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InnoCyto Inc.

15375 Barranca Pkwy, Suite I-103
Irvine, CA 92618
Email: info@innocyto.com
Phone: 1-949-418-7543

iF647 Anti-Human HLA-DR Antibody

Catalog Number:	102705, 102706
Size:	25 tests, 100 tests
Target Name:	HLA-DR, Major Histocompatibility Class II, MHC class II
Regulatory Status:	RUO

PRODUCT DETAILS

Clone:	L243
Application:	Flow Cytometry
Reactivity:	Human
Format:	iF647
Isotype:	Mouse IgG2a
Antibody Type:	Monoclonal
Formulation:	Phosphate-buffered solution, pH 7.2, containing 0.09% sodium azide and 0.2% (w/v) BSA
Protein Concentration:	Supplied at a lot-specific concentration.
Storage and Handling:	The antibody solution should be stored undiluted between 2°C and 8°C, and protected from prolonged exposure to light. Do not freeze.
Recommended Usage:	For flow cytometric staining, it is recommended to use 5 µL of this reagent per 0.5-1.0 million cells in a 100 µL volume. Optimal reagent performance should be determined by titration for each specific application. iF647 has an excitation max at 656 nm and an emission max at 670 nm.
Excitation Laser:	Red Laser (633 nm)
Isotype Control:	302607
RRID:	AB_3738649

BACKGROUND INFORMATION

HLA-DR is a major histocompatibility complex (MHC) class II molecule that plays a central role in adaptive immune responses by presenting antigenic peptides to $CD4^+$ T helper cells. It is primarily expressed on professional antigen-presenting cells (APCs), including dendritic cells, macrophages, B cells, and thymic epithelial cells, and its expression can be induced on other cell types under inflammatory conditions, particularly by interferon-γ.

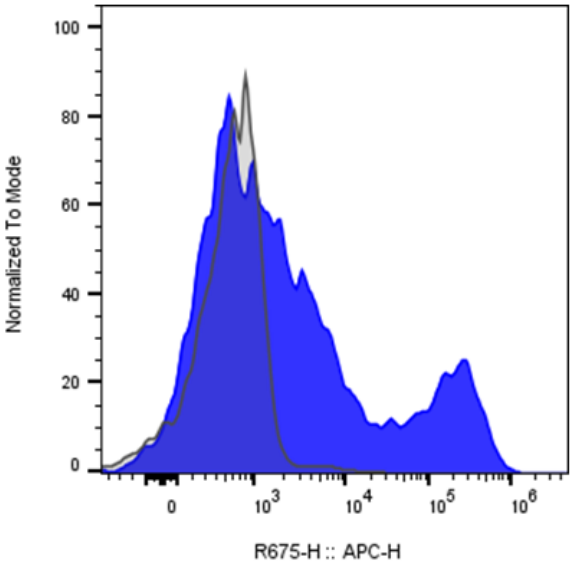
Structurally, HLA-DR is a heterodimer composed of an α chain (DRA) and a β chain (DRB), each containing two extracellular domains, a transmembrane region, and a short cytoplasmic tail. The α1 and β1 domains together form the peptide-binding groove, which accommodates peptides typically 13–25 amino acids in length. This groove is open at both ends, allowing for flexibility in peptide size. HLA-DR is highly polymorphic, particularly in the DRB genes, enabling the immune system to present a broad repertoire of antigenic peptides derived from pathogens or self-proteins. The ligands of HLA-DR are processed peptide antigens

generated from extracellular or vesicular proteins that are internalized, degraded in endosomal compartments, and loaded onto HLA-DR molecules. Peptide loading is tightly regulated by accessory molecules, including the invariant chain (Ii), which prevents premature peptide binding, and HLA-DM, which facilitates peptide exchange and stabilizes high-affinity peptide–HLA-DR complexes. The primary functional interaction of HLA-DR is with the T cell receptor (TCR) on $CD4^+$ T cells, initiating T cell activation and differentiation.

HLA-DR is strongly implicated in disease. Specific HLA-DR alleles are associated with susceptibility or protection in numerous autoimmune diseases, including rheumatoid arthritis, type 1 diabetes, systemic lupus erythematosus, and multiple sclerosis, reflecting differences in self-antigen presentation. Aberrant or reduced HLA-DR expression is also observed in cancer and sepsis, where impaired antigen presentation contributes to immune evasion or immunosuppression. Conversely, elevated HLA-DR expression on monocytes is often used as a marker of immune activation and immune competence.

Therapeutically, HLA-DR has both direct and indirect relevance. Anti-HLA-DR monoclonal antibodies have been explored in transplantation and hematologic malignancies to modulate immune responses or deplete malignant APCs. In cancer immunotherapy and vaccine development, effective antigen presentation via HLA-DR is essential for robust $CD4^+$ T cell help, supporting durable antitumor and antiviral immunity. Additionally, HLA-DR expression is widely used as a diagnostic and prognostic biomarker in immunology, oncology, and critical care settings.

PRODUCT DATA



Human peripheral blood lymphocytes stained with either iF647 anti-human HLA-DR clone L243 (blue histogram) or an isotype control (gray histogram).

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