Brain gene flicks the switch on gender

University of Adelaide researchers have discovered a way of creating a male mouse without a Y chromosome by manipulating a single gene in the developing foetus.

Normally males have one X and one Y chromosome and females have two X chromosomes. But Postdoctoral Research Officer Dr Edwina Sutton has produced male mice with two X chromosomes by artificially activating a gene in the developing gonads.

"The gene - Sox3 on the X chromosome - is well known for its impact on brain development, but this is the first time it's ever been shown to change sexual development. By making this brain gene active in the developing gonads of mice with two X chromosomes during the critical stage of development, we switched off female development and switched on `maleness'," said Dr Sutton.

"This is not only important for our knowledge of evolution of the sex chromosomes, but it also has potentially significant implications for people with disorders of sexual development, the causes of which we know very little about. We can use these mice to increase our understanding of these disorders which occur with a high frequency in our community and, ultimately, develop therapies or technologies to improve clinical outcomes."

This discovery came about by chance. Dr Sutton and her supervisor Research Fellow Dr Paul Thomas, both in the University's School of Molecular and Biomedical Science, were investigating the role of Sox3 in brain development and discovered they had produced 80% XX male offspring. Although completely male in appearance, reproductive structures and behaviour, the XX males are all sterile.

Dr Sutton's findings were recently presented at the First Pan American Congress in Developmental Biology in Cancun, Mexico.

Dr Edwina Sutton is one of 16 young scientists presenting their research to the public for the first time thanks to Fresh Science, a national program sponsored by the Federal and Victorian Governments. The program identifies new and interesting research being done by early-career scientists around the country.

Source: University of Adelaide