to more estrogen. Therefore, a person who is obese and has insulin resistance (hyperinsulinism) is creating a lot of growth signals, which drives various forms of cancer more.

We should also keep in mind that cancer patients generally are older—generally over 50--and often have co-morbidities. This is a long enough period of time to have your DNA go haywire and some cells to grow aberrantly. Cancer is a perfect storm between genetic vulnerabilities and environmental triggers. Obesity increases your risk of quite a number of types of cancer.

<https://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet> We get exposed to a lot of toxins and pesticides in the environment, we eat the industrialized food, and in the context of diabetes, we get a lot of signals that drive cancer. Also, most people are sedentary, even if they do one hour of exercise per day. Also, adipose tissue is an engine of inflammation and this plays a role in promoting cancer.

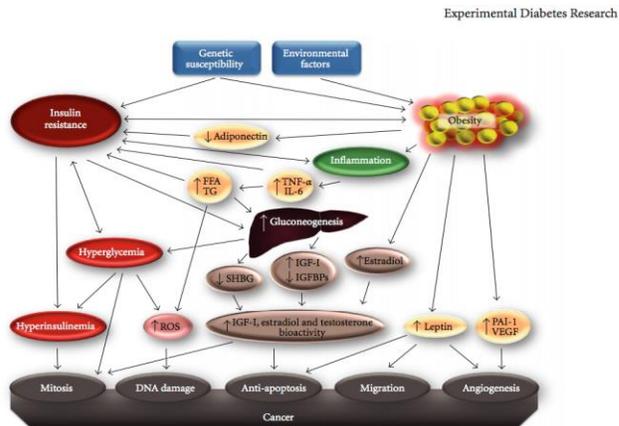
Dr. Chilkov pointed out all the different cancers that are related to obesity in this slide.



There is also increased cancer mortality rates in patients who are obese:

<http://www.nejm.org/doi/full/10.1056/NEJMoa021423#t=article>

Here is another great slide from Dr. Chilkov on the molecular pathways that connect diabetes and insulin resistance and cancer:



Dr. Chilkov said that when you are dealing with a stage III or stage IV cancer, one of the best things you can do is tell your patient that you have a long term plan for them. You may find that at this stage of care when the oncologist is starting to run out of ideas, the oncologist may be more receptive to some of the tools that we can offer in our toolbox. Dr. Chilkov pointed out that with the increasingly regulated health care industry, with doctors having to follow more rules, oncologists may be open to some suggestions from us at this point.

It may be beneficial to put such a cancer patient with an elevated IgF1 on a lower protein, more vegan diet that lowers methionine, which can shrink tumors and reduce cancer proliferation. But this can also cause sarcopenia. So if you have an elderly patient who is already sarcopenic, then a low protein diet may not be a good idea.

Dr. Chilkov mentioned some simple lab tests that may provide some useful information, including inflammatory factors, like CRP. She also said that you can order a CBC and look at the Neutrophil/Lymphocyte ratio, which has been shown to correlate with cancer prognosis. A neutrophil/lymphocyte ratio above 4 is correlated with a significantly worse prognosis with an optimal level below 2. You can also order Interleukin 6 and Interleukin 8, which are also inflammatory markers. Also, most patients have aberrations in their CYP1b1 pathway. Some oncologists will put steroids in their cancer patient's chemo infusion to prevent inflammation, but this will elevate their blood sugar and this will lead to a worse outcome. If the patient is robust enough to follow a ketogenic diet or to fast before their chemo or radiation, this will stress the tumor cells and lead to a better kill rate. This is a way that we can help to improve outcomes with our cancer patients. Patients with obesity or insulin resistance will have inflammatory cytokines, elevated leptin, and decreased adiponectin, as you can see in the diagram above. If you change their body composition, you change leptin and adiponectin. With obesity, you also get more aromatase and more free estrogen and you get a decrease in sex hormone binding globulin. This leads to more mitosis, more DNA damage, inhibition of apoptosis, and more

angiogenesis. Cancer cells use angiogenesis to create its own blood supply. By the time you have a tumor mass of 3 mm, which is the size of the head of a pin, you have a billion cells. So, by the time you have a mass that can be seen on a scan, you have a likelihood that some of those cells are swimmers and they have left the primary site. So it is really a myth that even in stage one that you only have local disease. Cancer is really a systemic disease and it needs to be treated as such.

Dr. Chilkov explained that one of the things that you can do to personalize care you send some of the tumor cells to get molecular testing for various genetic variants, which can assist you to better use nutraceuticals and botanicals to influence the tumor environment to inhibit tumor proliferation. For example, if you have tumors that have aberrations in the gene PTEN that results in tumor suppressors being turned off, that can be turned back on with a phytonutrient known as Honokial from Chinese magnolia bark. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3663139/> This is an example of how botanicals and nutraceuticals can impact the growth of cancer in the body.

