Cell insight offers clues on biological processes linked to fertility

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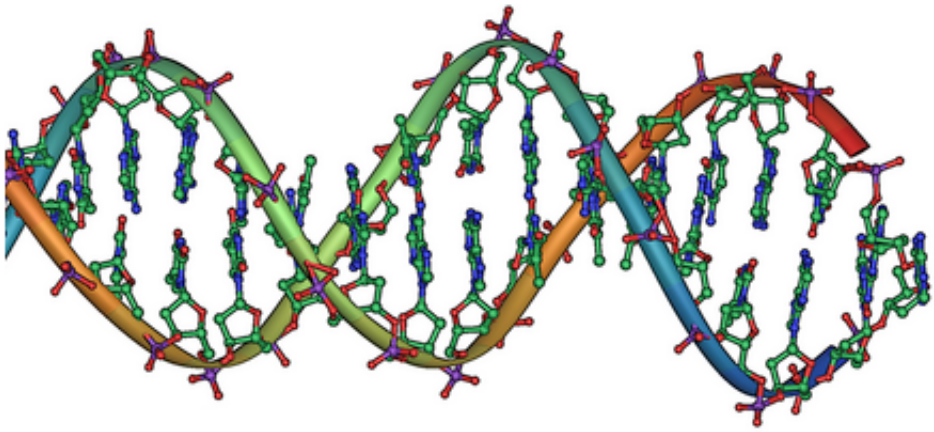

DNA double helix. Credit: public domain

Congenital disorders such as Down's syndrome could be better understood, following new insights into how healthy cells are formed.

Scientists have identified a set of proteins that play a key role in preventing errors during the formation of healthy cells.

The results may shed light on the mechanisms involved in formation of healthy egg cells in humans, and aid understanding of how infertility,

stillbirths and birth defects arise.

Researchers at the University of Edinburgh and the Max Planck Institute made the discovery using yeast - a model organism whose cells are very similar to those of humans.

Scientists studied processes involved in the natural re-ordering of genetic information that occurs before cell division. This reshuffling of genes is essential in reproductive cells and occurs in most, but not all, of a cell's packed DNA.

Researchers identified a set of proteins, known as Ctf19, which help suppress this re-ordering in some parts of the DNA. They found that this suppression process helps correctly distribute genetic material into packages known as chromosomes. When the process misfires, it leads to abnormal re-ordering of genetic material in sections of DNA that normally aid cell division.

This same error in DNA distribution in humans causes egg cells to have the wrong number of chromosomes - known as aneuploidy - and leads to common congenital conditions.

Researchers used fluorescent markers to highlight how genetic material moved during cell division in yeast. They found that when the protein was absent, the cell division was more likely to be flawed. They corroborated their findings by analysing the genes of newly formed cells. Their study published in *eLife*, was supported by the Wellcome Trust.

Nadine Vincenten, of the University of Edinburgh's School of Biological Sciences, who took part in the study, said: "Studying eggs and sperm cells in humans is very difficult for many reasons, but yeast provides a useful substitute from which we can learn a great deal. Our findings point towards a process in which DNA is organised correctly to ensure

fertility."

Provided by University of Edinburgh