

Chromosome glue repairs damaged DNA

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When a strand of DNA breaks in the body's cells, it normally does not take long until it has been repaired. Now researchers at the Swedish medical university Karolinska Institutet have discovered a new mechanism that helps to explain how the cell performs these repairs. The results are presented in *Science*.

The new results are concerned with a phenomenon called cohesion, whereby two copies of a chromosome in the cell nucleus are held tightly together by a protein complex called cohesin.

Cohesion fulfils an important function during cell division as the newly copied chromosomes, the sister chromatids, have to stay together until the right moment of separation. If the chromatids come apart too early, there is a risk of the daughter cells getting the wrong number of chromosomes, something that is often observed in tumour cells.

Dr Camilla Sjögren and her research team have now shown that the cell also employs cohesion to repair damaged sister chromatids. Their results show that DNA damage can reactivate cohesin, which runs counter to the commonly held view that cohesion only arises during the DNA copying that takes place before cell division.

Scientists have long been fascinated by the way in which the duplicated chromosomes are separated before cell division so that exactly half the copied genetic material ends up in each daughter cell. Another large research question is how cells repair damaged DNA and consequently prevent cancer, for example.

"We have shown that chromosome segregation and DNA repair are partly dealt with by the same machinery. These findings provide new understanding of two fundamental cellular mechanisms and may also be of value to cancer research," says Dr Sjögren.

Source: Karolinska Institutet

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