Someone asked what is the minimal amount of protein that must be included in the diet to prevent sarcopenia and Dr. Chilkov said about 60 gm protein per day. Nalini said that she will see where the patient is at presently with diet and figure out the best nutritional approach for them and what they are willing to do. I brought up the challenges of regulating blood sugar on a vegan or vegetarian diet, and Dr. Chilkov explained that vegetarians will need to eat low carb vegetarian and use the green smoothie/shake as a way to get extra protein. A doctor brought up the thought that eating a lot of animal protein will raise IgF1 levels, which promotes cancer.

Dr. Chilkov said that there is a lot of literature on ketogenic diets for cancer due to the Warburg effect. Tumor cells are efficient at using glucose and will shift their mitochondrial functions towards glucose and away from the electron transport chain to make ATP, even in an oxygen rich environment. This is unique to tumor cells. Lactic acid dehydrogenase is a blood test you can order that will be elevated if there is this energy substrate shift. Ketogenic diets work because they reduce the insulin signaling. But staying on a pure ketogenic diet is very difficult. Such a diet is very high fat with low protein and very low carbs. Patients often feel nauseous and often have diarrhea due to all the undigested fat in their stool. It is very hard to stay on a strict ketogenic diet long term, so it may be better to do ketogenic one or two days per week and do a less strict low carb diet on the other days. Or they can do intermittent fasting, such as the 12-14 hour fast, which can be beneficial if they only do it on the day of treatment. Chemo is usually active for about 4 days, so those are the days to do what you can to make the chemo cells more stressed.

Dr. Chilkov said that intermittent fasting or a low carb diet can have almost the same impact on cancer as a ketogenic diet, though she did mention that with brain cancer patients the ketogenic diet seems to have the biggest impact, so with those patients it is worth the negatives to press them to do ketogenic as many days per week as the can. For non-brain cancer patients, if you can get them to do keto, then do keto. But if they won't then have them do a low carb program and that should have pretty much the same impact on reducing insulin signaling. Dr. Chilkov said that she explains to her patients that anything that tastes sweet on their tongue will trigger an insulin response. Patients think that it is sugar that is the focus, but actually the most important thing is to reduce insulin. She instructs her patients to

avoid eating grains and desserts. Half their plate should be vegetables and the other half should be protein and healthy fats.

I mentioned that a few of my patients have been instructed by their oncologist to fast the day before and the day of chemo, as well as the day after, to improve tumor kill. Dr. Chilkov also mentioned insulin potentiation therapy that is used by some integrative oncologists to improve the effectiveness of chemo and radiation.

Dr. Elkin asked about some of the newer immunotherapies, which are not traditional chemo. They are more targeted therapies, which is good, since they are not chemo. Dr. Chilkov said that most of the immunotherapies are PD-L1 inhibitors, which turn off the switch that reduces the ability of the immune system to attack the cancer. From Wikipedia, the source of all knowledge: "In the cancer disease state the interaction of PD-L1 on the tumour cell surface with PD-1 on a T-cell reduces T-cell function signals to prevent the immune system from attacking the tumour cells. Use of a PD-L1 inhibitor that blocks the interaction of PD-L1 with the PD-1 receptor can prevent the cancer from evading the immune system responses in this way." Sometimes it doesn't work at all since the patient is not able to mount enough of an inflammatory response. Sometimes there is too much of an immune response and the patient can even die from uncontrolled inflammation from immunotherapy. These should not be given with autoimmune patients. So there is a lot of experimentation and confusion about when these drugs will be effective and when they won't.

Tumor cells hide from the immune system. There are several mechanisms to do this, including that: 1. Tumor cells can disable T cells through signaling, and 2. They can signal fibrosis and this creates little raincoats around the tumor cells and the immune cells then can't see the tumor. Dr. Chilkov explained that those in the cancer field are learning when these PD-L1 drugs can be more or less effective in which cancer patients.

Dr. Chilkov mentioned the benefits of Metformin in having an anticancer effect, esp. in patients for whom diet and lifestyle is not able to control their insulin response. Dr. Seaton asked about Berberine, and Nalini explained that berberine, which comes from herbs such as Goldenseal, Oregon grape, and Barberry, has an effect similar to Metformin in improving insulin sensitivity. Berberine is an Isoquinoline Alkaloid that also has impact on proliferation and cell division and apoptosis, so it has some direct anticancer effects. Berberine is also anti-inflammatory. So berberine is an excellent herb to use with cancer patients.

I asked why some of the studies show an inverse relationship between prostate cancer and diabetes or insulin resistance, as compared to most other forms of cancer. Is prostate cancer an outlier? Dr. Chilkov said there is no definitive research to explain why that is. And there is research showing benefits of Metformin with prostate cancer.

