Washington University in St. Louis
Office of Technology Management

GRAFT-VS-HOST DISEASE PREVENTION DURING STEM CELL TRANSPLANTATION

Albring, Jorn, Murphy, Kenneth, Sandau, Michelle

Zou, Dianxiong

T-009478

Background: Allogeneic hematopoietic stem-cell transplantation (aHSCT) from a healthy donor can cure a variety of blood cell disorders including leukemia, multiple myeloma, and some types of lymphoma. This has resulted in an increasing number of transplants, surpassing 8,000 a year in the US alone. Unfortunately, graft-versus-host disease (GVHD), in which donor cells attack the host cells, is a common complication and responsible for 20 percent of the deaths following an aHSCT treatment. This limits its widespread application, making aHSCT a therapeutic approach only indicated currently for a limited set of conditions where other treatment options are far inferior or lacking. Hence, methods that prevent GVHD have the potential to decrease morbidity and mortality of an aHSCT treatment and reduce the procedural and follow-up costs. This would also enable broadening of its application for patients with inherited disorders of hematopoiesis, such as sickle cell anemia or aplastic anemia as well as patients without a major histocompatibility complex (MHC)-matched donor.

Technology Description: A research team, led by Dr. Kenneth Murphy at Washington University in St. Louis, discovered that the inhibitory immunoglobulin superfamily receptor B and T lymphocyte attenuator (BTLA) regulates the expansion of donor T cells. The team developed a non-depleting monoclonal antibody against BTLA (anti-BTLA) and demonstrated that a single administration of anti-BTLA during the aHSCT treatment provides permanent prevention of GVHD. They further observed a restored immune system after an aHSCT, indicating that BTLA agonism prevents GVHD without the need for global immunosuppression. This novel approach has the potential to achieve permanent immune tolerance without the need for chronic immunosuppressive therapy (CIT) to solid organ grafts.

Key Advantages:

- Prevention of GVHD and significant improvement of patient outcomes
- Broadens therapeutic application of aHSCT
- Possible cost reduction of aHSCT procedure and follow-up costs
- Potential to perform solid organ transfers without CIT

Inventor Bio