

# RayBio<sup>®</sup> Label-Based (L-Series)

## Human Antibody Array L-4000 Glass Slide Kit

A combination of Human L-507, L-493, L-3, L-4, L-5, L-6, L-7, and L-8 arrays

### Patent Pending Technology User Manual (January 1, 2022)

For the simultaneous detection of the relative expression of 4000 human proteins in serum, plasma, cell culture supernatants, cell/tissue lysates or other body fluids.

**L-Series Human Antibody Array L-4000**

**Cat# AAH-BLG-4000-4 (4 Sample Kit)**

**Cat# AAH-BLG-4000-8 (8 Sample Kit)**

**Please read manual carefully  
before starting experiment**



**Your Provider of Excellent Protein Array Systems and Services**

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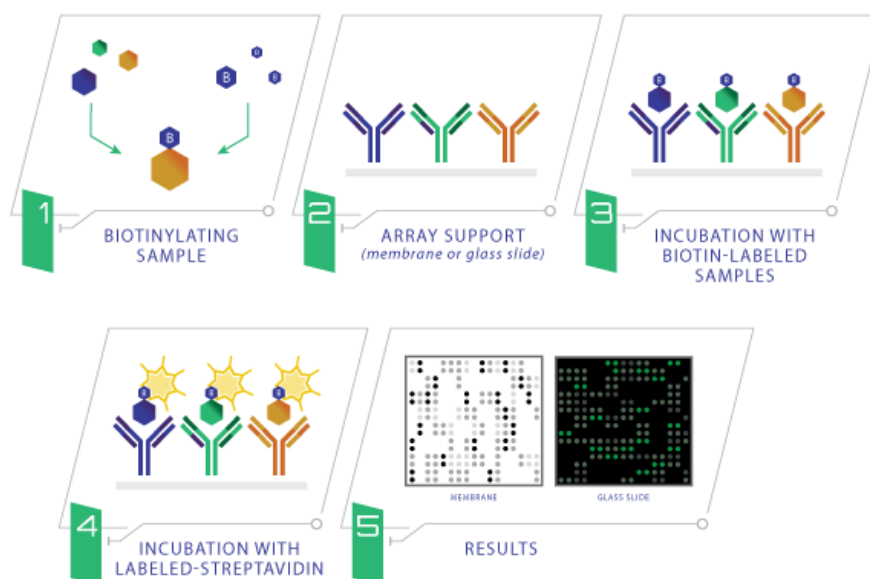
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## I. Introduction

Combining direct antigen-labeling technology with our vast library of array-validated antibodies, RayBiotech has created the largest commercially available antibody array to date. With the L-Series high density array platform, researchers can now detect thousands of proteins simultaneously, obtaining a broad, panoramic view of protein expression. Our newly expanded panel includes a wide variety of metabolic enzymes, structural proteins, epigenetic markers, neuroregulatory factors, in addition to our popular list of cytokines, growth factors, receptors, adipokines, proteases, and signaling proteins. Available on both glass slide and membrane formats, this array is ideally suited for biomarker discovery studies and exploratory screens.

The first step in using the RayBio® L-Series Antibody Array is to biotinylate the primary amine groups of the proteins in your sample (sera or plasma, cell culture supernatants, cell lysates or tissue lysates). The glass slide arrays are then blocked, just like a western blot, and the biotin-labeled sample is added onto the glass slide, which is pre-printed with capture antibodies. The slide is incubated to allow binding of target proteins. Streptavidin-conjugated fluorescent dye (Cy3 equivalent) is then applied to the array. Finally, the glass slide is dried, and laser fluorescence scanning is used to visualize the signals.



## II. Materials Provided

### A. Storage Recommendations

Upon receipt, the kit should be stored at -20°C until needed. It is recommended to use the kit within 6 months of the date of shipment. After initial use, remaining reagents should be stored at 4°C and may be stored for up to 3 months. Labeling Reagent (Item B) should be prepared fresh each time before use. Unused glass slides should be kept at -20 °C and repeated freeze-thaw cycles should be avoided (slides may be stored for 6 months).

