Global Research Consortium Announces First-Ever Assembly of the African Wild Dog Genome Using 10x Genomics' Supernova Assembler

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Novel long-range assembly represents an important conservation milestone that will facilitate population genomic studies, inform comparative canid evolution studies and potentially uncover evidence of historic selection

PLEASANTON, CALIFORNIA, JANUARY 26, 2017 – 10x Genomics, a company focused on enabling the mastery of biology by accelerating genomic discovery, today announced that a global consortium of collaborators using 10x Genomics' Supernova Assembler has successfully assembled the genome of the endangered African wild dog *de novo* for the first time.

An ongoing collaboration between the Program for Conservation Genomics at Stanford University (led by Professor Dmitri Petrov), and Painted Dog Conservation (PDC), Zimbabwe (led by Peter Binston) successfully sequenced and assembled the whole genomes of two African wild dog (*Lycaon pictus*) sisters from a dog pack studied by PDC in Hwange National Park, the largest game reserve in Zimbabwe. A third genome was assembled for an individual wild canine from the Endangered Wolf Center in Eureka, Missouri, provided by the Saint Louis Zoo. These data will be made available to the global research community in an upcoming publication and support conservation efforts for these endangered animals.

"PDC has been eager to engage in such a high level scientific collaboration for many years and we are delighted with how well the work is progressing. We believe that understanding the genetic makeup of the African wild dogs will contribute to their conservation and management over time," said Peter Blinston, managing director, Painted Dog Conservation. "On behalf of PDC and our collaborators, we wish to acknowledge and thank the Research Council of Zimbabwe and the Zimbabwe Parks and Wildlife Management Authority for their support of this ground breaking work."

Painted Dogs, also known as African Wild Dogs, are unique to Africa and they are among the continent's most endangered species. It is estimated that less than 7,000 remain in the wild. The Painted Dog population in Zimbabwe is one of the last strongholds of the species. Painted Dogs are intensely social animals, living most of the time in close association with each other. While a minimum of six dogs is necessary to successfully hunt and breed, a pack can be as small as a pair, or as large as thirty. Studies have shown that the loss of just one dog can devastate the whole pack.

State-of-the-art sequencing technologies, such as those being developed by 10x Genomics, significantly reduce the cost of genetic screening, which is helping address important management questions about endangered species, including, but not restricted to, assessing population sizes, population diversity, genetic flow between populations and hybridization. For example, African wild dogs have been shown to have the highest rate of uterine disease of any wild canid species, which affects their fertility and thus the success of conservation breeding programs. A high-quality reference genome will be an important tool for determining whether there is a genetic component to this propensity that would help focus research and treatment of this problem.

Sequencing libraries were prepared using 10x Genomics' Chromium System, sequenced on Illumina sequencers, and then assembled using 10x Genomics' Supernova Assembler. The resulting reference genome will facilitate population genomic studies, inform comparative studies of canid evolution and perhaps uncover evidence of historic selection.

"10x Genomics is pleased to support this important research, which clearly demonstrates the value of how our novel and cost-effective approach to *de novo* sequencing can be a game changer for investigating large mammalian genomes," said Serge Saxonov, co-founder and chief executive officer of 10x Genomics.

Participants in this research consortium include: Cheryl Asa, Ph.D., director of research: reproductive and behavioral sciences at the Saint Louis Zoo; Dimitri Petrov, Ph.D., the Michelle and Kevin Douglas professor of biology and associate chair of the biology department at Stanford University; Claudio Sillero, Ph.D., associate professor of conservation biology at University of Oxford and chair of the International Union for the Conservation of Nature (IUCN) Canid Specialist Group and scientific advisor to PDC and; Ryan Taylor, Ph.D., associate director of the Program for Conservation Genomics at Stanford University and chief executive officer of End2End Genomics.

For more information, visit www.painteddog.org and pcg.stanford.edu.

About 10x Genomics

10x Genomics is changing the definition of sequencing by providing an innovative genomics platform that dramatically upgrades the capabilities of existing sequencing technologies. This is achieved through a combination of new microfluidic science, chemistry and bioinformatics. By implementing GemCode Technology within the Chromium System, researchers can now, for the first time, find new structural variants, haplotypes and other valuable genomic information with comprehensive workflows for Single Cell, Genome, Exome and *de novo* Assembly applications that incorporate their pre-existing sequencing technologies.

www.10xGenomics.com

About Painted Dog Conservation

Painted Dog Conservation is a leading model for conservation. Painted dogs (*Lycaon pictus*), also called African wild dogs, are being driven towards

extinction by the loss of quality habitat and poaching. Our vision is to create an environment where the painted dogs can thrive and our mission is to protect and increase the range and numbers of painted dogs in Zimbabwe through robust research, direct action strategies and our Education & Development Program. PDC believes that conservation needs to deliver tangible benefits to local communities that share their daily lives with the wildlife. Such benefits bring necessary behavioral change that leads to the desired environment where the painted dogs and all wildlife can thrive.

About The Program for Conservation Genomics

The Program for Conservation Genomics (PCG) at Stanford University was founded and is currently directed by professor Dmitri Petrov and is a part of the Stanford Center of Computational, Evolutionary, and Human Genomics. It was established through the founding gift by Dr. John Stuelpnagel (chairman, 10x Genomics), who also initiated the collaboration between PCG and Painted Dog Conservation. PCG develops and implements cutting-edge genomic tools for a wide range of problems in conservation science and management. For more information, visit pcg.stanford.edu

About IUCN Canid Specialist Group

Based at the Wildlife Conservation Research Unit (WildCRU), at the University of Oxford's Department of Zoology, the IUCN Canid Specialist Group (CSG) is the world's chief body of scientific and practical expertise on the status and conservation of all canid species. The CSG is part of the Species Survival Commission of IUCN, the International Union for the Conservation of Nature. For more information, visit canids.org and wildcru.org

About the Saint Louis Zoo

Chosen as America's top free attraction by USA Today's 10 Best, the Saint Louis Zoo is widely recognized for its innovative approaches to animal management, wildlife conservation, research and education. One of the few free zoos in the nation, the zoo attracts more than 3,000,000 visitors a year. For more information, visit stlzoo.org.

About the Endangered Wolf Center

The Endangered Wolf Center's mission is to preserve and protect Mexican wolves, red wolves and other wild canid species, with purpose and passion, through carefully managed breeding, reintroduction and inspiring education programs. The Center, founded in 1971 by Dr. Marlin Perkins and Carol Perkins, is certified by the Association of Zoos and Aquariums. It is located on the grounds of Washington University's Tyson Research Center near St. Louis, Missouri.

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