

Newly discovered gene critical to embryo's first days

September 15 2016



A depiction of the double helical structure of DNA. Its four coding units (A, T, C, G) are color-coded in pink, orange, purple and yellow. Credit: NHGRI

A previously unknown gene plays a critical part in the development of the human embryo during the first days of fertilisation, researchers from Karolinska Institutet show. The paper, which is published in the scientific journal *Development*, describes the molecular mechanisms governing early embryonic development and can help in the understanding of what causes certain kinds of infertility.

In 2015, scientists at Karolinska Institutet discovered that a number of previously unknown [genes](#) are active in the embryo during the first days of fertilisation of the egg by the sperm. In the present study, they have identified a new variant of one of these genes – called LEUTX – and observed that it is one of the first to be activated in the embryo.

LEUTX belongs to a family of genes known for controlling anatomical development during the [embryonic stage](#) in humans and other organisms. Scientists have now, for the first time, shown that LEUTX potently activates hundreds of other genes involved in embryonic development during the first three days following fertilisation. The study shows that LEUTX is shut off shortly afterwards and remains dormant, probably until death.

"The discoveries provide new information about how the development of the human embryo gets started and how the process is controlled," says principal investigator Juha Kere, professor at Karolinska Institutet's Department of Biosciences and Nutrition. "Our results also indicate that LEUTX is one of few genes needed to start the first stages of development."

The researchers also found that the same genes that are activated by LEUTX are inhibited in the embryo just a few days later by another gene called DPRX. This suggests that both genes have opposing roles in the regulation of the embryo's development in the next phase, LEUTX by starting the process and DPRX by keeping it under control.

"The next stage in our research is to examine if these genes can explain the causes of certain kinds of infertility and if they have applications in [stem cell biology](#)," says Professor Kere.

More information: Eeva-Mari Jouhilahti et al. The human PRD-like homeobox gene has a central role in embryo genome activation, *Development* (2016). DOI: [10.1242/dev.134510](https://doi.org/10.1242/dev.134510)

Provided by Karolinska Institutet

Citation: Newly discovered gene critical to embryo's first days (2016, September 15) retrieved 18 June 2024 from <https://phys.org/news/2016-09-newly-gene-critical-embryo-days.html>

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