New study changes view about the genetics of leukemia risk

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(Medical Xpress)—A gene that helps keep blood free of cancer is controlled by tiny pieces of RNA, a finding that may lead to better ways to diagnose blood cancers and even lead to new forms of treatment, Yale School of Medicine researchers report online Oct. 10 in the journal *Cell Reports*.

In the past few years researchers have identified the crucial role of the gene TET2 in keeping blood cells healthy. Mutations of the gene have been found in about 20% of leukemias and indicate a poor prognosis for patients. However, the gene was thought to be irrelevant in 80% of leukemia cases.

The new study changes this view. The researchers identified the agents that could be responsible for many leukemias without TET2 mutation—a host of microRNAs from the large expanse of DNA that do not code for proteins. They found that patients with large numbers of these microRNAs are more likely to have impaired TET2 function, even without a known mutation, and are thus likely to have aggressive forms of cancer.

This knowledge could help doctors develop a course of treatment for leukemia patients, said Jun Lu, assistant professor of genetics, researcher in the Yale Stem Cell Center and Yale Cancer Center, and senior author of the paper.

Lu points out that half of leukemia patients who lack these markers may be spared side effects of aggressive treatments.

"If these markers are absent and TET2 gene is not mutated, then the 50% of leukemia patients without this marker would be spared harsher treatment such as high-dose chemotherapy or bone marrow transplants," Lu said.

New therapies that could block these microRNAs could in theory help treat blood cancers, he said.

"However, there is currently no good way to do that, but it is a problem I am very hopeful will be resolved," Lu said.