ITEM	DESCRIPTION	4 SAMPLE Kit	8 SAMPLE Kit
A	Spin Columns (2ml)	8 columns	16 columns
B	Labeling Reagent	1 vial	2 vials
D	Stop Solution	1 vial (50 µl)	2 vials (50 µl)
E	RayBio® L-Series Glass Slide*	1 slide each of Human L-507, L-493, L-3, L-4, L-5, L-6, L-7, and L-8	2 slides each of Human L-507, L-493, L-3, L-4, L-5, L-6, L-7, and L-8
F	Blocking Buffer	2 bottles (30 ml)	4 bottles (30 ml)
G	20X Wash Buffer I	2 bottles (30 ml)	4 bottles (30 ml)
H	20X Wash Buffer II	2 bottles (30 ml)	4 bottles (30 ml)
I	Cy3 equivalent-Conjugated Streptavidin	3 vials	6 vials
J	Adhesive Plastic Strips		
K	Labeling Buffer	2 bottles (30 ml)	2 bottles (30 ml)
n/a	2X Cell Lysis Buffer**	1 bottle (10 ml)	1 bottle (10 ml)
M	30 ml Centrifuge Tube	2 tubes	4 tubes

\*Each slide contains 4 identical subarrays

\*\*Only needed if testing cell or tissue lysates

### B. Additional Materials Required

- 1 ml tube, small plastic or glass containers
- Orbital shaker or oscillating rocker
- Pipettors, pipette tips and other common lab consumables
- Laser scanner for fluorescence detection
- Aluminum foil

### III. Overview and General Considerations

#### A. Preparation and Storage of Samples

##### 1) Preparation of Cell Culture Supernatants

1. Seed cells at a density of  $1 \times 10^6$  cells in 100 mm tissue culture dishes.\*
2. Culture cells in complete culture medium for ~24–48 hours.\*\*
3. Replenish with serum-free or low-serum medium such as 0.2% FCS/FBS serum, and then incubate cells again for ~48 hours.\*\*,† The membrane-based array is recommended if high serum medium such as 10% FCS/FBS is used, as high background can occur on glass slide arrays with high serum containing media samples.
4. To collect supernatants, centrifuge at 1,000 x g for 10 minutes and store as  $\leq 1$  ml aliquots at  $-80^\circ\text{C}$  until needed.
5. If you want to use cell mass for inter-sample normalization, measure the total wet weight of cultured cells in the pellet and/or culture dish. You may then normalize between arrays by dividing fluorescent signals by total cell mass (i.e., express results as the relative amount of protein expressed/mg total cell mass). Or you can normalize between arrays by determining cell lysate concentration using a total protein assay (BCA Protein Assay Kit, Pierce, Prod #: 23227).

*\*The density of cells per dish used is dependent on the cell type. More or less cells may be required.*

*\*\*Optimal culture time may vary and will depend on the cell line, treatment conditions and other factors.*

*†Bovine serum proteins produce detectable signals on the RayBio® L-Series Array in media containing serum concentrations as low as 0.2%. When testing serum-containing media, we strongly recommend testing an uncultured media blank for comparison with sample results.*

## 2) Extracting Protein from Cells

### 1. Centrifuging Cells

#### a. Adherent Cells:

- i. Remove supernatant from cell culture and wash cells gently twice with cold 1X PBS taking care not to disturb cell layer.
- ii. Add enough cold 1X PBS to cover cell layer and use cell scraper to detach cells.

#### b. Cells in Suspension: Pellet the cells by centrifuging using a microcentrifuge at 1500 rpm for 10 minutes.

2. Make sure to remove any remaining PBS before adding 1X Cell Lysis Buffer (2X Cell Lysis Buffer should be diluted 2-fold with ddH<sub>2</sub>O). Solubilize the cells at  $2 \times 10^7$  cells/ml in 1X Cell Lysis Buffer.
3. Pipette up and down to resuspend cells and rock the lysates gently at 2–8 °C for 30 minutes. Transfer extracts to microfuge tubes and centrifuge at 13,000 rpm for 10 minutes at 2-8 °C.

*Note: If the lysates appear to be cloudy, transfer the lysates to a clean tube, centrifuge again at 13,000 rpm for 20 minutes at 2-8°C. If the lysates are still not clear, store them at -20°C for 20 minutes. Remove from the freezer and immediately centrifuge at 13,000 rpm for 20 minutes at 2-8°C.*

4. Transfer lysates to a clean tube. Determining cell lysate concentrations using a total protein assay (BCA Protein Assay Kit, Pierce, Prod# 23227). Aliquot the lysates and store at -80°C.

## 3) Extracting Protein from Crude Tissue

1. Transfer approximate 100 mg crude tissue into a tube with 1 ml 1X Cell Lysis Buffer (2X Cell Lysis Buffer should be diluted 2-fold with ddH<sub>2</sub>O).

2. Homogenize the tissue according to homogenizer manufacturer instructions.
3. Transfer extracts to microcentrifuge tubes and centrifuge for 20 minutes at 13,000 rpm (4°C).

