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## **454 Life Sciences Celebrates a Revolution in Genomics - Announces the 454<sup>th</sup> Peer-Reviewed Publication Using the Genome Sequencer System**

In September 2005, a paper published in the journal *Nature* introducing a novel, highly parallel sequencing system capable of producing 100-fold greater throughput than the state-of-the-art capillary electrophoresis instrument. The paper entitled, "Genome Sequencing in microfabricated high-density picolitre reactors," marks the first in a list of peer-reviewed publications that now boasts over 454, all enabled by the pioneering technology of 454 Sequencing. With 150 publications thus far in 2009, the Genome Sequencer System has the fastest rate of publication and spans the widest range of applications of any next-generation sequencing technology to date.

The 454<sup>th</sup> paper, published last month in *Nature Biotechnology*, is just one illustration of the tremendous scientific breakthroughs achieved with the advent of high-throughput sequencing technology. The study, led by researchers at the Whitehead Institute for Biomedical Research in Cambridge, Mass., used targeted the 454 Sequencing System of mice to analyze the influence of single-nucleotide polymorphisms on miRNA-mediated repression. miRNAs are short, single-stranded RNA molecules that are involved in regulation of gene expression.

"Previously, when we wanted to observe the effects of miRNAs, we had to knock out the miRNA or change its target," explained David Bartel, study author. "In this study we were able to observe miRNA regulation in the animal, without having to alter either the miRNA or its target."

A testament to the versatility of the platform, the 454 publications span a wide range of applications, including de novo sequencing, resequencing of whole genomes target DNA regions, metagenomics, and transcriptome analysis. For example, the system has been used by researchers to identify a novel virus responsible for the death of organ transplant recipients and has opened new doors in the field of paleogenomics by enabling the comparison of extinct species, such as the woolly mammoth and Neanderthal, to their relatives that are alive today. The technology of 454 Sequencing has also been used to enhance our understanding of key agricultural crops, such as maize and oil palm, in order to generate a more sustainable supply of food and energy in the future. Finally, its use in medical

research studies continues to bring us closer to the ultimate vision of personalized healthcare, by identifying the genetic basis of disease and drug response.

The speed at which researchers are publishing highlights the usability of 454 Sequencing data. In one example, researchers at Bielefeld University in Germany used a single sequencing run, generated during the installation of their new Genome Sequencer FLX System, to completely assemble and characterize the genome of *Corynebacterium kroppenstedtii*. The results from this ‘one run and done’ study were published in the Journal of Biotechnology.

“In only a few short years, sequencing has become an integral tool in nearly all areas of biological research. The sheer breadth of discoveries made possible by the 454 Sequencing System illustrates how the technology is rapidly making an impact on the scientific community,” explained Chris McLeod, President and CEO of 454 Life Sciences, a Roche company. “We are proud to have reached this milestone in the history of genomics and look forward to the next four hundred and fifty-four publications.”

To view the complete list of over 454 peer-reviewed publications, visit [www.454.com](http://www.454.com)

454 Life Sciences, a center of excellence of Roche Applied Science, develops and commercializes the innovative 454 Sequencing System for ultra-high-throughput DNA sequencing. Specific applications include de novo sequencing and re-sequencing of genomes, metagenomics, RNA analysis, and targeted sequencing of DNA regions of interest. The hallmarks of the 454 Sequencing System are its simple, unbiased sample preparation and long, highly accurate sequence reads, including paired-end reads. The technology of the 454 Sequencing System has enabled hundreds of peer-reviewed studies in diverse research fields, such as cancer and infectious disease research, drug discovery, marine biology, anthropology, paleontology and many more.

## About Roche

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