ArsenalBio Announces Presentation of Six Abstracts at AACR Annual Meeting Highlighting Programmable Cell Therapy Progress

Company to share preclinical data on the use of integrated circuit T cells for the development of cell therapies for the treatment of kidney and other solid tumor cancers

South San Francisco, Calif. – April 14, 2023 – Arsenal Biosciences, Inc. (ArsenalBio), a clinical stage programmable cell therapy company engineering advanced CAR T-cell therapies for solid tumors, today announced the presentation of six abstracts at the American Association for Cancer Research (AACR) annual meeting in Orlando, Fla., April 14-19, 2023. These data demonstrate the company's continued progress towards the enhancement and clinical development of its unique integrated circuit T cell approach for diseases beyond ovarian cancer, including kidney cancer and other solid tumors.

"As we conduct our first clinical study on AB-1015, which leverages ArsenalBio's integrated circuit T cells for the potential treatment of ovarian cancer, we continue to innovate as we explore improvements and future applications of our platform and develop new therapeutic candidates for kidney cancer and other areas of unmet medical need," said Ken Drazan, M.D., ArsenalBio's Co-Founder and Chief Executive Officer. "These new data show the potency, power, and potential for integrated circuit T cells across multiple diseases."

ArsenalBio will disclose features and findings of AB-2100, a novel integrated circuit T cell therapeutic candidate engineered for the treatment of clear cell renal cell carcinoma. This is the company's second pipeline program which is targeting the initiation of a phase 1 trial in 2024. The following abstracts will be presented as poster presentations during the AACR annual meeting.

Abstract LB092: Identification of target antigens for logic gated CAR T-cell therapeutics for the treatment of clear cell renal cell carcinoma: an opportunity prime with PSMA and kill with CA9
Monday, Apr 17, 2023 9:00 AM - 12:30 PM
Late-Breaking Research: Immunology 1 Poster Session

A bioinformatic discovery and wet-bench validation approach were used to identify target antigens enabling AB-2100, ArsenalBio's sequential-AND logic gated ICT therapeutic, identifying PSMA as a promising priming antigen target expressed on tumor vascular endothelial cells and CA9 as a promising cytolytic antigen target expressed on tumor cells. These studies show that CA9 and PSMA are co-positive in >70% of ccRCC patient specimens in both primary and metastatic disease states, and suggest utility as target antigens for a sequential-AND logic gated integrated circuit T cell therapeutic.

Abstract 4088: A neovasculature-inducible CA9 CAR resistant to FASL and TGFb mediated suppression for the treatment of ccRCC
Tuesday, Apr 18, 2023 9:00 AM - 12:30 PM
Immunology: CAR T-cell therapy 2

Carbonic anhydrase IX (CA9) is expressed at a high level on the majority of tumor cells in ccRCC samples, making it an attractive target antigen for CAR T-cell therapy. Previous attempts to develop CA9 CAR T cells were limited, however, by on-target, off-tumor toxicity. In order to reduce this risk and restrict CA9 CAR activity specifically to ccRCC tumors, ArsenalBio's proprietary PrimeR logic gate technology was deployed to engineer a PSMA x CA9 sequential-AND logic gated therapeutic for the treatment of ccRCC, AB-2100. AB-2100 was shown to be specific in vivo and eliminated tumors in RCC-based xenograft models at doses so low that a CA9 CAR without enhancements had no anti-tumor effect. In this study, we confirmed the feasibility of killing ccRCC cells using this approach to selectively target antigens that cannot be safely targeted using conventional CARs and overcome multiple suppressive mechanisms in the tumor microenvironment in xenograft models.

