

New role for DNA unraveler in preventing brain tumours and other cancers

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(Medical Xpress)—A molecule originally implicated in DNA repair may also be a crucial factor in preventing tumours such as medulloblastoma, a type of childhood brain tumour, according to research published today in *Science*.

The molecule, called RTEL1, is known to be responsible for maintaining the ends of our chromosomes, the structures that contain the genetic material DNA. Now Cancer Research UK scientists have discovered that it also plays a critical role throughout the entire genome.

Dr Simon Boulton and his team, based at the charity's London Research Institute, found that RTEL1 works together with another molecule called PCNA. Like a hair tie, RTEL1 helps PCNA as it forms a ring around the DNA allowing it to remove knots and untangle DNA as it gets copied. This process is essential for correctly copying DNA, so that cells can grow and divide without making genetic mistakes.

When RTEL1 contains a fault preventing it from binding to PCNA, DNA replication is disrupted and mistakes are made, which can lead to cancer.

When the researchers looked in mice whose RTEL1 gene was flawed in this way, they found a substantial increase in the incidence of several types of cancer, including lymphoma and medulloblastoma, the most common type of [childhood brain](#) cancer.

Previous studies had shown that there was a potential link between RTEL1 and brain cancers, although it wasn't understood why. This study confirms that RTEL1 is definitively involved in preventing cancer by stopping mistakes from being made during DNA replication, but more research is needed to understand why it appears to be particularly associated with [brain](#) tumours.

Dr Simon Boulton, based at Cancer Research UK's London Research Institute, said: "This research exemplifies why it's so important to study fundamental cellular processes in model systems. With the aid of new technologies, we have uncovered an unexpected role for the RTEL1 protein, and shown that this new role in maintaining and replicating DNA may hold the key to some types of cancer."

Dr Simon Boulton was recently named as one of the recipients of the 2013 Paul Marks Prize for cancer research from the Memorial Sloan-Kettering Cancer Center in America.

Dr Kat Arney, Cancer Research UK's senior science communications manager, said: "Unravelling the inner workings of cancer cells is essential if we are to truly make progress in beating [cancer](#). This is an important step forward in understanding the molecular machinery that copies our DNA and what happens when it goes wrong. And it could open the door to future approaches for prevention, diagnosis or treatment."

More information: Vannier et al, RTEL1 Is a Replisome-Associated Helicase That Promotes Telomere and Genome-Wide Replication (2013)

Science.

Provided by Cancer Research UK

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