X4 Pharmaceuticals Announces Initiation of Clinical Study of X4P-001 in Combination with Opdivo for Patients with Advanced Clear Cell Renal Cell

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Clinical program now includes two Phase 1/2 studies in ccRCC to assess X4P-001 in combination with approved therapies

CAMBRIDGE, Mass., January 26, 2017 – X4 Pharmaceuticals, a clinical stage biotechnology company developing novel CXCR4 inhibitor drugs to improve immune cell trafficking and increase the ability for T-cells to track and destroy cancer, today announced dosing of the first patient in a Phase 1/2 study of X4P-001, the company's lead CXCR4 inhibitor, in patients with advanced clear cell renal cell carcinoma (ccRCC). This is the second clinical study of X4P-001 that combines the company's CXCR4 inhibitor with an approved cancer therapy for the treatment of ccRCC.

The primary objective of the newly-initiated study is to evaluate the safety and tolerability of X4P-001 in combination with Opdivo® (nivolumab), an approved immunotherapy for the treatment of advanced RCC after failure of prior anti-angiogenic therapy that blocks a signal preventing T-cells from attacking cancer. The study will enroll patients who have not responded to nivolumab. In addition to safety and tolerability, the trial will evaluate early signs of biological activity using biomarkers, and clinical efficacy as measured by objective response rate and progression free survival over a 12 month time frame. Multiple U.S. cancer centers with leading renal cell carcinoma researchers will participate in the study.

"Enabling the immune system to recognize and attack cancer cells is one of the most promising new approaches to improving outcomes for cancer patients," said Dr. David McDermott, Associate Professor of Harvard Medical School and Director of the Biologic Therapy Kidney Cancer Program at the Beth Israel Deaconness Medical Center and X4 study investigator. "While benefical for some patients, single-agent immuno-therapy treatments have room for significant improvements in the durability and number of responses. The evaluation of combination immuno-therapies is an important next step in cancer reseach. We are hopeful that X4P-001's complementary mechanism of CXCR4 antagonism with PD-1 inhibition will demonstrate an innovative approach to modulating the immune system that yields improved patient outcomes."

"Initation of this study is an important milestone in our strategy to develop X4P-001 in ccRCC in combination with dual classes of existing approved drugs," said Paula Ragan, PhD, President and CEO of X4. "Approved therapies address certain processes in the tumor microenvironment, but we believe more can be done to address the complex biology of challenging cancers, like ccRCC. By modulating cell trafficking in the microenvironment where cancer hijacks normal immune function, X4P-001 may be synergistic with other cancer therapies to result in enhanced responses."

In addition to this new Phase 1/2 study of X4P-001 in combination with Opdivo®, X4 has another Phase 1/2 study ongoing in patients with advanced ccRCC to evaluate X4P-001 in combination with Inlyta® (axitinib), a kinase inhibitor approved for the treatment of advanced RCC after failure of one prior systemic therapy, and a Phase 1b biomarker study in patients with advanced melanoma to evaluate X4P-001 in combination with Keytruda® (pembrolizumab).

About X4P-001 in Cancer

X4P-001, the company's lead drug candidate, is currently in Phase 1/2 testing in refractory clear cell renal cell carcinoma (ccRCC) and other solid tumor indications. Based on promising preclinical studies, X4P-001 is being evaluated in clinical studies in combination with approved cancer therapies, including tyrosine kinase inhibitors and checkpoint inhibitors. X4P-001 is an oral, small molecule inhibitor of CXCR4, or C-X-C receptor type 4, the receptor for the chemokine CXCL12. Recent studies demonstrate that CXCR4/CXCL12 is a primary receptor-ligand pair that cancer cells and surrounding stromal cells use to block normal immune function and promote angiogenesis through the trafficking of T-effector and T-regulatory cells, as well as myeloid derived suppressor cells (MDSCs), in the tumor microenvironment.[1, 2] X4P-001 was previously tested in over 70 subjects in four prior clinical trials in healthy volunteers and HIV-infected patients and was shown to be safe and well tolerated.

About Renal Cell Carcinoma

Kidney cancer is among the ten most common cancers in both men and women with more than 60,000 new diagnoses each year in the United States.[3] Clear cell renal cell carcinoma (ccRCC) is the most common form of kidney cancer, and advanced ccRCC accounts for approximately 20% of the patient population. Therapies for advanced ccRCC include immunotherapies, mammalian target of rapamycin (mTOR) kinase inhibitors, and angiogenesis inhibitors, such as vascular endothelial growth factor (VEGF) inhibitors.[4] There continue to be unmet medical needs with advanced ccRCC because durable responses remain a serious clinical challenge for patients with advanced disease.

About X4 Pharmaceuticals

X4 Pharmaceuticals is developing novel therapeutics designed to improve immune cell trafficking to treat cancer and rare diseases. The Company's oral small molecule drug candidates, including its lead clinical drug candidate X4P-001, inhibit the CXCR4 receptor, a pathway which plays a central role in immune surveillance. X4 was founded and is led by a team with deep product development and commercialization expertise, including several former members of the Genzyme leadership team, and is located in Cambridge, MA.

[1] Feig C., et. al., “Targeting CXCL12 from FAP-expressing carcinoma-associated fibroblasts synergizes with anti-PD-L1 immunotherapy in pancreatic cancer,” PNAS, Oct. 31, 2013.

[2] Guo F., et. al., “CXCL12/CXCR4: a symbiotic bridge linking cancer cells and their stromal neighbors to oncogenic communication networks,” Oncogene, May 11, 2015.

[3] National Cancer Institute, “Surveillance, Epidemiology, and End Results Program,” http://seer.cancer.gov/statfacts/html/kidrp.html

[4] Kidney Cancer Association, “Therapies for Advanced Kidney Cancer,” http://www.kidneycancer.org/knowledge/learn/therapies-for-advanced-kidney-cancer/