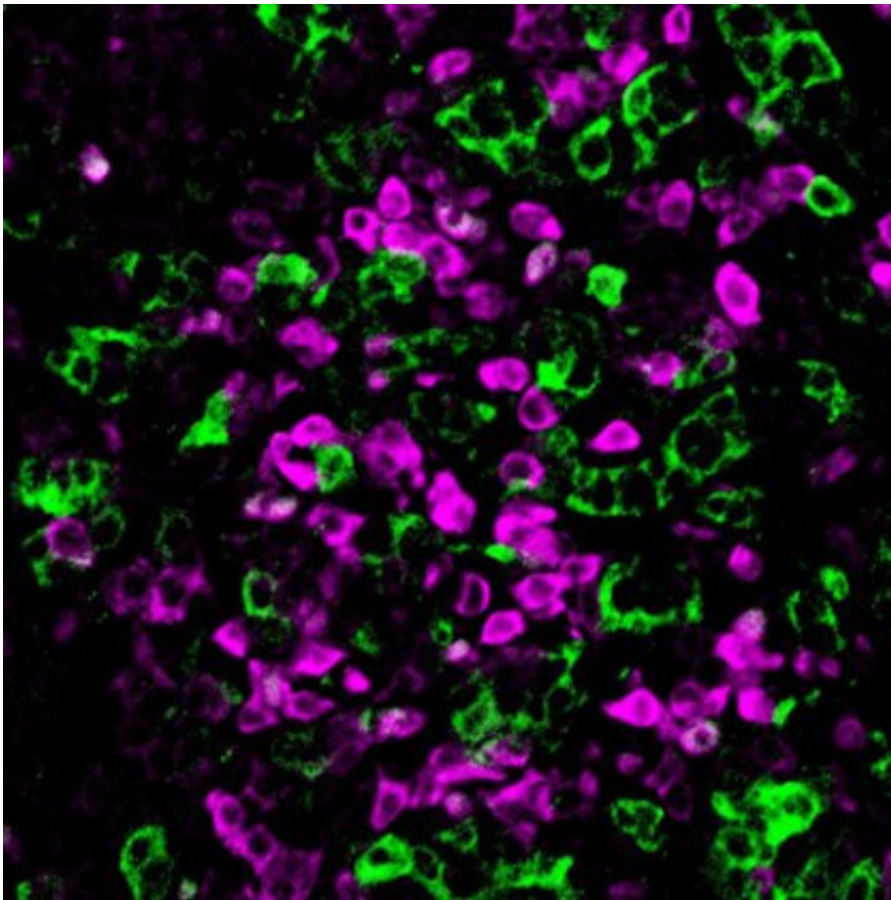


Researchers activate ancient mammalian sex development gene

March 16 2015, by Gemma Ward



UQ researchers have found an ancient sex switch can still trigger male development millions of years after it was ‘retired’ from this role

University of Queensland scientists have brought a retired sex gene in mammals back to life, proving it can still switch on male development in

mice despite not having done so for millions of years.

The gene *Dmrt1* is no longer used by [mammals](#) to determine [sex](#) but still plays a key role in determining sex in many vertebrates, including frogs, fish and birds.

UQ Institute for Molecular Bioscience researcher Professor Peter Koopman said this work provided valuable insights into the evolution of the genes responsible for determining sex in humans and animals.

"*Dmrt1* is an ancient genetic relic thought to have lost its function in mammalian sex determination," Professor Koopman said.

"Today the sex of modern mammals is determined by the newly evolved gene on the Y chromosome, called *Sry*.

"When genes are replaced in their role, like *Dmrt1* has been by *Sry*, we assume it's because the original gene either lost its function or was no longer expressed at the right time and place.

"When this happens, typically our body stops maintaining the gene.

"Eventually, the 'retired' gene may lose its original function while possibly acquiring new functions.

"In theory, this would make *Dmrt1* a bit like an old, unmaintained lawn mower sitting in the shed, collecting dust.

"To our surprise, however, when we pulled *Dmrt1* out of the shed we found that it started first time and is fully functional – it's remarkable."

Dr Liang Zhao said that the team was able to achieve complete female-to-male sex reversal in mice by overexpressing the *Dmrt1* gene.

"There's only a handful of genes known to be able to determine sex in mammals, and now we can add Dmrt1 to this important group," Dr Zhao said.

"This also shows us that in evolution, when new genes take over from old genes, old [genes](#) may retire but can still perform their roles when made available at the right time and place."

The research team hopes this new knowledge could help to develop better ways of managing sex ratios in agriculture, pest management, and conservation efforts for endangered species.

The research is published in the scientific journal *Development*.

More information: "Female-to-male sex reversal in mice caused by transgenic overexpression of Dmrt1."

dev.biologists.org/content/142/6/1083.full.pdf

Provided by University of Queensland

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