Quantibody® Human Cell Adhesion Molecule Array 1

--- Quantitative measurement of 17 human cell adhesion molecules

Patent Pending Technology

User Manual (Version Feb 2013)

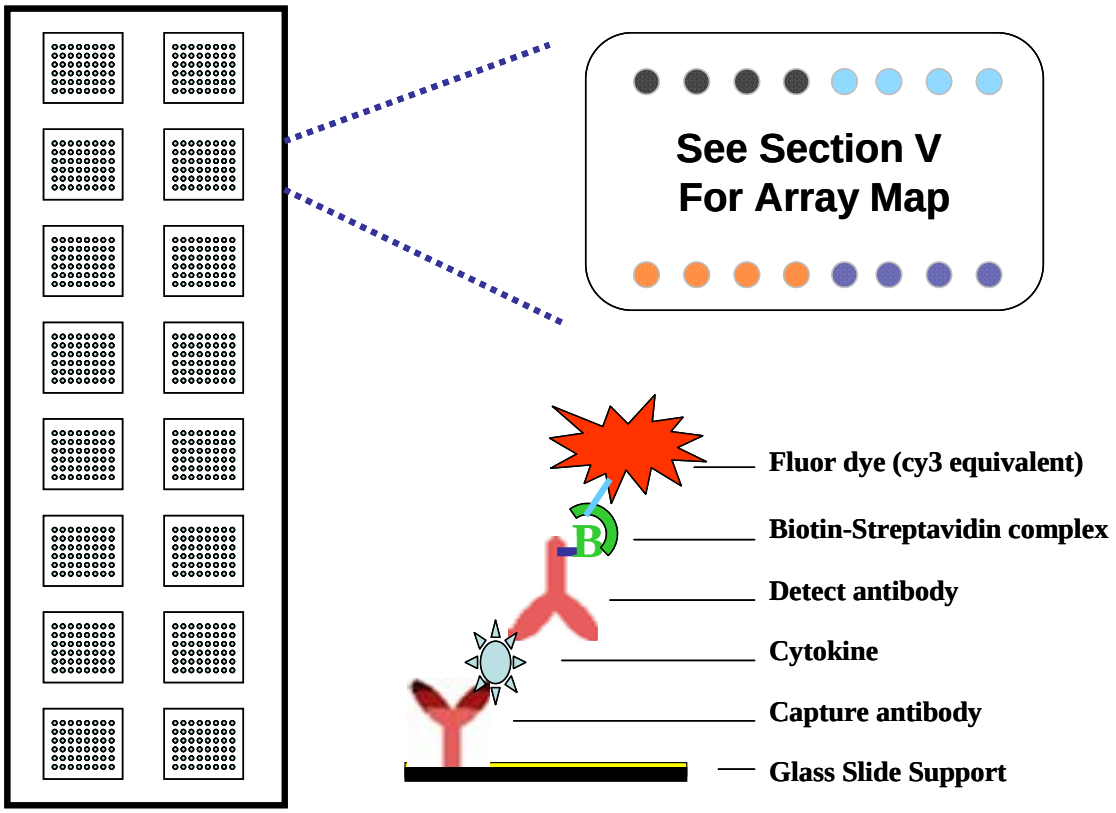
Cat # QAH-CAM-1

RayBiotech, Inc.

We Provide You With Excellent Protein Array Systems and Service

Tel:(Toll Free) 1-888-494-8555 or 770-729-2992; Fax: 1-888-547-0580;
Website:www.raybiotech.com Email: info@raybiotech.com

Cytokine Detected (17)	ALCAM, BCAM, CEACAM-1, E-Cadherin, EpCAM, E-Selectin, ICAM-1, ICAM-2, ICAM-3, L-Selectin, NCAM-1, NrCAM, P-Cadherin, P-Selectin, PECAM-1, VCAM-1, VE-Cadherin
Format	One standard glass slide is spotted with 16 wells of identical cytokine antibody arrays. Each antibody is arrayed in quadruplicate.
Detection Method	Fluorescence with laser scanner: Cy3 equivalent dye
Sample Volume	50 – 100 µl per array
Reproducibility	CV <20%
Assay duration	6 hrs



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I. Introduction

Cell Adhesion Molecules (CAMs) are transmembrane proteins located on the cell surface involved with the binding with other cells or with the extracellular matrix. CAMs mediate interactions between cells and their surroundings that are vital to processes controlling for cell proliferation, activation, migration, and survival. Based on their specific molecular structures, they are generally classified into four major CAM families: selectins, integrins, immunoglobulin (Ig)-like CAMs, and cadherins.

CAMs play an important role in many vital physiological processes. Altered levels of CAMs can be found in diverse diseases such as cardiovascular disease, stroke, cancer, Atherosclerosis, diabetes, and autoimmune disease. Recent advance showed increasing evidence that CAMs also play an important role in several neurological diseases, such as Alzheimer's disease, multiple sclerosis (MS) and Schizophrenia. Collective detection these molecules would help us to decipher their physiological functionality.

