A paper on circadian rhythms by Hildur Colot, M.A., a research associate in genetics, was highlighted for its special significance in the "In-Cytes" section of *Molecular Biology of the Cell*.

Chimeric cell shows promise against tumors

While the human immune system is often a mighty warrior, fighting off foreign invaders like bacteria and viruses, it's no match for wily cancer cells that can evade the body's defenses and grow into deadly tumors. So scientists keep tinkering with the immune system and working on immunotherapy treatments in the hope of one day defeating cancer.

At DMS, cancer researcher Charles Sentman, Ph.D., and postdoctoral fellow Tong Zhang, Ph.D., created a chimeric, or hybrid, immune cell by combining the best attributes of T cells and natural killer (NK) cells. The chimeric cells have been shown to kill cancer cells in the lab and have eradicated tumors and prevented the formation of new ones in mice.

Surveillance: Normally, immune cells use a process called immune surveillance to identify and eliminate cancer cells, which are detectable as foreign because they express different proteins on their surface than normal cells do. But cancer cells can also evade or suppress the immune system, thus escaping its surveillance and surviving to form tumors.

Scientists want to figure out how to outsmart the cancer cells' evasion tactics. One way might be to develop therapies that strengthen the ability of immune cells to kill cancer cells.

T cells can kill cancer cells directly, but there are often too few tumor-specific T cells to fight a given tumor. T cells survive for a long time, though, and activate other immune cells, enabling the immune system to continue its fight. And T cells that recognize a cancer cell can be given to a patient as immunotherapy.

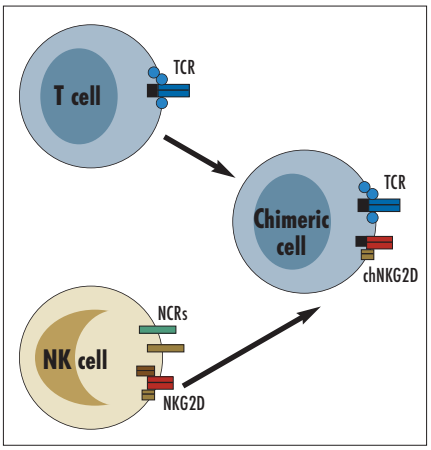
Receptor: NK cells can also kill cancer cells but are less specific than T cells. NK cells have a receptor called NKG2D that recognizes several proteins expressed on many types of cancer cells but not on most normal tissues. However, NK cells do not live as long as T cells and don't activate other immune cells as strongly.

The DMS researchers discovered that they could modify T cells by adding the NKG2D receptor to them.

"So now we have the recognition benefit of the NK cell [with] the expansion and survival ability of the T cell," explains Sentman, an assistant professor of microbiology and immunology. He believes these new immune cells are attacking the tumor directly and are also "activating the immune system to be much more aggressive against the tumor naturally."

Sentman's chimeric cells could potentially be given to patients to kill cancer cells and reactivate the body's natural immune system against the tumor. He speculates that the chimeric cells could be especially useful in combination with radiation therapy. Cells under stress, such as that caused by radiation, express more of the proteins that NKG2D recognizes. But, he cautions, "there are lots of different parameters that have to be worked out to see if it really is going to be a viable therapy."

Still, he hopes that his chimeric cell will turn out to be a powerful warrior against cancer. KRISTEN GARNER



Combining parts of two different immune-system cells may create a more powerful tumor-killer.

Revealing genes

Advanced testicular cancer can often be cured with conventional chemotherapy, and DMS pharmacologists are trying to find out why. In the journal *Oncogene*, they revealed 46 genes that are upregulated by chemotherapy and five that are repressed. Several of the upregulated genes are known to be affected by another gene, called p53. The activation of p53, the researchers now believe, is linked to testicular cancer's hypersensitivity to chemotherapy. "Many of the gene products" identified in this study "may participate in the unique curability of this disease," they concluded.

Enough is enough

Giving heart-surgery patients anti-inflammatory hormones—a common practice—may have limited benefit, says a study from DMS. The body produces enough of the anti-inflammatory hormone cortisol on its own during and after surgery, researchers found in a study of 60 patients. Patients who received anti-inflammatory medication—glucocorticoids (GCs)—did have more anti-inflammatory agents in their blood, but there were "no identifiable clinical differences between the treatment groups," reported lead author Mark Yeager, M.D., and his coauthors in the journal *Critical Care Medicine*. ■