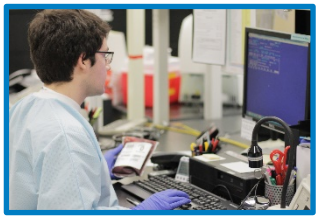
San Diego Blood Bank

Immunohematology Reference Laboratory

A Guide to Services



San Diego Blood Bank

Immunohematology Reference Laboratory

A GUIDE TO SERVICES

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California Clinical Lab ID#CLF1236

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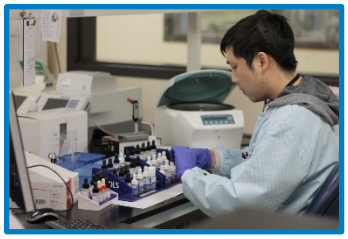


SAN DIEGO BLOOD BANK MISSION STATEMENT

Saving lives with quality blood services in partnership with the community.

QUALITY STATEMENT

San Diego Blood Bank is committed to meet or exceed the quality requirements of our customers and of federal, state and local regulatory agencies as well as AABB Standards. This commitment will be achieved and maintained by training and developing our personnel and by measuring and evaluating our results to provide continuous improvement of our blood services management and operating systems.

PRIVACY/CONFIDENTIALITY STATEMENT

We are committed to protecting the privacy of patient records. All records that have confidential medical information are handled in a way that ensures the privacy and security of those records. Unauthorized persons do not have access to patient information.

San Diego Blood Bank

CLIENT INFORMATION FOR SPECIMEN COLLECTION

- All specimens require two unique forms of identification.
  Example: full name and medical record number or date of birth.
- Date collected. All specimens must carry the collection date.
- All specimen information must match the information on the submitted consultation request form.

Important On computer generated labels, ensure entire patient name prints on label. Name on specimens must match request form.

SAMPLE ACCEPTANCE CRITERIA

- Proper patient identification on specimen(s).
- Adequate volume of specimen for requested test.
- Properly sealed, intact specimen containers.
- Accompanying order/consultation form with complete information.
- Specimens are unacceptable if grossly hemolyzed except in cases where in vivo hemolysis is suspected (e.g., transfusion reaction or hemolytic anemia).

STORAGE AND TRANSPORTATION

Storage: Refrigerate prior to transport. Do not freeze red cells.
Transport: Protect from extreme temperatures.

PATIENT PREPARATION

None required.

TURNAROUND TIMES

Routine ..... 48 - 72 hours

ASAP.....24 hours

STAT.....8 hours

Molecular ..... 7 - 10 days
Red Cell
Genotyping

Final Reports ..... 7 - 10 business days

All turnaround times are measured from the time samples are received by the testing laboratory.

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TEST INFORMATION

TEST	**ABO-Rh Blood Group**
SAMPLE REQUIREMENTS	One 5 -7 mL EDTA whole blood (purple or pink top tube) less than 10 days old.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled. DO NOT FREEZE RED CELLS. DO NOT DRAW IN SERUM SEPARATOR TUBES.
TEST USE	Determination of ABO and Rh(D) antigens and antibodies in patients who may require the transfusion of blood or blood components; to identify patients who may be candidates for Rh Immune Globulin.
LIMITATIONS	Aged red cells may exhibit weaker reactivity than fresh red cells.

TEST	**Rh Phenotype**
SAMPLE REQUIREMENTS	One 5 -7 mL EDTA whole blood (purple or pink top tube) less than 10 days old.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled. DO NOT FREEZE RED CELLS. DO NOT DRAW IN SERUM SEPARATOR TUBES.
TEST USE	Determination of probable Rh genotype; includes D, C, E, c, e.
LIMITATIONS	Reliable results may not be obtained in patients who have received red cell transfusions in the previous three months.

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TEST INFORMATION

TEST	**Direct Antiglobulin Test**
SAMPLE REQUIREMENTS	One 5 -7 mL EDTA whole blood (purple or pink top tube) less than 3 days old.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled. Exceptions will be made with hemolyzed samples if being submitted to investigate possible in vivo hemolysis, e.g., in the case of a possible hemolytic transfusion reaction. DO NOT FREEZE RED CELLS. DO NOT DRAW IN SERUM SEPARATOR TUBES.
TEST USE	Used to determine if red blood cells have been coated in vivo with immunoglobulin, complement, or both.
LIMITATIONS	Testing on red blood cells from a clotted sample may result in false positive reactions due to the in vitro uptake of complement.