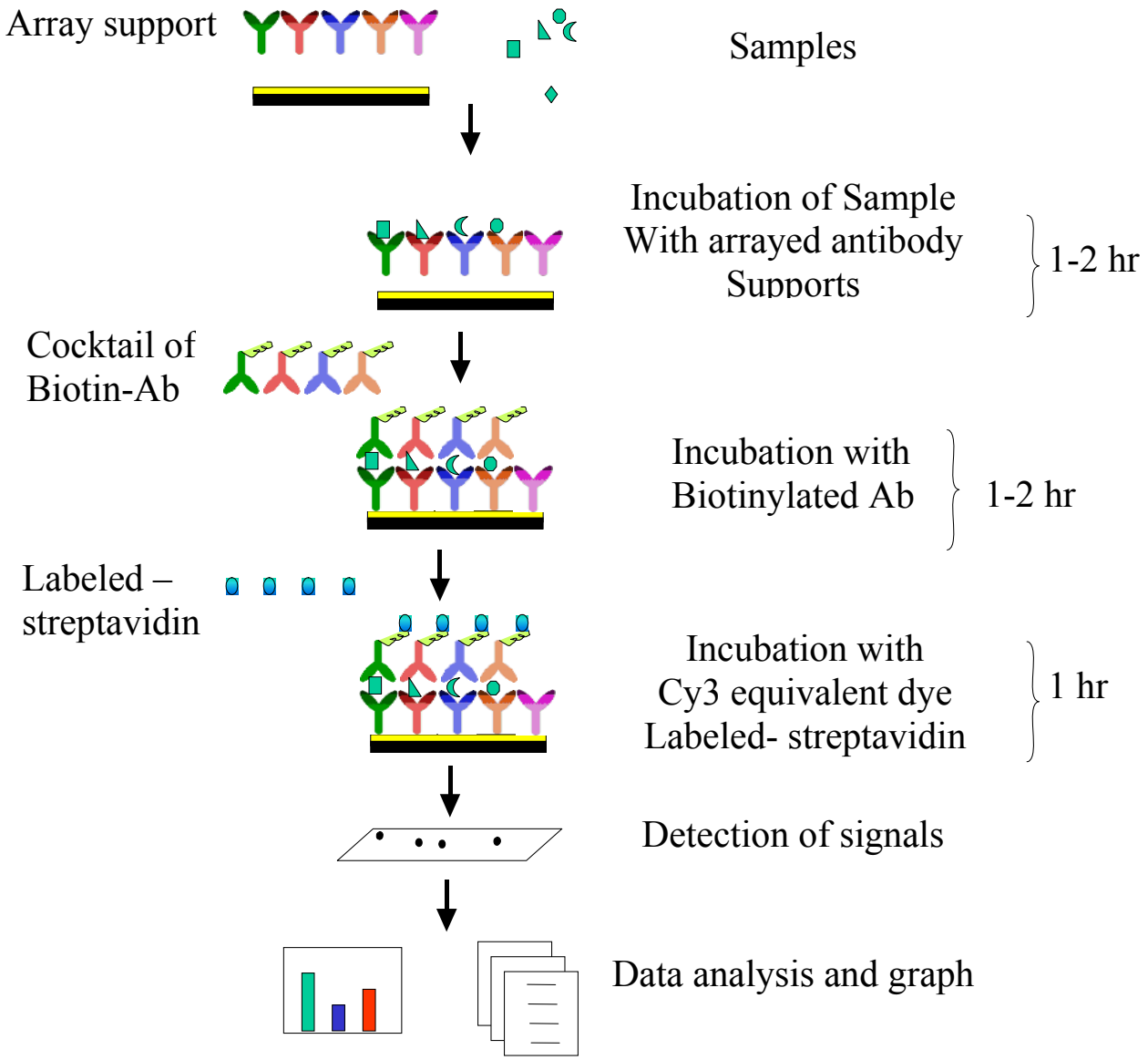
Molecule	**Full Name**
ALCAM	Activated Leukocyte Cell Adhesion Molecule
BCAM	Basal Cell Adhesion Molecule
CEACAM-1	CarcinoEmbryonic Antigen-related Cell Adhesion Molecule 1
E-Cadherin	Epithelial Cadherin
EpCAM	Epithelial Cell Adhesion Molecule
E-Selectin	E-Selectin
ICAM-1	Intercellular Adhesion Molecule 1
ICAM-2	Intercellular Adhesion Molecule 2
ICAM-3	Intercellular Adhesion Molecule 3
L-Selectin	L-Selectin
NCAM-1	Neural Cell Adhesion Molecule 1
NrCAM	Neuronal Cell Adhesion Molecule
P-Cadherin	Placental Cadherin
P-Selectin	P-Selectin
PECAM-1	Platelet Endothelial Cell Adhesion Molecule 1
VCAM-1	Vascular Cell Adhesion Molecule 1
VE-Cadherin	Vascular Endothelial Cadherin

The traditional method for cytokine detection and quantification is through the use of an enzyme-linked immunosorbent array (ELISA). While the traditional method works well for a single protein, the overall procedure is time consuming and requires a lot of sample. Take the advantage of advancement in microarray technology over the last decade; Raybiotech, has pioneered the development of cytokine antibody arrays, which has now been widely applied in the research community with hundreds of peer reviewed publications such as in Cell and Nature.

Quantibody® array, our quantitative array platform, uses the multiplexed sandwich ELISA-based technology and enables researchers to accurately determine the concentration of multiple cytokines simultaneously. It combines the advantages of the high detection sensitivity / specificity of ELISA and the high throughput of the arrays. Like a traditional sandwich-based ELISA, it uses a pair of cytokine specific antibodies for detection. A capture antibody is first bound to the glass surface. After incubation with the sample, the target cytokine is trapped on the solid surface. A second biotin-labeled detection antibody is then added, which can recognize a different isotope of the target cytokine. The cytokine-antibody-biotin complex can then be visualized through the addition of the streptavidin-labeled Cy3 equivalent dye using a laser scanner. In a real experiment, standard cytokines and samples will be assayed in each array simultaneously through a sandwich ELISA procedure. By comparing signals from unknown samples to the standard curve, the cytokine concentration in the samples will be determined. Unlike the traditional ELISA, Quantibody products use array format. By arraying multiple cytokine specific capture antibodies onto a glass support, multiplex detection of cytokines in one experiment is made possible.

