MedicalXpress

New insights into the epigenome of brain tumours

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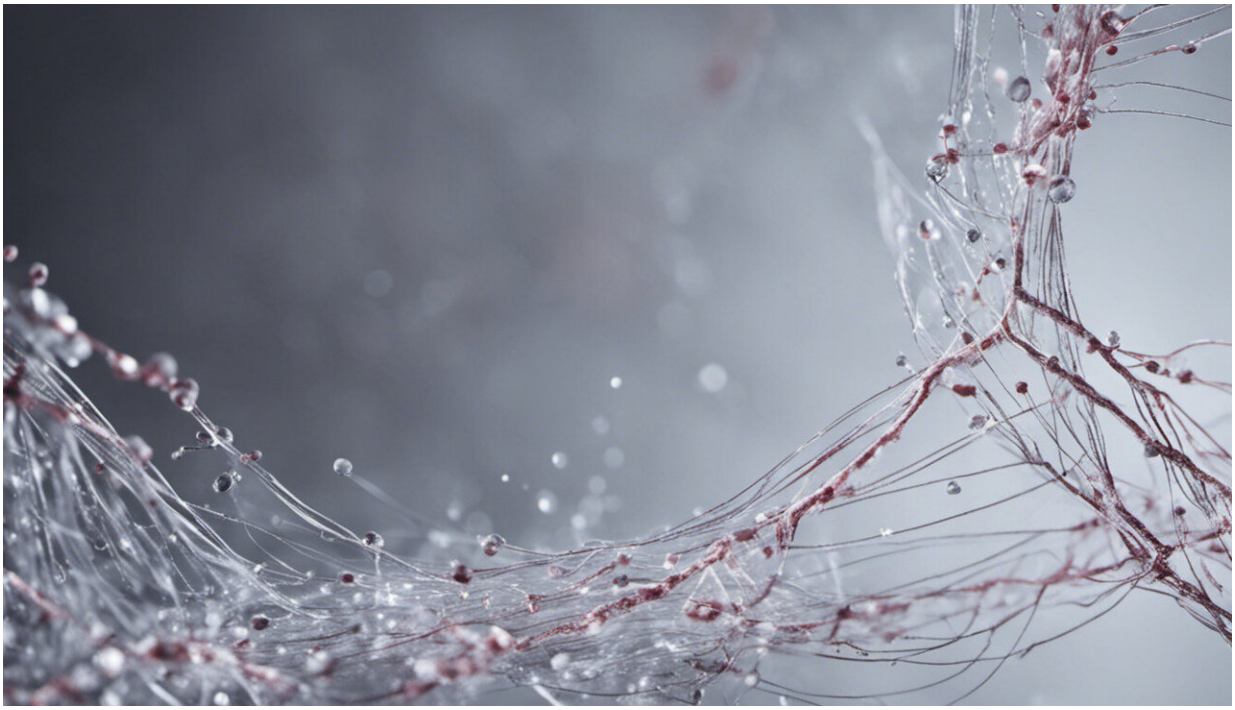

Credit: AI-generated image (disclaimer)

Brain cancer is the most common form of cancer amongst children and due to the large number of different types of brain tumours, a proper diagnosis is necessary for effective treatment. One EU-supported project has provided tools to improve the diagnosis and outcome predictions of patients with brain tumours.

Epigenetic alterations are observed at the earliest stages of neoplasia within stem cells. Importantly, the alterations are reversible and can potentially be treated. In children, brain tumours are the leading cause of cancer-related mortality and long-term morbidity, but there are many types of brain tumours and they can be hard to distinguish by standard methods. However, a proper diagnosis is essential to be able to treat the individual patients most effectively.

The aim of the EU-supported EPIBRAIN project, as lead researcher Dr. Helena Carén explains, was to explore the epigenome of brain tumours. "We wanted to provide tools to improve the diagnosis and outcome predictions of patients with brain tumours, and we were also looking for ways to improve the monitoring of patients' response to treatment."

In addition to these goals, EPIBRAIN sought to decipher the role of epigenetic aberrations in tumours and how to target them to improve survival rates and quality of life of patients.

Brain tumours in children and in adults are different at the molecular level. "Model systems to study paediatric brain tumours, under conditions which preserve the features of the cells, were not available. So, we optimised culture conditions and established in vitro cultures from these patients. These cultures are now used in further studies with the aim to find ways of targeting them therapeutically."

Their analysis threw up some interesting findings. "As an accurate diagnosis based on histopathological assessment is not always possible to achieve, we used DNA methylation profiles from paediatric brain tumours. By doing so we were able to develop, and publish, a diagnostic classifier called MethPed."

This classifier is currently being evaluated (together with another later published classifier) in a national study in which all tumours from these

patients are included with the aim of improving current diagnostics. The national study is ongoing and will be completed within the next couple of years. The team is continuing with their in vitro experiments, aimed at determining why and how the cells become tumour cells and how they can be targeted.

But it isn't just the research itself that is opening up new pathways. The coordination of a group of researchers, and the ongoing collaboration that fostered, is also a key outcome of the project. "I engaged in teaching and initiated and organised a new Ph.D. course in Cancer Epigenetics to transfer knowledge to other researchers at the University of Gothenburg," Dr. Carén explains. She adds that she also set up a research group at the Sahlgrenska Cancer Center, which is now composed of 12 team members including Ph.D. students, postdocs, technicians and master students.

As Dr. Carén adds, the trickiest elements can also be the best aspects of a challenge. "I found recruiting and setting up the research team, whilst at the same time conducting the experimental research, was both the most demanding and the most rewarding aspect of the project."

Provided by CORDIS