Scientists throw new light on DNA copying process

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Research led by a scientist at the University of York has thrown new light on the way breakdowns in the DNA copying process inside cells can contribute to cancer and other diseases.

Peter McGlynn, an Anniversary Professor in the University's Department of Biology, led a team of researchers who have discovered that the protein machines that copy DNA in a model organism pause frequently during this copying process, creating the potential for dangerous mutations to develop.

The research, which is published in the *Proceedings of the National Academy of Sciences* (PNAS), involved scientists at the School of Medical Sciences at the University of Aberdeen, where Professor McGlynn worked previously, the Centre for Genetics and Genomics at the Queen's Medical Centre, University of Nottingham and the Memorial Sloan-Kettering Cancer Center, New York.

The project focused on a bacterium called Escherichia coli which is a powerful model for studying the DNA copying process, the study of which has revealed many aspects of DNA metabolism in more complex organisms such as man.

Professor McGlynn, who was one of 16 Chairs established at York to mark the University's 50th Anniversary, says: "Our work demonstrates that when organisms try to copy their genetic material, the copying machines stall very frequently which is the first step in formation of

mutations that, in man, can cause cancers and genetic disease.

"We have analysed what causes most of these breakdowns and how, under normal circumstances, cells repair these broken copying machines. Just as importantly, our work reveals that efficient repair of these breakdowns is very important to avoid corruption of the genetic code."

More information: 'Protein-DNA complexes are the primary sources of replication fork pausing in Escherichia coli' is published online in the *Proceedings of the National Academy of Sciences* (PNAS). www.pnas.org/content/early/201 … /1303890110.abstract

Provided by University of York