Quantibody® array kits have been confirmed to have similar detection sensitivity as traditional ELISA. Our current high density Quantibody kits allow scientists to quantitatively determine the concentration of 320 human or 160 mouse cytokines in a single experiment. This is not only one of the most efficient products on the market for cytokine quantification, but makes it more affordable for quantification of large number of proteins. Simultaneous detection of multiple cytokines undoubtedly provides a powerful tool for drug and biomarker discovery.

How It Works


Array support
Samples
Incubation of Sample
With arrayed antibody
Supports
1-2 hr
Cocktail of
Biotin-Ab
Incubation with
Biotinylated Ab
1-2 hr
Labeled –
streptavidin
Incubation with
Cy3 equivalent dye
Labeled- streptavidin
1 hr
Detection of signals
Data analysis and graph

II. Materials Provided

Upon receipt, all components of the Quantibody® Array kit should be stored at -20^{0}C. At -20^{0}C the kit will retain complete activity for up to 6 months. Once thawed, the glass chip, cytokine standard mix, detection antibody cocktail and Cy3 equivalent dye-conjugated Streptavidin should be kept at –20^{0}C and all other components may be stored at 4^{0}C. The entire kit should be used within 6 months of purchase.

Components

Item	Description	1-Slide kit	2-Slide kit
1	Quantibody® Array Glass Chip	1	2
2	Sample Diluent	1	1
3	20X Wash Buffer I	2	3
4	20X Wash Buffer II	1	1
5	Lyophilized cytokine standard mix *	1	1
6	Detection antibody cocktail	1	2
7	Cy3 equivalent dye-conjugated Streptavidin	1	2
8	Slide Washer/Dryer	1	1
9	Adhesive device sealer	5	10
10	Manual	1	1

** See Section VI for detailed cytokine concentrations after reconstitution.*

Additional Materials Required

- Orbital shaker
- Laser scanner for fluorescence detection
- Aluminum foil
- Distilled water
- 1.5ml Polypropylene microcentrifuge tubes

III. General Considerations

A. Preparation of Samples

- Use serum-free conditioned media if possible.
- If serum-containing conditioned media is required, it is highly recommended that complete medium be used as a control since many types of sera contains cytokines.
- We recommend the following parameters for other samples:
  50 to 100 µl of original or diluted serum, plasma, cell culture media, or other body fluid, or 50-500 µg/ml of protein for cell and tissue lysates.

  If you experience high background or the readings exceed the detection range, further dilution of your sample is recommended.

B. Handling glass chips

- Do not touch the surface of the slides, as the microarray slides are very sensitive. Hold the slides by the edges only.
- Handle all buffers and slides with latex free gloves.
- Handle glass chip in clean environment.
- Because there is no barcode on the slide, transcribe the slide serial number from the slide bag to the back of the slide with a permanent marker before discarding the slide bag. Once the slide is disassembled, you might not have enough info to distinguish one slide from the other.

C. Incubation

- Completely cover array area with sample or buffer during incubation.
- Avoid foaming during incubation steps.
- Perform all incubation and wash steps under gentle rotation.
- Cover the incubation chamber with adhesive film during incubation, particularly when incubation is more than 2 hours or <70 µl of sample or reagent is used.
- Several incubation steps such as step 6 (blocking), step 7 (sample incubation), step 10 (detection antibody incubation), or step 13 (Cy3 equivalent dye-streptavidin incubation) may be done overnight at 4^0C. Please make sure to cover the incubation chamber tightly to prevent evaporation.

IV. Protocol

A. Completely air dry the glass chip

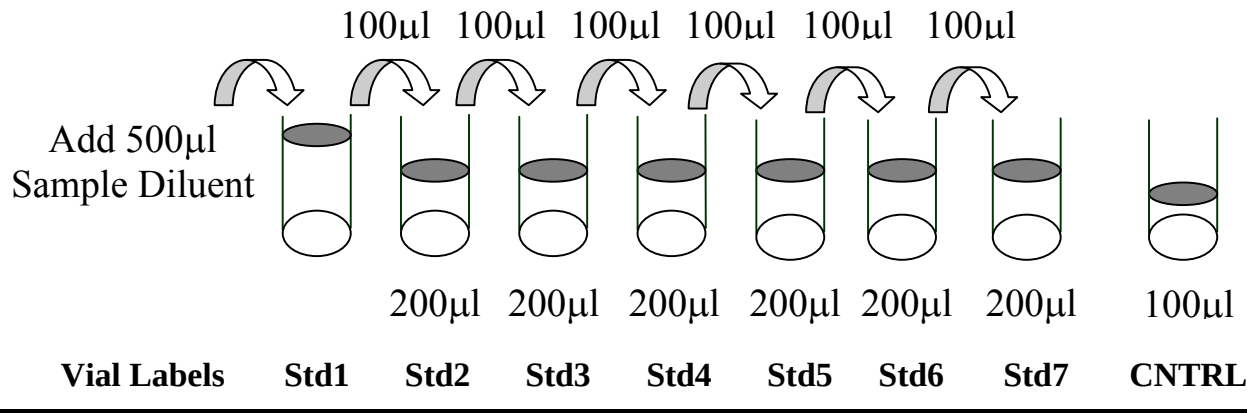
1. Take out the glass chip from the box, and let it equilibrate to room temperature inside the sealed plastic bag for 20-30 minutes. Remove slide from the plastic bag; peel off the cover film, and let it air dry at room temperature for another 1-2 hours.

Note: Incomplete drying of slides before use may cause the formation of "comet tails".

