# Unum Therapeutics Presents Preclinical Data for BOXR1030 at the Society for Immunotherapy of Cancer (SITC) Annual Meeting

November 5, 2019

*- Unum's first product candidate from its BOXR platform, BOXR1030, is designed to improve T cell functionality in the solid tumor microenvironment -*

*- BOXR1030 T cells co-express the GOT2 transgene to improve T cell metabolism and reduce T cell exhaustion, leading to complete tumor regressions in xenograft studies -*

CAMBRIDGE, Mass., Nov. 05, 2019 (GLOBE NEWSWIRE) -- Unum Therapeutics Inc. (NASDAQ: UMRX), a clinical-stage biopharmaceutical company focused on developing curative cell therapies for cancer, today announced preclinical data for its BOXR1030 program presented at the SITC meeting being held November 6–10, 2019 in National Harbor, MD.

"Solid tumors create an unfavorable microenvironment that depletes T cells of critical nutrients and amino acids, drives T cell dysfunction, and inhibits the effectiveness of cellular therapies, and our BOXR platform was specifically developed to discover novel transgenes that can be co-expressed with chimeric-targeting receptors to improve T cell functionality in the solid tumor microenvironment," said Seth Ettenberg, Ph.D., Chief Scientific Officer of Unum. "At this year's SITC, we present preclinical data on the first product candidate from our BOXR platform, BOXR1030, which contains the GOT2 transgene. In our preclinical studies using stringent animal xenograft models that simulate the solid tumor microenvironment, expression of the GOT2 mitochondrial enzyme in BOXR1030 increased the production of key amino acids and metabolites, improved the anti-oxidant balance of T cells, and prevented their dysfunction and exhaustion. This work extends the increasingly recognized importance of immunometabolism in ensuring proper immune cell function."

Poster presentation title: "Co-expression of the Metabolic Enzyme GOT2 with a GPC3-Targeted CAR-T Overcomes Challenges of the Solid Tumor Microenvironment, Substantially Improving Therapeutic Efficacy in Solid Tumor Xenografts"

**BOXR1030 Summary:**

- BOXR1030 contains a humanized single-chain variable fragment (scFv) 4-1BB CAR targeting GPC3 and separately co-expresses the glutamic-oxaloacetic transaminase 2 (GOT2) transgene from a single viral construct. Unum's BOXR platform led to the discovery of the utility of GOT2, a critical enzyme involved in cellular metabolism. When co-expressed with a GPC3-targeted CAR-T, GOT2 improved metabolic and transcriptional profiles resulted in greater anti-tumor activity compared with parental CAR-T when tested both in vitro and in vivo under stringent conditions representing the solid tumor microenvironment (TME).

- Over one hundred BOXR candidates were generated by cloning a library of literature-derived, hypothesis-driven bolt-on genes into vectors containing a GPC3-targeted CAR-T and were screened through Unum's novel TME assays. Candidates were selected for their ability to overcome multiple TME challenges, while maintaining specificity and tolerability.

- In vitro, BOXR1030 T cells were resistant to suppressive TME-like conditions, showing improved T cell proliferation under both hypoxic and low glucose conditions compared with control GPC3+ CAR-T cells. In vivo, BOXR1030 demonstrated superior activity compared to the parental CAR-T with treated animals achieving complete tumor regressions. Tumor infiltrating lymphocytes isolated from the tumors of treated animals revealed that BOXR1030 cells were more resistant to dysfunction and had fewer markers of exhaustion as compared to the control CAR-T cells.

**About Unum's BOXR platform**

Unum's BOXR platform was established with the aim of discovering novel "bolt-on" transgenes that can be co-expressed with chimeric-targeting receptors to improve the function of T cells in the solid tumor microenvironment. Unum's BOXR discovery capabilities broadly evaluate T cell phenotype through a rigorous, multi-stage screening strategy that simulates the tumor microenvironment. Unum has discovered and continues to enrich a library of master regulatory genes of T cell biology that regulate pathways essential for cell growth, proliferation, and survival under a variety of conditions. BOXR bolt-on transgenes identified in this platform are designed to address a variety of immunosuppressive mechanisms of solid tumors, including metabolic competition, immune suppressor cells, and exhaustion due to chronic stimulation. Once discovered, BOXR transgenes are designed to be incorporated into several different types of therapeutic T cells, including both ACTR T cells and CAR-T cells, to impart new functionality to T cells. BOXR platform objectives include expanding the scope of biological mechanisms and transgenes in its proprietary BOXR library, enabling BOXR bolt-on applications for a broad range of immune cell therapies, including both autologous and allogeneic approaches, and advancing new BOXR product candidates into the clinic.

**About Unum Therapeutics**

Unum Therapeutics is a clinical-stage biopharmaceutical company focused on developing curative cell therapies to treat a broad range of cancer patients. Unum's novel proprietary technologies include Antibody-Coupled T cell Receptor (ACTR), an autologous engineered T-cell therapy that combines the cell-killing ability of T cells and the tumor-targeting ability of co-administered antibodies to exert potent antitumor immune responses, and Bolt-On Chimeric Receptor (BOXR), designed to improve the functionality of engineered T cells by incorporating a "bolt-on" transgene to overcome resistance of the solid tumor microenvironment to T cell attack. Unum has multiple programs in Phase 1 clinical testing and preclinical testing, including; ACTR707 used in combination with trastuzumab in adult patients with HER2+ advanced cancer and used in combination with rituximab in adult patients with r/r NHL; and BOXR1030 targeting GPC3+ solid tumor cancers. The Company is headquartered in Cambridge, MA.

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**Forward looking Statements**

This press release contains forward-looking statements including, without limitation, statements regarding our future expectations, plans and prospects, including projections regarding future revenues and financial performance, our long-term growth, enrollment and results for our preclinical and clinical activities, the development of our product candidates, including the BOXR platform and product candidates, and the anticipated timing and success of any of our preclinical studies, clinical trials and regulatory filings, as well as other statements containing the words "anticipate," "believe," "continue," "could," "estimate," "expect," "intend," "may," "might," "plan," "potential," "predict," "project," "should," "target," "will," or "would" and similar expressions, constitute forward-looking statements within the meaning of the safe harbor provisions of The Private Securities Litigation Reform Act of 1995, as amended. We may not actually achieve the forecasts disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results could differ materially from the projections disclosed in the forward-looking statements we make as a result of a variety of risks and uncertainties, including risks related to the accuracy of our estimates regarding expenses, future revenues, capital requirements, and the need for additional financing, the success, cost and timing of our product development activities and clinical trials, our ability to obtain and maintain regulatory approval for our product candidates, and the other risks and uncertainties described in the "Risk Factors" sections of our public filings with the Securities and Exchange Commission. In addition, the forward-looking statements included in this press release represent our views as of the date hereof. We anticipate that subsequent events and developments may cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we specifically disclaim any obligation to do so. These forward-looking statements should not be relied upon as representing our views as of any date subsequent to the date hereof.

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