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## 21<sup>st</sup> Century Cancer Treatment “Whats Missing? Wake up Oncology”

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**Abstract:** *Although many advances have been made in cancer treatment, and some battles won, the war is far from over. The main reason is the huge disconnect between conventional and integrative oncology communities. The two most important areas involve cancer immunology and cancer metabolism. In this communication, we hope to bring attention to this important missing link.*

### INTRODUCTION

During the last 50 years, there have been tremendous advances and improvement in the surgical and medical treatment of cancer. Many of these advances can be attributed to early detection screening techniques, understanding pathophysiology of the disease, tumor biology, genomics, proteomics, and finally acceptance and advances in cancer immunotherapy. The biggest breakthrough has been the addition of checkpoint inhibitors.

Recently there has been a renewed interest in cancer metabolism and the work of Warburg [1]. However, this has been ignored and slow to be accepted by the conventional oncology community. This will be addressed later in this communication.

New techniques and gained knowledge has led to less invasive surgical staging and treatment procedures, drug development, targeted monoclonal antibodies, tyrosine kinase, checkpoint and other metabolic pathway inhibitors. A great example of a less invasive surgical staging procedure is sentinel lymph node biopsy; especially for melanoma and breast cancer. However, in the day to day practice of the clinical oncologist an important aspect of cancer and the cancer patient is still ignored. That area is attention and evaluation of the host immune system. We reported years ago that host immunity is ignored in clinical oncology in the USA [2]. The interaction of the immune system and cancer of the host are extremely important and determine the response to the therapy and the patient's final outcome.

Unfortunately, even with all of the great advances mentioned above, the fate of the patient with metastatic Stage IV disease is relatively unchanged. Many patients have treatment responses and short term remissions with extension of life; however, during that period quality of life is at times almost unbearable. The death rate in the stage IV cancer patient is still unacceptable. In order, for this to improve, there will

have to be a paradigm shift in the thinking and approach to cancer treatment within the entire oncology community.

Host immunity in the cancer patient is ignored by most oncologists; and their attention is mainly on the disease, type of tumor, clinical staging, tumor biology, and treatment options. However, the diagnosis, staging work-up, consultation and treatment decision period is extremely stressful to the newly diagnosed cancer patient. This period has a devastating cascade effect on the patient's immune system. This immunosuppression can effect treatment response and final outcome for the patient. Therefore, measures to reverse these immunosuppressive events should be implemented at the time of diagnosis. The stages of host cancer immunosuppression are described in our paper on “Psychoneuro-Immunooncology” [3]. Those that are interested in supporting host immunity throughout the cancer patient's journey should review that paper.

During chemotherapy medical oncologist carefully monitor the total white blood cell count especially neutrophils for prevention and early treatment of febrile neutropenia. This, of course, is very important, but the vast majority do not monitor the total lymphocyte count. Though ignored a great lymphocyte count is very important for the response to therapy and overall disease free survival [4]. We believe it is time to consider using small doses of IL-2 during chemotherapy to maintain a good total lymphocyte count; just as is done for neutropenia with Neulasta. It should also possibly be considered during radiation therapy. Radiation is very immunosuppressive causing patients to have very low lymphocyte counts. Placing patients on some of the good mushroom supplements helps patients maintain better lymphocyte health and counts.

During the last few years there has been a resurgence of interest in cancer metabolism. The main interest has been in the research community. However, in the medical oncology community metabolic therapy for cancer has been totally ignored. I have been involved in the immuno-metabolic treatment of cancer for many years; and have yet to know a medical oncologist in private practice that even knows about metabolic therapy must less being involved in using this type therapy.

Combining metabolic therapy with conventional treatment can be synergistic. A rigid ketogenic diet putting a patient in ketosis will stress cancer cells, inhibit aerobic glycolysis and make them more chemosensitive. This means less drug, less toxicity, less cost, and better response. Seyfried, has done a great job describing cancer as a metabolic disease in his book. He explains how the main characteristic of nearly all cancers is impaired cellular energy metabolism regardless of cellular or tissue of origin [5]. This glycolytic pathway is common to most cancers, while mutations can be numerous and different from cell to cell in the same tumor, attacking a common metabolic pathway along with the predominant mutation will yield more benefit. I highly recommend Seyfried's book for those that want details and more science.

### CONCLUSION

There are two important messages in this opinion commentary. The first is the importance of supporting the patient's host immune system throughout the patient's entire cancer treatment journey. The second message is that conventional oncology needs to become involved in integrative oncology. Metabolic therapy, nutrition, proper supplements, meditation, and exercise can improve response to therapy and quality of life for the cancer patient. After patients complete therapy and have no evidence of disease; an adjuvant personalized vaccine should be considered to avoid recurrence [6]. When patients get metastatic disease, they need a great integrative oncology approach. It should be a combined immuno-metabolic oncology

protocol with a modified conventional treatment regimen. I am convinced if we implement this combined approach in the beginning of the patient's cancer journey; we will come to a much better destination on this long, complex, difficult cancer trip.

### REFERENCES

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Cancer immunology is extremely complex with numerous interactions between the tumor and the host. It is time for those that treat cancer, especially surgeons, to learn more about these complex interactions. We need to know more about host immunity and immunosuppressive mechanisms which are not directly related to the disease, but caused by stress and therapy of the disease. Most cancer physicians (surgical, medical, and radiation oncologist) do not appreciate the impact on host cell mediated immunity (CMI) caused by cancer therapy, and definitely do not know how devastating, psychic stress is on host immunity. This communication is an attempt to bring awareness to this problem. By "21st Century Cancer Therapies" I intend to specifically focus on a new wave of technology that has up till this point been entirely unavailable to us. Most of our discussions on this forum have stressed currently available chemicals and treatments. It is of course wise to focus on this aspect of treatment that is within the easy reach of patients. Another upgrade might be to find a way to reduce the small amount of systemic exposure by perhaps adding a treatment that would knock down the residual liposomes after about 2 hours that had not accumulated in the tumor (See Figure 4A from the reference above). What is even more encouraging is that the method to make these nanoparticles appears to be best described as basic (actually very basic).