Cellectis Publishes New CAR Design to Control CAR T-Cells in Non-Lethal Way

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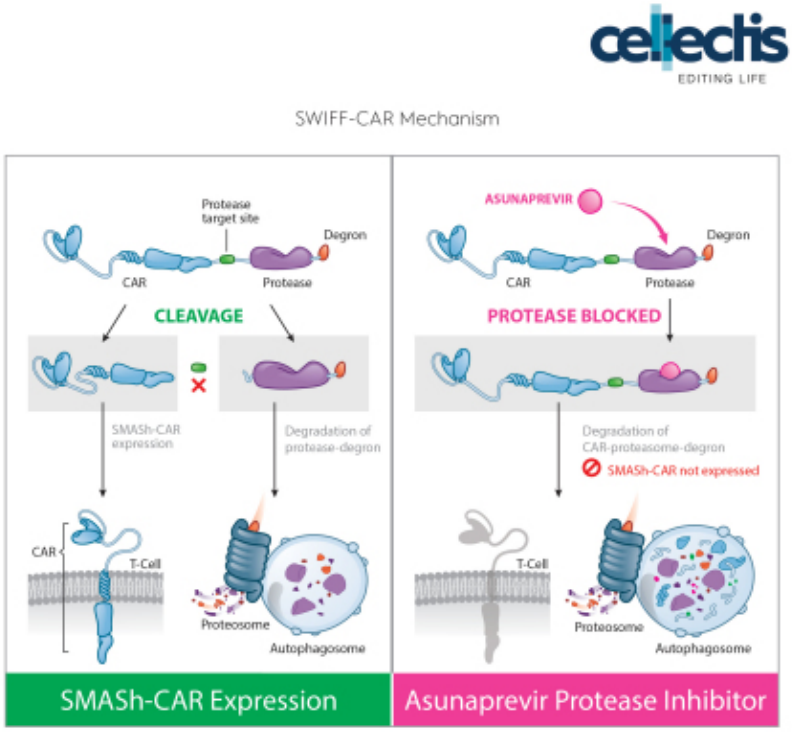

Fig. 1 Schematic representation of the SWIFF-CAR principle. The SWIFF-CAR construct is composed of the CAR followed by a protease target site, a protease, and a degradation moiety (degron). In the absence of the protease inhibitor, the degron is cleaved from the CAR, allowing the exposition of the antigen targeting scFV at the T-cell surface ("ON" state, left panel). The presence of Asunaprevir inhibits the cleavage of the degron from the CAR by the HCV NS3 protease, leading to the degradation of the CAR by the T-cell proteolytic pathways ("OFF" state, right panel). ©The Cellectis Group

SWIFF-CAR Mechanism (Photo: Business Wire)

Cellectis (Paris:ALCLS) (NASDAQ:CLLS) (Euronext Growth: ALCLS - Nasdaq: CLLS), a clinical-stage biopharmaceutical company focused on developing immunotherapies based on gene-edited allogeneic CAR T-cells (UCART), announced today the publication of a study in *BMC Biotechnology*, a Springer Nature journal, describing and evaluating the development of the SWIFF-CAR, a CAR construct with an embedded on/off-switch, which enables tight control of the CAR surface presentation and subsequent cytolytic functions using a small molecule drug. The reversible control of these engineered T-cells represents a promising approach to further mitigate the potential toxicities that are associated with CAR T-cell administration in clinical settings and to improve the process of CAR T-cell production for specific target antigens.

"Following Cellectis' previously developed CubiCAR system, an all-in-one CAR architecture with an embedded multi-functional tag for purification, detection and elimination of CAR T-cells, we knew that we needed an additional 'on/off switch' to direct T-cells to either be active or inert, without necessarily killing them," said Dr. Alexandre Juillerat, Ph.D., Project Leader and U.S. Laboratory Head, Cellectis. "The SWIFF-CAR system does precisely that, representing a major breakthrough in our ongoing efforts to develop innovative applications to treat a range of diseases, including cancer and autoimmune diseases."

"While suicide gene systems have proven to be an effective way to eliminate transduced CAR T-cells, they also potentially terminate CAR T-cell treatment altogether," added Dr. Philippe Duchateau, Ph.D., Chief Scientific Officer, Cellectis. "The capability to manipulate CAR surface presentation improves the safety of CAR-T therapies and enhances our ability to circumvent hurdles associated with manufacturing. The SWIFF-CAR system addresses both of these factors and is an important next step for Cellectis in treating deadly illnesses that affect patients globally."

Alexandre Juillerat, Ph.D. Project Leader and Senior Scientist, Cellectis

Dr. Alexandre Juillerat, Ph.D., graduated in Chemistry from the University of Lausanne, Switzerland. After receiving his Ph.D. in 2006 in protein engineering from the École Polytechnique Fédérale de Lausanne (EPFL, Switzerland), he moved to the laboratory of Structural Immunology at the Institut Pasteur in Paris, France. In 2010, he joined the R&D department of Cellectis in Paris, France, working on the development and implementation of sequence specific designer nucleases including the

transcription activator-like effector nucleases (TALEN®). He then joined the Cellectis facility based in New York, NY, USA, leading projects associated with the development of the T-cell chimeric antigen receptor (CAR) technology.

Modulation of Chimeric Antigen Receptor surface expression by a small molecule switch

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About Cellectis

Cellectis is a clinical-stage biopharmaceutical company focused on developing a new generation of cancer immunotherapies based on gene-edited T-cells (UCART). By capitalizing on its 19 years of expertise in gene editing – built on its flagship TALEN® technology and pioneering electroporation system PulseAgile – Cellectis uses the power of the immune system to target and eradicate cancer cells.

Using its life-science-focused, pioneering genome engineering technologies, Cellectis' goal is to create innovative products in multiple fields and with various target markets.

Cellectis is listed on the Nasdaq market (ticker: CLLS) and on Euronext Growth (ticker: ALCLS). To find out more about us, visit our website: www.cellectis.com

Talking about gene editing? We do it. TALEN® is a registered trademark owned by Cellectis.

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