

'Smart' Immune Cells Kill More Cancer

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"SMART" IMMUNE CELLS KILL MORE CANCER

In efforts to educate the body to fight off cancer, researchers have found that some immune cells are "smarter" than others. Working with collections of human cells, Johns Hopkins Kimmel Cancer Center scientists tested kill-rates of two kinds of T-cells "primed" to home in on myeloma, a cancer of the bone marrow. Those that live in the bone marrow outperformed their counterparts circulating in the blood by more than 90 percent.

"It is very difficult to design cancer therapies that get the body's immune system to recognize and kill cancer cells that the system has ignored for a long time," says Ivan Borrello, M.D., assistant professor of oncology and director of the research, which is published in the March 1 issue of *Cancer Research*. "Now, we have evidence that 'educating' T-cells in the bone marrow may be the most effective way to get an anti-tumor response."

In nature, T-cells are responsible for identifying cells that are foreign to the body, including genetically altered cancer cells, and marking them for destruction. In the Hopkins study of both kinds of T-cells, those from the blood and bone marrow, scientists mixed them with magnetic beads coated with tumor antibodies, a sort of "artificial intelligence" that activated and expanded the T-cells' cancer-killing mode.

The marrow T-cells identified not only mature myeloma cells but the primitive cells responsible for the disease. Activated bone marrow T-cells stopped the growth of 86 percent of myeloma stem cell colonies compared to 47 percent for activated t-cells taken from circulating blood. The researchers' next step is to determine whether the cells' ability to limit cancer growth in culture dishes ultimately may do the same in patients.

Kimmel Cancer Center researchers are planning studies in a small number of myeloma patients to test the activated marrow T-cells alone and in combination with a myeloma vaccine.

"While T-cells from circulating blood traditionally are used in immunotherapy strategies because they are easy to obtain and grow, they often don't recognize the tumor," says Borrello.

"In the case of myeloma, we believe the marrow T-cells have certain surface markers that may help them migrate back to the site of the tumor," he says. "Moreover, the marrow itself contains some type of stimulant to attract the cells," says Kimberly Noonan, researcher and first author of the paper.

To treat patients, the scientists will collect a small amount of bone marrow from patients and with relative ease, grow and activate large numbers of T-cells from that source. These would then be given intravenously back to patients. However, according to Borrello, they may find that an additional cancer vaccine may increase the overall anti-tumor effect of the marrow T-cells.

They also believe that patients with other blood, bone marrow and solid tumors such as breast cancer may benefit from this type of immunotherapy. Evidence from other research groups indicates that breast cancer patients have T-cells in their bone marrow that are specific to their tumor.

Myeloma strikes close to 16,000 Americans annually and kills 11,300.

Other participants of this research include William Matsui, Paolo Serafini, Rebecca Carbley, Gladys Tan, Hyam Levitsky, and Katherine Whartenby from Johns Hopkins; and Jahan Khalili and Mark Bonyhadi from Xcyte Therapies.
--JHMI--

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