



ISBMT

Indian Society for Blood & Marrow Transplantation

BMT MASTER CLASS

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HLA and donor selection

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- **Basics of HLA – UCB not covered !**
- **Current Guidelines for donor selection**
- **Q & A – You ask , I answer !**
- **MCQs – I ask , you answer !**

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- Major histocompatibility complex (MHC) = **[Histo-: Greek root "histos" means "tissue" + Compatibility: Latin-derived word for a state of mutual tolerance or ability to coexist without conflict]**
- MHC are a set of cell surface proteins essential for immune system to recognize exogenous molecules in vertebrates, which determines histocompatibility. Human MHC is called the HLA (Human Leukocyte Antigen) system because these antigens were first identified and characterized using alloantibodies against leukocytes.
- HLA is located on short arm of chromosome 6 and is the most polymorphic genetic system in humans.
- **Significance of HLA**
 - Genetic diversity – Human HLA is extremely polymorphic** in nature with a vast number of different variants (alleles). This high genetic diversity ensures that humanity, as a species, can recognize and mount immune responses against a huge variety of evolving pathogens.
 - Primary biological role of HLA class I and class II molecules is to present processed peptide antigens** so that foreign peptides can be eliminated and self antigens preserved. This is crucial for adaptive immunity.
 - Plays a crucial role in success of transplantation or transfusion of cells or tissue through donor –recipient pair HLA compatibility.**
 - Disease Association:** Specific HLA alleles are strongly associated with susceptibility to certain **autoimmune diseases**

The human HLA is divided into three regions

Expression of HLA genes.

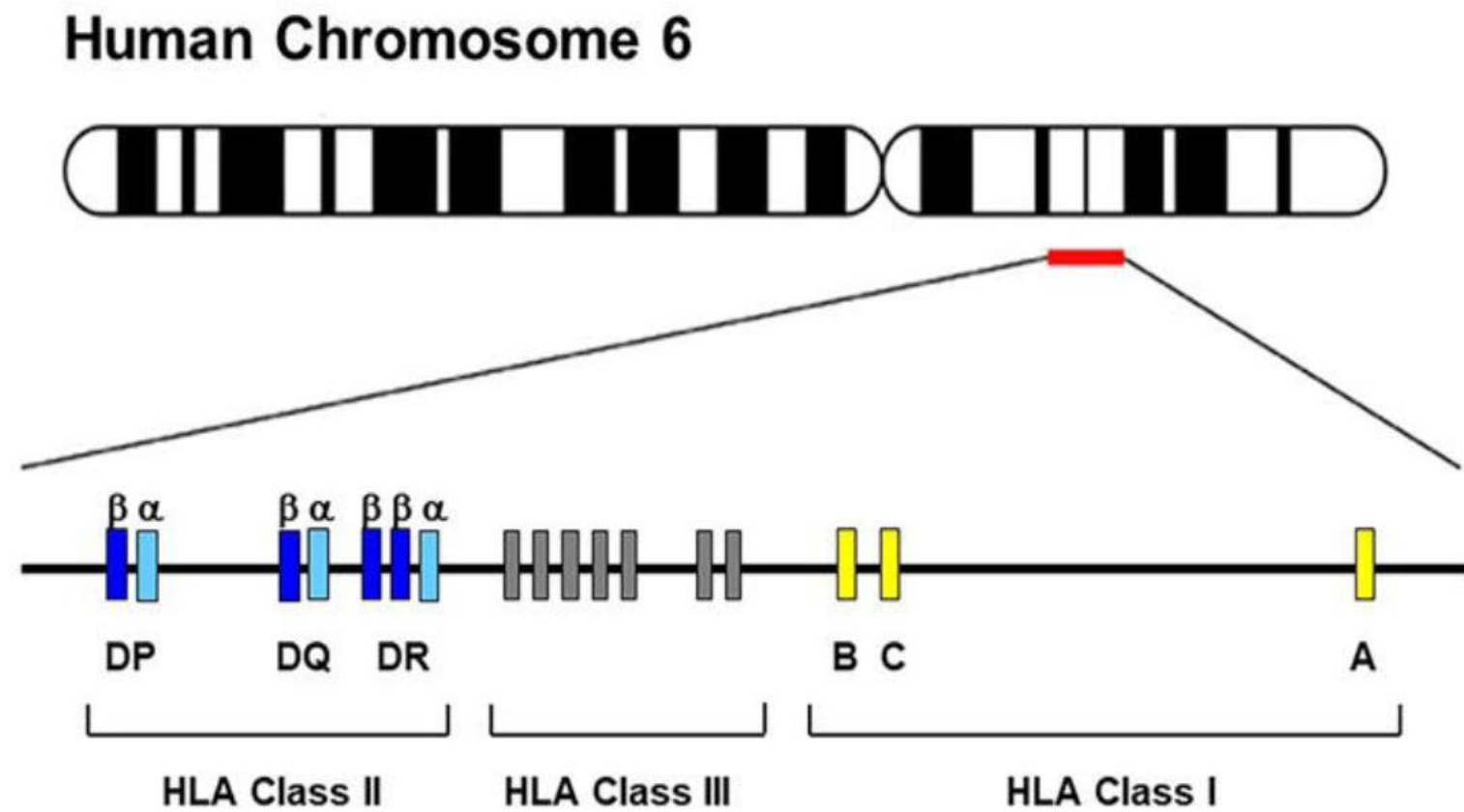


Figure 1.

The human leukocyte antigen complex on chromosome 6. The HLA class I region is 3-6 kb long and the HLA class II region is 4-11 kb long. The HLA class III is not part of the polymorphic HLA system.

MHC Region	Gene Product	Tissue location	Function
HLA-class I	HLA-A-B-C	Nucleated cells	Recognition of tumor and virus infected cells by CD8+ T lymphocytes
HLA-class II	HLA-DR-DQ-DP	Antigen presenting cells. B lymphocyte, Macrophage, Dendritic cells and Endothelial cells	Recognition of foreign antigens cells by CD4+ T lymphocytes
HLA-class III	Complement C2,C4,B	Plasma	Lysis of extracellular pathogens

4

What are HLA haplotypes and its inheritance patterns in humans ?

- HLA genes are closely linked and the entire MHC is inherited as an HLA haplotype in Mendelian fashion from each parent.
- Segregation of HLA haplotypes within a family can be assigned by family HLA studies (Figure).
- Two siblings have a 25% chance of being genotypically HLA identical, a 50% chance of being HLA haploidentical (sharing one haplotype), and a 25% chance that they share no HLA haplotypes.

