

# Overcoming an Obstacle-Flow DSA XM for HIV+ Transplant Recipients

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## Introduction

Advancements in antiretroviral therapies have significantly improved the lifespan of patients with HIV. However, prolonged use of these therapies can lead to end-stage renal disease, creating a need for kidney transplantation. Pre-transplant compatibility testing in this population is often complex and may obscure accurate assessments of donor-recipient compatibility. By incorporating additional assays, we aim to enhance the accuracy of compatibility evaluations, ultimately facilitating successful transplant outcomes for HIV+ recipients.

## Methodology

- Cohort of 7 HIV+ waitlist candidates receiving a deceased donor kidney transplant
- LABScreen™ Single Antigen Bead and Lifecodes™ Single Antigen Bead assay testing was performed
- A prospective flow cytometric XM was performed
- Autologous flow cytometric XM was performed for each recipient
- Additional testing using FlowDSA-XM™ was performed

## Supporting Data

### Flow cytometry XM results

Also Crossmatch									
UNOS ID:	Relationship:	Donor Sample ID:	Donor Sample ID:	Donor Sample ID:	Donor Sample ID:	Donor Sample ID:	Donor Sample ID:	Donor Sample ID:	Donor Sample ID:
02040003	Deceased Donor	23-41400	T cells	154	Positive				
02040003		23-41400	B cells	136	Positive				
02040003		23-12253	T cells	348	Positive				
02040003		23-10053	B cells	507	Positive				
02070003		23-13631	T cells	680	Positive				
02070003		23-13631	B cells	1248	Positive				
02070003		23-13631 HI	T cells	83	Positive				
02070003		23-13631 HI	B cells	265	Positive				

Crossmatch Interpretation: No DSA present. Autologous XM is also positive. Reactivity likely due to HIV+ status and NOT a contraindication to transplant.

### HLA Antibody result

Test	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly
Test	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly	HLA-LABScreen SAB II Monthly
Result	MC	MC	MC	MC	MC	MC	MC	MC	MC
Comments	3 Weak Pos	3 Weak Pos	3 Weak Pos	3 Weak Pos	3 Weak Pos	3 Weak Pos	3 Weak Pos	3 Weak Pos	3 Weak Pos
HLA-Lifecodes SAB II Treated	MC	MC	MC	MC	MC	MC	MC	MC	MC
HLA-Lifecodes SAB II Treated	MC	MC	MC	MC	MC	MC	MC	MC	MC
HLA-Lifecodes SAB II Treated	MC	MC	MC	MC	MC	MC	MC	MC	MC

### FlowDSA-XM™ result

Flow DSA XM Calculations									
Sample ID	Sample Date	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII
23-41400	02/14/2023	277	386	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379
23-41400	02/14/2023	379	379	379	379	379	379	379	379

### Summary of results

Recipient	CPRA	Flow XM	Flow DSA XM	DSA
JM51	96	Tpos/Bpos	NEG	N
MG07	92	Tpos/Bpos	NEG	N
AM57	90	Tpos/Bpos	NEG	N
FT82	85	Tpos/Bpos	NEG	N
VE95	100	Tpos/Bpos	NEG	N
LR77	100	Tpos/Bpos	NEG	N
HS26	100	Tpos/Bpos	NEG	N

## Discussion

In this study, we examined the immunological compatibility of seven HIV+ kidney transplant recipients through standard flow crossmatches and LABScreen™ Single Antigen Bead assays. Initial findings revealed positive flow crossmatches without donor-specific antibodies (DSA), raising concerns about potential non-MHC binding related to the recipients' HIV+ status. Additionally, autologous XM was T and B positive for all recipients.

To further investigate this phenomenon, we employed the FlowDSA-XM™ assay developed by Thermo Fisher One Lambda. This advanced assay integrates traditional flow crossmatching with microbead technology, allowing for the differentiation of HLA donor specific antibody reactivity from non-MHC reactivity. It identifies HLA Class I or II DSA bound to HLA antigens on donor cells in their native state, and its design mitigates interference from monoclonal antibody treatments or autoantibodies.

Consistent with our hypothesis, FlowDSA-XM™ assay yielded negative results for all seven recipients. Notably, all patients underwent successful transplantation without experiencing acute antibody-mediated rejection or graft dysfunction. Although a typical decline in lymphocyte levels was observed, the HIV infections remained well controlled post-transplant. Outcomes for these HIV+ recipients were comparable to those of HIV-negative transplant patients.

## Conclusion

- The initial positive results from standard flow cytometric crossmatches, combined with the absence of identifiable HLA donor-specific antibodies, raised concerns about potential interference related to the patients' HIV+ status.
- However, the FlowDSA-XM™ assay effectively clarified this issue, yielding negative results across all cases. This allowed the medical team to proceed confidently with the transplants.
- Notably, all patients experienced successful transplantation without any episodes of rejection or graft dysfunction, underscoring the assay's utility in ensuring safe outcomes for HIV+ recipients.

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