*Note: If the supernatant appears to be cloudy, transfer the supernatants to a clean tube, centrifuge again at 13,000 rpm for 20 minutes at 2-8°C. If the supernatant is still not clear, store the lysate at -20°C for 20 minutes. Remove from the freezer, immediately centrifuge at 13,000 rpm for 20 minutes at 2-8°C.*

4. Transfer supernatant to a clean tube and store at -80°C.

#### 4) Determine the total protein concentration

For optimal biotin labeling, it is necessary to determine the protein concentration in the cell/tissue lysate. We recommended using a BCA total protein assay (e.g., Pierce, Catalog # 23227).

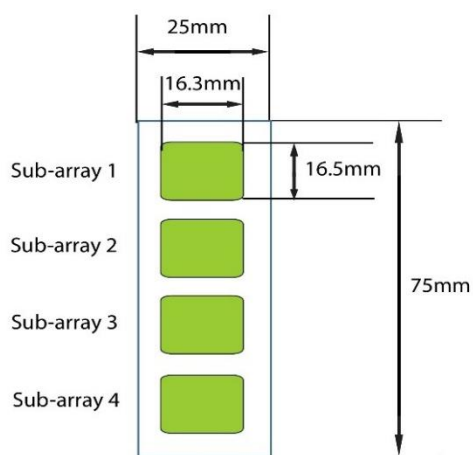
### **B. Handling the Glass Slides**

- The microarray slides are delicate. Please do not touch the array surface with pipette tips, forceps or your fingers. Hold the slides by the edges only.
- Handle the slides with powder-free gloves and in a clean environment.
- Do not remove the glass slide from the chamber assembly until step 20, and take great care not to break the glass slide when doing so.
- Remove reagents/sample by gently applying suction with a pipette to corners of each chamber. Do not touch the printed area of the array, only the sides as seen in image below.



### C. Layout of Array Slide

Four identical sub-arrays on one slide



4 printed sub-arrays per glass chip

### D. Incubations and Washes

- Cover incubation chamber with a Plastic Adhesive Strip (Item J) to prevent evaporation during incubation or wash steps, particularly those steps lasting 2 hours or longer.
- During incubation and wash steps avoid foaming and remove all bubbles from the sub-array surface.

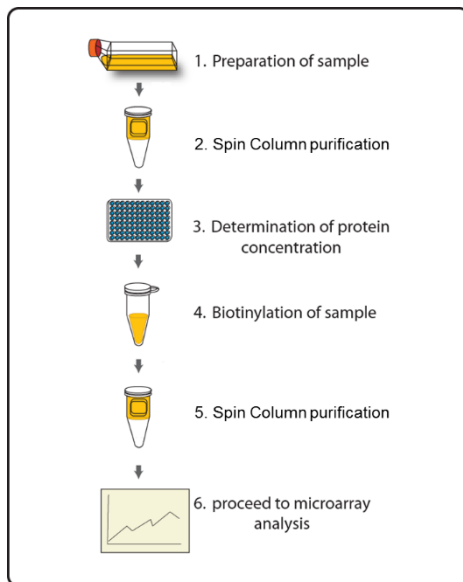


- Perform all incubation and wash steps under gentle rotation or rocking motion (~0.5 to 1 cycle/sec).
- Wash steps in Wash Buffer II and all incubation steps may be performed overnight at 4°C.
- Avoid cross-contamination of samples to neighboring wells. To remove Wash Buffers and other reagents from chamber wells, you may invert the Glass Slide Assembly to decant, and aspirate the remaining liquid.
- Unlike most Cy3 fluors, the streptavidin-conjugated fluor used in this kit is very stable at room temperature (RT) and resistant to photobleaching on the hybridized glass slides. However, please protect glass slides from direct, strong light and temperatures above RT.

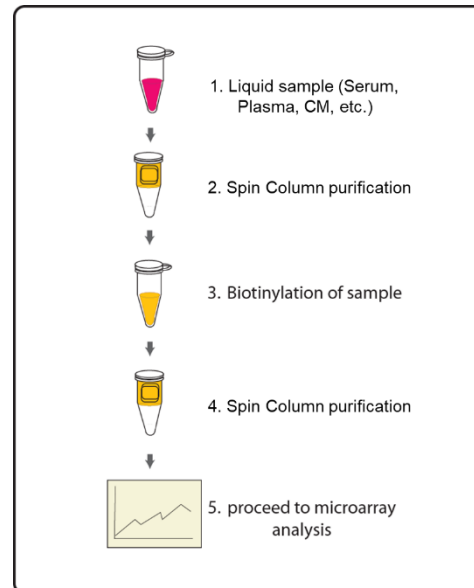
## IV. Protocol

### Assay Diagram

#### 1. Cell/tissue lysates



#### 2. Serum, plasma, body fluid, or Cell culture supernatants



### A. Sample purification

*Note: This step removes low molecular weight amine derivatives or unwanted buffer from samples to ensure quality biotinylation in Steps 5–7.*