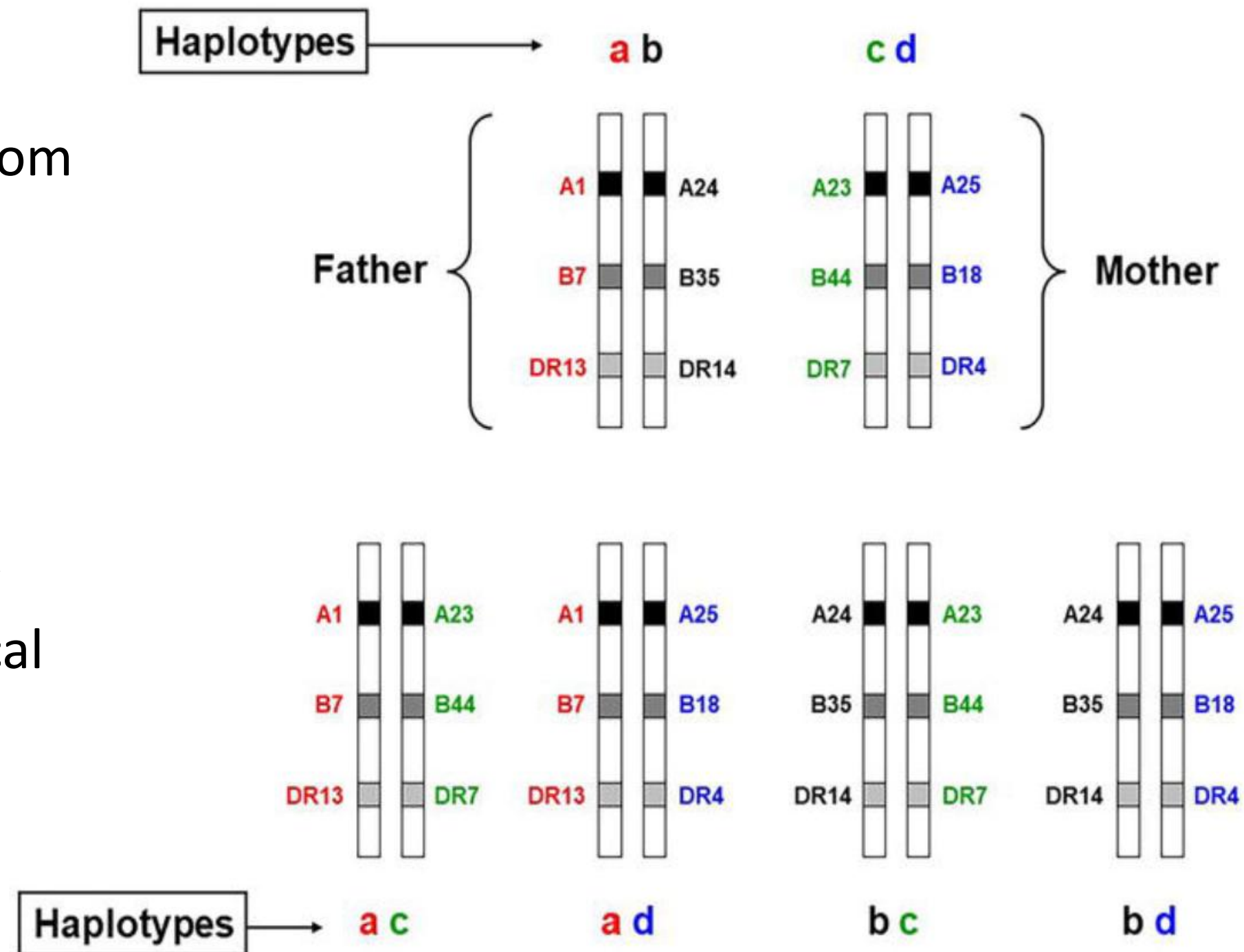
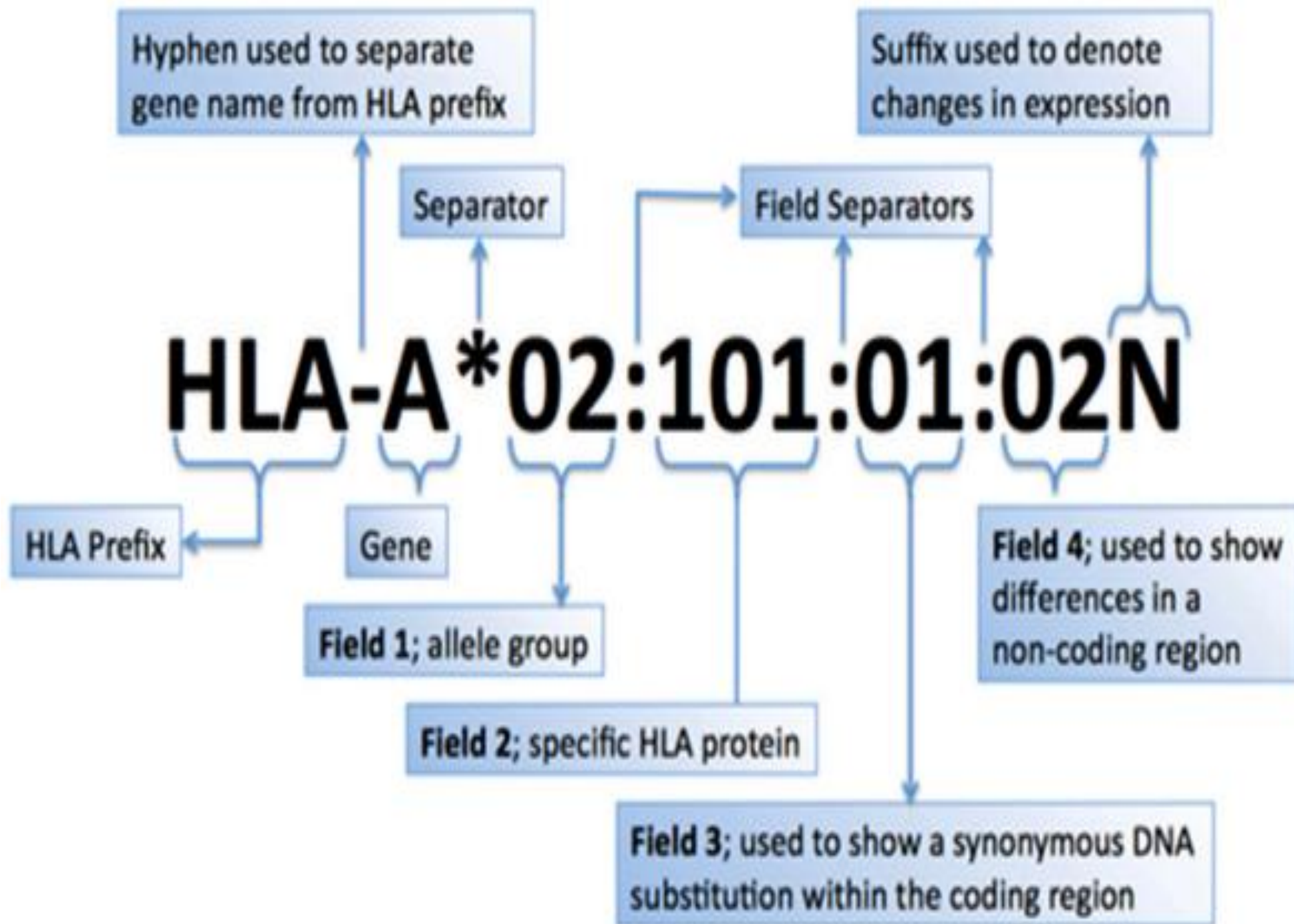


Figure 2.

Inheritance of HLA haplotypes. HLA genes are inherited en block from each parent according to Mendelian laws.