Abstract 4073: Tunable STAT activation by synthetic pathway activators (SPAs) increases engineered T-cell potency and persistence
Tuesday, Apr 18, 2023 9:00 AM - 12:30 PM
Immunology: Adoptive Cell and Natural Killer Cell Therapy

STAT signaling is known to govern T cell activation and differentiation. In these studies, ArsenalBio highlights the creation of a library of synthetic proteins (Synthetic Pathway Activators or SPAs), that can control STAT signaling without an external cytokine input. When expressed in integrated circuit T cells, SPAs result in significant enhancements in T-cell potency and expansion both in vitro and in murine xenograft tumor models. These studies demonstrate the effectiveness of the SPA platform as a novel, tunable, and T cell intrinsic approach for engineering cells that result in potent anti-tumor properties.

Abstract 1768: Multiplexed shRNA cassettes targeting orthogonal pathways (Fas/PTPN2/TGFBR) enhance the potency of Integrated Circuit T cells (ICTs) in multiple solid tumor models
Monday, April 17 9:00 AM -12:30 PM
CAR T-cell Therapy 1

ArsenalBio has previously shown success in engineering dual shRNA cassettes that significantly increase the antitumor potency of integrated circuit T cells in ovarian cancer models. This study builds on these prior findings to develop a quadruple shRNA cassette that adds the ability to protect against inhibitory signals present in multiple solid tumor types, including renal cell carcinoma (RCC). Quadruple shRNA cassettes targeting Fas/PTPN2/TGFBR significantly enhance the antitumor activity of ICT cells in multiple xenograft tumor models, thereby demonstrating the utility of this multiplexed shRNA strategy.

Abstract 1783: High-throughput arrayed screening of logic gated CARs enables the selection of candidates for ccRCC with optimal potency and fidelity traits
Monday, Apr 17, 2023 9:00 AM - 12:30 PM
CAR T-cell Therapy 1

The identification of synthetically engineered molecules, including chimeric antigen receptors (CARs), requires comprehensive screening to identify molecules with optimal attributes and activity. These studies demonstrate the utility of an ArsenalBio platform that permits the screening of hundreds of candidate constructs that enable to dual targeting of PS MA as a priming target and CA9 as a cytolytic target, to select an optimal sequential-AND logic gated integrated circuit T cell therapeutic candidate for ccRCC. From those initially screened independently, the top PSMA- and CA9-targeting compounds were combined and screened across T cells engineered from four human donors. The best-performing candidates were shown to be superior to CAR T cells in a long-term killing assay, showed potent cytotoxicity of low expressing antigen lines, and displayed background levels of cytotoxicity against single antigen targets.

Abstract 5329 High-throughput screening strategies in the development of logic gated cell therapies
Tuesday, April 18, 1:30 PM - 4:30 PM
High-throughput Screening, Lead Identification, and Optimization, and in Silico Drug Discovery
Poster Session, Date (Time)

To overcome the limits of CAR T-cell therapy in the treatment of solid tumors, ArsenalBio tested multiple ways to engineer T cells to improve their fidelity and on-target functionality using cell lines co-cultured with CAR and PrimeR antigens or with just a single antigen. This study showed highly concordant results from pooled and array screens helping to define a small set of PrimeR binders that exhibited both high fidelity and on-target functionality for additional testing in in vivo models.

For more information about ArsenalBio, visit www.arsenalbio.com.

About Arsenal Biosciences Inc.
Arsenal Biosciences, Inc. (ArsenalBio), headquartered in South San Francisco, Calif., is a clinical stage programmable cell therapy company discovering and developing a pipeline of next-generation autologous T cell therapies to defeat cancer. Our full-stack R&D engine generates multifunctional engineered cell-based medicines, enabled by precise and specific CRISPR insertion of large synthetic DNA cassettes into patient-derived T cells. ArsenalBio is building the industry's largest DNA library of therapeutic enhancing integrated circuits, incorporating sequential-AND logic-gating for improved tumor targeting and synthetic features enabling multiple pharmaceutical functions. In pioneering a computationally driven approach alongside nonviral clinical manufacturing, we aspire to deliver enhanced efficacy, increased

patient safety, reduced stakeholder costs, and expanded market access. To learn more, visit www.arsenalbio.com and follow us on Twitter @ArsenalBio, LinkedIn, and Facebook.

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