TEST	**Red Cell Antibody Screen**
SAMPLE REQUIREMENTS	One 10 mL clotted whole blood (plain red top tube). EDTA whole blood is acceptable (purple or pink top tube).
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled.
TEST USE	Detection of red cell antibody(s) in patients who may require the transfusion of blood or blood components. Prenatal screen for possible maternal-fetal incompatibilities.
LIMITATIONS	Does not completely ensure the absence of all blood group antibodies, nor detect all maternal-fetal incompatibilities.

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TEST INFORMATION

TEST	**Red Cell Antibody Identification**
SAMPLE REQUIREMENTS	Two 10 mL clotted whole blood (plain red top tubes) and two 10 mL EDTA whole blood (purple or pink top tube). Please consult with the Immunohematology Reference Laboratory regarding sample volume necessary for the investigation of autoantibodies.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled. Exceptions will be made with hemolyzed samples if being submitted to investigate possible in vivo hemolysis, e.g., in the case of a possible hemolytic transfusion reaction. DO NOT FREEZE RED CELLS. DO NOT DRAW IN SERUM SEPARATOR TUBES.
TEST USE	Identification of red blood cell antibody(s) in patients who may require the transfusion of blood or blood components, or in prenatal samples for possible maternal-fetal incompatibility. Includes ABO and Rh blood groups, Direct Antiglobulin Test, red cell antibody identification by various methods Additional testing may be required depending on the antibody complexity.
LIMITATIONS	Does not completely ensure the absence of all blood group antibodies, nor detect all maternal-fetal incompatibilities.

TEST INFORMATION

TEST	**Red Cell Antibody Titer**
SAMPLE REQUIREMENTS	One 10 mL clotted whole blood (plain red top tube) and one 7 mL EDTA whole blood (purple or pink top tube).
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled. DO NOT FREEZE RED CELLS. DO NOT DRAW IN SERUM SEPARATOR TUBES.
TEST USE	Semi quantitative method used to determine the concentration of antibody in a serum, e.g., estimation of antibody activity in alloimmunized pregnant women to assist in monitoring clinically significant antibodies.
LIMITATIONS	Comparison of results is only valid when the same methodology is used.

Note: Antibody identification must be performed prior to performing this test. There will be additional charges.

TEST	**Eluate**
SAMPLE REQUIREMENTS	One 5-7 mL EDTA whole blood (pink or purple top tube) collected within 3 days. Must be a minimum of 2 mL red cells.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled. DO NOT FREEZE RED CELLS. DO NOT DRAW IN SERUM SEPARATOR TUBES.
TEST USE	Resolution of positive Direct Antiglobulin Test.
LIMITATIONS	Red cells from samples stored longer than 3 days may yield less potent eluates than those from freshly drawn samples.

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TEST INFORMATION

TEST	**Red Cell Antigen Profile – Molecular (LDT)**
SAMPLE REQUIREMENTS	One 3-7 mL EDTA whole blood (pink or purple top tube) less than 14 days old. A buccal sample or cord blood sample can be sent with IRL approval.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled.
TEST USE	*In vitro* diagnostic test intended for the molecular determination of allelic variants that predict erythrocyte antigen phenotypes in blood group systems in human genomic DNA. The test also detects the Hgb S mutation in the beta globin gene. The results from this mutation detection are not intended for the diagnosis of sickle cell disease.
LIMITATIONS	New mutations that inactivate gene expression or new variant alleles may not be identified in this assay. The genotype obtained from DNA from leukocytes may differ from that of other tissues in persons with a history of transplantation.

TEST	**Platelet Crossmatch by Solid-Phase Red Cell Adherence**
SAMPLE REQUIREMENTS	One 10 mL clotted whole blood (plain red top tube) or one 10 mL EDTA whole blood (pink or purple top tube) less than 14 days old.
ACCEPTANCE CRITERIA	Specimens are unacceptable if contaminated with IV fluid, grossly hemolyzed, of inadequate volume, or improperly labeled.
TEST USE	Pretransfusion test in patients with platelet refractoriness due to alloimmunization.
LIMITATIONS	Does not determine platelet antibody specificity or differentiate HLA Class I antibody from platelet antibody.