1. Twist to remove the bottom plug of the Spin Column and loosen the cap (do not remove).
2. Place the Spin column into a 15 ml conical collection tube, centrifuge at 1,000 x g for 3 minutes to remove the storage buffer. Discard the flow-through.
3. Wash the Spin Column three times with 1 ml Labeling Buffer each, centrifuge at 3,000 x g for 3 minute to remove the flow-through.

Discard the flow-through and blot the bottom of the column to remove excess liquid. Transfer the Spin Column to a new collection tube.

4. Apply sample on top of the resin within the next few minutes. Centrifuge at 1,000 x g for 3 minutes. Collect the flow-through that contains the sample. The recommended sample dilutions are as follows:

- *Culture Media: 600  $\mu$ l neat supernatant*
- *Serum/Plasma: 10  $\mu$ l serum/plasma in 500  $\mu$ l labeling buffer*
- *Cell/tissue lysate: 100  $\mu$ g lysate in 500  $\mu$ l labeling buffer*

*Note: Each labelled sample volume is enough for at least 15 arrays following the protocol below.*

*Note: The maximal sample volume is 700  $\mu$ l for each Spin Column. Do not load over 700  $\mu$ l of sample into a Spin Column.*

## **B. Biotin-Labeling the Sample**

*Note: Amines (e.g., Tris, glycine) and azides quench the biotinylation reaction. Avoid contaminating samples with these chemicals prior to biotinylation.*

5. Immediately before use, prepare the Labeling Reagent. Briefly spin down the Labeling Reagent tube (Item B). Add 100  $\mu$ l Labeling Buffer into the tube, then pipette up and down or vortex slightly to dissolve the lyophilized reagent.
6. Add Labeling Reagent to the sample tube. Incubate the reaction solution at RT with gentle rocking or shaking for 30 min. Mix the reaction solution by gently tapping the tube every 5 minutes.
  - a. For labeling cell culture supernatants: Add 10  $\mu$ l of Labeling Reagent into the sample tube (for 600  $\mu$ l supernatant).

- b. For labeling serum or plasma: Add 10  $\mu$ l of Labeling Reagent Solution into the sample tube (for 10  $\mu$ l serum/plasma *in 500  $\mu$ l labeling buffer*).
- c. For labeling cell or tissue lysates: Add 5  $\mu$ l of Labeling Reagent Solution into the sample tube (for 100  $\mu$ g lysate *in 500  $\mu$ l labeling buffer*).
- d. For all other body fluid: Add 2  $\mu$ l of Labeling Reagent Solution per 100  $\mu$ g sample to be labelled.

*Note: The addition of Labeling Reagent volume is based upon the sample amount used in Step 4. If the amount of sample being labelled differs from the example in Step 6, adjust this volume proportionally.*

7. Add 5  $\mu$ l Stop Solution (Item D) to each sample tube. Using a new spin column, repeat Steps 1-4 of section A. Sample Purification to remove the excess non-reacted biotin reagent from each sample.

*Note: Biotinylated samples can be stored at -20°C or -80°C until you are ready to proceed with the assay.*

### **C. Drying the Glass Slide**

8. Remove the package containing the Assembled Glass Slide (Item E) from the freezer. Place unopened package on the bench top for ~15 minutes, and allow the Assembled Glass Slide to equilibrate to RT.
9. Open package, and take the Assembled Glass Slide out of the sleeve. Do not disassemble the Glass Slide from the chamber assembly. Place glass slide assembly in laminar flow hood or similar clean environment for 1-2 hours at RT.