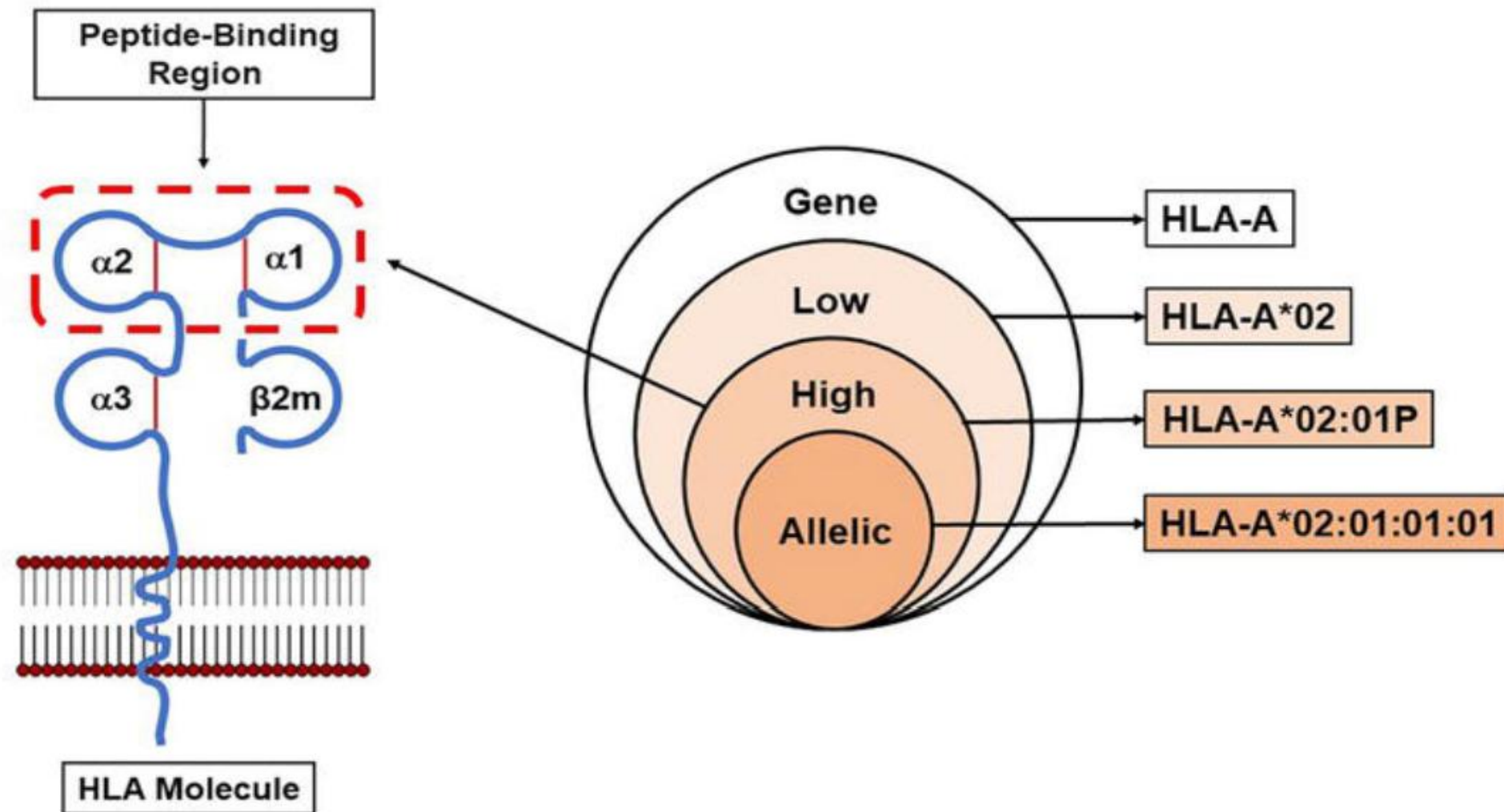
How do you read the HLA or its nomenclature !

HLA alleles are characterized by specific combinations of single nucleotide polymorphisms (SNPs) and insertions/deletions within single-phased sequences. A distinct nomenclature system is employed to meticulously define these alleles, a comprehensive database of which can be accessed at IPD-IMGT/HLA database (<https://www.ebi.ac.uk/ipd/imgt/hla/align.html>) and HLA Nomenclature (<http://hla.alleles.org/nomenclature/index.html>)



Component	Example: HLA-A*02:01:01:02	Meaning
HLA-	HLA-	The prefix indicating the Human Leukocyte Antigen system.
Locus	A	The specific gene (e.g., A, B, C for Class I; DRB1, DQB1, DPB1 for Class II)
Field 1	02	<ul style="list-style-type: none"> Gene names: HLA-A or HLA-DRB1 Antigen names: A2 or DR1 Allele names: A*020101 or DRB1*01010101
Field 2	:01	Identifies alleles that result in a different amino acid sequence in the peptide-binding domain (the most important part for function). This is the standard for high-resolution matching.
Field 3	:01	Synonymous DNA Change: Identifies an allele that differs only by a synonymous (silent) nucleotide change within the coding sequence, meaning the protein sequence is the same.
Field 4	:02	Non-Coding Region Change: Identifies an allele that differs only by a change in the introns or untranslated regions (non-coding DNA) which might affect gene regulation.

What are the different methods of HLA resolution ?



Level of resolution		
Low level of resolution	A*02	Antigen matched
Medium level (string)	A*0201/0205/0209/0240	Type is ONE OF these four: Antigen matched BUT do not know if allele matched
High level	A*020101	Allele matched

Figure 5. HLA typing resolution. The Venn diagram illustrates increasing levels of HLA typing resolution. The figure on the left shows the “peptide-binding region” of an HLA class I molecule. High-resolution HLA typing defines the specific DNA sequence of the ‘peptide-binding region’. Allelic resolution defines a single allele as defined by a unique DNA sequence for the HLA gene. Adapted from Nunes et al. [40, 41].

Nunes E, Heslop H, et al. Definitions of histocompatibility typing terms. Blood. 2011

Nunes E, Heslop H, et al. Definitions of histocompatibility typing terms: Harmonization of Histocompatibility Typing Terms Working Group. Human Immunology. 2011

N. P. Mayor et al. HLA typing: A review of methodologies and clinical impact on haematopoietic cell transplantation. Best Practice & Research Clinical Haematology 37 (2024)

Different methods of HLA typing ?

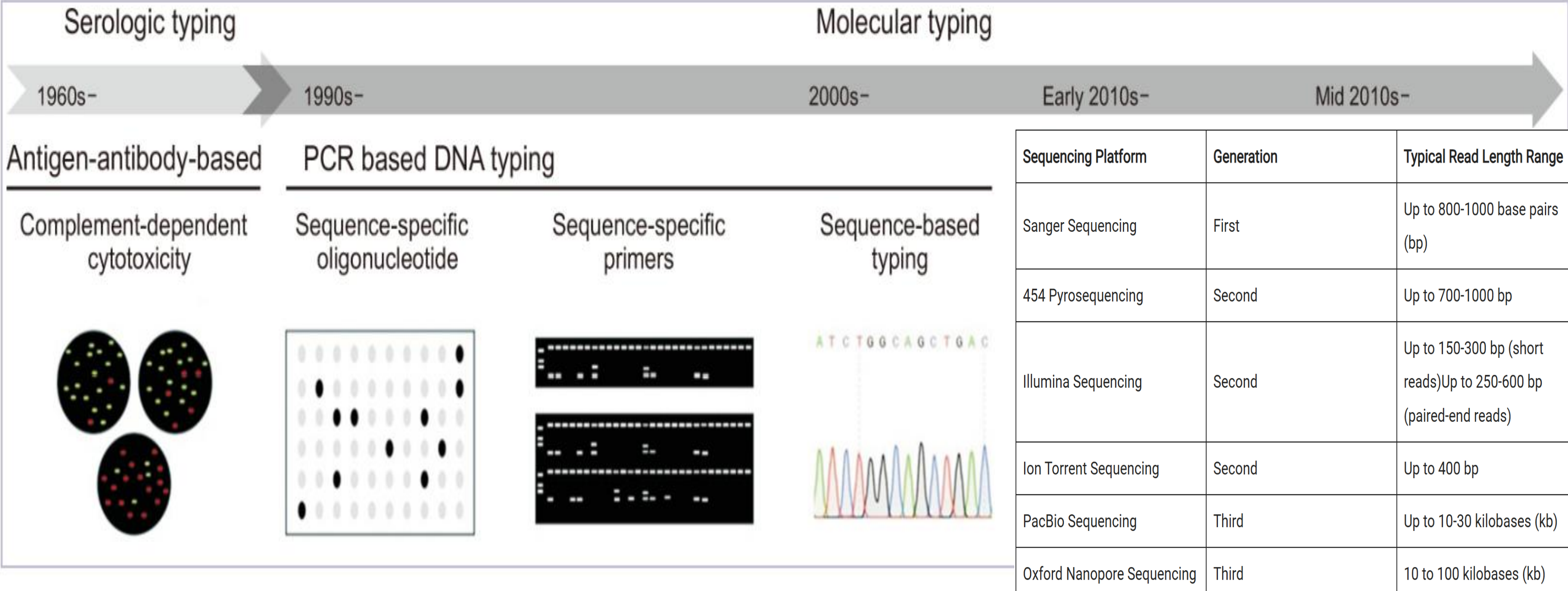


Fig 1. Timeline of technological advancements in human leukocyte antigen (HLA) typing methods. This timeline shows the introduction of developing HLA typing methods from serological assays from the 1960s to third-generation sequencing technology. PCR, polymerase chain reaction.

