PRESS RELEASE

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NEW SUPPORTIVE TREATMENT OPTION FOR EMBRYONAL RHABDOMYOSARCOMA

Rhabdomyosarcoma is the most common soft-tissue tumour in children. It is a tumour of mesenchymal origin that closely resembles skeletal muscle cells. Two types are classically distinguished: alveolar and embryonal rhabdomyosarcoma. Both tumour types have in common that differentiation into postmitotic skeletal muscle cells is inhibited although they have the general capability for myogenic differentiation. Differentiating proliferating tumour cells into differentiated, non-dividing myotubes or muscle fibres could represent a new supportive approach in the treatment of rhabdomyosarcoma. A group of researchers led by Julia von Maltzahn at the Brandenburg University of Technology Cottbus-Senftenberg (BTU) and the Leibniz Institute on Aging (FLI) have found a way to convert embryonal rhabdomyosarcoma cells into differentiated postmitotic muscle cells. The Wilhelm Sander Foundation supported this project with EUR 185,000.

Rhabdomyosarcoma is the most common soft-tissue tumour in children. Rhabdomyosarcomas can develop in almost any part of the body. Two main types are distinguished: alveolar and embryonal rhabdomyosarcoma. In alveolar rhabdomyosarcoma, the molecular cause is reasonably well understood, arising from a PAX3/7-FOXO1 fusion. In embryonal rhabdomyosarcoma, by contrast, the molecular cause is diverse, which makes treatment more difficult. Rhabdomyosarcomas are currently treated with a combination of resection, chemotherapy and radiotherapy. However, since the tumours often cannot be fully removed, and chemotherapy and radiotherapy in children can also have consequences in adulthood, supportive therapies are urgently needed.

The molecular repressor TRPS1 blocks myogenic differentiation in embryonal rhabdomyosarcoma

The molecular repressor TRPS1 plays an important role in myogenic differentiation and in certain forms of breast cancer. The team led by Julia von Maltzahn at BTU Cottbus-Senftenberg and the Leibniz Institute on Aging has identified the downregulation of TRPS1 in embryonal rhabdomyosarcoma as a starting point for new therapeutic approaches. The idea here is that reducing the amount of TRPS1 drives a proliferating tumour cell into differentiation to become a postmitotic myotube/muscle fibre. Rhabdomyosarcoma cells generally retain the ability to differentiate into differentiated, non-dividing skeletal muscle cells (myotubes/muscle fibres). However, the induction of differentiation is inhibited.

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Reducing the amount of TRPS1 enables myogenic differentiation in embryonal rhabdomyosarcoma

The results show that reducing the amount of TRPS1 in embryonal rhabdomyosarcoma cells leads to reduced proliferation and to differentiation into postmitotic myotubes. The study demonstrates this for various human embryonal rhabdomyosarcomas and to confirmed it in an in vivo xenograft transplantation experiment. This showed that tumour growth was reduced and that an increased number of differentiated skeletal muscle cells was detected.

In the future, this approach could complement chemotherapy and radiotherapy in embryonal rhabdomyosarcoma – one of the most common soft-tissue tumours in children. The study, funded by the Wilhelm Sander Foundation, was published in the journal “Molecular Therapy”.

Wilhelm Sander Foundation: Research. Knowledge. Future.
The Wilhelm Sander-Stiftung supported the research project with a total amount of EUR 185,000 over 3 years. The foundation's purpose is to promote medical research, in particular projects relating to the fight against cancer. Since the foundation was established, more than EUR 350 million has been awarded in total for research funding in Germany and Switzerland. This makes the Wilhelm Sander-Stiftung one of the most significant private research foundations in the German-speaking world. It was established from the estate of the entrepreneur of the same name, who died in 1973.

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About BTU

The Brandenburg University of Technology Cottbus-Senftenberg is the second-largest university and the only technical university in Brandenburg. Through its profile area “Health and Life Sciences”, it brings leading biomedical research – such as the approach against childhood cancer presented here – to the region.

Weitere Informationen

www.wilhelm-sander-stiftung.de
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