New DNA technology may improve the treatment of aggressive childhood cancer

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Neuroblastoma, a form of cancer, is the most common childhood tumour outside of the brain, and the one that has been the most difficult to treat. Researchers have now been able, using high-resolution DNA technology, to develop a new method for analysing the genes that cause relapses into this disease. Their results are presented in the scientific journal *Journal of Clinical Oncology*.

Neuroblastoma occurs in infants, originating in the autonomic nervous system. The treatment of this disease is adapted to the genetics of the cancer cells at the time of diagnosis, and relapses often entail a poor prognosis. Earlier research has indicated that changes in the ALK gene, which controls the division rate of cancer cells, affect the risk of both occurrence and reoccurrence of neuroblastomas.

With the help of a significantly improved analysis method, which is based on an extremely sensitive DNA sequencing technology, the researchers have now succeeded in identifying a number of specific genetic changes that influence the risk of reoccurrence. This may lead to new treatments for children suffering from neuroblastoma, as pharmaceutical companies have recently developed drugs that target the mutated ALK gene, i.e., ALK inhibitors. This treatment could prove successful in patients with neuroblastomas, for whom relapses are caused by a mutation in the ALK gene.

"These results indicate that the testing, analysis and treatment of these children with neuroblastomas has to be changed," says Per Kogner,

professor at Karolinska Institutet and paediatric oncologist at the Karolinska University Hospital Astrid Lindgren Children's Hospital,

According to Per Kogner, one of the conclusions to draw is that samples of the tumour should be taken to check for possible ALK mutations both when the patient is first diagnosed and at any subsequent relapses. The samples should also be analysed using high-resolution DNA sequencing technology, and patients should be given the opportunity to take part in studies and treatments with ALK inhibitors.

"Several Swedish children with neuroblastomas have already been treated with ALK inhibitors, and the initial results have been promising," says Per Kogner. This brings new hope for families with children suffering from neuroblastomas, whose relapses have not always been halted by previously available therapies.

More information: "Emergence of new ALK mutations at relapse of neuroblastoma." Schleiermacher G, Javanmardi N, Bernard V, Leroy Q, Cappo, Frio TR, Pierron G, Lapouble E, Combaret V, Speleman F, de Wilde B, Djos A, Øra I, Hedborg F, Träger C, Holmqvist BM, Abrahamsson J, Peuchmaur M, Michon J, Janoueix-Lerosey I, Kogner P, Delattre O, Martinsson T. *Journal of Clinical Oncology*, 28 July 2014, DOI: 10.1200/JCO.2013.54.0674

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