Clin Transplant Res 2024;38:294~308 <https://doi.org/10.4285/ctr.24.0055>

<https://geneticeducation.co.in/what-is-first-second-and-third-generation-sequencing/>

Table 1. Overview of different HLA typing techniques

Typing method	Basic mechanism	Advantages	Disadvantages
Serologic method	Detection of HLA molecules using antisera	<ul style="list-style-type: none"> • Rapid screening • Suitable for deceased donor typing 	<ul style="list-style-type: none"> • Low resolution • Limited availability of serological reagents • Typing limited to known alleles
SSO	Hybridization with short oligonucleotide DNA probes	Multiple sample typing	<ul style="list-style-type: none"> • Low to intermediate resolution • Typing limited to known alleles • Certain amount of ambiguities
SSP	Amplification of HLA alleles with sequence-specific primers	<ul style="list-style-type: none"> • Low cost • Applicable for deceased donor • Different resolutions can be obtained depending on the primers 	<ul style="list-style-type: none"> • Unsuitable for large numbers of samples • Low to intermediate resolution • Typing limited to known alleles • Certain amount of ambiguities
SBT	Direct DNA sequencing	<ul style="list-style-type: none"> • High resolution • Able to sequence novel alleles 	<ul style="list-style-type: none"> • Requires longer time • High cost • Unable to set phase between polymorphisms • Not suitable for deceased donor typing
NGS	Sequencing of small fragments of DNA in parallel	<ul style="list-style-type: none"> • High resolution • High throughput • Able to sequence novel alleles • Low ambiguity • Whole-gene coverage 	<ul style="list-style-type: none"> • Expensive sequencer • Requires suitable software for analysis • Not suitable for deceased donor typing
TGS	<ul style="list-style-type: none"> • Individual DNA molecule sequencing in real time (PacBio SMRT sequencing) • Single DNA molecule sequencing through a nanopore (Oxford Nanopore sequencing) 	<ul style="list-style-type: none"> • High resolution • Able to sequence novel alleles • Low ambiguity and phasing • Whole-gene coverage • Applicable for deceased donor typing (Oxford Nanopore sequencing) 	<ul style="list-style-type: none"> • Expensive equipment • Relatively high error rate • Require suitable bioinformatics tools

HLA, human leukocyte antigen; SSO, sequence-specific oligonucleotide; SSP, sequence-specific primers; SBT, sequence-based typing; NGS, next-generation sequencing; TGS, third-generation sequencing, SMRT, Single-Molecule Sequencing in Real Time.

Choi H et al. A walk through the development of human leukocyte antigen typing from serologic techniques to next-generation sequencing. Clin Transplant Res 2024.

TABLE 3 Suggested reporting comments for indicating level of HLA typing used to assess matching between patient and donor

Comment on report	Interpretation
10/10 HR match	The patient and donor have been typed to high resolution, i.e. the polymorphisms within the ARD have been defined
10/10 UHR match	The patient and donor have been typed to ultra high resolution, i.e. polymorphisms within and outside the ARD have been defined
10/10 allele match	The patient and donor have been typed to allele resolution, i.e. the polymorphisms within the full HLA gene sequence, that is exons and introns and untranslated regions have been defined
10/10 HR match and 9/10 UHR match (B mismatch)	The patient and donor have no mismatches at high resolution HLA typing for HLA-A, HLA-B, HLA-C, HLA-DRB1 and HLA-DQB1. A mismatch outside the ARD has been identified for HLA-B by UHR typing