B. Prepare Cytokine Standard Dilutions

Note: There is only one vial of standard provided in the two-slide kit, which is enough for making two standard curves. Reconstitute the lyophilized standard within one hour of usage. If you must use the standard for two different days, store only the Std1 dilution at -80 ^{0}C.

Prepare serial dilution of cytokine standards



2. Reconstitute the Cytokine Standard Mix (lyophilized) by adding 500µl Sample Diluent to the tube. For best recovery, always quick-spin vial prior to opening. Dissolve the powder thoroughly by a gentle mix. Labeled the tube as Std1.

3. Label 6 clean microcentrifuge tubes as Std2 to Std7. Add 200µl Sample Diluent to each of the tubes.

4. Pipette 100µl Std1 into tube Std2 and mix gently. Perform 5 more serial dilutions by adding 100ul Std2 to tube Std3 and so on.

5. Add 100µl Sample Diluent to another tube labeled as CNTRL. Do not add standard cytokines or samples to the CNTRL tube, which will be used as negative control. For best results, include a set of standards in each slide.

Note: Since the starting concentration of each cytokine is different, the serial concentrations from Std1 to Std7 for each cytokine are varied which can be found in section VI.

C. Blocking and Incubation

6. Add 100µl Sample Diluent into each well and incubate at room temperature for 30 min to block slides.

7. Decant buffer from each well. Add 100µl standard cytokines or samples to each well. Incubate arrays at room temperature for 1-2 hour. *(Longer incubation time is preferable for higher signals)*

   Note: We recommend using 50 to 100 µl of original or diluted serum, plasma, conditioned media, or other body fluid, or 50-500 µg/ml of protein for cell and tissue lysates. Cover the incubation chamber with adhesive film during incubation if less than 70 ul of sample or reagent is used.

   Note: This step may be done overnight at 4^0C for best results.

8. Wash:
   - Decant the samples from each well, and wash 5 times (5 min each) with 150 µl of 1x Wash Buffer I at room temperature with gentle

shaking. Completely remove wash buffer in each wash step. Dilute 20x Wash Buffer I with H_2O.

- (*Optional for Cell and Tissue Lysates*) Put the glass chip with frame into a box with 1x Wash Buffer I (cover the whole glass slide and frame with Wash Buffer I), and wash at room temperature with gentle shaking for 20 min.

- Decant the 1x Wash Buffer I from each well, wash 2 times (5 min each) with 150 µl of 1x Wash Buffer II at room temperature with gentle shaking. Completely remove wash buffer in each wash step. Dilute 20x Wash Buffer II with H_2O.

D. Incubation with detection antibody cocktail and wash.

9. Reconstitute the detection antibody by adding 1.4 ml of Sample Diluent to the tube. Spin briefly.

10. Add 80 µl of the detection antibody cocktail to each well. Incubate at room temperature for 1-2 hour. *(Longer incubation time is preferable for higher signals and backgrounds)*

11. Decant the samples from each well, and wash 5 times with 150 µl of 1x Wash Buffer I and then 2 times with 150 µl of 1x Wash Buffer II at room temperature with gentle shaking. Completely remove wash buffer in each wash step.

E. Incubation with Cy3 equivalent dye -Streptavidin and wash

12. After briefly spinning down, add 1.4 ml of Sample Diluent to Cy3 equivalent dye-conjugated streptavidin tube. Mix gently.

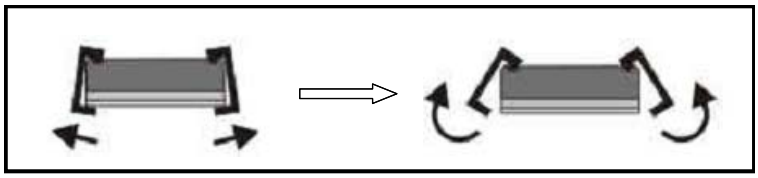
13. Add 80 µl of Cy3 equivalent dye-conjugated streptavidin to each well. Cover the device with aluminum foil to avoid exposure to light or incubate in dark room. Incubate at room temperature for 1 hour.

14. Decant the samples from each well, and wash 5 times with 150 µl of 1x Wash Buffer I at room temperature with gentle shaking. Completely remove wash buffer in each wash step.

F. Fluorescence Detection

15. Disassemble the device by pushing clips outward from the slide side. Carefully remove the slide from the gasket.

(Be careful not to touch the surface of the array side)



16. Place the slide in the slide Washer/Dryer (a 4-slide holder/centrifuge tube), add enough 1x Wash Buffer I (about 30 ml) to cover the whole slide, and then gently shake at room temperature for 15 minutes. Decant Wash Buffer I. Wash with 1x Wash Buffer II (about 30 ml) with gentle, and gently shake at room temperature for 5 minutes.

