



# Histocompatibility Laboratories

The American Red Cross Histocompatibility Laboratories provide comprehensive and leading edge human leukocyte antigen (HLA) services supporting related and unrelated hematopoietic cell transplantation (HCT), and HLA-matched platelet transfusions to help patients and their physicians. The Red Cross Histocompatibility laboratories are at the forefront of testing best practices and provide expert consultation and guidance to institutions throughout the country.

Our histocompatibility laboratories are CLIA-certified and accredited by agencies such as the American Society for Histocompatibility and Immunogenetics (ASHI), the New York State Department of Health, the Florida Health Agency, and the State of California Department of Public Health and provide contracted histocompatibility services to the National Marrow Donor Program (NMDP) supporting national and international transplant centers.

## Indications

- High-resolution HLA typing of all class I and class II loci, KIR gene typing, and HLA antibody detection for hematopoietic cell transplantation (HCT)
- Detection/identification of HLA antibodies in patients and donors by Solid-Phase Single Antigen Beads (SAB)
- Comprehensive studies to assist in the provision of optimal HLA-matched platelet transfusion therapy by HLA typing of the patients and donors, HLA antibody profiling of the patients, and platelet crossmatching of the patient with platelet donor panels
- Unrelated HCT donor testing for CCR5-Delta 32 genetic variant to assist donor selection for HIV-1 infected patients
- Engraftment monitoring, including multiple lineage-specific subsets, for post-HCT patients
- Identification of disease-predisposition HLA genes for Celiac disease, Narcolepsy, Ankylosing spondylitis and others
- Identification of drug hypersensitivity related HLA genes, including: –HLA-B\*57:01 with Abacavir –HLA-B\*15:02 with Carbamazepine –HLA-B\*58:01 with Allopurinol, and others
- Allele and high resolution level HLA typing for non-transplant purposes, including the support of subjects enrolled in clinical cellular therapy trials for solid tumors and hematological malignancies for biotech and pharmaceutical companies

## Description

HLA services include allelic resolution, high resolution, and intermediate resolution of Class I (HLA-A, -B, -C) and Class II (HLA-DRB1, -DRB345, -DQA1, -DQB1, -DPA1, -DPB1) typing and low resolution KIR gene typing. Both NGS and STR markers are utilized for post-HCT engraftment monitoring. The laboratories also use various approaches to test for HLA antibody profile to assist donor selections for highly sensitized patients receiving transplantations or identify acceptable antigens for highly immunized patients receiving platelet transfusions.

## Test Methods

- HLA typing: qPCR, PCR-SSP, PCR-SSOP, Sanger-SBT, NGS
- HLA antibody detection/identification: SAB (Single-Antigen Bead) panel or Luminex-based flow cytometry methods
- T and B cell FCXM (Flow Cytometric Crossmatch)
- KIR gene typing: qPCR, PCR-SSP, PCR-SSOP
- CCR5-Delta 32 mutation: NGS, Sanger-SBT, PCR-SSP
- Engraftment monitoring: NGS, STR
- Disease association and HLA typing for all non-transplant purpose: qPCR, PCR-SSP, PCR-SSOP, Sanger-SBT, NGS
- Relationship testing

## HLA Testing for Platelet Transfusion Support:

Platelets play a vital role in the maintenance of normal hemostatic activity. Refractoriness to platelet transfusion can be separated into non-immune and immune causes. Working together with the Red Cross HLA laboratories, strategies for effective patient support can be achieved.

## HLA Testing for Transplantation:

HLA is one of the most polymorphic gene systems in the human genome. Consequently, many patients lack HLA-matched donors. In recent years, advances in HLA testing and matching, extensive research on the role of each HLA locus mismatched on clinical outcome and further knowledge of donor selection factors, have made it easier to search for and select a partially matched donor.