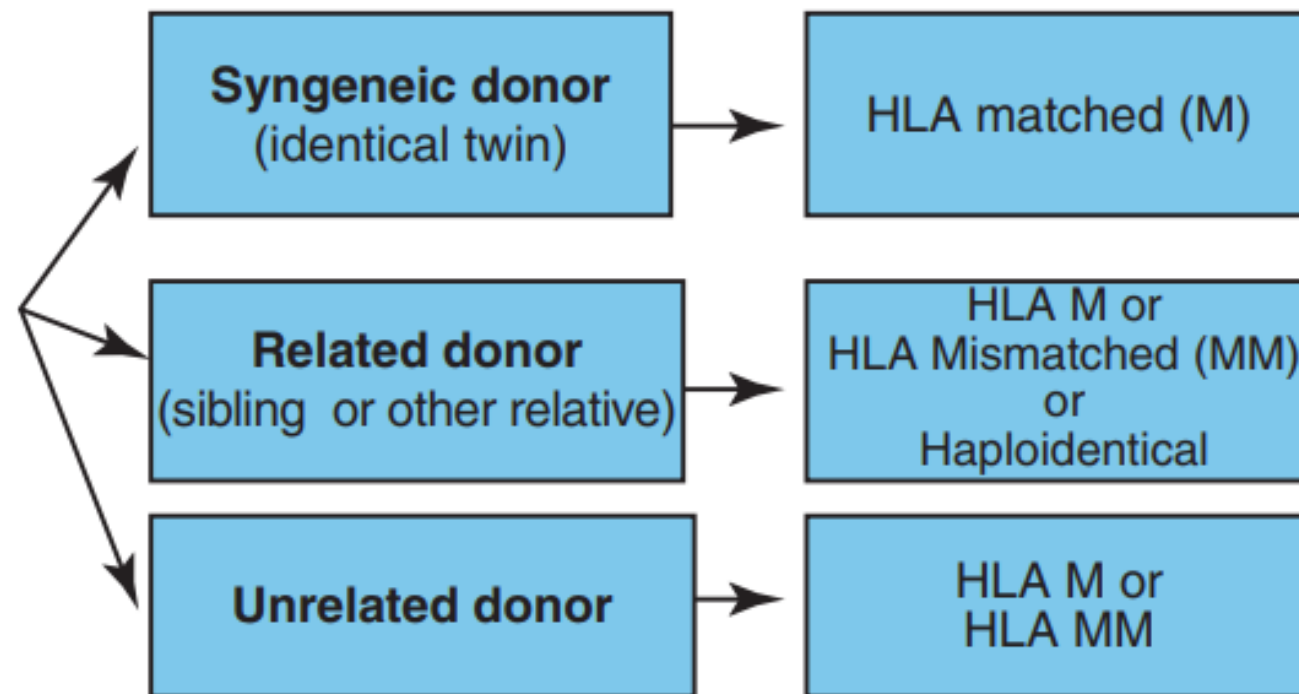
Types of Allogeneic Transplant

Types of donors

● Autologous



● Allogeneic

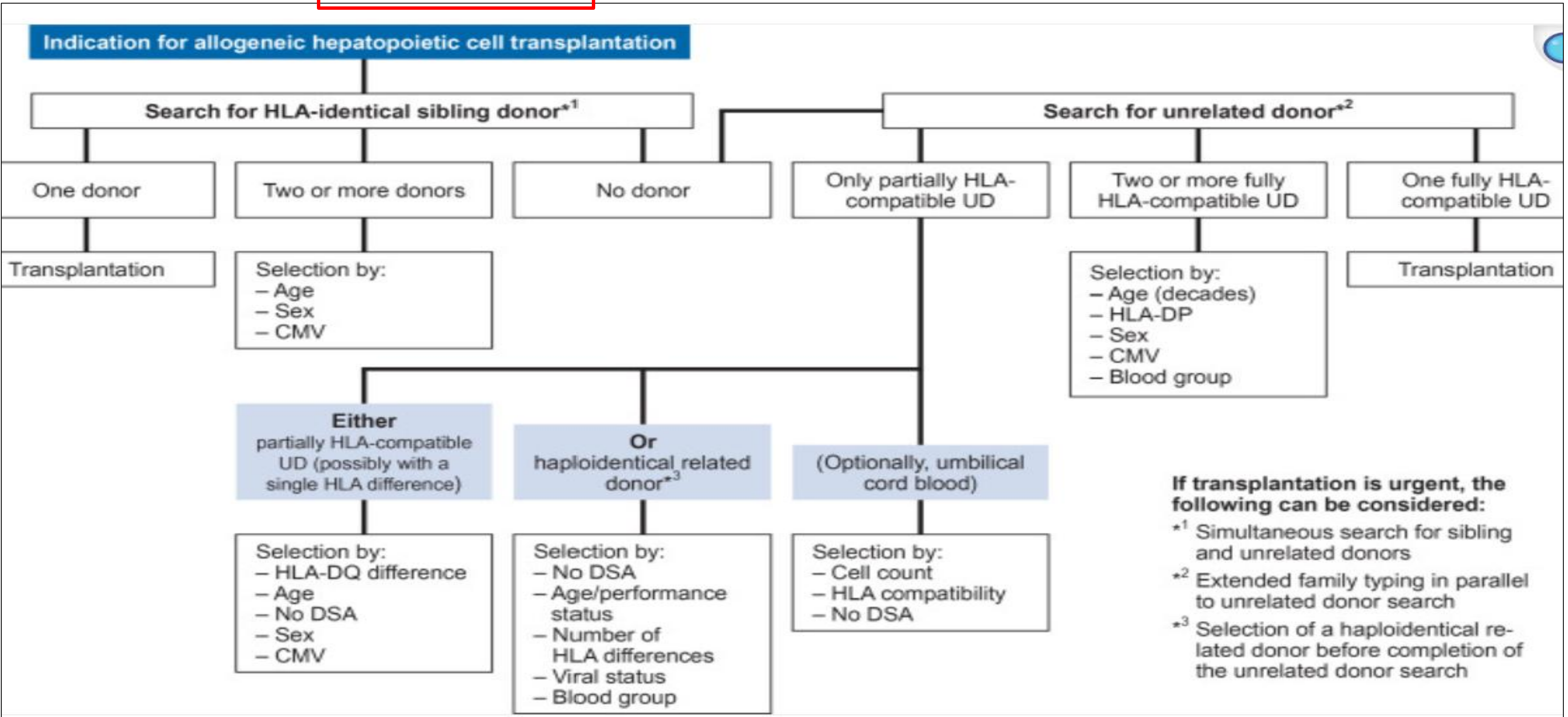


1. Matched sibling allogeneic transplant (MSD) – 6/6 or 10/10 or 12/12
2. Matched unrelated allogeneic transplant (MUD) 10/10 or 12/12
3. Single mismatched donor allogeneic transplant – 9/10 or 11/12
4. Haploidentical stem cell transplant (Haplo) – 6/12 to 10/12

How do you choose the right donor ? There are established guidelines – NMDP, CIBMTR !!

Flow chart for stem cell donor selection.

Remember, there is nothing called as the “Perfect Donor”



Prioritizing Available Donor Types		
Recommendation	Evidence Level	References
A suitable MSD is generally the first choice.	++	Nath et al 2025 ³³ Sanz et al 2024 ⁹³ Piemontese et al 2024 ⁹⁹
MUD are generally the second choice.	+++	Dehn et al 2024 ¹ Nath et al 2025 ³³

“The Perfect donor may not exist, but these guidelines are closest to being perfect as per available evidence”

- We still get GVHD !
- We still get graft failure !

Haplo and MMUD have similar outcomes using PTCy and these sources should be considered upfront in a patient with a very unlikely search prognosis score. Factors to consider in selection between these donor sources include prioritizing younger donor, avoiding DSA, logistic concerns, and available clinical trials	++	
Donors with a high titer DSA target should not be used.*	++	

Secondary Characteristic Considerations:		
Recommendation	Evidence Level	References
Donor age: <ul style="list-style-type: none"> • Donors ≤ 30 years old should be prioritized to maximize OS. 	+++	Dehn et al. [1] Ciurea et al. [39] Kollman et al. [61] Spellman et al. [68] Mehta et al. [69] Anthias et al. [88] Sanz et al. [94] Murthy et al. [98]
Donor CMV, ABO, and sex: <ul style="list-style-type: none"> • Donor/recipient ABO matching may reduce post HCT transfusion burden. • Major ABO mismatches should be avoided in haplo and when using BM grafts. • Donor CMV serostatus may be considered in specific clinical cases (e.g., SCID) 	++	
Donor weight: <ul style="list-style-type: none"> • A large patient-donor weight discrepancy should be avoided in the setting of BM HCT. 	+	
	+	
	+++	

HLA Matching Considerations		
Recommendation	Evidence Level	References
In the CNI setting: <ul style="list-style-type: none"> • Avoid HLA-DPB1 non-permissive mismatches in MUD. 	++	

In the PTCy setting: <ul style="list-style-type: none"> • HLA-DRB1 mismatched haplos may be protective against relapse. • HLA-DPB1 TCE non-permissive mismatching may be associated with better survival in haplo. • MUD and MMUD 7/8 outcomes are similar. • There is insufficient evidence to recommend prioritization of specific HLA mismatches when selecting between MMUDs. • Highly MMUDs (4–6/8 matched) can be considered. 	+	
	+	
	+	
	++	
	++	

		Shaffer et al 2024 ⁴¹
		Shaw et al 2023 ⁴³
		Fuchs et al 2022 ⁵²
		Sanz et al 2024 ⁹⁴
		Arrieta-Bolanos et al ⁹⁵

Jimnex et al. Allogeneic Hematopoietic Cell Donor Selection: Contemporary Guidelines from the NMDP/CIBMTR. Transplantation and Cellular Therapy July 2025

Guidelines for Unrelated Donor selection for MUD HSCTs

Guidelines for unrelated donor selection

	Multiple HLA-A, HLA-B, HLA-C, and HLA-DRB1 (8/8) HLA matched unrelated donors available	8/8 match unavailable; multiple 7/8 unrelated donors available
1. Resolution of typing HLA-A, HLA-B, HLA-C, and HLA-DRB1	High-resolution, matches for ARDs	High-resolution matches for ARDs for 7 matched alleles; Select HLA-C*03:03 vs C*03:04 mismatch, if present; No other preference for mismatched loci (HLA-A/B/C/DRB1) or other allele combinations
2. Donor age	Select donors of younger age	Select donors of younger age
3. Permissive mismatching HLA-DPB1	Select matched/permissive DPB1 mismatch based on the algorithm developed by Crivello et al ^{68,70} (http://www.ebi.ac.uk/cgi-bin/ipd/imgt/hla/dpb_v2.cgi)	Select matched/permissive DPB1 mismatch based on the algorithm developed by Crivello et al ^{68,70} (http://www.ebi.ac.uk/cgi-bin/ipd/imgt/hla/dpb_v2.cgi)
4. Matching HLA-DRB3/4/5 and HLA-DQB1	Minimize mismatches	Minimize mismatches
5. Vector of mismatch	N/A	Select donor with single allele mismatched at patient's homozygous locus (HLA-A/B/C/DRB1), if applicable
6. DSA in patient	Avoid mismatches of allotypes targeted by DSAs, including DQA1 and DPA1	Avoid mismatches of allotypes targeted by DSAs, including DQA1 and DPA1
7. Transplant center practice may differ in additional considerations to use in the selection among multiple donors equivalent for the characteristics above		

Functional distance between recipient and donor HLA-DPB1 determines nonpermissive mismatches in unrelated HCT

Pietro Crivello, Andreas Heinold, Vera Rebmann, Hellmut D. Ottinger, Peter A. Horn, Dietrich W. Beelen, Katharina Fleischhauer

Blood (2016)

- Permissive and non-permissive HLA-DPB1 mismatches are classifications used in hematopoietic stem cell transplantation (HSCT) to predict the risk of complications.
- The **Crivello algorithm** refines the definition of permissible and non-permissible mismatches for the HLA-DPB1 protein by calculating a "functional distance" between different DPB1 alleles, based on amino acid variations in key polymorphic regions. This classification is based on a T-cell epitope (TCE) algorithm that groups different HLA-DPB1 alleles based on their T-cell.
- This approach aims to balance the risks of graft-versus-host disease (GvHD) and the beneficial graft-versus-leukemia.
- **Problem:** Most unrelated donors won't match at DP.
- **Solution:** Permissive mismatches: Low immunogenicity (less likely to trigger GVHD).
 - Non-permissive mismatches: High T-cell reactivity → higher risk of GVHD, Higher TRM and Inferior OS (Pidala et al 2014 CIBMTR Study).
- **Utility:** Helps stratify risk when a perfect DP match isn't feasible.
 - HLA-A, -B, -C, and DRB1 remain most critical.

