

Researchers develop editing toolkit for customizing zebrafish genomes

September 23 2012

Mayo Clinic researchers and an international team of scientists have developed a highly-efficient means of editing zebrafish genomes for research purposes, eliminating a bottleneck that has stymied biomedical scientists from using the fish as a model for human disease. The details appear online today in the journal *Nature*.

For many researchers, zebrafish are becoming the model of choice for [genetic studies](#). However, the inability to efficiently target [genetic modifications](#) has delayed their use by some. The Mayo team used an improved variant of artificial transcription activator-like effector nucleases, or TALENs, to provide a new approach.

"By using genetic engineering tools called TALENs and [synthetic DNA](#) to make defined changes in the genomes of our fish, we are able to make small changes (just a few nucleotides) as well as add a specific sequence for biological [gene switch](#) applications," says Stephen Ekker, Ph.D., senior author and head of Mayo's zebrafish core facility. "This is the first time we've been able to make custom changes to the zebrafish genome."

Dr. Ekker says this toolkit opens the door to a range of new experiments in zebrafish, including modeling of human disease by introducing small point mutations, designing regulated gene alleles, and developing classical structure/function experiments using an animal model system.

This new approach has implications for other model systems, including

mice, rats, flies and worms, and possible applications in [stem cell research](#).

"To our knowledge, this TALEN toolkit also is the most active described to date," says Dr. Ekker. "This has important implications for the growing TALEN field, whether used in fish or any other cells. We used this higher activity for genome editing applications. We also used it to conduct a series of somatic gene function assessments, opening the door to an array of non-germline experiments in zebrafish."

More information: DOI: 10.1038/nature11537

Provided by Mayo Clinic

Citation: Researchers develop editing toolkit for customizing zebrafish genomes (2012, September 23) retrieved 25 April 2024 from <https://medicalxpress.com/news/2012-09-toolkit-customizing-zebrafish-genomes.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.