Description
Novel treatments for cancer have become possible in the last decade using genetically engineered T cells from a patient’s own immune system. The immune system cannot always clear solid tumors effectively, due to local T cell suppression and lack of cell homing abilities. This novel method addresses both of these challenges.

In this discovery, first a patient’s tumor infiltrating lymphocytes are harvested surgically. Next, the T cells from the tumor are expanded in culture and engineered to additionally express a receptor for a known pathogen with a potent vaccine response. The genetically modified cells are reinfused and the patient is vaccinated near the site of the tumor. This vaccination allows the T cells to home to the site of the tumor more effectively and to become easily and robustly activated, leading to tumor clearance.

The method has been tested in mouse models of breast, melanoma, and bladder cancer with 70% complete eradication of the tumor.

Benefits
- Potential therapy when complete tumor resection not possible
- A biologic targeted approach to the tumor
- Low toxicity compared to alternative chemotherapeutic/radiologic interventions
- Less invasive than complete tumor resection
- Could be combined with other treatments or used for resistant tumors

Plans
An initial clinical trial is in the planning stages for bladder cancer using Bacillus Calmette-Guérin (BCG) as the pathogen. Seventy percent of bladder cancer patients have their tumors surgically resected as a part of normal therapy. BCG, a live attenuated strain of Mycobacterium bovis, has been widely used in treating bladder cancer and melanoma for decades. Instillation of the vaccine is aided using a routine catheter procedure.

Seeking
We are seeking additional clinical partners for the bladder cancer trial and other support to expand this work into other solid tumor treatments. Licenses are available for the pending patent application, which was filed internationally (PCT/US16/62831 filed November 18, 2016).

Publications
GXin, DSchauder, WJing, AJiang, NJoshi, BJJohnson, WCui (Inventor) A Pathogen Boosted Adoptive Cell Transfer Immunotherapy to Treat Solid Tumors. PNAS (in press as of 12/20/2016)