

Advancements in prostate cancer research provide hope for finding a cure and lead to the discovery of new treatments to minimize the impact of a man's prostate cancer and maximize his quality of life. Us TOO is excited to introduce this new, regular *Hot SHEET* supplement which includes some of the latest research from the Prostate Cancer Foundation (www.pcf.org).

The PCF is the world's leading philanthropic organization funding and accelerating prostate cancer research. Founded in 1993, the PCF has raised more than \$745 million and provided funding to more than 2,000 research programs at nearly 200 cancer centers and universities.

Natural Killer Cells for Prostate Cancer Immunotherapy

Achoo! Caught a nasty cold from that co-worker who insisted on bringing her hacking cough to the office? No problem ... your **immune system** will fight the invading virus and you'll be feeling better in a few days.

We're used to thinking of the immune system as the body's defense against colds, the flu, or a troublesome stomach bug. But it does much more, including detecting and destroying errant cells almost anywhere in our body that have become cancerous. **Scientists can harness the power of the immune system to treat cancer, including prostate cancer.** (For background, go to <https://www.pcf.org/news/immunotherapy-a-vaccine-for-prostate-cancer/> for a three-part primer on the immune system and prostate cancer. These articles provide a clear introduction to what can seem like a complex topic).

Now, PCF-funded investigator Dr. Aaron LeBeau of the University of Minnesota and his team are developing an **interesting and provocative new type of immunotherapy** using a specific type of immune cell called natural killer cells, or **NK cells** for short. These cells are like beat cops on patrol, **traveling around the body to look for and kill cells** infected with a virus, bacteria, and cancer cells.

NK cells have several potential advantages vs. other types of immunotherapy.

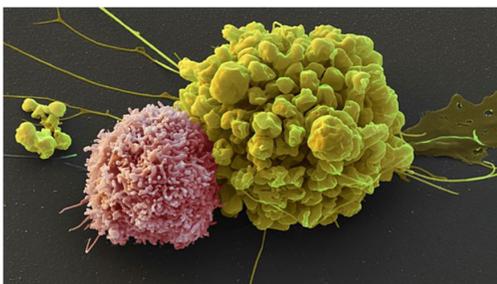
A single patient requires an infusion of ten billion NK cells. Where do these cells come from? NK cells can easily be isolated from blood and grown in the lab. They do not require donor matching, a process similar to that used for blood transfusions, so a single donor could, in theory, provide NK cells for many patients. **Thus, NK cell treatments can be significantly cheaper** than other immunotherapies that must be made from a patient's own cells. NK cells live for about a week in the body, so they won't "hang around" too long, possibly causing adverse effects.

What's the catch? NK cell therapies still face some hurdles, such as a lack of "targeted" action – they don't necessarily go to where they are needed. Tumors can also influence the environment immediately around them and suppress the immune system locally.

How do NK cells work?

They are ready to go, and don't require any ramp-up time to become activated. Once they recognize a foreign or dangerous cell, they release toxic payloads of enzymes that make holes in the target cell, enter that cell, and digest its proteins, killing it. However, NK cells don't run amok. They receive both activating (go!) and inhibitory (stop!) signals; whether they actually deploy depends on the balance of these signals.

One way to **overcome the problem of tumors hiding from the immune system is to create and attach a "targeting device" to the NK cell**, such that it would recognize prostate cancer cells and not normal tissue. Dr. LeBeau and his



NK cell (pink) attacking tumor cell (green).
Sources: Nature (Credit: Eye of science/SPL)

team are creating a specialized "chimeric antigen receptor," or CAR for short, to accomplish tumor targeting. The CAR is a genetically engineered protein that recognizes a particular protein on the surface of prostate cancer cells and activates the NK cell to kill the tumor cell. Supported by a PCF Challenge Award, the project will move to testing in animal models this fall. **It may be possible to start clinical trials in four years.**

That may sound like a long time for a patient considering his options for treatment today. However, it is a reminder that clinician-scientists like **Dr. LeBeau are working today to ensure that we have safe and effective new treatments in the future.** PCF is proud to support promising early-stage research that has the potential to significantly advance the field of prostate cancer therapeutics.

For more information visit www.pcf.org, email info@pcf.org, or call 1-800-757-2873.