Protein finding can pave the way for improved treatment of malignant melanoma

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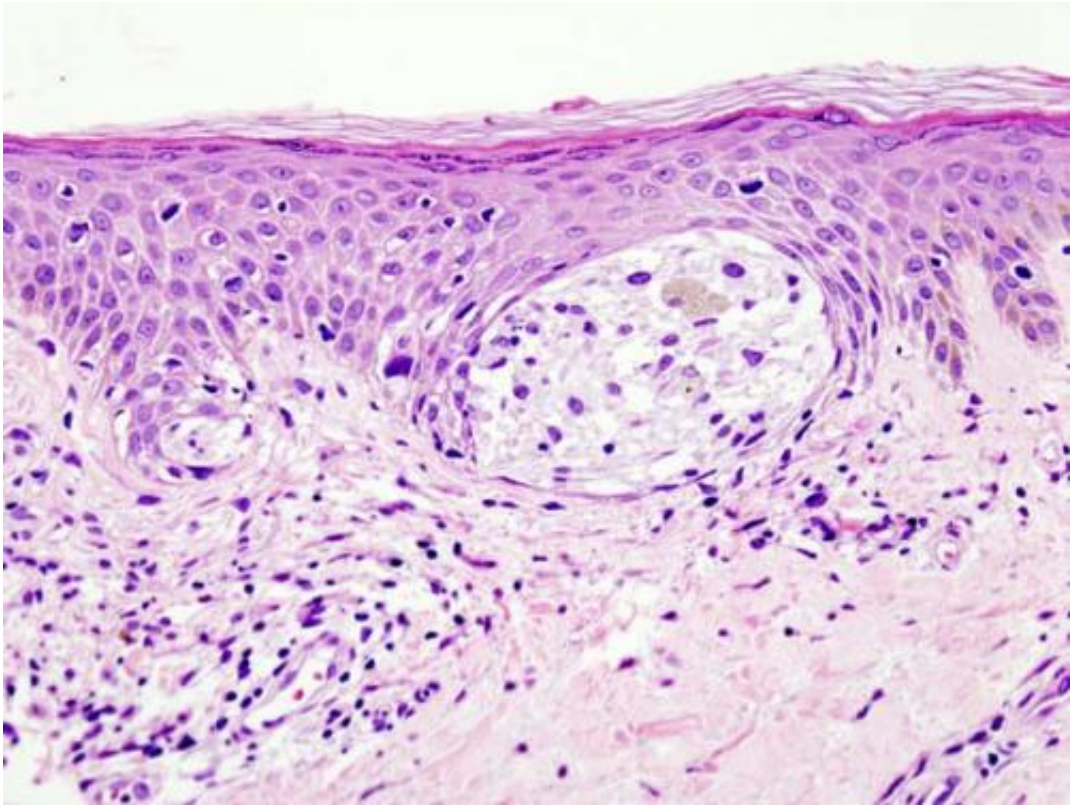

Melanoma in skin biopsy with H&E stain—this case may represent superficial spreading melanoma. Credit: Wikipedia/CC BY-SA 3.0

Today it is not possible to predict spreading from malignant melanomas. Melanoma metastases are furthermore extremely difficult to eliminate as traditional treatment such as chemotherapy and radiotherapy is mostly ineffective. Only ten per cent of the patients survive once they reach an

advanced stage with distant metastases.

New research now demonstrates that the presence of the protein megalin in a malignant melanoma is an indicator of cancer cells that are particularly aggressive. The protein improves the ability of the cancer cells to divide and to survive. Accordingly, it has also been found in a number of metastases from malignant melanomas.

The discovery point towards the possibility of identifying aggressive melanomas at an earlier stage than is currently possible, which could turn out to be of utmost value for correct prognosis and improved treatment strategies for patients with malignant melanomas in the future. The research results have been published in one of the most prestigious scientific journals in the area, Pigment Cell & Melanoma Research.

May be possible to predict disease progression

It is the first time that the protein megalin, which is otherwise primarily known for its function in the kidneys, has been connected with malignant melanomas. The novel knowledge is the result of long-standing research in the field of cell surface receptor proteins at the Department of Biomedicine at Aarhus University.

"Our studies have shown that the protein megalin is almost always detectable in malignant melanomas, while it is rarely found in the benign counterparts. We see a clear trend that the more megalin is present, the faster the cells divide and the better they are at surviving. This therefore indicates that a high level of megalin in a malignant melanoma should be seen as a warning of particularly aggressive cancer cells with extremely good conditions for spreading," says Associate Professor Mette Madsen from the Department of Biomedicine at Aarhus University.

With the new knowledge, the hope is that pathologists and oncologists at

an early stage will be able - unlike today - to predict whether a patient should expect spreading and relapse or not from a malignant melanoma.

"It is a new and interesting marker that no-one has thought of before. The preliminary results look very promising. Even though we currently see considerable progress and success from novel treatment strategies for patients with metastatic melanoma, it remains a very serious illness when it reaches later stages with spreading. In a best case scenario, this discovery can pinpoint those patients who will experience a relapse, and identify which treatment will benefit which patients the most," says Henrik Schmidt, consultant at the Department of Oncology at Aarhus University Hospital, who is collaborating forwards with Mette Madsen on the project.

Potential for novel treatment

The discovery may also lead to novel treatment options in the long term.

"In general, the protein is present at the surface of cells and can absorb many things from the surroundings such as nutrients. So it is therefore well suited for targeted treatment; either medicine affecting the protein and its function thereby inhibiting the proliferation of the cancer cells and their survival, or for transporting lethal drugs into the cancer cells. Since the protein is not found in all of the cells of our body, but in a limited number of places in a healthy individual, this type of treatment can be expected to have less side-effects than the treatment regimes we can offer today," says Mette Madsen, who emphasises that the this type of treatment will first be possible in the longer term.

The first step is to clarify as quickly as possible how the level of megalin correlates with the spreading from a malignant melanoma and patient survival. Established methods for examining the level of the protein in birthmarks already exist and could easily be introduced at the hospitals.

Provided by Aarhus University