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Zebrafish can bring breakthrough in DNA sequencing'

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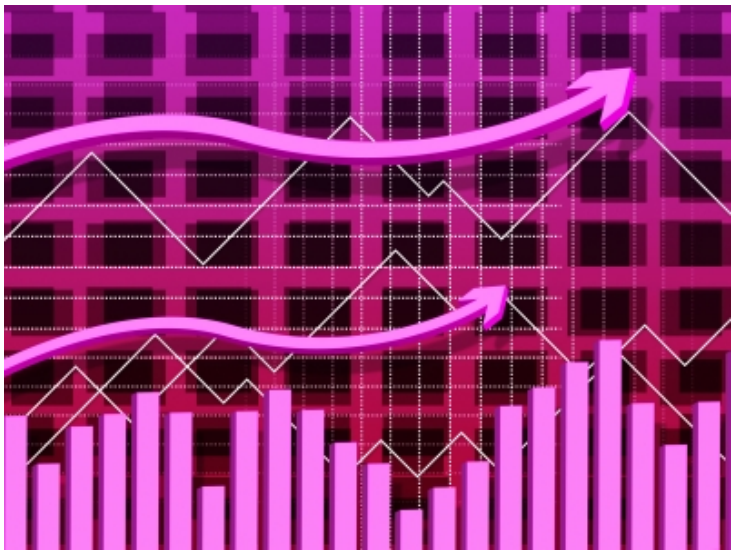

Singapore: Zebrafish is a relatively new method of targeting specific DNA sequences that could dramatically accelerate the discovery of gene function and the identification of disease genes in humans, according to scientists at the National Human Genome Research Institute (NHGRI), part of the National Institutes of Health.

NHGRI scientists are homing in on specific genes in zebrafish to help them better understand the function of genes in people.

In a study posted online on June 5, 2015, and to be published in the July 2015 issue of Genome Research, the researchers reported that the gene-editing technology known as CRISPR/Cas9 is six times more effective than other techniques at homing in on target genes and inserting or deleting specific sequences. The study also demonstrated that the CRISPR/Cas9 method can be used in a "multiplexed" fashion, that is, targeting and mutating multiple genes at the same time to determine their functions.

"It was shown about a year ago that CRISPR can knock out a gene quickly," said Dr Shawn Burgess, a senior investigator with NHGRI's Translational and Functional Genomics Branch and head of the Developmental Genomics Section. "What we have done is to establish an entire pipeline for knocking out many genes and testing their function quickly in a vertebrate model." Researchers often try to determine the role of a gene by knocking it out, turning it off or removing it, and watching the potential effects on an organism lacking it.

"The study of zebrafish has already led to advances in our understanding of cancer and other human diseases," said Dr Eric Green, director, NHGRI. "We anticipate that the techniques developed by NHGRI researchers will accelerate understanding the biological function of specific genes and the role they play in human genetic diseases."

The CRISPR/Cas9 method of gene editing is one of the two essential components in the NHGRI team's high-throughput method. Modeled on a defense mechanism evolved by bacteria against viruses, CRISPR/Cas9 activity was first described in 2012. Since then, its use has spread quickly in genomic research labs in the United States and abroad.