*Note: Protect the slide from dust or other contaminants.*

## D. Blocking and Incubations

*Note: Glass slide should be completely dry before adding Blocking Buffer to wells.*

10. Block sub-arrays by adding 400  $\mu$ l of Blocking Buffer (Item F) into each well of Assembled Glass Slide and incubating at RT for 30 minutes. Ensure there are no bubbles on the array surfaces.
11. Dilute samples with Blocking Buffer. Recommended dilution of the biotin-labeled samples with Blocking Buffer is 10-fold for cell culture supernatants, 20-fold for serum/plasma and 100-fold for cell/tissue lysate. *Dilution for other body fluid needs to be determined by the end user. Generally, most samples can be 10-20x dilution, while tears and saliva samples may need 100x dilution.*

*Note: Optimal sample dilution factor will depend on the abundance of target proteins. If the background or antigen-specific antibody signals are too strong, the sample can be diluted further in subsequent experiments. If the signal is too weak, more concentrated samples can be used.*

12. Completely remove the Blocking Buffer from each well. Add 400  $\mu$ l of diluted sample into appropriate wells. Remove any bubbles on array surfaces. Incubate arrays with gentle rocking or shaking for 2 hours at RT or overnight at 4°C.

*Note: Avoid the flow of sample into neighboring wells.*

13. Based on number of samples and remaining protocol, calculate the amount of 1X Wash Buffer I and 1X Wash Buffer II needed to complete the experiment. Separately dilute the required amounts of 20X Wash Buffer I Concentrate (Item G) 20-fold and 20X Wash Buffer II Concentrate (Item H) with ddH<sub>2</sub>O.
14. Decant the samples from each well and wash 3 times with 800  $\mu$ l of 1X Wash Buffer I at RT with gentle rocking or shaking for 5 minutes per wash.

15. Obtain a clean container (e.g., pipette tip box or slide-staining jar), place the Assembled Glass Slide into the container with enough volume of 1X Wash Buffer I to completely cover the entire assembly, and remove any bubbles in wells. Wash 2 times at RT with gentle rocking or shaking for 10 minutes per wash.
16. Decant the Wash Buffer I from each well, place the Assembled Glass Slide into the container with enough volume of 1X Wash Buffer II to completely cover the entire assembly, and remove any bubbles in wells. Wash 2 times at RT with gentle rocking or shaking for 5 minutes per wash.
17. Prepare 1X Cy3-Conjugated Streptavidin:
  - a) Briefly spin down tube containing the Cy3-Conjugated Streptavidin (Item I) immediately before use.
  - b) Add 1000  $\mu$ l of Blocking Buffer into the Cy3-Conjugated Streptavidin tube to prepare a concentrated Cy3-Conjugated Streptavidin stock solution. Pipette up and down to mix gently (do not store the stock solution for later use).
  - c) To prepare 1X Cy3-Conjugated Streptavidin, add 200  $\mu$ l of the concentrated Cy3-Conjugated Streptavidin stock solution into a tube with 800  $\mu$ l of Blocking Buffer. Mix gently.
18. Carefully remove Assembled Glass Slide from container. Remove all of Wash Buffer II from the wells. Add 400  $\mu$ l of 1X Cy3-Conjugated Streptavidin to each sub-array. Cover the incubation chamber with the plastic adhesive strips.

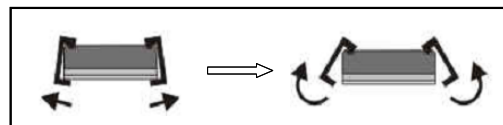
*Note: Avoid exposure to light in Steps 19–25 by covering the Glass Slide Assembly with aluminum foil or incubate in a dark room.*

19. Incubate with 1X Cy3-Conjugated Streptavidin at RT for 1 hour with gentle rocking or shaking.

*Note: Incubation may be done overnight at 4°C.*

20. Decant the solution and disassemble the glass slide from the incubation frame and chamber. Disassemble the device by pushing clips outward from the side, as shown below. Carefully remove the glass slide from the gasket.

*Note: Be careful not to touch the printed surface of the glass slide, which is on the same side as the barcode.*



21. Gently place the glass slide into 30 ml Centrifuge Tube (Item M). Add enough 1X Wash Buffer I to cover the entire glass slide (about 30 ml). Wash with gentle rocking or shaking for 10 min. Remove the wash buffer. Repeat 2 times for a total of 3 washes.
22. Add enough 1X Wash Buffer II to cover the entire glass slide (about 30 ml). Wash with gentle rocking or shaking for 5 minutes. Remove the wash buffer. Repeat one time for a total of two washes for 5 minutes per wash.
23. Finally, wash the glass slide with 30 ml of ddH<sub>2</sub>O for 5 minutes. Remove glass slide and decant water from Centrifuge Tube.
24. Remove buffer droplets from the slide completely by one of the following ways:
- Put the glass slide into the Slide Washer/Dryer, and dry the glass slide by centrifuge at 1,000 rpm for 3 minutes without cap.
  - Or dry the glass slide by a compressed N<sub>2</sub> stream.
  - Or gently apply suction with a pipette to remove buffer droplets. Do not touch the array surface, only the sides.

