

## APC/Cyanine7 Anti-Human HLA-DR Antibody

<b>Catalog Number:</b>	102723, 102724
<b>Size:</b>	25 tests, 100 tests
<b>Target Name:</b>	HLA-DR, Major Histocompatibility Class II, MHC class II
<b>Regulatory Status:</b>	RUO

### PRODUCT DETAILS

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<b>Clone:</b>	L243
<b>Application:</b>	Flow Cytometry
<b>Reactivity:</b>	Human
<b>Format:</b>	APC/Cyanine7
<b>Isotype:</b>	Mouse IgG2a
<b>Antibody Type:</b>	Monoclonal
<b>Formulation:</b>	Phosphate-buffered solution, pH 7.2, containing 0.09% sodium azide and 0.2% (w/v) BSA
<b>Protein Concentration:</b>	Supplied at a lot-specific concentration.
<b>Storage&amp;Handling:</b>	The antibody solution should be stored undiluted between 2°C and 8°C, and protected from prolonged exposure to light. Do not freeze.
<b>Recommended Usage:</b>	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. APC/Cyanine7 has an excitation max at 650 nm and an emission max at 774 nm.
<b>Excitation Laser:</b>	Red Laser (633 nm)
<b>Isotype Control:</b>	301518

### BACKGROUND INFORMATION

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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<sup>+</sup> 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- $\gamma$ .

Structurally, HLA-DR is a heterodimer composed of an  $\alpha$  chain (DRA) and a  $\beta$  chain (DRB), each containing two extracellular domains, a transmembrane region, and a short cytoplasmic tail. The  $\alpha 1$  and  $\beta 1$  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<sup>+</sup> 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<sup>+</sup> 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.

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