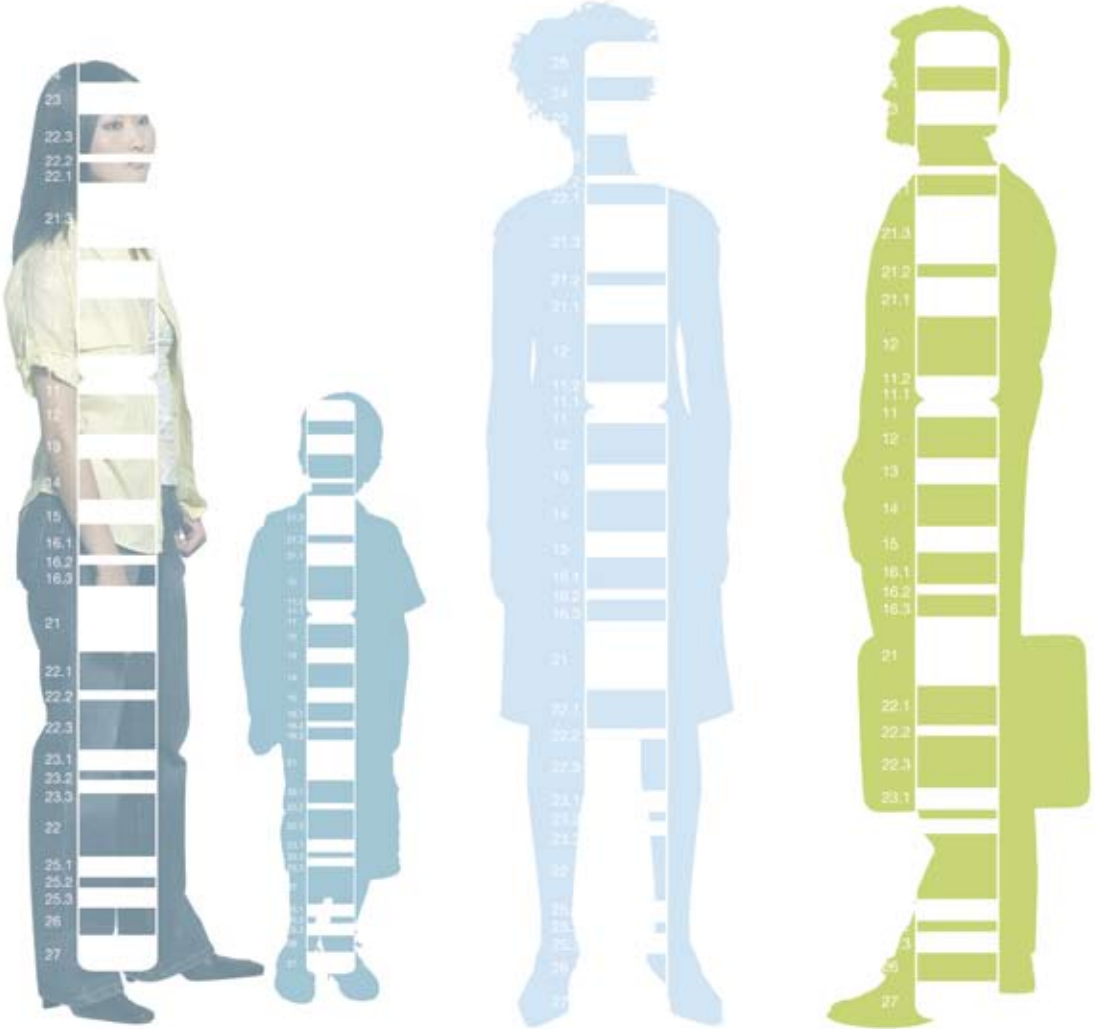




Dedicated to the difference

The DynaChip™ Antibody Analysis System





Transplant Diagnostics

The ultimate in multiplexing, automation, and throughput for spot-on class I and class II antibody identification

The DynaChip™ Antibody Analysis System

- A single assay analyzes PRA and class I and class II specificity, eliminating multiple tests
- Absolute automation frees up technician time and provides consistency
- Extensive antigen panel for class I and class II analysis

Invitrogen's DynaChip™ Antibody Analysis System provides fully integrated instrumentation, reagents, and software for automated analysis of HLA class I and class II antibodies. The protein chip format offers the familiarity of an ELISA method while allowing for increased multiplexing capabilities, improving the efficiency of your lab processes and antibody analysis results. Obtain more relevant data in less time.



Figure 1—The DynaChip™ Processor.

The DynaChip™ Processor

The DynaChip™ Processor (Figure 1) is designed for the automated processing of serum samples with the DynaChip™ Antibody Analysis products. This instrument covers all steps of assay processing from dispensing, incubation, and washing to image detection and results analysis. The instrument enables fully automated microarray processing in a convenient and accessible format.

- Saves time and resources
- Chips imaged without removing them from the instrument
- Full control and traceability of the entire process

The DynaChip™ protein array

The unique chip format (Figure 2) allows for increased multiplexing capabilities, and is created in three steps (Figure 3):



Figure 2—DynaChip™ protein array in a 96-well plate format.

Step 1

Purified proteins are deposited onto the surface of a specialized chip.



Step 2

Individual chips are affixed to the bottom of an 8-well strip.



Step 3

The 8-well strips are inserted into a 96-well holding frame resembling an ELISA plate.



Figure 3—DynaChip™ array design.

The DynaChip™ software



DynaChip™ antibody analysis software has been designed to aid interpretation.