*Note: Make sure the finished glass slide is completely dry before scanning or storage.*

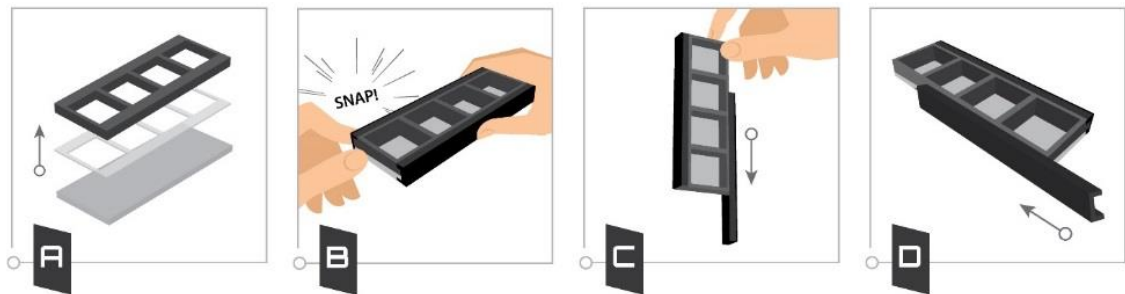
## **E. Fluorescence Detection**

25. You may proceed immediately to scanning or you may store the slide at -20 °C in the Centrifuge Tube provided or at RT to scan at a later time.

*Note: Please protect the finished glass slides from temperatures above RT and store them in the dark. Do not expose glass slide to strong light, such as sunlight or a UV lamp.*

*Note: If you need to repeat any of the incubation steps after finishing the experiment, you must first re-assemble the glass slide into the incubation chamber by following the steps as described below. To avoid breaking the printed glass slide, you may first want to practice assembling the device with a blank glass slide.*

1. Apply slide to incubation chamber barcode facing upward (image A).
2. Gently snap one edge of a snap-on side (image B).
3. Gently press other of side against lab bench and push in lengthwise direction (image C).
4. Repeat with the other side (image D)



## V. Antibody Array Map



## A. RayBio® Human Antibody Array L-507 Array Map

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	POS1	POS1	POS2	POS2	POS3	POS3	Neg	Neg	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11
2	12	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26
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35	503	503	504	504	505	505	506	506	507	507	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	POS1	POS1	POS2	POS2	POS3	POS3	

## B. RayBio® Human Antibody Array L-493 Array Map

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	POS1	POS1	POS2	POS2	POS3	POS3	Neg	Neg	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11
2	12	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26
3	27	27	28	28	29	29	30	30	31	31	32	32	33	33	34	34	35	35	36	36	37	37	38	38	39	39	40	40	41	41
4	42	42	43	43	44	44	45	45	46	46	47	47	48	48	49	49	50	50	51	51	52	52	53	53	54	54	55	55	56	56
5	57	57	58	58	59	59	60	60	61	61	62	62	63	63	64	64	65	65	66	66	67	67	68	68	69	69	70	70	71	71
6	72	72	73	73	74	74	75	75	76	76	77	77	78	78	79	79	80	80	81	81	82	82	83	83	84	84	85	85	86	86
7	87	87	88	88	89	89	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	99	100	100	101	101
8	102	102	103	103	104	104	105	105	106	106	107	107	108	108	109	109	110	110	111	111	112	112	113	113	114	114	115	115	116	116
9	117	117	118	118	119	119	120	120	121	121	122	122	123	123	124	124	125	125	126	126	127	127	128	128	129	129	130	130	131	131
10	132	132	133	133	134	134	135	135	136	136	137	137	138	138	139	139	140	140	141	141	142	142	143	143	144	144	145	145	146	146
11	147	147	148	148	149	149	150	150	151	151	152	152	153	153	154	154	155	155	156	156	157	157	158	158	159	159	160	160	161	161
12	162	162	163	163	164	164	165	165	166	166	167	167	168	168	169	169	170	170	171	171	172	172	173	173	174	174	175	175	176	176
13	177	177	178	178	179	179	180	180	181	181	182	182	183	183	184	184	185	185	186	186	187	187	188	188	189	189	190	190	191	191
14	192	192	193	193	194	194	195	195	196	196	197	197	198	198	199															

