

Sneaky males adopt female-like brains to fool big brutes

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Can you spot the sneaker male? Distinctive territorial males (top left) defend courtship territories visited by groups of females, which may also include cryptic “sneaker” males. Credit: Kevin Bryant

In the ever-competitive mating scene, new University of Otago research has revealed how males of some species revert to deception and disguise in order to lure females.

Lead author, Dr Erica Todd says there is a constant struggle in nature to improve mating success. One of the most extraordinary ways animals have responded to this challenge is female mimicry, where so called "sneaker males" disguise themselves as [females](#) to avoid aggression from larger males, and steal mating opportunities.

Her study, published this week in the prestigious international journal *Molecular Biology and Evolution*, shows that sneaker males can achieve their extraordinary feat of subterfuge by turning specific genes in their brains and gonads on or off.

Dr Todd says her study species, the bluehead wrasse, has a social organisation that rivals the most outrageous soap opera.

"There are two types of males – large, aggressive blue-headed males that openly court females, and smaller 'sneaker' males that look, and act, like females in order to sneak in matings".

Working with Professor Neil Gemmell and other researchers from the University of Otago and North Carolina State University, Dr Todd used high-throughput RNA-sequencing to uncover which genes are active in sneaker male brains, compared with territorial males and females.

She and her colleagues were surprised to discover that sneaker males had brain gene expression patterns near-identical to females, but very different to territorial males.

The study also revealed how sneaker males make themselves look like females to sneak past other males and avoid confrontation.

"Males of many species use bright colours and other ornamentation to attract mates and compete with rivals, which are often regulated by male sex hormones produced in the testes. In sneaker male testes, we found

that many of the genes critical for male sex hormone production were turned off – making them look female," says Dr Todd.

While they may look and act like females, these sneaker males are reproductively potent – their testes are three to four times larger and produce 60 percent more sperm than territorial males.

Dr Todd discovered that the larger testes of sneaker males had higher expression of genes involved in cell proliferation and sperm quality control.

The study also revealed insights into how the different males cope with their divergent lifestyles.

"Sneaker males express genes for neuroplasticity that may help them elude territorial males and steal mating opportunities with females. Territorial males express genes associated with stress and protection against cellular damage, suggesting that life is tough at the top of the social hierarchy."

But that's not all that's going on in the bluehead wrasse: astonishingly, females can change sex, and sneaker males can change roles, to become territorial [males](#) when they grow large enough.

Dr Todd and her colleagues are now investigating the [genes](#) and environmental signals that trigger sex change in both the bluehead wrasse and the New Zealand spotty.

More information: Erica V Todd et al. Female Mimicry by Sneaker Males Has a Transcriptomic Signature in Both the Brain and the Gonad in a Sex-Changing Fish, *Molecular Biology and Evolution* (2017). [DOI: 10.1093/molbev/msx293](https://doi.org/10.1093/molbev/msx293)

Provided by University of Otago

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