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University of Minnesota discovery is now a first-in-human clinical trial for leukemia

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The discovery of tri-specific natural killer engagers (TriKE), a combination protein that bridges an immune cell and a tumor cell to drive tumor cell killing power exponentially, has led to a new Phase I, first-in-human study to treat leukemia. The study is opening exclusively at the University of Minnesota Medical Center, and is being sponsored by GT Biopharma, Inc.

The trial will use GT Biopharma-funded and U of M-designed and manufactured molecules called GTB-3550 to treat leukemia. Significant additional research funding was provided by Minnesota Masonic Charities. This first-of-its-kind protein is made from three separate components that bind, activate and target the patient's own natural killer (NK) immune cells to specifically attack Acute Myeloid Leukemia (AML) tumors. The study will be led by Principal Investigator Erica Warlick, MD, Associate Professor, who works in the Division of Hematology, Oncology and Transplantation at the U of M Medical School, along with being a researcher at the Masonic Cancer Center.

AML is an aggressive acute leukemia with 21,000 new cases annually, according to the American Cancer Society. The current standard of care is most commonly chemotherapy, however, about half of AML patients relapse or require additional therapies. This shows a significant unmet need in current therapies.

"The clinical trials team at the University of Minnesota is excited to open this Phase Itrial, testing this novel immunotherapeutic agent for

AML patients," said Warlick. "Building on over a decade of successful trials using NK cell infusions from related donors to kill tumors, this new TriKE molecule, with its modification to target AML, doesn't need a related donor's cells to work."

The TriKE platform was created and brought into the clinic by Masonic Cancer Center Deputy Director Jeffrey Miller, MD, who is a Professor of Medicine in the U of M Medical School. Along with colleagues Martin Felices, Ph.D., Assistant Professor of Medicine, and Daniel Vallera, Ph.D., Professor of Therapeutic Radiology-Radiation Oncology in the U of M Medical School, the group has taken their decades-long expertise in NK cell biology and protein fusion to bring GTB-3550 from the laboratory into the clinic in a cost-effective and off-the-shelf therapy for resistant or relapsing AML.

"GTB-3550 is a protein immune engager that binds to NK cells and targets them specifically to leukemia cells," said Miller. "Our team has been working on the structure for years, and we are excited to see it in clinical testing. Another important feature is that the same TriKE protein will stimulate IL-15, an NK cell growth factor, which significantly increases the number of immunotherapeutic cells targeting leukemia cells."

"The success of the Phase I trial could lead to the development of a broad pipeline of TriKE therapies that could be used against a variety of cancer targets," Warlick said. "This molecule has the potential to be an off-the-shelf therapy—ready for use against anyone's AML—which would be revolutionary in terms of cost and efficiency. Unlike CAR-T therapies, which require customization for every patient, TriKE therapies are customized for a disease broadly and should be significantly less expensive but an equal or even better therapeutic option."

GTB-3550 was produced and manufactured at the University of Minnesota's Molecular and Cellular Therapeutics (MCT) center, which offers full-service development and GMP manufacturing of cell- and tissue-based products, monoclonal antibodies and other therapeutic proteins, as well as active pharmaceutical ingredients for use in Phase I, II or III clinical trials. University of Minnesota Health (M Health), the clinical partner of the Masonic Cancer Center, supports the MCT in the production of these molecules.

Provided by University of Minnesota