## C. RayBio® Human Antibody Array L-3, L-4, L-5, L-6, L-7, and L-8 Array Map

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1	POS1	POS1	POS2	POS2	POS3	POS3	Neg	Neg	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	
2	12	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26	
3	27	27	28	28	29	29	30	30	31	31	32	32	33	33	34	34	35	35	36	36	37	37	38	38	39	39	40	40	41	41	
4	42	42	43	43	44	44	45	45	46	46	47	47	48	48	49	49	50	50	51	51	52	52	53	53	54	54	55	55	56	56	
5	57	57	58	58	59	59	60	60	61	61	62	62	63	63	64	64	65	65	66	66	67	67	68	68	69	69	70	70	71	71	
6	72	72	73	73	74	74	75	75	76	76	77	77	78	78	79	79	80	80	81	81	82	82	83	83	84	84	85	85	86	86	
7	87	87	88	88	89	89	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	99	100	100	101	101	
8	102	102	103	103	104	104	105	105	106	106	107	107	108	108	109	109	110	110	111	111	112	112	113	113	114	114	115	115	116	116	
9	117	117	118	118	119	119	120	120	121	121	122	122	123	123	124	124	125	125	126	126	127	127	128	128	129	129	130	130	131	131	
10	132	132	133	133	134	134	135	135	136	136	137	137	138	138	139	139	140	140	141	141	142	142	143	143	144	144	145	145	146	146	
11	147	147	148	148	149	149	150	150	151	151	152	152	153	153	154	154	155	155	156	156	157	157	158	158	159	159	160	160	161	161	
12	162	162	163	163	164	164	165	165	166	166	167	167	168	168	169	169	170	170	171	171	172	172	173	173	174	174	175	175	176	176	
13	177	177	178	178	179	179	180	180	181	181	182	182	183	183	184	184	185	185	186	186	187	187	188	188	189	189	190	190	191	191	
14	192	192	193	193	194	194	195	195	196	196	197	197	198	198	199	199	200	200	201	201	202	202	203	203	204	204	205	205	206	206	
15	207	207	208	208	209	209	210	210	211	211	212	212	213	213	214	214	215	215	216	216	217	217	218	218	219	219	220	220	221	221	
16	222	222	223	223	224	224	225	225	226	226	227	227	228	228	229	229	230	230	231	231	232	232	233	233	234	234	235	235	236	236	
17	237	237	238	238	239	239	240	240	241	241	242	242	243	243	244	244	245	245	246	246	247	247	248	248	249	249	250	250	251	251	
18	252	252	253	253	254	254	255	255	256	256	257	257	258	258	259	259	260	260	261	261	262	262	263	263	264	264	265	265	266	266	
19	267	267	268	268	269	269	270	270	271	271	272	272	273	273	274	274	275	275	276	276	277	277	278	278	279	279	280	280	281	281	
20	POS1	POS1	POS2	POS2	POS3	POS3	Neg	Neg	282	282	283	283	284	284	285	285	286	286	287	287	288	288	289	289	290	290	291	291	292	292	
21	293	293	294	294	295	295	296	296	297	297	298	298	299	299	300	300	301	301	302	302	303	303	304	304	305	305	306	306	307	307	
22	308	308	309	309	310	310	311	311	312	312	313	313	314	314	315	315	316	316	317	317	318	318	319	319	320	320	321	321	322	322	
23	323	323	324	324	325	325	326	326	327	327	328	328	329	329	330	330	331	331	332	332	333	333	334	334	335	335	336	336	337	337	
24	338	338	339	339	340	340	341	341	342	342	343	343	344	344	345	345	346	346	347	347	348	348	349	349	350	350	351	351	352	352	
25	353	353	354	354	355	355	356	356	357	357	358	358	359	359	360	360	361	361	362	362	363	363	364	364	365	365	366	366	367	367	
26	368	368	369	369	370	370	371	371	372	372	373	373	374	374	375	375	376	376	377	377	378	378	379	379	380	380	381	381	382	382	
27	383	383	384	384	385	385	386	386	387	387	388	388	389	389	390	390	391	391	392	392	393	393	394	394	395	395	396	396	397	397	
28	398	398	399	399	400	400	401	401	402	402	403	403	404	404	405	405	406	406	407	407	408	408	409	409	410	410	411	411	412	412	
29	413	413	414	414	415	415	416	416	417	417	418	418	419	419	420	420	421	421	422	422	423	423	424	424	425	425	426	426	427	427	
30	428	428	429	429	430	430	431	431	432	432	433	433	434	434	435	435	436	436	437	437	438	438	439	439	440	440	441	441	442	442	
31	443	443	444	444	445	445	446	446	447	447	448	448	449	449	450	450	451	451	452	452	453	453	454	454	455	455	456	456	457	457	
32	458	458	459	459	460	460	461	461	462	462	463	463	464	464	465	465	466	466	467	467	468	468	469	469	470	470	471	471	472	472	
33	473	473	474	474	475	475	476	476	477	477	478	478	479	479	480	480	481	481	482	482	483	483	484	484	485	485	486	486	487	487	
34	488	488	489	489	490	490	491	491	492	492	493	493	494	494	495	495	496	496	497	497	498	498	499	499	500	500	Neg	Neg	Neg	Neg	
35	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	POS3	POS3	POS2	POS2	POS1	POS1

