MedicalXpress

US doctors defeat leukemia with modified HIV (Update)

December 11 2012, by Sebastian Smith

US doctors say they have saved a seven-year-old girl who was close to dying from leukemia by pioneering the use of an unlikely ally: a modified form of the HIV virus.

After fighting her disease with chemotherapy for almost two years and suffering two relapses, the young girl "faced grim prospects," doctors at Children's Hospital of Philadelphia said.

So in February this year they agreed to take her on in an experimental program that fought fire with fire.

Helped by a genetically altered HIV virus—stripped of its devastating properties that cause AIDS—doctors turned the girl's own immune cells into a superior force able to rout the "aggressive" leukemia.

Emily Whitehead was the first child and is one of only a handful of people in total to be given what's officially known as CTL019 therapy. The hospital stressed this could not yet be called "a magic bullet."

However in her case at least the success was dramatic.

First, millions of the girl's natural immune system cells were removed. Then the modified HIV virus was used to carry in a new gene that would boost the immune cells and help them spot, then attack cancer cells that had previously been able to sneak in "under the radar," the hospital said on its website.

Finally the rebooted immune cells were sent back in to do their work.

"The researchers have created a guided missile that locks in on and kills B cells, thereby attacking B-cell leukemia," the hospital said.

Pediatric oncologist Stephan Grupp, who cared for the girl, explained Tuesday that there was never any danger of AIDS during the process.

"The way we get the new gene into the T cells (immune cells) is by using a virus. This virus was developed from the HIV virus, however all of the parts of the HIV virus that can cause disease are removed," he said in an email.

"It is impossible to catch HIV or any other infection. What's left is the property of the HIV virus that allows it to put new genes into cells."

During the treatment, Emily became very ill and went into the intensive care unit, underlining how risky the procedure can be. However, drugs that partly block the immune reaction were administered, without interfering with the anti-leukemia action, and she recovered, the hospital said.

The result was "complete" and best of all, the doctors say, the boosted immune shield continues "to remain in the patient's body to protect against a recurrence of the cancer."

"She has no leukemia in her body for any test that we can do—even the most sensitive tests," Grupp told ABC television. "We need to see that the remission goes on for a couple of years before we think about whether she is cured or not. It is too soon to say."

Emily's parents Kari and Tom told the hospital that the success of the operation has changed their world. Instead of chemotherapy that made

the girl lose all her hair, she is now back in school, walking her dog Lucy and playing soccer. "T cell therapy was really the only option left for Emily," Tom said.

Grupp said on the Children's Hospital of Philadelphia website that cell therapies might eventually replace the more costly, painful bone marrow transplant treatment, a standard last-ditch defense against cancer.

"I've been meeting with families to discuss bone marrow transplant for 20 years," he said. "In almost every meeting, I say that bone marrow transplant is very hard and that if we had an alternative for children at that point in treatment, I would be delighted to put myself out of business. And for the first time, we're seeing how that might actually happen."

(c) 2012 AFP