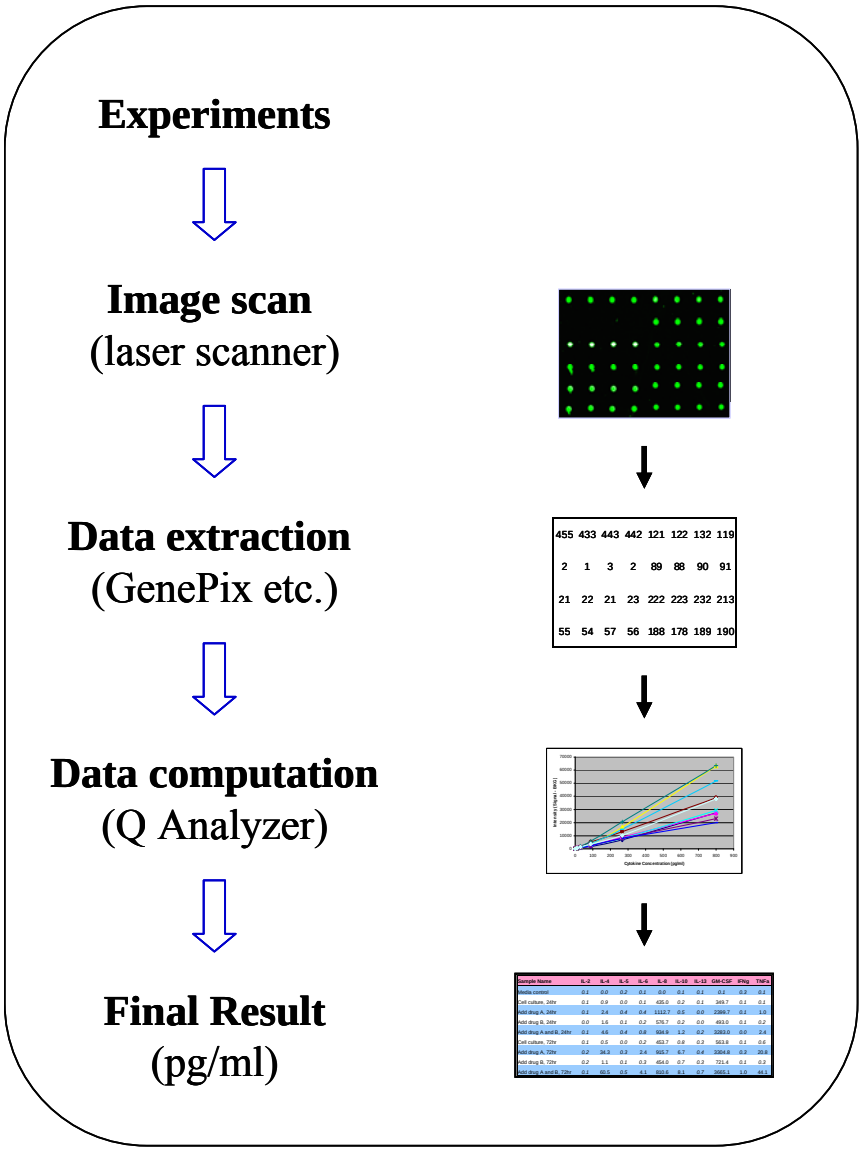
17. Remove water droplets completely by one of the following ways:
    - Put the glass chip into the Slide Washer/Dryer, and dry the glass chip by centrifuge at 1,000 rpm for 3 minutes without cap.
    - Or, dry the glass chip by a compressed N_2 stream.
    - Or gently apply suction with a pipette to remove water droplets. Do not touch the array, only the sides.

18. Imaging: The signals can be visualized through use of a laser scanner equipped with a Cy3 wavelength such as Axon GenePix. Make sure that the signal from the well containing the highest standard concentration (Std1) receives the highest possible reading, yet remains unsaturated.

Note: In case the signal intensity for different cytokine varies greatly in the same array, we recommend using multiple scans, with a higher PMT for low signal cytokines, and a low PMT for high signal cytokines.

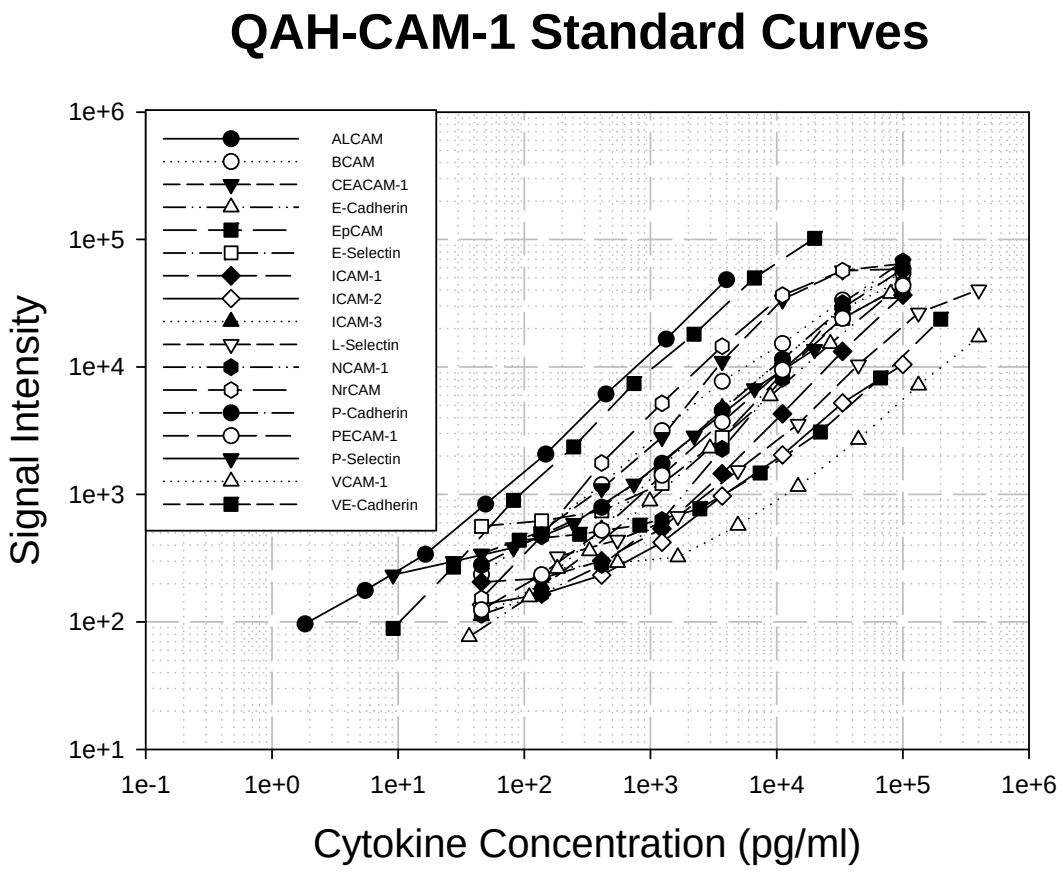
G. Data Analysis

19. Data extraction can be done with most of the microarray analysis software (GenePix, ScanArray Express, ArrayVision, or MicroVigene). For quantitative data analysis, our Quantibody® Q-Analyzer software is available. It gives visual output as well as digital values. More information can be found in section VIII.



