Scientists unwrap DNA packaging to gain insight into cells

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Scientists have built a clearer picture of how lengthy strands of DNA are concertinaed when our cells grow and divide, in a discovery could help explain how cell renewal can go wrong.

Scientists have identified thousands of proteins that play a key role in compacting DNA - a crucial process by which DNA is shortened up to 10,000 times to fit inside cells as they split into two.

Researchers hope the findings could shed light on what happens when this packaging process fails and cells divide abnormally - which can lead to cancer or cause developing embryos to miscarry.

Scientists developed a new technology for their research by combining existing techniques in biology, genetics and maths and the large-scale study of proteins. They were able to define some 4,000 proteins involved in the division of cells. The proteins protect the fragile genetic material and help it fold into the correct shape before it splits into two new cells. The new methods can identify many of those proteins that are most important to the process.

University of Edinburgh scientists, who carried out the study, hope the discovery will help them better understand how these proteins influence the process of cell division.

The research was carried out in collaboration with the University of Oxford and the Japanese National Institute of Genetics in Mishima,

Japan. It was supported by the Wellcome Trust and published in the journal *Cell*.

Professor William Earnshaw of the University of Edinburgh's School of Biological Sciences, who directed the study with Professor Juri Rappsilber, said: "Until now, our understanding of the very complex way in which DNA moves during cell division was patchy - this latest development allows us, for the first time, to fully identify all the proteins that take part in the process, and how they interact with one another. Future work is needed to reveal more of the intricacies of this process and how to prevent it from going wrong."

Provided by University of Edinburgh