New genetic cause of childhood cancer found

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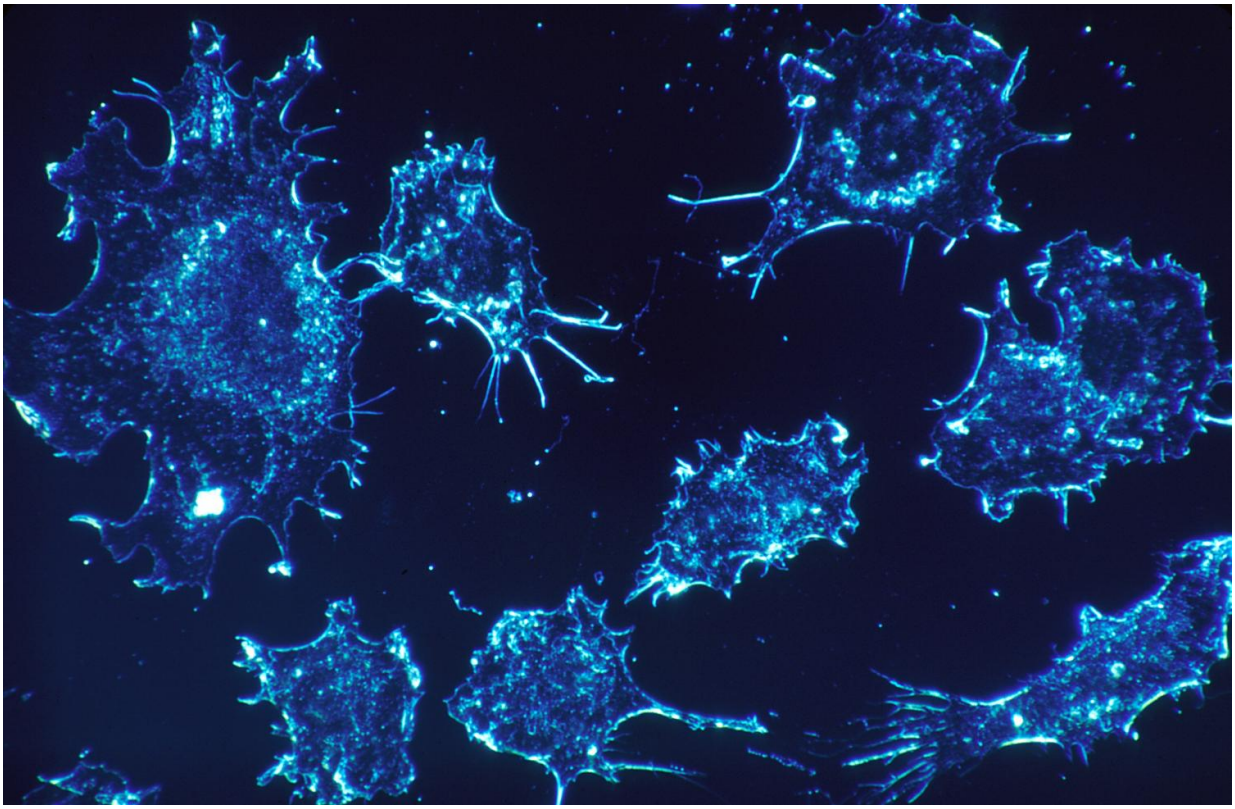

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Scientists have identified a genetic mutation that causes a childhood kidney cancer called Wilms' tumour.

The research revealed how loss of control over the number of chromosomes in a cell can lead to cancer.

How the research was done

Researchers looked at families with a rare genetic syndrome called mosaic variegated aneuploidy (MVA) to try to identify mutations that might be linked to Wilms' tumour.

Individuals with MVA have cells with the wrong number of chromosomes – some have too many, while others have too few. This is known as aneuploidy.

Twenty families with MVA had their genes analysed using a technique called exome sequencing. Mutations in a gene called TRIP13 were found.

Wilms' tumour is a form of kidney cancer that occurs mainly in children. It affects about 1 in 10,000 children but fortunately is curable in about 90% of cases.

What the research found

The TRIP13 gene codes for one of the essential proteins involved in ensuring the correct number of chromosomes go into each cell during cell division. Aneuploidy is a hallmark of cancer and so it is unsurprising that children with MVA are at risk of cancer.

However, the study found that not all children with MVA were at high risk. Those with the TRIP13 mutation, and another previously identified mutation called BUB1B, were at high risk. But children with MVA due to other causes were not.

This suggests that it is the underlying mechanism which causes aneuploidy that might be important in understanding cancer risk and not

solely having the wrong number of chromosomes in a cell. It is an important development that provides valuable information about the fundamental biology of cancer.

Wellcome Senior Investigator Professor Nazneen Rahman from The Institute of Cancer Research, London, who led the study, said: "This study has been of immediate use to families in providing a reason for why their child developed cancer, and information about risks to other children, which is very rewarding.

"Equally importantly the study has provided new information about how aneuploidy and cancer are linked – a topic that has been hotly debated and intensively researched for many decades."

More information: Shawn Yost et al. Biallelic TRIP13 mutations predispose to Wilms tumor and chromosome missegregation, *Nature Genetics* (2017). DOI: 10.1038/ng.3883

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