TEST INFORMATION

TEST	**Hospital Inventory Search for Red Cell Phenotypes**
SAMPLE REQUIREMENTS	NA
ACCEPTANCE CRITERIA	NA
TEST USE	Provided as a tool to assist in locating RBC units for testing.
LIMITATIONS	These red cell antigen results reflect historic information and are provided only as a tool to assist in locating units for testing. They may have been tested with unlicensed antisera and are not to be considered test of record. Antigen tests must be performed by the ordering facility prior to use for transfusion.

TEST	**Red Blood Cell Antigen Negative Donor RBC**
SAMPLE REQUIREMENTS	NA
ACCEPTANCE CRITERIA	NA
TEST USE	Serologic test used in providing donor RBC that are negative for requested red blood cell antigens for transfusion in patients who have produced clinically significant red blood cell antibodies.
LIMITATIONS	Licensed antisera are not available for all blood group antigens.

Request RBC using **FRM 2800135, IRL Request for Antigen Negative Red Blood Cells**.

TEST	**Hemoglobin S Screen**
SAMPLE REQUIREMENTS	NA
ACCEPTANCE CRITERIA	NA
TEST USE	Qualitative test used in screening for Hemoglobin S negative donor units intended for transfusion.
LIMITATIONS	This test is not for diagnostic purposes in the evaluation of patient samples.

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Immunohematology Consultation Request

California Clinical Lab ID# CDF1236
CLIA No. 05D643088
Mark Edmunds, MD, Chief Medical Officer

3636 Gateway Center Ave., Ste. 100
San Diego, CA 92102
(619) 400-8257, 400-8211
FAX (619) 725-3004

INSTRUCTIONS:

1. Please call the IRL before sending specimens.
2. Submit 10-20cc of clotted blood and 10-20cc of anticoagulated blood.
   For recently transfused patients, submit pretransfusion red cells if available.
3. Send blood in stoppered tubes that prevent leakage. Do not use tubes with serum separators.
4. Label each tube with patient's first and last names, DOB or MR#, date and time of collection.
5. Complete each item on this form.
6. Mark the container "ATTN: IRL".

Improperly Labeled Tubes Will Not Be Tested

PATIENT INFORMATION

Patient Name: _____ DOB: _____ MR#: _____

Sex: _____ Ethnicity: _____ Hemoglobin / Hematocrit: _____ Date Specimen Collected: _____

Clinical Diagnosis: _____ Ordering Physician (required): _____

Medications: _____

Transfusion History: Within last 3 months, dates: _____

Prior to last 3 months, dates: _____

No. of Pregnancies: _____ Pregnant Now? _____ Due Date: _____ History of HDN? _____

Has the patient received Rh Immune Globulin? _____ Date of injection: _____

Known RBC antibody(ies): Anti-D ☐ -C ☐ -E ☐ -c ☐ -e ☐ -K ☐ -S ☐ -s ☐ -Fy^a ☐ -Fy^b ☐ -Jk^a ☐ -Jk^b ☐

Other (list): _____

TEST(S) / INVESTIGATION REQUESTED

☐ ABO-Rh typing ☐ Antibody Identification ☐ Transfusion Reaction
☐ Direct Antiglobulin Test ☐ Hemolytic Disease of the Fetus and Newborn
☐ Platelet Crossmatch ☐ Red Cell Antigen Genotype (Molecular)*
☐ Other _____

*Red Cell Antigen Genotype (Molecular) is recommended if a warm autoantibody is identified or patient has been transfused.

