

UAlberta creates DNA bank to unlock genetic clues about stuttering

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The University of Alberta's Institute for Stuttering Treatment and Research has created a first-of-its-kind DNA bank to study the genetics of stuttering. The research could eventually help identify a cause and cure. Credit: Richard Siemens/University of Alberta

Scientists at the University of Alberta's Institute for Stuttering Treatment

and Research (ISTAR) want Albertans to give a spit—five millilitres to be precise—to help find the cause and a cure for stuttering.

ISTAR researchers have collected [saliva samples](#) from 150 people who stutter and their [family members](#), part of a first-of-its-kind DNA repository aimed at advancing research into the genetics of stuttering—an area that is seldom studied and poorly understood.

"The saliva DNA bank at ISTAR is the largest of its type in the world and will help address the fundamental question—what is the root genetic cause of stuttering?" says Beal, an assistant professor in the Department of Communication Sciences and Disorders in the Faculty of Rehabilitation Medicine.

Previous breakthroughs in genetics have identified the cause of disorders such as Down or Turner syndrome, but it's been far more difficult to unlock more complex "low-penetrance" disorders such as stuttering, where even if someone carries the gene it may or may not present itself, Beal said.

Technology advances now allow scientists to look at entire DNA sequences spanning thousands of computations and identify genetic differences in people who stutter and their family members. A sample size of at least 150 participants is needed to understand whether these [genetic differences](#) are in fact related to stuttering, Beal said.

"You need a large number of people for the true difference related to stuttering to come above the noise that that type of variability generates."

ISTAR started collecting saliva samples two years ago thanks to funding support from the Women and Children's Health Research Institute at the U of A. Participants either provide a sample at ISTAR's offices or at home through an easy-to-use collection kit that can be sent in the mail.

"Supporting highly skilled researchers and health-care professionals allows innovative ideas to advance healthcare," said Sandy Davidge, director of WCHRI. "Thanks to generous support from the Stollery Children's Hospital Foundation, this project holds the promise of greatly improving the quality of life for children who suffer from stuttering by increasing our understanding of the genetic and neural causes of this condition."

For the Ukrainetz family, donating samples to the DNA bank was not only an opportunity to give back to ISTAR but to unlock their genetic history. Thirteen-year-old Josh was diagnosed with a stutter about 10 years ago and since that time has received ongoing treatment at ISTAR's Calgary office. The treatment and support he's received has helped him speak fluently, excel academically and even enjoy public speaking, said his mom Sandra.

She said it was an easy decision to provide saliva samples to ISTAR, especially given the family's genetic history—her brother has also struggled with stuttering since the 1960s.

"Nobody knows what causes stuttering and there are so many misconceptions about what causes and what exacerbates it," Sandra said. "We are just so keen to do anything that can help further our understanding."

DNA analysis a longer-term project

The actual DNA analysis work cannot begin until additional funding is secured, Beal said, noting such sequencing can cost upward of \$1,000 per participant. When it does happen, that part of the project will be overseen by Christopher Bartlett at Nationwide Children's Hospital in Columbus, Ohio, a geneticist who specializes in developmental speech-language disorders.

Ultimately, ISTAR would like to use that genetic analysis and compare it with MRI scans that show structural differences in the brains of people who stutter. That will help solve the old chicken-and-egg problem of whether differences in brain development in people who stutter are genetic or a reaction in the brain to stuttered speech, Beal said.

"This is the best way we have to move forward to solve that chicken-and-egg problem at this time."

Provided by University of Alberta

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