Quantitative donor specific antibody titration enables patient specific risk assessment and longitudinal monitoring

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DSA Discover Kit Concept

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1. Background & Aim

- Single-point MFI readouts are not true quantitative potency measures.
- Signal saturation, background effects, and prozone can distort interpretation.
- Serial titration converts each donor HLA response into a dose–response profile.
- Key curve parameters enable patient-specific monitoring beyond positive/negative calls.
- Goal: create a standardized framework for DSA risk assessment and longitudinal tracking.

Moving beyond MFI

2. DSA Discover Kit / Required Reagents



Streptavidin microtiter plate



Biotinylated soluble donor HLA targets



Calibrated reference antibody



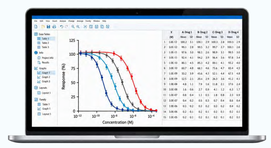
Patient serum serial dilution set



Anti-human IgG-HRP detector



OPD substrate / plate reader

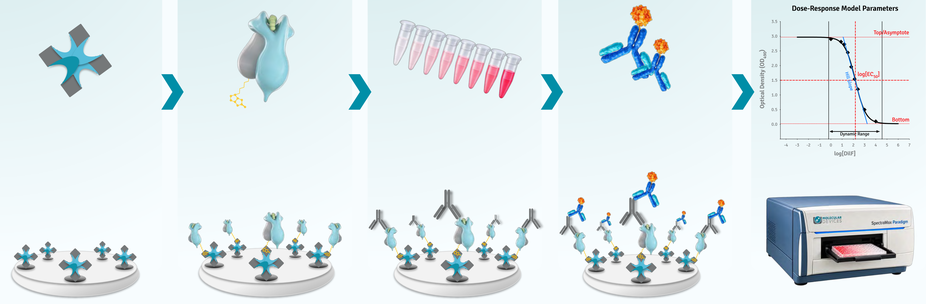


Analysis workbook + Prism curve fitting

Low HLA consumption • Standardized capture chemistry • Scalable assay format

3. Assay Workflow

1. **Capture Streptavidin on Plate**
2. **Load HLA^{bio} Donor Targets**
3. **Apply Serial Serum Titration**
4. **Detect bound IgG with HRP Conjugate**
5. **Read OD and fit Dose-Response Curves**

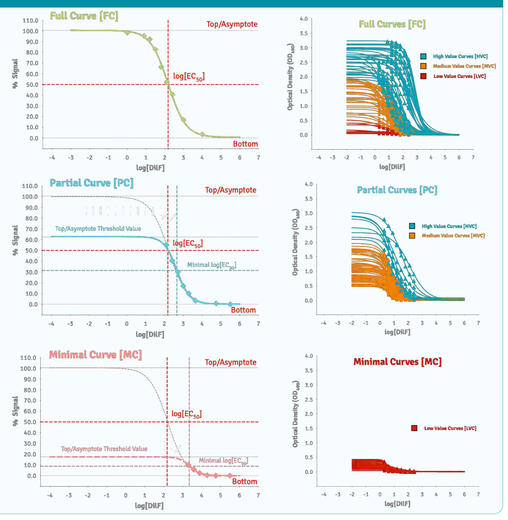


Standardized capture chemistry • Serial titration workflow • Quantitative dose-response readout

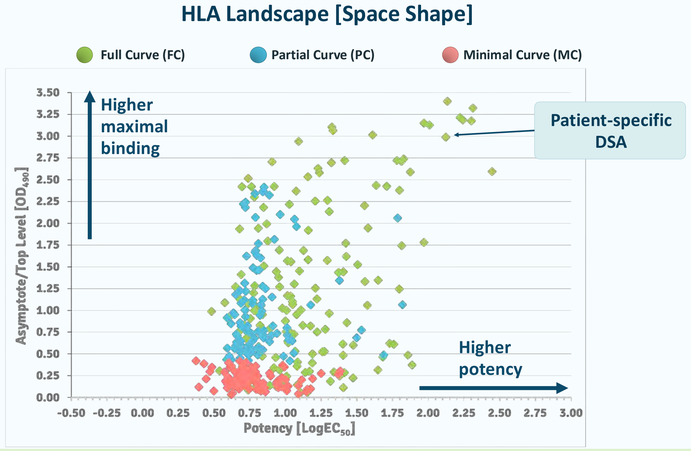
4. Curve Processing & Dose–Response Analytics

1. Signal-to-background calculation
2. Positive threshold: S/B > 1.25
3. Background subtraction
4. Outlier review
5. Saturation correction
6. 4-parameter logistic fit

Key outputs:
EC_{50}, Top/Asymptote, Curve Class

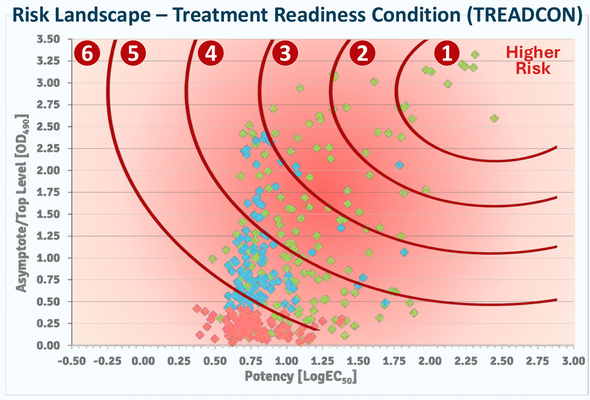


5. Landscape Format: Patient-Specific HLA Signatures



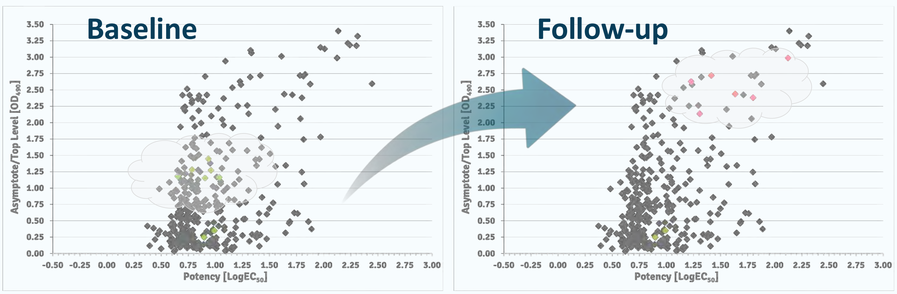
Two-dimensional landscapes capture both DSA strength and breadth across targets.

6. Risk Assessment Model



- Turns antibody data into an individualized risk state to reveal patient's actual alloimmune pressure
- Identifies meaningful change before risk becomes clinically obvious identifying immune activity escalation
- Links immune risk to treatment readiness providing clinicians a quantitative framework

7. Longitudinal Monitoring



Repeated testing under standardized conditions tracks directional changes not visible with single-point assays.

8. Why This Matters / Conclusions

- Quantitative titration resolves limitations of single-point serology.
- EC_{50} reflects apparent DSA potency.
- Asymptote captures maximal binding capacity independent of simple signal height.
- Landscape analytics translate complex reactivity into a unified patient profile.
- The DSA Discover kit concept enables scalable, data-driven DSA monitoring.

A standardized titration framework can support individualized transplant risk assessment without relying on MFI alone.