Docket #: S24-347

Donor-specific anti-HLA antibodies to treat and diagnose acute Graft-versus-Host Disease (GVHD)

Researchers at Stanford University have discovered that donor-specific anti-HLA antibodies can be used to detect and treat graft-versus-host disease (GVHD) in transplant recipients after allogenic transplantation.

Allogeneic hematopoietic stem cell transplantation (allo-HSCT) is a treatment for severe hematologic disorders. Successful graft acceptance is most likely with fully human leukocyte antigen (HLA)-matched donors. However, when a perfect match is unavailable, alternatives such as haploidentical or umbilical cord blood transplants are used, increasing the risk of GVHD – a lethal complication in which donor immune cells attack the recipient's tissues. Immunosuppressive treatments such as steroids, calcineurin inhibitors, and anti-thymocyte globulin can help manage GVHD but often cause severe side effects, including opportunistic infection and anaphylaxis. A new approach is critically needed to improve patient outcomes.

Stanford researchers have developed allele-specific anti-HLA monoclonal antibodies (ASHmAbs) to diagnose and treat allogeneic GVHD by selectively targeting donor-derived cells. When ASHmAbs were administered in severe GVHD mouse models, they effectively disrupted the donor cells responsible for GVHD, leading to successful engraftment. Their invention could help mitigate graft-versus-host reactivity while preserving recipient immune function.

Stage of Development
In vivo data

Applications

- Diagnostic: chimerism analysis using flow cytometry

- Therapeutic: GVHD treatment targeting donor-derived cells

Advantages

- Specific to donor-derived cells
- Ultra-low dose
- Higher efficacy

Publications

- Yamazaki, S., Suzuki, N., Saito, T., Ishii, Y., Takiguchi, M., Nakauchi, H., & Watanabe, N. (2009). A rapid and efficient strategy to generate allele-specific anti-HLA monoclonal antibodies. *Journal of immunological methods, 343*(1), 56–60.
- Nakauchi, Y., Yamazaki, S., Napier, S. C., Usui, J., Ota, Y., Takahashi, S., Watanabe, N., & Nakauchi, H. (2015). Effective treatment against severe graft-versus-host disease with allele-specific anti-HLA monoclonal antibody in a humanized mouse model. *Experimental hematology, 43*(2), 79–88.e884.

Patents

- Published Application: WO2026080608

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