V. Cytokine Array Map & Standard Curves

POS1	POS2
ALCAM	BCAM
CEACAM-1	E-Cadherin
EpCAM	E-Selectin
ICAM-1	ICAM-2
ICAM-3	L-Selectin
NCAM-1	NrCAM
P-Cadherin	PECAM-1
P-Selectin	VCAM-1
VE-Cadherin	NEG



VI. 8-Point Standards

After reconstitution of the lyophilized cytokine standard mix, the 8-point cytokine concentration used for generating the standard curve of a given antigen is listed below. The detection sensitivity of each protein in one experiment is user dependent. Try our array specific Quantibody Q-Analyzer to see your Limit of Detection (LOD). (Section VIII).

Serial standard concentration (pg/ml)

(pg/ml)	Control	Std7	Std6	Std5	Std4	Std3	Std2	Std1
ALCAM	0	5	16	49	148	444	1,333	4,000
BCAM	0	137	412	1,235	3,704	11,111	33,333	100,000
CEACAM-1	0	137	412	1,235	3,704	11,111	33,333	100,000
E-Cadherin	0	110	329	988	2,963	8,889	26,667	80,000
EpCAM	0	27	82	247	741	2,222	6,667	20,000
E-Selectin	0	137	412	1,235	3,704	11,111	33,333	100,000
ICAM-1	0	137	412	1,235	3,704	11,111	33,333	100,000
ICAM-2	0	137	412	1,235	3,704	11,111	33,333	100,000
ICAM-3	0	137	412	1,235	3,704	11,111	33,333	100,000
L-Selectin	0	549	1,646	4,938	14,815	44,444	133,333	400,000
NCAM-1	0	137	412	1,235	3,704	11,111	33,333	100,000
NrCAM	0	137	412	1,235	3,704	11,111	33,333	100,000
P-Cadherin	0	137	412	1,235	3,704	11,111	33,333	100,000
PECAM-1	0	137	412	1,235	3,704	11,111	33,333	100,000
P-Selectin	0	27	82	247	741	2,222	6,667	20,000
VCAM-1	0	549	1,646	4,938	14,815	44,444	133,333	400,000
VE-Cadherin	0	274	823	2,469	7,407	22,222	66,667	200,000

VII. System Recovery

The antibody pairs used in the kit have been tested to recognize their specific antigen. The spiking recovery rate of the cytokines by the kit in 2x diluted Human serum and 2x diluted Human cell culture media (CM) is listed in the following table.

System cross-reactivity test

CAB\DAB	ALCAM	BCAM	CEACAM-1	E-Cadherin	EpCAM	E-Selectin	ICAM-1	ICAM-2	ICAM-3	L-Selectin	NCAM-1	NrCAM	P-Cadherin	PECAM-1	P-selectin	VCAM-1	VE-Cadherin
ALCAM	29114	17	13	387	28	18	21	24	13	9	36	68	36	18	10	4	17
BCAM	70	9727	63	230	58	67	80	105	88	81	73	436	123	75	38	61	78
CEACAM-1	12	36	11582	62	18	30	6	26	29	36	16	121	34	40	24	29	42
E-Cadherin	23	231	30	14900	29	30	14	75	38	45	21	86	184	33	14	24	47
EpCAM	17	1	15	256	27806	6	15	16	1	9	15	29	20	15	1	1	27
E-Selectin	72	79	70	171	71	6535	69	95	58	70	69	313	91	57	47	59	79
ICAM-1	23	18	18	33	116	15	11157	12	6	18	7	53	26	12	6	9	16
ICAM-2	43	33	50	212	54	58	34	14699	54	42	31	54	72	40	18	23	64
ICAM-3	28	16	19	67	36	5	32	12	14331	26	9	14	28	12	17	5	20
L-Selectin	47	73	68	117	69	63	49	113	44	9511	38	238	95	68	14	41	68
NCAM-1	44	18	47	19	65	38	41	44	41	64	47151	39	49	38	27	63	48
NrCAM	25	12	31	106	18	34	17	27	8	8	24	13317	38	27	8	41	36
P-Cadherin	41	13	28	290	21	41	25	15	7	18	31	131	27786	33	1	18	54
PECAM-1	19	1	8	14	4	18	4	20	9	3	4	26	17	6285	1	6	1
P-selectin	169	74	99	72	105	125	94	110	136	101	84	54	126	56	41235	104	155
VCAM-1	57	44	78	79	102	78	53	85	91	38	48	100	151	77	31	8943	78
VE-Cadherin	158	30	63	448	58	66	46	55	43	53	30	228	94	50	28	58	21749