Pidala et al. Nonpermissive HLA- DPB1 mismatch increases mortality after myeloablative unrelated allogeneic hematopoietic cell transplantation. *Blood*, 2014

Little Ann-Margaret et al. BSHI guideline: HLA matching and donor selection for haematopoietic progenitor cell transplantation. *Int J Immunogenet.* 2021

Which is the single HLA mismatch which shows the worst outcomes in HSCT ?

Ann-Margaret Little et al. BSHI guideline 2020

- There is no consensus regarding which of the HLA-A, B, C, DRB1 loci are more detrimental to mismatch.
- HLA-A and HLA-DRB1 mismatching were reported as being less well tolerated compared with HLA-B and HLA-C mismatches in a NMDP study with all mismatches reducing OS at 1 year by 9%–10% (Lee et al., 2007).
- In contrast, the Japanese registry reported transplants with HLA- A and HLA- B mismatches had worse survival than HLA-C and HLA-DRB1 mismatches (Morishima et al., 2002), with single DRB1- mismatched unrelated donors being preferentially selected if a matched unrelated donor is not available (Atsuta et al., 2019)
- HLA-B mismatches were associated with a higher risk of aGVHD II–IV in an Italian study of 805 patients transplanted for haematological malignancies (Crocchiolo, Ciceri, et al., 2009) whereas HLA-C antigen mismatches were associated with lower leukaemia-free survival (LFS) and increased risk for mortality and grade III-IV GvHD in an NMDP/Centre for International Blood and Marrow Transplant Research (CIBMTR) study of 1933 patients transplanted with haematological malignancies (Woolfrey et al., 2011)
- *More recent analysis of transplant data held by the ‘International Histocompatibility Working Group in HPCT’ has demonstrated individual locus- specific risks. In this analysis, HLA-A, HLA-B and HLA-C mismatches were more detrimental than HLA-DRB1 and HLA-DQB1 mismatches for all endpoints with exception of relapse. Mismatching at each locus (compared with HLA-DQB1) was detrimental and risk increased with higher mismatches (Petersdorf et al., 2020).*

Direction of HLA mismatch

Unidirectional – HVG or GVH or Bidirectional HLA

TABLE 4 Example of HVG and GVH directional mismatches

HLA	Patient	Potential Donor
A	*02:01	*02:01, *03:01
B	*07:02, *08:01	*07:02, *08:01
C	*05:01, *07:02	*05:01, *07:02
DRB1	*04:01, *15:01	*04:01, *15:01
DQB1	*03:01, *06:02	*03:01, *06:02
DPB1	*03:01, *04:01	*04:01

Note: The patient and donor differ with an HLA-A mismatch in the HVG direction and an HLA-DPB1 mismatch in the GVH direction.

Donor and patient HLA mismatches may be bidirectional, that is GVH and HVG or unidirectional.

The effect of direction of HLA mismatch has been investigated within a cohort of 2,687 unrelated donor transplants in patients with malignant disease. In multivariate analyses, patients receiving a 7/8 (HLA-A, B, C, DRB1) matching graft with unidirectional GVH mismatch and patients receiving a 7/8 bidirectional mismatch had significantly worse TRM; OS and DFS compared with patients receiving a 8/8 matched transplant.

This worse transplant outcome (compared with 8/8 transplants) was not shared with patients receiving a 7/8 matching graft with unidirectional HVG mismatch.

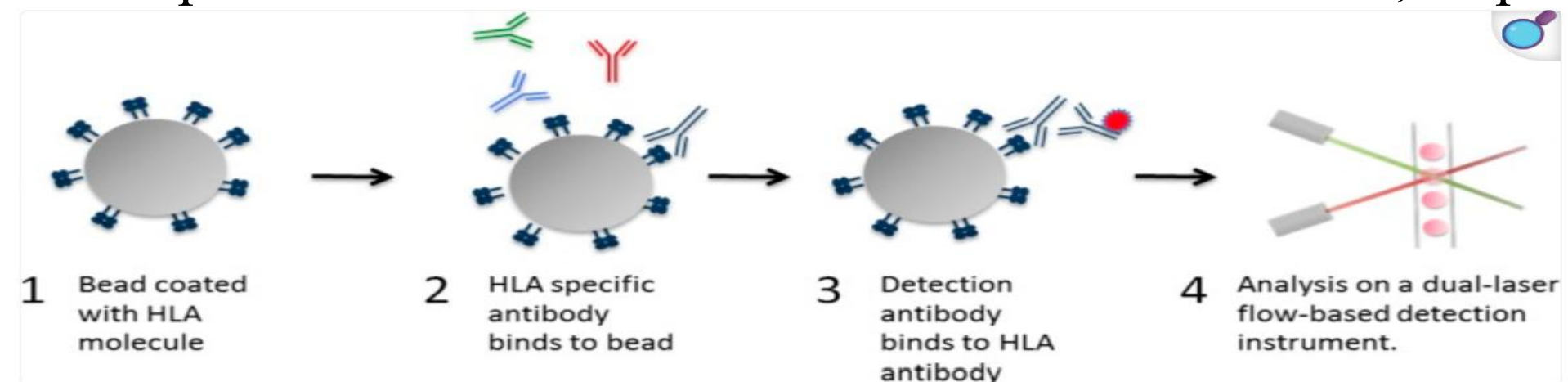
These findings support selection of a 7/8 HVG mismatch over a 7/8 bidirectional or 7/8 GVH mismatch unrelated donor for patients with malignant disease. This finding has not been reproduced in patients with nonmalignant disorders. For patients at risk of graft rejection, avoidance of HVG mismatches is desirable.

Hurley et al. The impact of HLA unidirectional mismatches on the outcome of myeloablative hematopoietic stem cell transplantation with unrelated donors. **Blood** 2013

Little Ann-Margaret et al. BSHI guideline: HLA matching and donor selection for haematopoietic progenitor cell transplantation. *Int J Immunogenet.* 2021

