A microRNA prognostic marker identified in acute leukemia

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A study has identified microRNA-3151 as a new independent prognostic marker in certain patients with acute leukemia. The study involves patients with acute myeloid leukemia and normal-looking chromosomes (CN-AML).

The study by researchers at the Ohio State University Comprehensive Cancer Center - Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC - James) found that when microRNA-3151 (miR-3151) is overexpressed in CN-AML, the disease responds poorly to treatment and patients experience shorter remissions and survival periods. This effect is independent of other gene mutations that may be present in the cells.

Additionally, miR-3151 is encoded within a gene called BAALC, which itself is an independent marker of poor survival when overexpressed in CN-AML.

The findings, published online in the journal Blood, provide new insights into the nature of AML and might in the future help determine the best therapy for individual patients and further personalize AML therapy.

"Patients with high levels of both miR-3151 and BAALC had the poorest outcome compared with those showing high expression of either miR-3151 or BAALC alone, or those expressing low levels of both," says principal investigator Dr. Clara D. Bloomfield, a Distinguished University Professor at Ohio State and cancer scholar and senior advisor

to the OSUCCC - James. "This suggests that miR-3151 and BAALC may act through different mechanisms to enhance poor outcome of CN-AML patients."

The study involved 179 patients aged 60 years or older with CN-AML who were treated on Cancer and Leukemia Group B (CALGB) clinical trials.

MicroRNAs are small molecules that cells use to help regulate the kinds and amount of proteins they make. About one-third of human microRNAs are encoded within host genes. Specifically, they are located in the portions of genes called introns, short stretches of DNA that are not used when genetic information is translated to make a protein.

"Very little is known about the regulation of microRNAs located within introns, and especially about their possible interactions with their host genes," says first author Dr. Ann-Kathrin Eisfeld, a post-doctoral researcher who works in the laboratory of study co-author Dr. Albert de la Chapelle and Bloomfield.

"This is the first description of interplay of an oncogene and its intronic, and possibly oncogenic, microRNA," Eisfeld says. "It may be the first of other important intronic microRNAs in leukemia and perhaps other malignancies."

Provided by Ohio State University Medical Center