BREAST CANCER: NEW IMMUNOTHERAPY LEADS TO COMPLETE REGRESSION

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PUBLISHED WEDNESDAY 6 JUNE 2018

Article from: https://www.medicalnewstoday.com/articles/322041.php

AN EXPERIMENTAL FORM OF IMMUNOTHERAPY COMPLETELY OBLITERATED BREAST CANCER IN A PATIENT WHO HAD PREVIOUSLY BEEN FAILED BY ALL OTHER TREATMENTS.

Immunotherapy is a form of cancer therapy that boosts the body's immune system in the fight against tumors. Adoptive cell transfer (ACT), in particular, is a type of immunotherapy that strengthens a specific kind of immune cell: T cells.

In ACT, healthcare professionals collect T cells from the malignant tumor and isolate immune cells that are the most aggressive against cancer.

Next, they grow these T cells in large numbers in the laboratory and then reintroduce them in the patient's body intravenously.

ACT has been proved to be effective in the treatment of several cancers, such as melanoma, lung cancer, and bladder cancers. These cancers are all characterized by a high level of mutations.

But this form of therapy is not particularly effective against cancers that have fewer mutations, such as stomach cancer, cancer of the esophagus, ovarian cancer, and breast cancer.

Now, however, a new and improved form of ACT has led to full regression of breast cancer in a patient who had previously been unresponsive to all other treatments — including chemotherapy and hormone therapy.

The treatment was administered as part of a phase II clinical trial led by Dr. Steven A. Rosenberg, the chief of the Surgery Branch at the Center for Cancer Research (CCR), which is part of the National Cancer Institute (NCI).

The findings were published in the journal *Nature Medicine*.

TREATMENT LED TO COMPLETE REGRESSION

The novelty of this new, experimental form of immunotherapy consists of using cells called tumor-infiltrating lymphocytes (TILS) to target the tumor mutations.

In this individual case, the breast cancer patient joined the trial after chemotherapy and hormonal treatment had failed her.

Dr. Rosenberg and team analyzed the DNA and RNA of the patient's tumor and compared them with those of normal tissue in order to find out which genetic mutations were specific to this particular cancer.

The researchers revealed 62 different mutations and tested which TILS had the ability to recognize these mutations. They found some TILS that could recognize four mutations.

While these TILS were collected and grown in the laboratory, the patient also took pembrolizumab, which is a so-called checkpoint inhibitor that helps the immune system to react more strongly to cancer.

After the treatment, the breast cancer disappeared completely; it has been 22 months since the cancer's complete regression, and the tumors have not returned since.

The senior investigator is hopeful that the findings are generalizable and will soon be applicable to a wide range of patients.

> ***"We've developed a high-throughput method," says Dr. Rosenberg, "to identify mutations present in a cancer that are recognized by the immune system."***
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> ***He also emphasizes the fact that this treatment does not depend on the type of cancer, but on the mutations. "All cancers have mutations, and that's what we're attacking with this immunotherapy," he says, adding, "This research is experimental right now."***
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> ***"But because this new approach to immunotherapy is dependent on mutations, not on cancer type, it is in a sense a blueprint we can use for the treatment of many types of cancer."***
>
> ***Dr. Steven A. Rosenberg***

The director of CCR, Tom Misteli, Ph.D., echoes the same sentiment. He says, "This is an illustrative case report that highlights, once again, the power of immunotherapy."

"If confirmed in a larger study," Misteli adds, "it promises to further extend the reach of this T cell therapy to a broader spectrum of cancers."