International Journal of Research in Engineering, Science and Management
Volume-2, Issue-11, November-2019
www.ijresm.com | ISSN (Online): 2581-5792

A Critical Study on New Advancements in Cancer Treatment

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***Abstract*: This paper focuses on the new methods in cancer treatment popular these days. Operation, radiation therapy, chemotherapy, hormone therapy, and biological therapy may include cancer treatment. Depending on the cancer type and location, whether the disease has spread, the patient's age and general health, and other factors, the doctor may use one method or a combination of methods. Because cancer treatment can damage healthy cells and tissues as well, it often causes side effects. Some patients may be concerned that the treatment side effects are worse than the disease. Patients and doctors, however, generally discuss treatment options, weighing the likely benefits of cancer cells being killed and the risks of possible side effects. Doctors may recommend ways of reducing or removing problems that may occur during and after treatment.**

***Keywords*: Cancer Treatment**

1. Introduction

People must eat to survive. And the cells that make up the body eat too. Or more accurately, cells break down and rebuild food into the individual molecules they need to stay alive and grow. This complex network of processes is called cellular metabolism.

Cancer cells can alter their metabolism to survive, so targeting cancer cell metabolism has become of great interest to researchers. Questions being asked include: Is it possible to attack a tumor's nutritional needs as part of cancer treatment? And could this be done by tweaking a cancer patient's diet?

When the researchers tested a low methionine diet in six healthy adults, methionine levels in their bodies fell and they experienced metabolic changes similar to those seen in the mouse studies. However, the study was not designed to test the effect of methionine restriction on cancer treatment in humans. The concept of using specific dietary changes to enhance cancer treatment "is really at the very early stages," said Jason Locasale, Ph.D., of Duke University, who led the new study. "And there's not going to be one be-all, end-all diet for [treating] cancer. But these aspects of diet seem to have all kinds of really interesting effects on cancer outcomes, and we have to take them seriously."

2. Dietary Vulnerability

This means that they become completely reliant on the diet for their methionine requirements.

Methionine is needed by cells to repair damaged DNA and reduce oxidative stress, Dr. Espey explained. So depleting methionine from cancer cells targeted by DNA-damaging therapies, such as chemotherapy or radiation therapy, "may enhance the ability of these treatments to kill the cancer cells," he said.

"Cancer researchers recognized this feature and surmised that methionine could be a potential weakness, because anything that a cancer cell has become reliant on is a good target, as long as you have some sort of treatment to attack that vulnerability," said Dr. Espey.

A. Enhancing Treatment Effects

The researchers next tested whether adding dietary methionine restriction to cancer treatments in mice could magnify the effects of those treatments.

In mice bearing tumors derived from human colorectal cancer, low doses of the DNA-damaging chemotherapy drug 5-fluorouracil (5-FU) failed to shrink the tumors. But when the mice were fed the methionine-restricted diet during 5-FU treatment, their tumors shrank. Analyses of metabolism showed that the production of molecules needed to repair DNA, which requires methionine, had been altered as expected.

The researchers also tested the combination of methionine restriction and radiation therapy in mice engineered to grow aggressive soft tissue sarcomas. The combination of the methionine-restricted diet plus radiation therapy slowed tumor growth by about 50% compared with the combination of a normal diet plus radiation.

B. More Knowledge Needed

In a proof-of-concept follow-up experiment, six healthy middle-aged adults were recruited to eat a low methionine diet for 3 weeks. The diet contained about 80% less methionine than an average normal diet. Protein was mainly supplied through a methionine-free dietary supplement. The diet also included fruits, vegetables, and refined grains, which are naturally low in methionine.

In the human study, the low methionine diet quickly reduced the amount of the amino acid available to participants' cells and altered the cells' metabolism, similar to what the researchers had observed in mice fed a methionine-restricted diet. Methionine restriction "is a potential strategy" to treat cancer, Dr. Espey said. "But more research is needed into the correct dose and timing, and the amount of restriction that's necessary

to balance the positive effects on enhancing cancer therapy versus the negative effects on the body's normal physiology."

Among other things, methionine is needed to maintain nerve cells and muscle mass, he added. "So there could potentially be side effects of restricting methionine in the diet [in the long term]."

"We can speculate that there's going to be all kinds of interesting nutritional interventions that could influence cancer, but we're nowhere near the point of really being able to prescribe these dietary interventions," added Dr. Locasale. Some cancer patients will only receive one treatment. Nevertheless, most patients have a variety of therapies, such as chemotherapy and/or radiation. You have a lot to learn and think about when you need cancer treatment. It's normal to feel confused and overwhelmed. But speaking to your doctor and reading about treatment forms will help you feel more monitored. Our questions may help to ask your doctor about treatment.

Operation Chirurgy is a procedure in which a surgeon removes cancer from your body when used to treat cancer. Learn how the surgery works and what you can expect before, during and after the surgery.

- Radiation Therapy Radiation treatment is a form of cancer therapy using high radiation doses to kill cancer cells and to decrease tumours. Learn about the types of radiation, why, what and more side effects can happen.
- Chemotherapy Chemotherapy is a type of cancer therapy used for the killing of cancer cells with drugs. Find out how cancer chemotherapy works, why it causes side effects and how it is used with other treatments for cancer.

3. Conclusion

The development of abnormal cells anywhere in the body is uncontrolled. Such abnormal cells are called cancer cells, malignant cells, or cells of the tumor. Such cells are capable of infiltrating normal body tissues. The names of the tissue from which abnormal cells have originated (for example, breast cancer, lung cancer, colorectal cancer) are further identified in many tumors and irregular cells that form the carcinogenic tissue. Cancer is not limited to humans; cancer can occur in animals and other living organisms.

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