Immunotherapy: What You Need to Know About This Cancer Treatment

Diet and physical activity may improve the effectiveness of therapies that help the immune system fight cancer.

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Key Takeaways

- Immunotherapy works by helping the body's immune system fight cancer.
- Researchers are looking at how diet and lifestyle may help make immunotherapy more effective.
- Probiotics, fiber intake, intermittent fasting and different types of physical activity are being studied to see if they impact the effectiveness of immunotherapy.

What Is Immunotherapy?

Immunotherapy is now recognized as one of five major types of cancer treatment, alongside surgery, radiation, chemotherapy and targeted therapy.

Immunotherapy is a treatment that helps the body's immune system fight cancer. Our immune system can find and destroy cancer cells. But sometimes cancer cells can hide from the immune system, allowing them to continue multiplying and spreading into other tissues. If cancer cells hide from the immune system and are not destroyed, it may affect the immune system's ability to work properly. The idea of immunotherapy is to help restore the immune system's ability to destroy cancer cells.

Immunotherapy treatment can be given intravenously (IV), in pills, in capsules or topically as a cream you rub into your skin. The method will depend on which type of cancer is being treated, and which type of immunotherapy is being used.

Some types of immunotherapies include:

- Immune checkpoint inhibitors
- T-cell transfer therapy
- Immune system modulators
- Monoclonal antibodies
- Therapeutic vaccines
- Cytokines
- Nonspecific immune system modulators

So far, immunotherapy works best for specific sub-types of each of these types of cancers:

- Melanoma (skin cancer)
- Cervical
- Lung
- Skin
- Breast
- Brain

- Prostate

Can Diet and Lifestyle Improve the Response to Immunotherapy?

Researchers are looking at how diet and physical activity may improve the effectiveness of immunotherapy. The American Institute for Cancer Research (AICR) is funding some of this work.

Fiber: High-fiber diets may improve the effectiveness of some forms of immunotherapy. In an observational study of people treated for melanoma with immune checkpoint inhibitor immunotherapy, after adjusting for clinical factors, each additional five grams of dietary fiber was associated with a 30 percent lower risk of cancer progression or death.

Gut microbiome: The gut microbiome, which is made up of bacteria and other microbes that live in the gut, is strongly related to the body's immune system. What you eat influences the types of microbes that make up your gut microbiome.

AICR grantees are looking at how diet may affect the gut microbiome to enhance responsiveness to immunotherapies. Dr. Wendy Garrett, MD, PhD, of the Harvard T.H. Chan School of Public Health is an AICR grantee. Her team is using gut microbiome data (from human and animal models) and specially designed diets to study interactions with immunotherapies.

Probiotics: Probiotic supplements (with live microbes that produce health benefits) may seem like a logical choice to help immunotherapy through gut microbiome effects. But research does not support this concept so far. In the same observational study of immunotherapy for melanoma that showed benefits of fiber, probiotic use showed no association with cancer progression or response to immunotherapy. And in follow-up investigations in mice, researchers found that mice receiving probiotics had a worse response to immunotherapy treatment and larger tumors compared to mice without them. Research is just beginning to identify specific probiotics that may work with immunotherapy for individual types of cancer.

Keto diet: In research partially funded by AICR, Dr. Xin Lu, PhD, of the University of Notre Dame, is investigating how diet might help to reduce resistance to immunotherapy for prostate cancer. In a laboratory study with mice, a high-fat ketogenic diet was part of a protocol that enhanced response to immune checkpoint inhibitor treatment. This approach requires further research, since a ketogenic diet is generally low in fiber, which is the opposite of the high-fiber diets discussed above as possibly beneficial with immunotherapy.

Intermittent fasting: Periodic cycles of fasting and periods of normal nutrition have been tested in mouse models of cancer treated with immunotherapy. These studies suggest some improvements in treatment effectiveness and reduction in heart damage that immunotherapy may cause. Human studies of this type of diet for use with immunotherapy are extremely limited and more research is needed to understand how effective they may be and how safe they are in people at risk of malnutrition due to cancer.

Physical activity: Being active may enhance the effectiveness of immunotherapy. Research is in

progress on how individual exercise sessions and long-term lifestyle with physical activity might each improve response to several types of cancer immunotherapy. Researchers are looking into the types, intensity and amount of physical activity that are most effective in supporting cancer immunotherapy treatments.

Immunotherapy: Work in Progress

Immunotherapy is promising, but more research is needed. Some types of cancer do not respond to immunotherapy, and not all individuals with a similar kind of cancer respond equally well. Plus, some people whose cancer initially responds to immunotherapy later develop resistance to the treatment and experience relapse. This is known as acquired resistance to treatment.

Researchers are studying biomarkers that might identify people most likely to respond to this treatment. They are also testing how different types of immunotherapy might be combined with each other, or with other types of cancer treatment, to become even more effective and overcome treatment resistance.

Immunotherapy is an exciting step forward in cancer treatment. The future of this treatment will grow even brighter as researchers discover the best type of immunotherapy for specific cancer types, and understand the lifestyle choices that may maximize immunotherapy effectiveness. AICR will continue to fund promising research.

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