Research paves the way for predicting disease progression for incurable cancer

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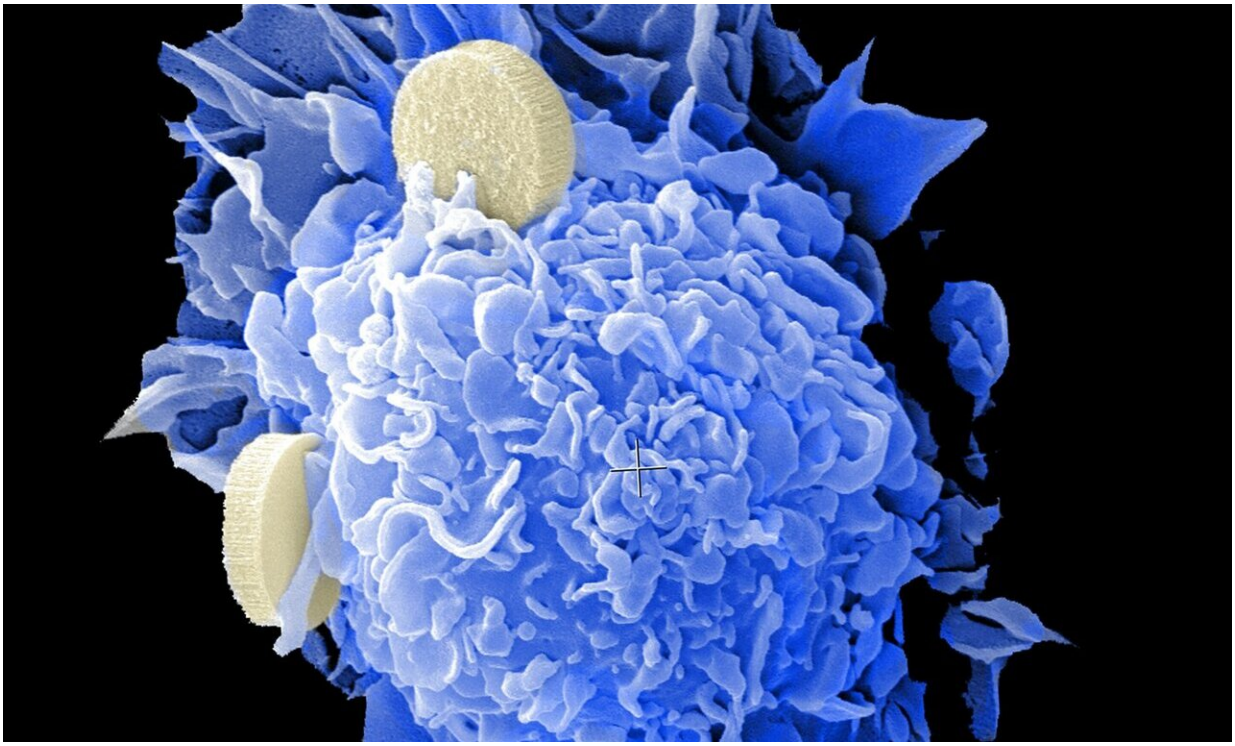

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Researchers have come one step closer to answering why, in some patients, a type of lymphoma changes from indolent to aggressive, and in particular, they are closer to identifying which patients are at high risk of this change happening.

Part of the answer lies in the protein expression in the tumor, explains Associate Professor Maja Ludvigsen from the Department of Clinical Medicine at Aarhus University. Maja is one of the authors of a new study on the subject, which has just been published in the journal *Blood Advances*.

Follicular lymphoma is an incurable lymphoma. But unlike many other cancers, it is not always aggressive from the start. This means that patients with the disease have to live with the uncertainty of when—and how—the cancer will develop. It also means frequent visits to the hospital to monitor any acute developments.

Patients generally respond well to treatment, and most are physically well, even with a serious diagnosis. However, for the majority of patients, the disease will flare up periodically, and for some patients, it will change into an aggressive form.

"For some, the disease can be controlled with treatment., For others, the cancer will progress to the aggressive lymphoma type, diffuse large B-cell lymphoma (DLBCL). This development is associated with a deterioration in the patient's condition and the chances of survival are significantly lower," says Ludvigsen.

The study was conducted by Ph.D. student Marie Beck Hairing Enemark, and the researchers analyzed the protein composition of cancerous tumors from patients with follicular lymphoma. This has provided new insights into why the cancer transforms into an aggressive type and, in particular, which patients are at high risk of being affected.

Can cause worry and anxiety

"You could consider the proteins in the tissue as the tumor's toolbox. Our study shows that tumors from patients who experience

transformation to the aggressive type later in the course of the disease have a different protein content at the time of diagnosis. We can utilize this to find out more about the mechanism that drives the transformation. Interestingly, we found proteins that affect the cells' ability to survive," says Ludvigsen.

"We therefore decided to take a deeper look at five proteins, which confirmed a different level of expression in the tumor in patients with different disease progression. It is particularly interesting to note that, based on the combined expression of the five proteins, at the time of diagnosis, we were able to identify patients who would later experience transformation to aggressive lymphoma," explains the researcher.

She calls the study a groundbreaking discovery about the biology of the transformation process in this type of cancer.

"At the moment, patients have to live with the uncertainty of when and how their disease will return. This can lead to high levels of worry and anxiety," says Ludvigsen. She hopes that, in the future, the study can be used to predict the course of an individual patient's disease.

"This would mean that low-risk patients could be less concerned about their disease and it could save many unnecessary hospital visits. Perhaps it could even take some of the pressure off our busy hospitals. It will also be possible to tailor treatment strategies to high-risk patients earlier, ultimately with the hope of treating and saving a larger group of patients than is possible today," she says.

Maja Ludvigsen points out that, although the researchers have validated the results in tumor tissue from patients, further research is necessary to see whether the results also apply to a larger patient group. Expansion of the study has already been initiated as part of the research project.

More information: Marie Beck Enemark et al, Proteomics identify apoptotic markers as predictors of histological transformation in patients with follicular lymphoma, *Blood Advances* (2023). DOI: 10.1182/bloodadvances.2023011299