Universal donor immune cells

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One of the latest attempts to boost the body's defenses against cancer is called adoptive cell transfer, in which patients receive a therapeutic injection of their own immune cells. This therapy, currently tested in early clinical trials for melanoma and neuroblastoma, has its limitations: Removing immune cells from a patient and growing them outside the body for future re-injection is extremely expensive and not always technically feasible.

Weizmann Institute scientists have now tested in mice a new form of adoptive cell transfer, which overcomes these limitations while enhancing the tumor-fighting ability of the transferred cells. The research, reported recently in *Blood*, was performed in the lab of Prof. Zelig Eshhar of the Institute's Immunology Department, by graduate student Assaf Marcus and lab technician Tova Waks.

The new approach should be more readily applicable than existing adoptive cell transfer treatments because it relies on a donor pool of immune T cells that can be prepared in advance, rather than on the patient's own cells. Moreover, using a method pioneered by Prof. Eshhar more than two decades ago, these T cells are outfitted with receptors that specifically seek out and identify the tumor, thereby promoting its destruction.

In the study, the scientists first suppressed the immune system of mice with a relatively mild dose of radiation. They then administered a controlled dose of the modified donor T cells. The mild suppression temporarily prevented the donor T cells from being rejected by the

recipient, but it didn't prevent the cells themselves from attacking the recipient's body, particularly the tumor. This approach was precisely what rendered the therapy so effective: The delay in the rejection of the donor T cells gave these cells sufficient opportunity to destroy the tumor.

If this method works in humans as well as it did in mice, it could lead to an affordable cell transfer therapy for a wide variety of cancers. Such therapy would rely on an off-the-shelf pool of donor T cells equipped with receptors for zeroing in on different types of cancerous cells.

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