Unravelling the secrets of maleness

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New research has identified the key to becoming male is an enzyme that "unravels" DNA to trigger male development of the embryo, a discovery that may give greater insight into intersex disorders.

University of Queensland and Japanese scientists observed that mice lacking the Jmjd1a enzyme developed as females despite having a Y chromosome.

The study is published today in the leading international scientific journal *Science*.

Professor Peter Koopman, from UQ's Institute for Molecular Bioscience, said the discovery provided new information on the earliest steps the body takes in becoming male or female.

"Most mammals, including humans and mice, are programmed to develop as females unless a specific Y-chromosome gene called Sry is present to trigger male development during embryonic life," Professor Koopman said.

"We knew that Sry is responsible for switching on maleness genes, but what we didn't know is that the DNA containing Sry needs be unwound before the gene can become active.

"It's as if the DNA is a ball of string that needs to be unravelled by Jmjd1a to expose the Sry gene before it can be used.

"This latest discovery has put the spotlight on DNA packaging as a major determinant of the sex of the embryo.

"In broader terms it continues to open our eyes to the enormous amount of activity occurring in every cell to co-ordinate when and where each of our 30,000 genes is active – it's a huge logistical task.

"Fundamental discoveries like this bring us a step closer to controlling stem cell behaviour by activating or repressing certain genes."

Professor Koopman, who was part of the team that originally discovered the Sry gene, said this latest study could also help with the diagnosis and understanding of intersex disorders.

Intersex people are not biologically male or female but can have characteristics of both.

More information: "Epigenetic Regulation of Mouse Sex Determination by the Histone Demethylase Jmjd1a," by S. Kuroki et al. *Science*, 2013

Provided by University of Queensland