# Gene discovery could improve treatment for acute myeloid leukemia

August 13 2012

Scientists at Albert Einstein College of Medicine of Yeshiva University have made a discovery involving mice and humans that could mean that people with acute myeloid leukemia (AML), a rare and usually fatal cancer, are a step closer to new treatment options. Their study results were published online today in *Cancer Cell*.

"We have discovered that a gene called HLX is expressed at abnormally high levels in leukemia stem cells in a mouse model of AML," said Ulrich Steidl, M.D., Ph.D., assistant professor of cell biology and of medicine at Einstein and senior author of the paper. (Gene expression is the process by which a gene synthesizes the molecule that it codes for; an "over-expressed" gene makes its product in abnormally high amounts.)

According to the National Cancer Institute, AML will be diagnosed in one of every 254 people during their lifetime. Most die within a few years of diagnosis. For the last several decades there has been little improvement in the survival rate for AML patients.

Dr. Steidl and his colleagues found that over-expression of the HLX gene in mice caused blood-forming stem cells to become dysfunctional and develop into abnormal progenitors (biological ancestors) of white blood cells that failed to differentiate into normal blood cells. Instead, those early, abnormal white cells formed duplicates of themselves.

The researchers then analyzed HLX expression data collected from 354 AML patients and found that 87 percent of them were over-expressing

HLX compared with HLX expression in healthy individuals. And among patients expressing HLX at high levels in an even larger cohort of 601 patients: the greater their degree of HLX expression, the worse their survival chances.

Importantly, when Dr. Steidl's team used a laboratory technique to "knock down" HLX expression in AML cells taken from a mouse model of AML and from AML patients, proliferation of leukemia cells was greatly suppressed in both cases. And when the researchers knocked down HLX expression in mouse AML cells and human AML cells and then transplanted both types of cancer cells into healthy mice, those mice lived significantly longer compared with mice that received unaltered AML cells.

These findings suggest that targeting elevated HLX expression may be a promising novel strategy for treating AML.

"HLX is clearly a key factor in causing the over-production of white cells that occurs in AML," said Dr. Steidl. "Our research is still in its early stages, but we're looking towards developing drugs…so we can improve treatment for AML and possibly other types of cancer." Einstein has filed a patent application related to this research. The HLX technology is available for licensing.

**More information:** "H2.0-like homeobox (HLX) regulates early hematopoiesis and promotes acute myeloid leukemia," *Cancer Cell*.

Provided by Albert Einstein College of Medicine