Caribou Biosciences Announces New Methods to Harness Type I CRISPR-Cas Systems for Genome Engineering in Human Cells

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BERKELEY, Calif. – Caribou Biosciences, Inc., a leading CRISPR genome editing company, announced the publication of a new study demonstrating human genome engineering with Type I CRISPR-Cas systems. The study, entitled “Harnessing Type I CRISPR-Cas Systems for Genome Engineering in Human Cells,” was published today in the peer-reviewed scientific journal Nature Biotechnology. The Company believes that its new platform, termed “FokI-Cascade,” will enable human genome editing with extremely high specificity.

CRISPR-Cas systems are divided into two broad classes based on whether they contain single- or multi-protein effector complexes. Thus far, research efforts to identify new CRISPR-Cas systems have largely focused on those containing single-protein effectors based on the underlying assumption that such systems will ultimately be easier to deliver to eukaryotic cells. However, multi-protein systems, which are highly diverse in composition and mechanism of action, are far more abundant than single-protein systems in nature, accounting for approximately 80% of all sequenced CRISPR systems, and may serve as a valuable resource for developing CRISPR-based tools for genome editing.

In the study, Caribou researchers and their collaborators tested whether the multi-protein Class 1 Type I CRISPR-Cas system could be harnessed for human genome engineering. The paper describes the development of robust and streamlined methods to genetically express and functionally reconstitute the Type I multi-protein complex (known as Cascade) in human cells, a critical step in the larger effort to use these systems for biotechnology applications. In this work, they demonstrated that the FokI-Cascade platform can be used to perform genome editing with extremely high precision. Reconstitution of the native E. coli Type I CRISPR-Cas system, comprising both Cascade and a nuclease known as Cas3, which permitted the generation of large targeted deletions, is also described, and this discovery may lead to new strategies for gene knockout or studying gene control.

“We are extremely proud of the research conducted by our team, as these findings have the potential to serve as a key roadmap for repurposing alternative, previously untapped multi-protein CRISPR-Cas systems for biotechnology applications,” said Steven Kanner, Ph.D., Caribou’s Chief Scientific Officer. “In particular, we are excited to further research and advance the FokI-Cascade and Cas3-Cascade platforms, which we believe could be used for the development of allogeneic immuno-oncology directed cell therapies.”

The study was led by Peter Cameron and Samuel H. Sternberg and the other contributing authors were Mary M. Coons, Sanne E. Klompe, Alexandra M. Lied, Stephen C. Smith, Bastien Vidal, Paul D. Donohoue, Tomer Rotstein, Bryan W. Kohrs, David B. Nyer, Rachel Kennedy, Lynda M. Banh, Carolyn Williams, Mckenzi S. Toh, Matthew J. Irby, Leslie S. Edwards, Chun-Han Lin, Arthur L. G. Owen, Tim Künne, John van der Oost, Stan J. J. Brouns, Euan M. Slorach, Chris K. Fuller, Scott Gradia, Steven B. Kanner, and Andrew P. May. Caribou has granted patents and pending patent applications on the FokI-Cascade system and on Cas3-Cascade.

About Caribou Biosciences, Inc.

Caribou is a leading company in CRISPR genome editing founded by pioneers of CRISPR-Cas9 biology. Caribou’s proprietary technologies put the company at the forefront of creating new medical therapies. The company is developing an internal pipeline of off-the-shelf CAR-T cell therapies, other gene-edited cell therapies, and engineered gut microbes.

Additionally, Caribou offers licenses to its CRISPR-Cas9 foundational IP in multiple fields including research tools, internal research use, diagnostics, and industrial biotechnology. Interested companies may contact Caribou at licensing@caribou bio.com.

For more information about Caribou, visit www.caribou bio.com and follow the Company @CaribouBio.

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