

Cancer-Fighting Cells in Cord Blood Increased

Umbilical Cord Cells Are Effective Against Leukemia

Umbilical cord blood, which a mother produces to nourish her unborn child, contains natural killer (NK) cells that are especially effective against leukemia. Researchers have found a way to dramatically increase the number of these cells in laboratory samples that might be collected for use in cancer patients.

Significance of results

In the study, M. D. Anderson researchers increased the number of NK cells in umbilical cord blood more than 30-fold while maintaining the cell's effectiveness against leukemia cells. The results were presented in May at the American Society of Pediatric Hematology/Oncology annual conference.

NK cells target and kill cancer cells without disturbing normal cells. This characteristic reduces the chance of NK cells causing the development of graft-versus-host disease (GVHD). The condition is a dangerous side effect for some patients who receive stem cell transplants to treat acute lymphocytic leukemia (ALL) and acute myelogenous leukemia (AML).

GVHD is caused by T cells (a type of white blood cell) in the transplanted blood that react against the body's own cells.



Patrick Zweidler-McKay, M.D., Ph.D.

"Cord blood is a promising source of NK cells," says Patrick Zweidler-McKay, M.D., Ph.D., assistant professor in the Division of Pediatrics at the Children's Cancer Hospital at M. D. Anderson. "They're more sensitive to stimulation than those from other sources and have a lower possibility of causing graft-versus-host disease. Also, cord blood cells are easily available from cord banks throughout the country and the world."

Zweidler-McKay led the research study with co-senior investigator Elizabeth Shpall, M.D., professor in M. D. Anderson's Department of Stem Cell Transplantation and Cellular Therapy. Research scientist Dongxia Xing, Ph.D., in Shpall's lab was an integral part of the research as well.



Elizabeth Shpall, M.D. Background

Stem cell transplants traditionally relied on a matched donor's blood or bone marrow. In 1988, researchers found that umbilical cord blood can be used for stem cell transplantation. The immature stem cells in umbilical cord blood are easier to match to patients and can be stored for future use.

Subsequent attempts to increase the number of NK cells in cord blood made the cells ineffective, however.

Research methods

In developing the new method, researchers separated NK cells from umbilical cord blood. Then they treated NK cells with cytokine, interleukin-2 and irradiated "feeder" cells from the same cord blood. This kept the NK cells active during the three weeks they multiplied.

Researchers then injected mice with aggressive types of human leukemias.

Primary results

Researchers were able to generate more than 150 million NK cells from one cord blood unit while maintaining the cells' ability to find and kill acute leukemia cells.

The NK cells reduced ALL and AML cells by 60% to 85%.

“Our results support the use of NK cells from umbilical cord blood as a possible approach to treating acute leukemias,” Zweidler-McKay says.

What’s next?

Zweidler-McKay says transplanting NK cells from umbilical cord blood might be particularly valuable for adults with leukemia in certain cases.

These include adults who have had:

- Previous transplants
- Low blood counts
- Presence of another illness
- Lack of a donor

— Adapted by Dawn Dorsey from an M. D. Anderson [news release](#)

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