The spiking recovery rate for culture media and serum

(pg/ml)	Spiking	CM	CM+Ag	CM%	Serum	Serum+Ag	Serum%
ALCAM	2,000	0	1,973	99%	41	1,886	92%
BCAM	50,000	0	43,543	87%	0	30,477	61%
CEACAM-1	50,000	0	48,175	96%	394	30,163	60%
E-Cadherin	40,000	0	12,708	32%	0	12,480	31%
EpCAM	10,000	0	9,137	91%	0	6,274	63%
E-Selectin	50,000	0	57,754	116%	307	38,574	77%
ICAM-1	50,000	0	41,004	82%	54,633	112,939	117%
ICAM-2	50,000	0	27,273	55%	14,330	32,617	37%
ICAM-3	50,000	0	31,862	64%	0	31,518	63%
L-Selectin	200,000	0	137,506	69%	73,849	196,903	62%
NCAM-1	50,000	2,184	65,343	126%	24,689	79,904	110%
NrCAM	50,000	0	45,917	92%	0	30,221	60%
P-Cadherin	50,000	630	47,044	93%	3,716	62,841	118%
PECAM-1	50,000	0	38,203	76%	0	37,333	75%
P-selectin	10,000	0	11,348	113%	2,029	13,415	114%
VCAM-1	200,000	0	228,073	114%	10,674	133,383	61%
VE-Cadherin	100,000	0	38,297	38%	0	40,056	40%

VIII. Quantibody® Q-Analyzer

Quantibody Q-Analyzer is an array specific, Excel-based program. However, it is not a simple calculation macro as it contains sophisticated data analysis.

Key features:

- *Simplicity:* Easy to operate and requires no professional training. With a simple copy and paste process, the cytokine concentration is determined.
- *Outlier Marking & Removing:* The software can automatically mark and remove the outlier spots for more accurate data analysis
- *Normalization:* The program allows for intra- and inter-slide normalization for large number of samples.
- *Two Positive Controls*: The program takes the two positive controls in each array for normalization.
- *Two Analytical Algorithms*: Users can choose either linear regression or log-log algorithms to meet their analytical needs.
- *Two Data Outputs*: standard curves and digital concentration.
- *User Intervention:* The program allows for user manual handling of those outliers and other analytical data.
- *Lower and Upper Limits Determination:* The program automatically marks out the values below or above the detection range.
- *Standard Deviation:* The program outputs the standard deviations of the quadruplicate spots for data accuracy.
- *Analytical Tips:* Q-Analyzer analysis tips are included in the program.

IX. Troubleshooting guide

Problem	Cause	Recommendation
Weak Signal	Inadequate detection	Increase laser power and PMT parameters
	Inadequate reagent volumes or improper dilution	Check pipettes and ensure correct preparation
	Short incubation time	Ensure sufficient incubation time and change sample incubation step to overnight
	Too low protein concentration in sample	Don't make too low dilution or concentrate sample
	Improper storage of kit	Store kit as suggested temperature. Don't freeze/thaw the slide.
Uneven signal	Bubble formed during incubation	Avoid bubble formation during incubation
	Arrays are not completed covered by reagent	Completely cover arrays with solution
	Reagent evaporation	Cover the incubation chamber with adhesive film during incubation
Poor standard curve	Cross-contamination from neighboring wells	Avoid overflowing wash buffer
	Comet tail formation	Air dry the slide for at least 1 hour before usage
	Inadequate standard reconstitution or Improper dilution	Reconstitute the lyophilized standard well at the room temperature before making serial dilutions. Check pipettes and ensure proper serial dilutions.
	Inadequate detection	Increase laser power that the highest standard concentration for each cytokine receives the highest possible reading yet remains unsaturated.
	Use freeze-thawed cytokine standards	Always use new cytokine standard vial for new set of experiment. Discard any leftover.
High background	Overexposure	Lower the laser power
	Dark spots	Completely remove wash buffer in each wash step.
	Insufficient wash	Increase wash time and use more wash buffer
	Dust	Work in clean environment
	Slide is allowed to dry out	Don't dry out slides during experiment.

X. Select Quantibody Publications

1. Stechova, et al. Influence of Maternal Hyperglycaemia on Cord Blood Mononuclear Cells in Response to Diabetes-associated Autoantigens. *Scandinavian Journal of Immunology*. 2009. 70(2):149-158
2. Willingham, SB et al. NLRP3 (NALP3, Cryopyrin) facilitates in vivo caspase-1 activation, necrosis, and HMGB1 release via inflammasome-dependent and -independent pathways. *J Immunol.* 2009; 183(3):2008-15
3. El Karim et al. Neuropeptides Regulate Expression of Angiogenic Growth Factors in Human Dental Pulp Fibroblasts. *Journal of Endodontics*, 2009; 35(6): 829-833
4. Souquière S. et al. T-Cell tropism of simian T-cell leukaemia virus type 1 and cytokine profiles in relation to proviral load and immunological changes during chronic infection of naturally infected mandrills (*Mandrillus sphinx*). *J Med Primatol*. 2009; 38(4):279-89
5. Sharma, et al. Induction of multiple pro-inflammatory cytokines by respiratory viruses and reversal by standardized *Echinacea*, a potent antiviral herbal extract. *Antiviral Research*. 2009; 83(2)165-170.
6. Altamirano-Dimas, et al. *Echinacea* and anti-inflammatory cytokine responses: Results of a gene and protein array analysis. *Pharmacuetical Biology*. 2009; 47(6): 500-508.
7. Cheung, et al. Cordysinocan, a polysaccharide isolated from cultured *Cordyceps*, activates immune responses in cultured T-lymphocytes and macrophages: Signaling cascade and induction of cytokines. *Journal of Ethonopharmacology*. 2009; 124(1): 61-68.
8. Du, et al. P2-380: Identification and characterization of human autoantibodies that may be used for the treatment of prion diseases. *Alzheimer's and Dementia*. 2009; 4(4): T484-T484.
9. Van Rossum et al. Granulocytosis and thrombocytosis in renal cell carcinoma: a pro-inflammatory cytokine response originating in the tumour. *Neth J Med*. 2009; 67(5):191-4.
10. Zhai, et al. Coordinated Changes in mRNA Turnover, Translation, and RNA Processing Bodies in Bronchial Epithelial Cells following Inflammatory Stimulation. *Molecular and Cellular Biology*. 2008; 28(24): 7414-7426.
11. Gao, et al. A Chinese herbal decoction, Danggui Buxue Tang, activates extracellular signal-regulated kinase in cultured T-lymphocytes. *FEBS Letters*, 2007; 581(26): 5087-5093. (This reference validates mulitplex ELISA results for several analytes with standard ELISA test results).
12. Piganelli, et al: Autoreactive T-cell responses: new technology in pursuit of an old nemesis. (Editorial Review) *Pediatric Diabetes* 2007: 8: 249–251

