Medical Xpress

A blood sample 24 hours after the start of chemotherapy can predict survival

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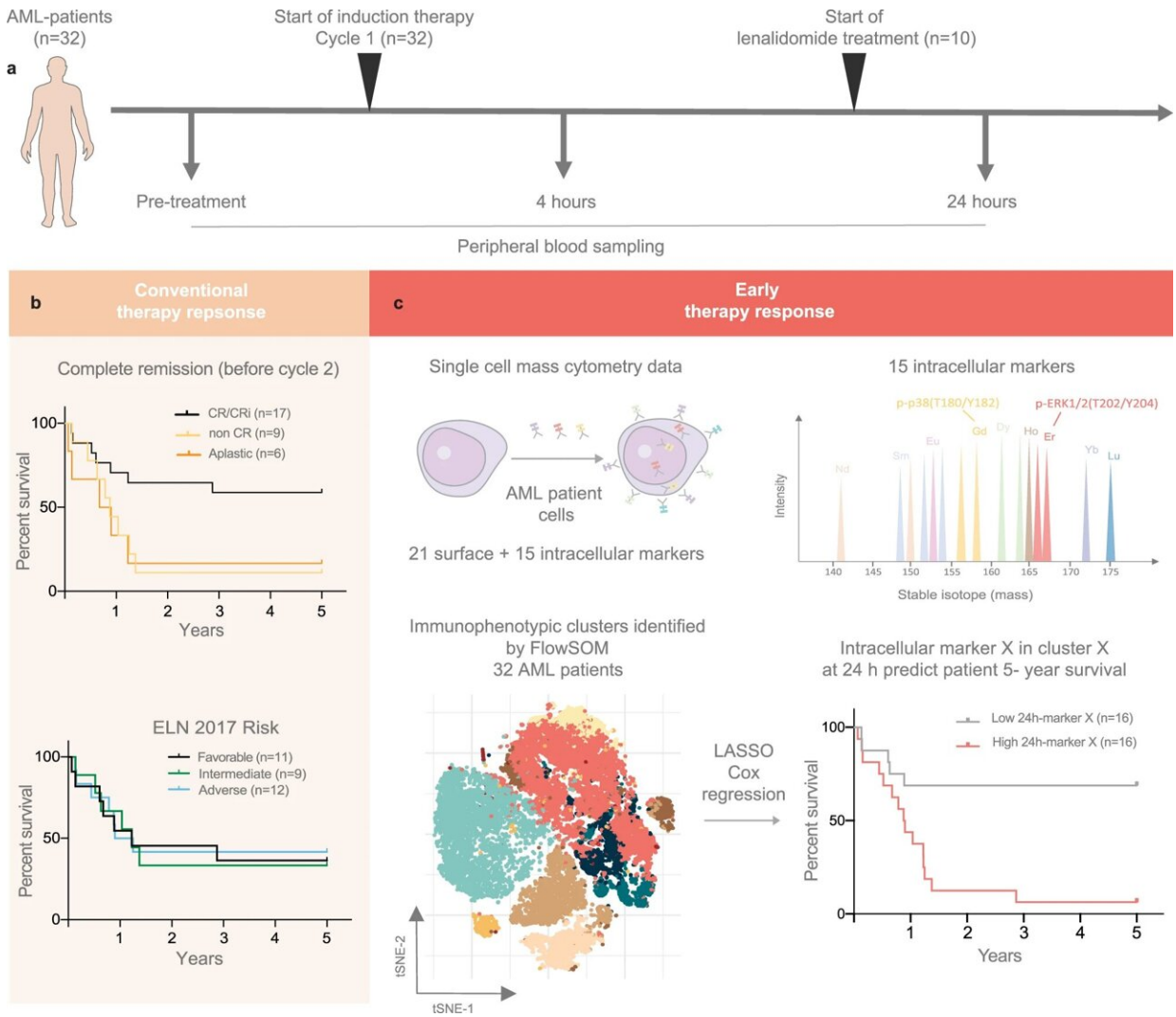

Mass cytometry analysis of early response evaluation by single-cell signaling to profile. **a** Peripheral blood samples were collected from 32 AML patients treated with conventional induction therapy ("7 + 3" cytarabine + daunorubicin).

Samples were collected before the start of treatment, at 4- and 24-h after the start of treatment, and immediately fixed to preserve in vivo signaling. Ten patients in this study received per-oral treatment of lenalidomide in addition to the 7 + 3 induction therapy from days 1–21. **b** Five-year survival Kaplan–Meier curves showing the survival for the 32 AML patients in this study based on conventional therapy response assessment and European Leukemia Net (ELN) 2017 risk classification. Conventional therapy response assessment was done by bone marrow aspiration on day 17 post-treatment or before cycle two of induction therapy. Seventeen patients had CR/CRi, nine patients had nonCR and six patients were aplastic before the second cycle of induction therapy. Based on the ELN 2017 Risk classification, 11 patients had favorable risk, nine had intermediate risk and 12 had adverse risk. **c** Early therapy response assessment by mass cytometry at 4- and 24-h post-treatment by investigation of intracellular signaling response to chemotherapy. Machine learning approaches were used to identify markers in the blast cell population that could be predictive of patients' 5-year survival hours after the start of induction therapy (Kaplan–Meier curve, 16 patients in each group). Credit: *Nature Communications* (2023). DOI: 10.1038/s41467-022-35624-4

Researchers from the University of Bergen, Norway, have found a new method that within hours can predict if certain cancer patients will survive or not after chemotherapy.

Acute myeloid leukemia is an aggressive blood cancer with poor survival. Although high rates of initial chemotherapy response, patients often relapse due to the selection and development of chemotherapy-resistant leukemic cells.

"When treating patients with leukemia, it is challenging to quickly follow if the patient is responding to therapy or not," says Benedicte Sjo Tislevoll, researcher at the University of Bergen and leader of the new study.

The response to therapy is currently measured after weeks to months of treatment, thereby losing important time. However, an immediate response to chemotherapy can be measured by investigating the functional properties of the leukemic cells.

"Our results show that the protein ERK1/2 increases within the first 24 hours of chemotherapy in patients who have a poor response to therapy. We believe that this protein is responsible for the cancer cells' resistance to chemotherapy and can be used to distinguish responders from non-responders," the researcher says.

"We think that this is an important key in our understanding of cancer, and our aim is to use this information to change treatment early for patients who are not responding to therapy," Tislevoll concludes.

The findings are published in the journal *Nature Communications*.

More information: Benedicte Sjo Tislevoll et al, Early response evaluation by single cell signaling profiling in acute myeloid leukemia, *Nature Communications* (2023). DOI: 10.1038/s41467-022-35624-4

Provided by University of Bergen