

Therapeutic – Immunotargeting Monoclonal Antibody

Broad Specificity HLA-DR monoclonal antibody

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Background

HLA-DR plays a central role in antigen presentation and immune regulation. It is expressed on professional antigen presenting cells (APCs) and is upregulated during immune activation. Aberrant HLA-DR expression is implicated in hematologic malignancies, autoimmune diseases, and transplant rejection. Despite its importance, therapeutic targeting of HLA-DR has been limited due to polymorphism and concerns about immune dysregulation.

Our team aims to address these challenges with a novel antibody product exhibiting broad HLA-DR reactivity with a modular architecture (Fig. 1) allowing the fusion to antigens, epitopes, or payloads for diverse therapeutic applications.

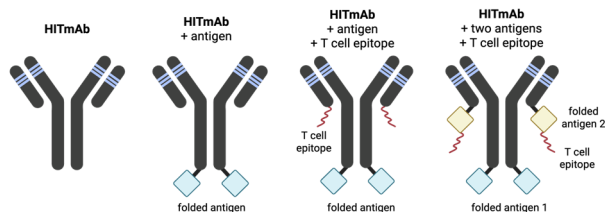


Fig. 1. Modular Architecture of HITmAb enabling fusion of diverse antigens and peptides.

Description of the Invention

Drs. Brian Barber and Jean-Philippe Julien have engineered a fully humanized Immune Targeting monoclonal antibody (HITmAb). Derived from murine antibody 44H10 and engineered using CDR grafting onto an IgG1 framework, HITmAb binds HLA-DR with nanomolar affinity and maintains high stability and specificity post-humanization. The antibody demonstrates broad allele reactivity (Fig. 2) enabling HLA-DR targeted delivery of antigens, cytotoxic agents, or immunomodulators to APCs in all humans. Additionally, HITmAb has cross-species compatibility (demonstrated in humans, rabbits, ferrets, macaques), and exhibits robust performance as an adjuvant-free vaccine in pre-clinical models (Fig. 3).

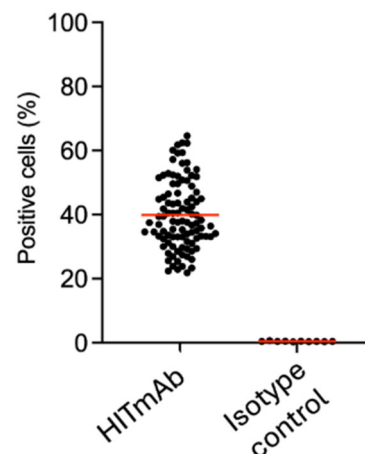


Fig. 2. Broad specificity of HITmAb. Data showing HITmAb binding to 100% of blood donor derived PBMCs of 100 random samples from a diverse population.

Keywords monoclonal antibody, vaccine, antibody drug conjugate, immune dampening, graft vs host disease, autoimmune disease

Commercial Applications

In addition to infectious disease vaccine applications the platform can be adapted for:

- the delivery of tumour neoantigens to APCs thereby focusing the immune system on the recognition of these specific neoantigen-expressing tumour cells.
- the delivery of self-antigens to APCs to re-establish tolerance in the case of autoimmune diseases.
- the delivery of immunomodulatory drugs (i.e. IL-10 or TGF- β) to APCs to modulate/regulate an ongoing immune response.
- the development of novel antibody drug conjugates (ADC) that deliver toxic payloads to HLA-DR positive malignant cells.
- depleting of donor graft APCs prior to host engraftment, reducing the potential for graft vs host disease (GVHD).

Publications & Patents

Patents pending in Canada (CA 3250551) and the US (US [18/863143](#)).

Kassardjian et al., *Antibodies* 13, 57 (2024). DOI: [10.3390/antib13030057](#)

Kassardjian et al., *Cell Reports* 42, 112391 (2023). DOI: [10.1016/j.celrep.2023.112391](#)

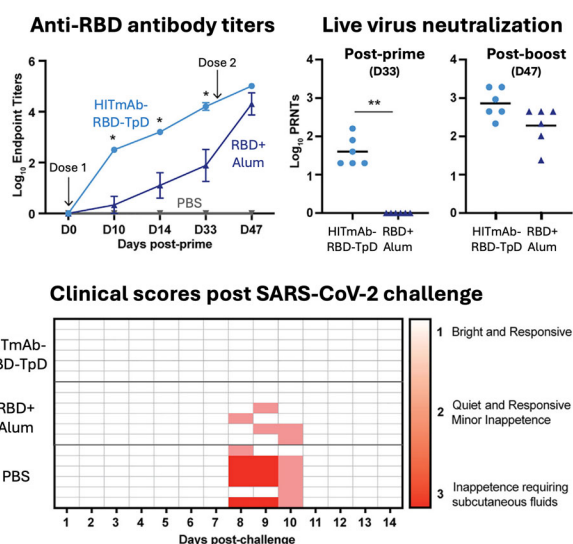


Fig. 3. Efficacy of HITmAb fused to the SARS-CoV-2 spike protein RBD and the T cell epitope TpD as a vaccine candidate in a pre-clinical ferret infection model of COVID-19. The HITmAb-RBD-TpD construct elicits robust antigen-specific antibody responses that neutralize live SARS-CoV-2 virus both before (D33) and after (D47) boosting, and protect immunized rabbits from clinical COVID-19, surpassing responses elicited by RBD adjuvanted in Alum.

Seeking strategic partnership/licensing to develop immunotargeted therapeutic products

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