Potential Biomarker for personalized Leukemia therapy identified

Researchers at Heidelberg Faculty of Medicine at Heidelberg University, in collaboration with partners from 29 German study centers, have found evidence of a potential biomarker for personalized therapy of acute myeloid leukemia (AML) in a Phase II study. Analyses showed that certain patients could benefit from additional treatment with the drug Motixafortide in addition to standard chemotherapy. The results of the BLAST trial were published in the journal Blood.

The study examined the role of the surface receptor CXCR4 in acute myeloid leukemia (AML) and the efficacy of the CXCR4 inhibitor Motixafortide. CXCR4 enables leukemia cells to anchor themselves in a protected bone marrow niche where they can evade chemotherapy. Motixafortide breaks this bond and makes the cells vulnerable again. In the multicenter, randomized Phase II BLAST trial, 128 AML patients in remission received either Motixafortide or a placebo in addition to standard chemotherapy

Overall, the drug showed no benefit. "It was only through single-cell analysis of the leukemia cells remaining after chemotherapy that this nuanced effect became apparent. Patients with high CXCR4 expression on these cells had a significantly reduced risk of relapse with Motixafortide, a subgroup that would have remained undetected without this resolution," explained first author Dr. Enise Ceran, physician scientist in the Epigenomics, Epitranscriptomics and Novel Therapy Approaches in AML at the Department of Hematology, Oncology, and Rheumatology at Heidelberg University Hospital.

The study underscores the importance of personalized AML therapies: Analysing individual surviving leukemia cells can help target medications such as motixafortide to those patients most likely to benefit. "With this study, we demonstrate that modern single-cell analyses can have concrete clinical relevance beyond pure research, namely when they help identify patients who are suitable for additional therapy. The next steps will be to validate this approach in prospective studies," added study leader Prof. Dr. Carsten Müller-Tidow, Medical Director of the Department of Hematology, Oncology, and Rheumatology at Heidelberg University Hospital.

The BLAST-study was sponsored by Martin Luther University Halle-Wittenberg, with scientific coordination and management provided by Heidelberg University Hospital. The study was conducted at 29 centers in Germany with active support from the East German Study Group for Hematology and Oncology (OSHO) and the Leukemia Study Alliance (SAL).

Publication:
Ceran, E., Jaramillo, S., Merbach, A. K. et al. Inhibition of high CXCR4 with Motixafortide and absence of single-cell MRD predict outcome after AML consolidation. Blood (2026). DOI: doi.org/10.1182/blood.2025032033

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Further information

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