Urgency:		**Products Requested:** Quantity_____ Date & time needed:_____
☐ Routine (24-48 hours)	☐ Stat (8 hours)	☐ CMV Negative ☐ Hemoglobin S Negative
☐ ASAP (24 hours)	**Stat Fees Will Apply**	☐ Irradiated ☐ Other_____

RESULTS OF YOUR STUDIES (Attach Copies)

ABO-Rh Groups: _____ Direct Antiglobulin Test: _____

Test Method: ☐ LISS ☐ PEG ☐ GEL ☐ OTHER please list _____

REQUESTING HOSPITAL:	PHONE & FAX REPORT TO :

San Diego Blood Bank

RED CELL ANTIGEN FREQUENCY CHART

	Antigen	ISBT	Caucasian	Black	Asian	Interesting Facts
ABO	A	ABO1	43%	27%	27%	• First blood groups discovered in 1900 by Karl Landsteiner.
	B	ABO2	9%	20%	25%	
	AB	ABO3	4%	4%	5%	
	O		44%	49%	43%	
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
Rh	D	RH1	85%	92%	>99%	• 52 known antigens. • Rh incompatibility still the leading cause of hemolytic disease of the fetus and newborn.
	C	RH2	68%	27%	93%	
	E	RH3	29%	22%	39%	
	c	RH4	80%	96%	47%	
	e	RH5	98%	98%	96%	
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
Kell	K	KEL1	9%	2%	<0.01%	• 34 known antigens. • Named in 1946 after Mrs. Kelleher who made the first antibody, anti-K.
	k	KEL2	99.8%	>99%	>99%	
	Kp^a	KEL3	2%	<0.01%	<0.01%	
	Kp^b	KEL4	>99%	>99%	>99%	
	Js^a	KEL6	<0.01%	20%		
	Js^b	KEL7	>99%	99%	>99%	
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
Duffy	Fy^a	FY1	66%	10%	99%	• The Duffy glycoprotein is a receptor for some malarial parasites. • Fy(a-b-) red cells resist invasion by *P. vivax & P. knowlesi.*
	Fy^b	FY2	83%	23%	9-18%	
	Fy3	FY3	>99%	32%	99.9%	
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
Kidd	Jk^a	JK1	77%	92%	72%	• Named after John Kidd who suffered from hemolytic disease of the newborn due to anti-Jk^a.
	Jk^b	JK2	74%	49%	76%	
	Jk3	JK3	>99%	>99%		
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
Diego	Di^a	DI1	0.01%		5-12%	• Named in 1955 after Mrs. Diego who made the first anti Di^a. • 17 of 19 Diego antigens are of low frequency.
	Di^b	DI2	>99%	>99%		
	Wr^a	DI3	<0.01%	0%		
	Wr^b	DI4	>99%			
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
Lewis	Le^a	LE1	22%	23%	19-24%	• Lewis antigens on red cells are greatly reduced during pregnancy. • Lewis antibodies are frequently naturally occurring.
	Le^b	LE2	72%	55%	72-77%	
	Antigen	**ISBT**	**Caucasian**	**Black**	**Asian**	
MNS	M	MNS1	78%	74%	79-81%	• Discovered in 1927. • Many are sensitive to enzymes.
	N	MNS2	72%	75%	67%	
	S	MNS3	55%	31%	7-10%	
	s	MNS4	89%	93%	>99%	
	U	MNS5	>99%	99%	>99%	

REFERENCES

1. Marion Reid and Christine Lomas-Francis. The Blood Group Antigen FactsBook, Elsevier Academic Press 3rd Ed., 2012

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ISBT Nomenclature for Red Blood Cell Antigens

ISBT Designation	Antigen or Symbol(s)
ABO1	A
ABO2	B
ABO3	AB
ABO4	A1
RH1	D
RH2	C
RH3	E
RH4	c
RH5	e
RH10	V
RH20	VS
KEL1	K
KEL2	k
KEL3	Kp^a
KEL4	Kp^b
KEL6	Js^a
KEL7	Js^b
FY1	Fy^a
FY2	Fy^b
FY3	Fy3
FY5	Fy5
JK1	Jk^a
JK2	Jk^b
JK3	Jk3
MNS1	M
MNS2	N
MNS3	S
MNS4	s
MNS5	U

ISBT Designation	Antigen or Symbol(s)
LU1	Lu^a
LU2	Lu^b
DI1	Di^a
DI2	Di^b
DI3	Wr^a
DO1	Do^a
DO2	Do^b
DO4	Hy
CO1	Co^a
CO2	Co^b
CO3	Co3
YT1	Yt^a
YT2	Yt^b
KN1	Kn^a
KN2	Kn^b
KN3	McC^a
KN5	YK^a

ISBT = International Society of Blood Transfusion
www.isbtweb.org