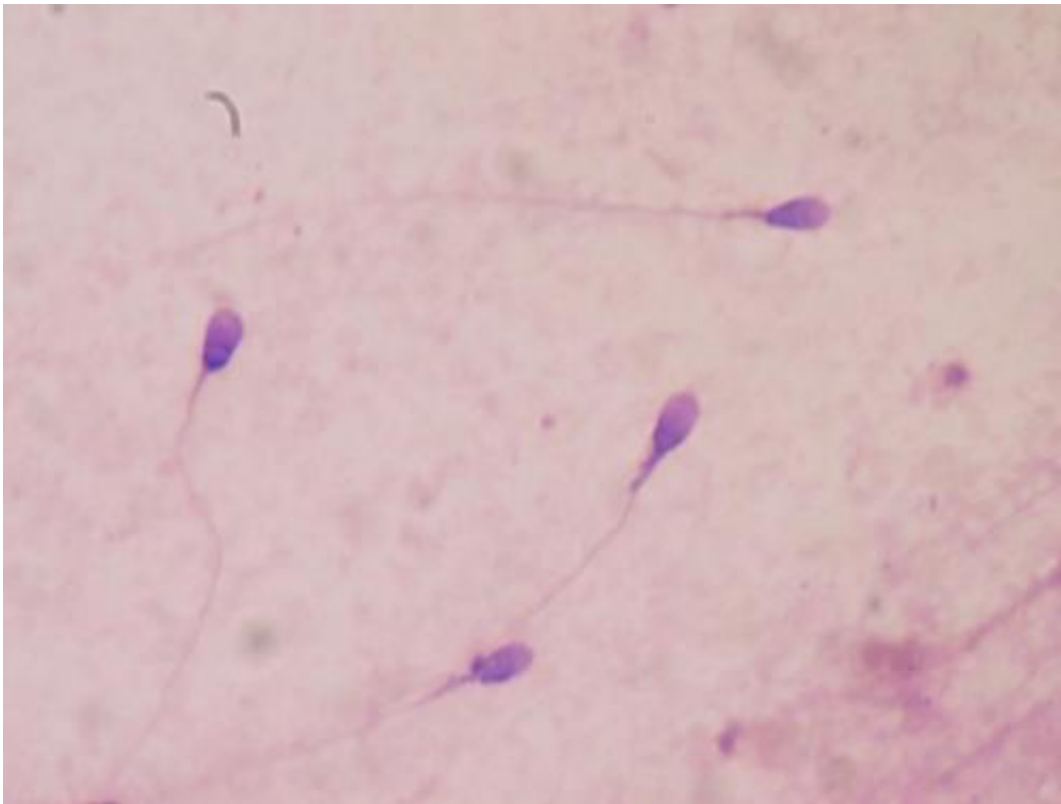


Males rapidly adjust sperm speed to beat rivals, study finds

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Human sperm stained for semen quality testing in the clinical laboratory. Credit: Bobjgalindo/Wikipedia

Joint research by the University of Otago and University of Canterbury has revealed that male salmon can adjust their sperm's swimming speed if competing with a rival to reproduce.

Michael Bartlett, a PhD student in the University of Canterbury's School of Biological Sciences, says that males of many species fight to establish social dominance and control over access to females and the opportunity to reproduce.

His PhD research was carried out as part of a Marsden Fund grant held by his principal supervisor Dr Patrice Rosengrave, a research fellow in the Department of Anatomy at the University of Otago and also a fellow in the School of Biological Sciences at Canterbury.

It involved investigating the link between male social status (dominance), which reflects [sperm](#) competition risk, and sperm quality (sperm swimming [speed](#)) in chinook salmon.

"Males adjust their sperm swimming speed when their social status/sperm competition risk changes (increasing speed with increased risk) in less than 48 hours," he says.

His paper, "Sperm competition risk drives rapid ejaculate adjustments mediated by [seminal fluid](#)" has been published in open access journal *eLife*.

His discovery contributes to a better understanding of the reproductive biology of [chinook salmon](#), a species that is valued both commercially and culturally and is of conservation concern.

Improved knowledge of the effects that seminal fluid has on sperm function may also have important consequences for our wider understanding of male fertility, he says.

"We found that when males changed their sperm velocity (via seminal fluid) that this altered the number of eggs that they fertilised relative to a rival male. In other words, the adjustment of sperm velocity altered male

reproductive success and therefore fitness.

"This rapid change in sperm speed is caused by differences in seminal fluid, not the sperm themselves. At present, we still don't know what component of seminal fluid is involved.

"Taken together, our results provide novel insight into the evolution of male [reproductive biology](#)."

Professor Neil Gemmell from Otago's Department of Anatomy was also involved in the study, as was Dr Tammy Steeves, from the School of Biological Sciences at Canterbury.

Dr Rosengrave, who has been working in Professor Gemmell's laboratory, says the males that are socially dominant, and have good mating positions close to females, put resources into being "good fighters". They "beat up" and chase away the socially subdominant males.

"When we did competitive fertilisation experiments, we raced sperm from two males to see who fertilised the greatest amount of eggs. Those males with fast sperm fertilised more eggs, and the seminal [fluid](#) from males with fast sperm sped up the sperm of other [males](#)."

Provided by University of Otago

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