Researchers at Lund University in Sweden have identified one of the reasons why the childhood cancer neuroblastoma becomes resistant to chemotherapy. The findings are significant for how future treatments should be designed. The results have been published in *Science Advances.*

Neuroblastoma is an aggressive cancer of the sympathetic nervous system, especially of the adrenal gland. Despite intense treatment with chemotherapy, the disease can be difficult to cure and the prognosis is poor for children who have the aggressive variant. One of the reasons is that the tumor often develops resistance to drugs. In order to understand what happens when the tumor becomes resistant, good disease models are needed that can mimic the complex drug treatment given to patients today:

"Tumors from patients with neuroblastoma look very different, and it is difficult to produce a model that is representative of many patients. This type of challenge often limits medical research," explains the study's first author, Adriana Mañas, child cancer researcher at Lund University.

However, the researchers have now succeeded in developing a model in mice with human neuroblastoma tumor cells, which makes it possible to follow the mechanisms that occur when certain tumor cells develop resistance to drugs.

"What happens is that the tumor cells change to mimic embryonic cells from the fetal development..."
These embryonic tumor cells are more resistant to chemotherapy," says research group leader Daniel Bexell, who led the study.

It has long been known that genetic changes are crucial for neuroblastoma to form and develop into an aggressive tumor. However, when it comes to resistance, it is not primarily about genetic changes, but rather that the cells quickly adapt their behavior. The reason why the embryonic tumor cells are less responsive to drugs is not yet fully understood, but the researchers think that that the cells in their immature state can adapt and survive in changing conditions.

"Current treatment with chemotherapy targets rapidly dividing tumor cells. Our research results can contribute to new treatments which better reach the entire tumor, in order to avoid the development of resistance. In future research, it will be important to understand how to specifically target the embryonic state of the neuroblastoma cell in order to cure patients," concludes Daniel Bexell.