Dr. Chilkov mentioned some of the research showing that intermittent fasting improves outcome in breast cancer patients, including the WHEL study noted in these 2 slides:

JAMA Oncol. March 31, 2016, Catherine R. et al
**Prolonged Nightly Fasting
 and Breast Cancer Prognosis**
Women's Healthy Eating and Living" (WHEL) study

- Cohort of 2413 patients with early-stage breast cancer
- No patients had diabetes at enrollment
- Ages 27 to 70 years at diagnosis
- 7 year follow up

Breast cancer survivors, who reported consistently not eating for 13 hours or more (overnight), had a 36% lower risk of having a breast cancer recurrence and 21% lower risk of dying from their breast cancer.

JAMA Oncol. March 31, 2016, Catherine R. et al
**Prolonged Nightly Fasting
 and Breast Cancer Prognosis**
Women's Healthy Eating and Living" (WHEL) study

- **36% higher risk of breast cancer recurrence** in those who did not fast for greater than 13 hours, at night
- **21% higher risk of dying from breast cancer** (a trend, albeit not statistically significant) in those who did not fast for greater than 13 hours, at night
- **22% higher risk of death from any cause** (a trend, albeit not statistically significant) in those who did not fast for greater than 13 hours, at night



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Dr. Chilkov talked about the importance of including in her cancer patients' diet a therapeutic shake. A therapeutic shake is a healthy version of Ensure, which is often recommended to cancer patients but is loaded with sugar, artificial sweeteners, artificial colors and artificial flavoring. This makes it easier to eat a more plant based diet and avoid eating a lot of meat and still get enough protein. It's also an easier way to get an increased concentration of greens and various nutrients instead of having to swallow too many capsules, including healthy fats. This is especially helpful when you have patients who are too nauseous to eat solid food and are losing weight or who may have trouble swallowing if they have throat or neck cancer:

Daily Therapeutic Shake: Low CHO, High Protein, High FA

- Protein Powder = 35-40 grams of protein per shake
- Medium Chain Triglycerides 1 tablespoon
- Carnitine Tartrate 1/2 teaspoon (1.5-2.0 g)
- Phosphatidyl Choline 1 heaping teaspoon (170mg choline)
- Phosphatidyl Serine 1/2 teaspoon (400mg)
- Acetyl L Carnitine 1/2 teaspoon (1.5g)
- Cordyceps, Coriolus, Ganoderma 3 grams each
- Omega 3, 6, 7, 9 Essential Fatty Acids 1-2 TBS (4-6 g)
- Concentrated reds and greens powders 2 tsp
- Black Chia Seeds 1 tablespoon
- Hemp Seeds 1 tablespoon ½ avocado
- Fiber Powder (Soluble+Insoluble fibers) 1-2 heaping tsp.
- Add 1/2 organic lemon with the peel
- Optional: mint, orange zest, ginger, cinnamon, cardamom, vanilla, cacao nibs, fresh greens, spinach, parsley, kale



Daily Therapeutic Shake: Low CHO, High Protein, High FA

Make thick or thin according to your preference
 May sip on each shake over several hours
 Not necessary to consume all at once



Mix with choice of unsweetened coconut milk (best brands are free of carageenan), coconut water, green tea, filtered water

Take each shake with digestive enzymes

Protease Formula 2 caps with full shake (take 1 cap with each 1/2 shake) *avoid Betaine Hydrochloride*

Lipase Concentrate 2 caps with full shake (take 1 cap with each 1/2 shake)

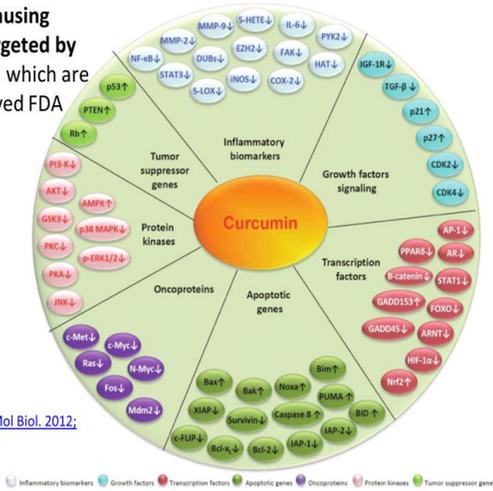
If you are nauseous from the high fat content you can double the dose of the Lipase



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Even though we didn't talk much about curcumin this evening, this is one of the most incredibly anti-cancer nutraceuticals and I just love this slide of Dr. Chilkov's that she has shown at her seminars in the past of all the genes that are targeted by curcumin. By contrast, the pharmaceutical industry is developing drugs that can target one of these genes that get touted as such incredible medications, such as Avastin, when we have a natural product that targets all of these. This is why nutrition should get more credit for the role it can play in reducing cancer, if we do the right things.

Cancer causing genes targeted by curcumin which are unapproved FDA targets



[Int J Biochem Mol Biol. 2012; 3\(4\): 328-351.](https://doi.org/10.1186/1475-2875-3-4)

See you all May 25 for an exciting discussion with James Maskell!