Lastly, HLA Antibodies called the Donor Specific Antibodies

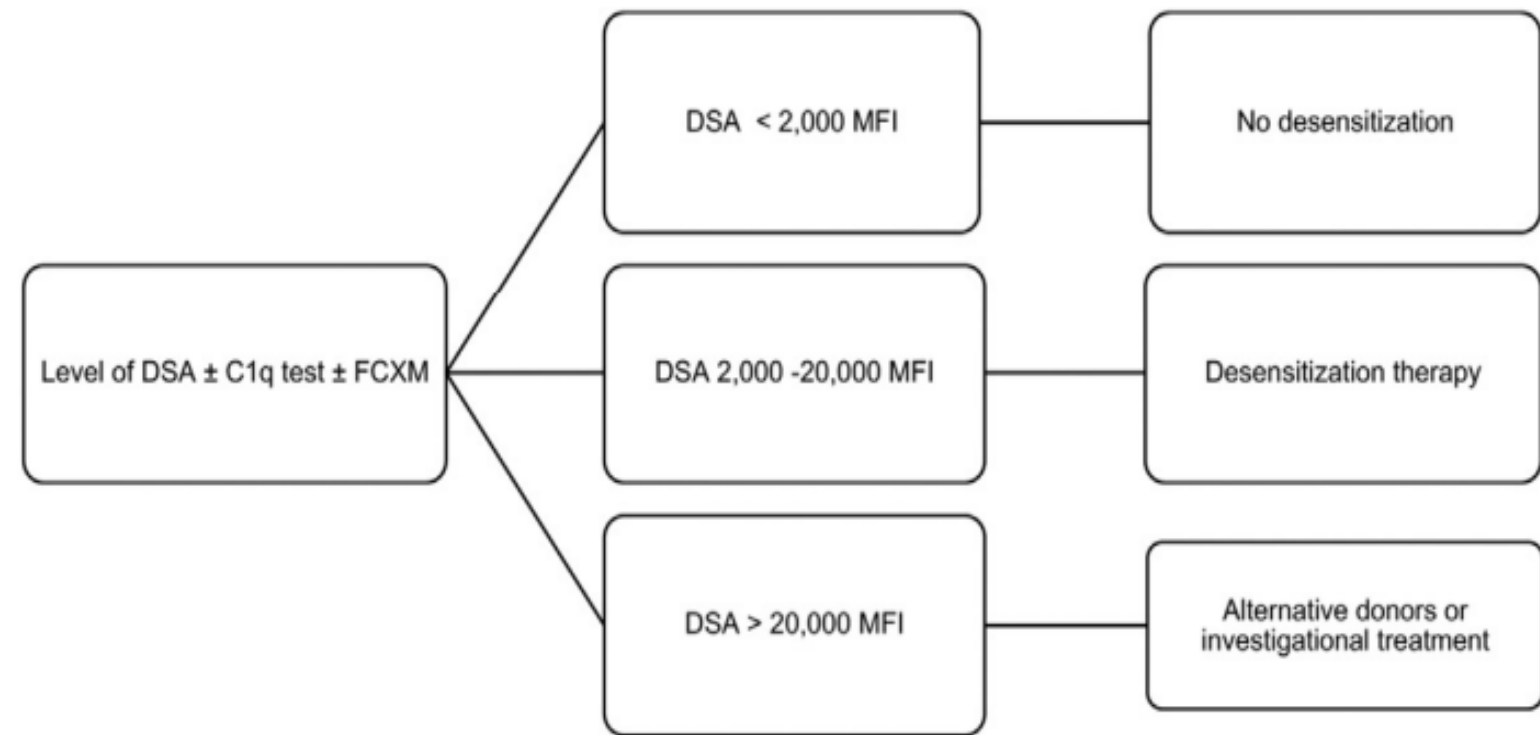
- HLA DSAs are preformed antibodies in recipient directed against donor's class I and/or class II HLA antigens. Partially HLA-mismatched donors allows for the possibility of DSAs, which can predispose to graft failures and Inferior OS/EFS.
- Examples include exposure to non-self HLA antigens, through transfusion of blood products or intrauterine can trigger development of anti-HLA antibodies. Thus, HLA antibody evaluation requires reassessment over time.
- Using mean fluorescence intensity (MFI) of 500, reported incidence of anti-HLA antibodies and DSA ranged from 20-25% and 11-18%, respectively. Other studies reported an incidence between 20-70% and 10-30%, respectively, when using MFI of >1,000.



Luminex HLA antibody assay principle. The principle of the Luminex-based HLA antibody assay is depicted. (1) Bead coated with HLA molecules. Up to 100 different sets of color-coded beads, each bearing 1 or several HLA types can be tested simultaneously. Each bead set is internally dyed with differing ratios of 2 fluorochromes resulting in a unique signal. (2) After incubation with the test serum, the HLA antibody, if present, binds to the appropriate HLA molecule. Non-HLA antibodies are discarded after washing. (3) The bound HLA antibody is detected by a phycoerythrin-conjugated secondary antibody specific for human IgG. (4) The beads are analyzed on a dual-laser flow-based detection instrument. The red laser classifies the bead and determines the HLA molecule that is being detected. The green laser determines the magnitude of the phycoerythrin-derived signal, which is proportional to the amount of HLA antibody bound.

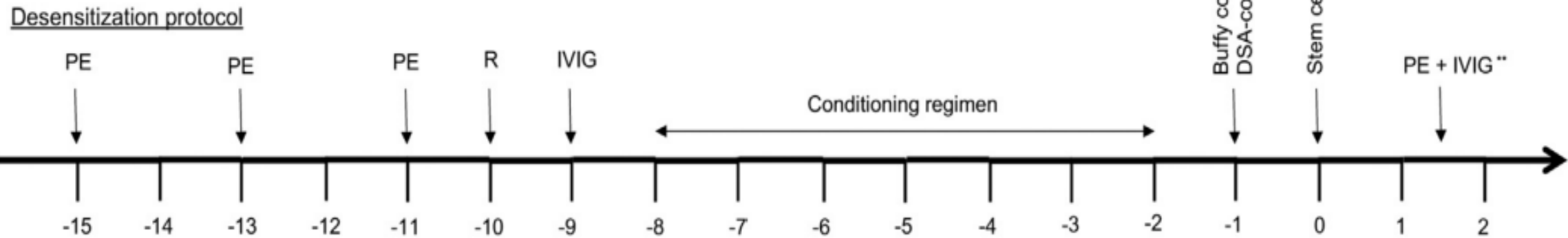
Gladstone DE, Bettinotti MP. HLA donor-specific antibodies in allogeneic hematopoietic stem cell transplantation: challenges and opportunities. ASH. 2017 Dec

P. Kongtim et al. ASTCT Consensus Recommendations on Testing and Treatment of Patients with Donor-specific Anti-HLA Antibodies. Transplantation and Cellular Therapy 30 (2024)



<2000 MFI has minimal impact on graft outcome, but ATSCCT Guidelines recommend repeated DSA testing within 2 weeks of starting conditioning regimen in transplant recipients with previous history of low level DSA (1,000 MFI for CBT and >2,000 MFI for haploidentical and unrelated HSCT might serve as a threshold to initiate desensitization

> 2000 MFI has a poor graft function, graft failure, and worse survival



Monitoring DSA weekly after initiation therapy & D-1 until engraftment
 PE: Plasma exchange 1-1.5 total plasma volume
 R: Rituximab 375 mg/m²
 IVIG dose 1 g/kg
 * For DSA class I only
 ** Consider in case of trending up of DSA after starting desensitization

Take Home Messages -

We need our own guidelines to have more clarity and currently, as current practice varies based upon institution.

Figure 1. Multimodality pre-transplant DSA desensitization protocol.

The European Society for Blood and Marrow Transplantation (EBMT) consensus recommendations for donor selection in haploidentical hematopoietic cell transplantation

Stefan O. Ciurea¹ et al.

Received: 3 December 2018 / Revised: 25 January 2019 / Accepted: 20 February 2019

T cell depleted haploidentical transplants

- No DSAs (MFI < 1000)
- NK cell alloreactive donor
- Younger donor over older donor
- Male donor for a male recipient
- First degree relative over second degree HLA half-matched donor
- Between parent donors, mother is preferred over father
- ABO matched donor
- CMV seropositive donor for CMV seropositive recipients

T cell replete haploidentical transplants

- No DSAs (MFI < 1000)
- Younger donor over older donor
- Male donor for a male recipient
- Sibling or offspring donor over parent donor
- Between parent donors, father is preferred over mother donor
- ABO matched is preferred to minor ABO mismatch to major ABO mismatched donor
- Donor with KIR ligand match for a recipient of HHCT^a
- First degree relative over second degree HLA half-matched donor^a
- Donor with NIMA mismatch over NIPA mismatch for a recipient of HHCT^a

DSA donor-specific anti-HLA antibodies, *NK* natural killer cells, *HHCT* haploidentical hematopoietic cell transplantation, *NIMA* non-inherited maternal antigens, *ABO* blood group

^aConclusive data available for the TCR Haploidentical transplants with GCSF-primed bone marrow and enhanced GVHD prophylaxis (Beijing protocol)

Table 1 Summary of characteristics considered in selecting donors for haploidentical hematopoietic cell transplantation

Yeh NIMA/NIPA kya hai !!