XI. Experiment Record Form

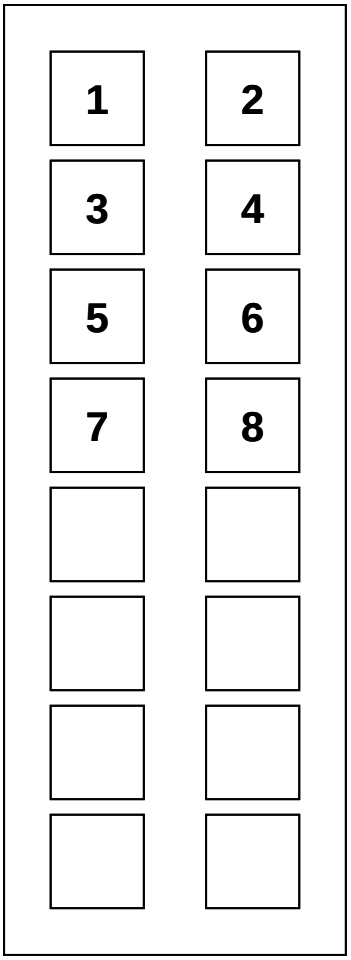
Date: _____

File Name: _____

Laser Power: _____

PMT: _____

Well No.	Sample Name	Dilution factor
1	CNTRL	
2	Std7	
3	Std6	
4	Std5	
5	Std4	
6	Std3	
7	Std2	
8	Std1	
9		
10		
11		
12		
13		
14		
15		
16		



XII. How to Choose Quantibody® Products?

Species-based selection:

- **Human**: (QAH-)
- **Mouse**: (QAM-)
- **Rat**: QAR-CYT-1, QAR-CYT-2, QAR-CYT-3, QAR-INF-1
- **Non-Human Primates (NHP)**: QAN-CYT-1
- **Porcine**: QAP-CYT-1
- **Canine**: QAC-CYT-1
- **Feline**: QAF-CYT-1

Function-based selection:

- **TH1/TH2/TH17 Array:** QAH-TH-1, QAH-TH17, QAM-TH17
- **IL-1 Family Cytokine and Receptor Arrays:** QAH-IL1F-1, QAH-IL1R-1
- **Inflammation Arrays:** QAH-INF-1, QAH-INF-2, QAH-INF-3; QAM-INF-1; QAR-INF-1
- **Angiogenesis Arrays:** QAH-ANG-1, QAH-ANG-2, QAH-ANG-3, QAH-ANG-1000
- **Chemokine Arrays:** QAH-CHE-1, QAM-CHE-1
- **MMP Array:** QAH-MMP-1
- **Immunoglobin Isotype Array:** QAH-ISO-1; AAM-ISO-G1
- **Dried Eye Disease Array:** QAH-DED-1
- **Periodontal Disease Array**: QAH-PDD-1
- **Bone Metabolism Array:** QAH-BMA-1, QAH-BMA-2, QAH-BMA-1000
- **Obesity Arrays:** QAH-ADI-1, QAH-ADI-2, QAH-ADI-3
- **Adhesion Molecule Arrays:** QAH-CAM-1

Cytokine Number-based selection:

- **320 cytokines:** QAH-CAA-7000
- **280 cytokines:** QAH-CAA-6000
- **240 cytokines:** QAH-CAA-5000
- **200 cytokines:** QAH-CAA-4000
- **160 cytokines:** QAH-CAA-3000, QAM-CAA-3000
- **120 cytokines:** QAH-CAA-2000; QAM-CAA-2000
- **80 cytokines:** QAH-CAA-1000; QAM-CAA-1000
- **60 cytokines:** QAH-ANG-1000; QAM-CYT-Q2000
- **40 cytokines:** QAH-INF-3, QAH-CHE-1, QAH-GF-1, QAH-REC-1,
- **30 cytokines:** QAH-ANG-2, QAH-ANG-3, QAR-CYT-3, QAM-CHE-1
- **20 cytokines:** QAM-INT-1, QAH-TH17-1, QAM-TH17-1
- **10 cytokines:** QAH-TH-1, QAM-INT-2, QAR-INF-1, QAN-CYT-1, QAP-CYT-1,
- **less than 10 cytokines:** QAH-ISO-1, QAH-ADI-2, AAM-ISO-G1

Purpose-based selection --- Custom Arrays

- Choose from over 800 cytokine pool; Any kind; Any number
- Order slide only or full service in house
- Desired marker not in our pool? No problem! For certain developmental fee, we may be able to add the marker to your panel if the paired antibodies are available on the market.

Note:

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Cytokine protein arrays are RayBiotech patent-pending technology.

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