- Clear presentation of results in either paper or electronic format
- Interactive display allows manual calling of results
- Database allows you to review past DynaChip™ or patient results
- Will automatically calculate PRA, Chi-square, and R values, providing rapid, efficient, automated analysis

Automated workflow

DynaChip™ technology offers an automated workflow compared to bead-based and ELISA methods (Table 1). Automated processing eliminates manual pipetting and incubation steps, allowing you to gain valuable lab time. After the initial setup of the processor, you're free to work on other projects.

Table 1—Comparison of workflows of the automated DynaChip™ system and manual antibody analysis methods.

		Multiplex class I and class II analysis		Single class I and class II analysis	
		DynaChip™ system	Luminex® platform	ELISA	
I	Prepare serum samples and assay reagents				
	II	<p style="text-align: center;">Automated processing</p> <p>Load and start DynaChip™ Processor</p> <ul style="list-style-type: none"> Block Wash Transfer sample Incubate chip Wash Detect Incubate Wash Add substrate Image 	<p style="text-align: center;">Manual processing</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Binding reaction Incubate 30 min Spin Wash 3x Add detection Ab Incubate 30 min Wash 3x (Transfer to plate) Add detection buffer Wash Load on reader</td> <td style="padding: 5px;">Prewet wells Binding reaction Incubate 30–40 min Wash 3x Add 2nd Ab Incubate 30–40 min Wash 3x Add substrate Incubate 30 min Add stop solution Take OD reading</td> </tr> </table> 		Binding reaction Incubate 30 min Spin Wash 3x Add detection Ab Incubate 30 min Wash 3x (Transfer to plate) Add detection buffer Wash Load on reader
Binding reaction Incubate 30 min Spin Wash 3x Add detection Ab Incubate 30 min Wash 3x (Transfer to plate) Add detection buffer Wash Load on reader	Prewet wells Binding reaction Incubate 30–40 min Wash 3x Add 2nd Ab Incubate 30–40 min Wash 3x Add substrate Incubate 30 min Add stop solution Take OD reading				
III	Data analysis				

Sample volume

The DynaChip™ system conserves precious serum samples (Table 2). When working with limited patient samples, it is important to conserve serum for future testing. The DynaChip™ system is designed to use as little as 8 µl of serum for the entire test, which includes class I and class II analysis.

Table 2—Comparison of recommended serum sample volumes for antibody analysis methods.

Assay	DynaChip™ system	ELISA	Luminex® assay	Flow cytometry
Class I and II screen	↓	24 µl	20–40 µl	20 µl
Class I ID/PRA		550 µl	12.5–20 µl	20 µl
Class II ID/PRA		425 µl	12.5–20 µl	20 µl
Serum sample total	8 µl	999 µl	45–80 µl	60 µl

Comparative data— DynaChip™ system compared to ELISA

DynaChip™ provides an automated alternative to ELISA for antibody analysis and provides comparable performance. In one study, 298 clinical samples were analyzed using the DynaChip™ method and a standard ELISA method. The results from comparing the two methods show a high level of concordance (Table 3).

Interlaboratory comparison of DynaChip™ assay performance

The performance of the DynaChip™ system was compared between two clinical laboratories using 94 identical serum samples. The results show that the DynaChip™ system provides similar performance results from lab to lab (Table 4).

Table 3—Comparison of the DynaChip™ system with ELISA. The DynaChip™ system and the standard qualitative ELISA method show comparable performance.

		DynaChip™ positive	DynaChip™ negative	Overall concordance*
Class I	ELISA positive	185	19	87.6%
	ELISA negative	18	76	
Class II	ELISA positive	151	27	87.6%
	ELISA negative	10	110	

* P value greater than 0.05 for the hypothesis that there is no difference between techniques.

Table 4—Antibody analysis with the DynaChip™ system provides robust, consistent, and reproducible results.

Antibody class	Overall concordance	P value
Class I	88.29%	0.3383
Class II	92.55%	0.8413

Antibody specificity comparison

Antibody specificity data using the DynaChip™ and Luminex® methods were compared for both sera and known cell types, with confirmation from flow cytometry crossmatch analysis. Three serum samples and six cell types were analyzed, for a total of 18 crossmatches (Tables 5 and 6).

Table 5—Comparison of antibody specificities detected by the DynaChip™ system and the Luminex® platform, with confirmation by flow cytometry crossmatch.

		DynaChip™ specificities		Luminex® specificities	
		Confirmed	Not confirmed	Confirmed	Not confirmed
Flow crossmatch	Positive	8	5	11	2
	Negative	5	0	2	3

Table 6—Comparative data from two samples showing the positive correlation of data from DynaChip™ analysis with flow cytometry crossmatch analysis.

Cells	DynaChip™ specificities	Luminex® specificities	Actual channel shift	Flow crossmatch results*
Cell I: A3, A24, B8 , B27, Cw2.7	B52, B35, B70 (71, 72), B17 (57)	B62, B63, B75, B53, B35, B71, B78, B72, B52, B51, B58, B8 , B7, B65, B42, B41, B18, B81, B55, B54, B82	50	Negative
Cell II: A31, A32, B62, B35 , Cw3	B12 (44, 45), B60, B61 (41, 49)	B44, B45, B60, B61, B40, B41, B49, B50, B13, B35, B62	30	Negative

* Positive cutoff equals 60-channel shift

Contact your Invitrogen Transplant Diagnostics representative to learn more about the DynaChip™ system.

DynaChip™ system components include the DynaChip™ Processor, the DynaChip™ Antibody Analysis Kit, DynaChip™ Processor pipetting tips, and DynaChip™ Processor sample plates.

www.invitrogen.com/transplantdiagnostics