Figure 1

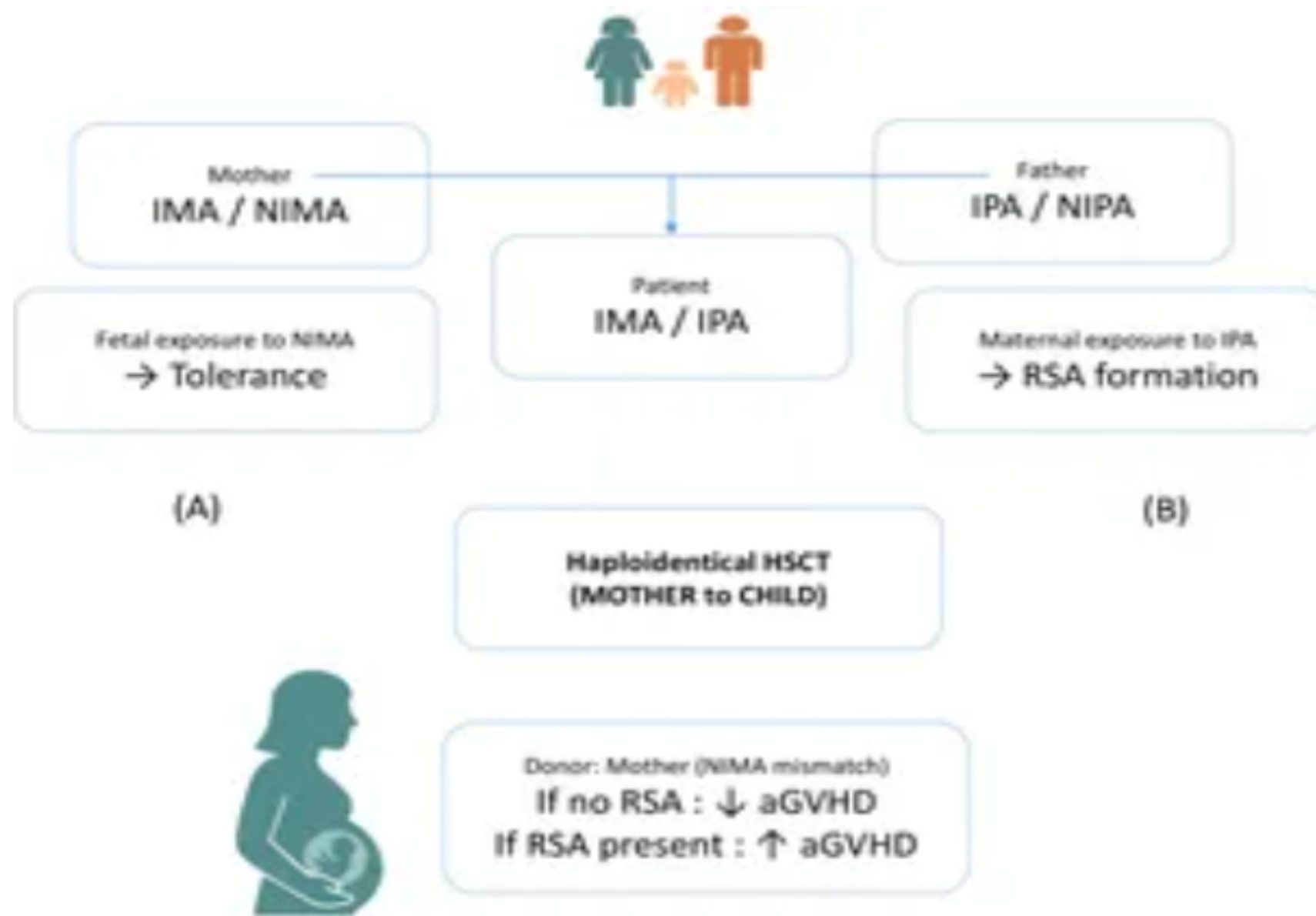


Figure 1. Schematic representation of dual immunological mechanisms occurring during pregnancy. (A) The fetus is exposed to non-inherited maternal antigens (NIMA), which may induce immune tolerance. (B) Conversely, the mother develops B e T cell immunity becoming sensitized to inherited paternal antigens (IPA) expressed by the fetus, this potentially leads to the formation of recipient-specific antibodies (RSAs).

One possibility is that **RSAs contribute to the creation of a pro-inflammatory environment in the period immediately following transplantation, amplifying tissue damage triggered by conditioning regimens or subclinical allogeneic reactivity.**

In particular, **RSAs capable of binding complement may have greater pathogenic potential, suggesting the use of functional assays, such as the C1q binding test, to identify clinically relevant cases.** RSAs could thus act more as immunological “modulators” rather than direct barriers to engraftment, influencing the threshold for the development of GVHD, endothelial dysfunction, or chronic graft failure.

Several studies have demonstrated that NIMA-mismatched haplo-HSCT is associated with a significantly lower incidence of acute graft-versus-host disease (aGVHD) compared to NIPA-mismatched transplants.

The EBMT consensus recommendations (Ciurea et al., 2020) concluded that NIMA-mismatched siblings may be preferred over NIPA-mismatched ones in T-cell replete haploidentical donor transplants with ATG but that it remains unclear whether this immunologic tolerance is associated with better outcomes in either T-cell replete haploidentical donor transplants with PTCy or T-cell deplete haploidentical donor transplant.

Pasi A. et al Recipient-specific antibodies in HSCT: current knowledge and future perspectives. Front. Immunol., 03 July 2025

Little Ann-Margaret et al. BSHI guideline: HLA matching and donor selection for haematopoietic progenitor cell transplantation. Int J Immunogenet. 2021

Q and A – You ask, I answer, then I ask, you answer !!

Question 1

Father		Mother	
A*02:01	A*02:01	A*01:01	A*11:01
C*05:01	C*05:01	C*07:01	C*03:03
B*44:02	B*44:02	B*08:01	B*55:01
DRB1*04:01	DRB1*04:04	DRB1*03:01	DRB1*14:54
DQB1*03:01	DQB1*03:02	DQB1*02:01	DQB1*05:03
a	b	c	d

A*01:01	A*02:01	A*01:01	A*02:01	A*01:01	A*02:01
C*07:01	C*05:01	C*07:01	C*05:01	C*07:01	C*05:01
B*08:01	B*44:02	B*08:01	B*44:02	B*08:01	B*44:02
DRB1*03:01	DRB1*04:01	DRB1*03:01	DRB1*04:04	DRB1*03:01	DRB1*04:01
DQB1*02:01	DQB1*03:01	DQB1*02:01	DQB1*03:02	DQB1*02:01	DQB1*03:01
c	a	c	b	c	a

Patient

Sibling 1 = 24 years , Elder brother Male,
8/10 match

Sibling 2 = 32 years, Elder sister,
multiparous, 10/10 match

Patient has a high risk acute myeloid
leukemia and post induction in CR and needs
to undergo an allogeneic transplant

Please help us to choose the right donor !

Question 2

TYPING RESULT					
LOCUS	HLA-A*	HLA-B*	HLA-C*	HLA-DRB1*	HLA-DQB1*
██████████ (Patient)					
HLA-CLASS I & II	A*24:02:01G	B*38:02:01:01	C*03:02:01G	DRB1*03:01:01G	DQB1*02:01:01G
	A*33:03:01G	B*58:01:01G	C*07:02:01G	DRB1*15:04	DQB1*05:02:01G
██████████ (Donor)					
HLA-CLASS I & II	A*33:03:01G	B*15:08:01	C*01:02:01G	DRB1*03:01:01G	DQB1*02:01:01G
	A*68:01:02:02	B*58:01:01G	C*03:02:01G	DRB1*12:02:01G	DQB1*03:01:01G

Mention type of match ?
Explain the direction of HLA !

Question 3

Describe the two HLAs on the degree of resolution given - Ex --- Allele match, antigen match or both allele and antigen match

- Patient:

- A*0201, B*1801, DRB1*0401

- Donor:

- **A2, B18, DRB1 04**: Antigenic match for A, B, DRB1
 - No data can be entered for C, DQB1, DPB1
 - No data can be entered for allele level matching
 - **A*0201, B*1801, DRB1*0401**: Allelic and antigenic match for A, B, DRB1
 - No data can be entered for C, DQB1, DPB1
 - **A*0201/05, B*1801, DRB1*0401**: Allelic and antigenic match for B, DRB1
 - Antigenic match for HLA-A BUT cannot say that this is an allelic match

Three donors available

1. Available HLA - A2, B18, DRB1 04

2. Available HLA - A*0201, B*1801, DRB1*0401

3. Available HLA - A*0201/05, B*1801, DRB1*0401

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Thank You

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