

# Parasitic Biological Agents for Treatment and Prevention of Graft Versus Host Disease

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## Technology description

### Background

Graft versus host disease (GVHD) is a major and potentially severe complication of bone marrow transplantation in leukemia, lymphoma, and myeloma patients, as well as in patients with various other diseases. GVHD is controlled by various immune modulatory mechanisms that suppress inflammation. Current treatment of GVHD is limited to immune suppressive medications with little benefit and significant long-term toxicity. Although GVHD can be managed by depleting donor T cells from the graft, this impairs the immune system of the transplanted individual by predisposing them to life-threatening infections and recurrence of cancer. The intestinal immune system plays a crucial role in the induction, maintenance or control of graft versus host responses. There is a need for methods of treating and preventing GVHD, and reducing GVHD-related morbidity and mortality, while preserving the effect of the donor T cells on elimination of a tumor of the recipient. Researchers at The University of Iowa discovered that intestinal helminth (*Heligmosomoides bakeri*, a parasite) colonization increases donor and recipient regulatory T cell numbers, while down-regulating inflammatory responses in acute GVHD. Moreover, helminths preserve graft versus tumor (GVT) in this model.

### Description

Researchers at The University of Iowa developed technology which treats bone marrow patients with helminths, which limits signaling related to Th1 immune responses (associated with inflammation and the development of GVHD), and favors Th2 and regulatory immune responses. Patients are exposed to helminths that remain in the GI tract of the patients for the duration of their self-limiting infection. The presence of these parasites in the gut stimulates signaling pathways in the host's immune system that promotes development of a T cell variety, called Fox3p+ Tregs. These T-cells promote regulation of the immune system, and limits an immune response which results in the inflammation of GVHD and preserves GVT. A patent has currently been filed for this development (Patent No. 61/978,118).

## University of Iowa Research Foundation

<https://research.uiowa.edu/uirf/pages/technologies/>

## Advantages

Our invention has the potential to be useful for hematology and other areas of human medicine where bone marrow or stem cell transplantation may be applied as a therapeutic regimen. Helminths are less toxic compared to current immune suppressive regimens. The results suggest that helminths reduce negative effects of GVHD and preserve the donor T cells.

## Institution

[University of Iowa](#)

## 联系我们



叶先生

电 话 : 021-65679356

手 机 : 13414935137

邮 箱 : yeyingsheng@zf-ym.com