## VI. Antibody Array Target List

# A. RayBio® Human Antibody Array L-507 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	6CKine	74	F3	147	FGF-19	220	IGFBP-4	293	IL-22 BP	366	MMP-20	439	Shh-N
2	Activin A	75	CRIM 1	148	FGF-20	221	IGFBP-6	294	IL-22 R	367	MMP-24	440	SPARC
3	Activin B	76	Cripto-1	149	FGF-21	222	IGFBP-rp1	295	IL-23	368	MMP-25	441	Spinesin
4	Activin C	77	CRTH-2	150	FGF-23	223	IGF-I	296	IL-23 R	369	MSPa	442	TACI
5	Activin RIA	78	Cryptic	151	FLRG	224	IGF-I R	297	IL-24	370	Musk	443	Tarc
6	Activin RIB	79	Csk	152	Flt-3 Ligand	225	IGF-II	298	IL-26	371	NAP-2	444	TCR
7	EYA2	80	CTACK	153	Follistatin	226	IGF-II R	299	IL-27	372	NCAM-1	445	TECK
8	Activin RIIA	81	CTGF	154	Follistatin-like 1	227	IL-1 alpha	300	IL-28A	373	Neurtin	446	TFPI
9	Adiponectin	82	CTLA-4	155	Fractalkine	228	IL-1 beta	301	IL-29	374	NeuroD1	447	TGF-alpha
10	AgRP	83	CV-2	156	Frizzled-1	229	IL-1 F5	302	IL-31	375	Neuropilin-2	448	TGF-beta 1
11	ALCAM	84	CXCL14	157	Frizzled-3	230	IL-1 F6	303	IL-31 RA	376	Neurturin	449	TGF-beta 2
12	Angiogenin	85	CXCL16	158	Frizzled-4	231	IL-1 F7	304	BACE-1	377	NGF R	450	TGF-beta 3
13	Angiopoietin-1	86	CXCR1	159	Frizzled-5	232	IL-1 F8	305	FACX	378	Nidogen-1	451	ATP2B1
14	Angiopoietin-2	87	CXCR2	160	Frizzled-6	233	IL-1 F9	306	Insulin	379	NOV	452	TGF-beta RI
15	Angiopoietin-4	88	CXCR3	161	Frizzled-7	234	IL-1 F10	307	Insulin R	380	NrCam	453	TGF-beta RII
16	ANGPTL1	89	CXCR4	162	Galectin-3	235	IL-1 R3	308	Insulysin	381	GGF2	454	Grb2
17	ANGPTL2	90	CXCR5	163	GASP-1	236	IL-1 R4	309	IP-10	382	NRG2	455	TGF-beta RIII
18	ANGPTL7	91	CXCR6	164	GASP-2	237	IL-1 R6	310	I-TAC	383	NRG3	456	Thrombopoietin
19	Angiostatin	92	D6	165	GCP-2	238	IL-1 R8	311	Kininostatin	384	NT-3	457	Thyroid Peroxidase
20	APJ	93	DAN	166	GCSF	239	IL-1 R9	312	Kremen-1	385	NT-4	458	Thrombospondin-1
21	APRIL	94	DANCE	167	G-CSF R	240	IL-1 ra	313	Kremen-2	386	Orexin A	459	Thrombospondin-2
22	Amphiregulin	95	DCR3	168	GDF1	241	IL-1 RI	314	LTBP1	387	Orexin B	460	Thrombospondin-4
23	Artemin	96	Decorin	169	GDF3	242	IL-1 RII	315	LBP	388	OSM	461	Thymopoietin
24	Axl	97	Dkk-1	170	GDF5	243	IL-2	316	Lck	389	Osteoactivin	462	Tie-1
25	B7-1	98	Dkk-3	171	GDF8	244	IL-2 R alpha	317	LECT2	390	Osteocrin	463	Tie-2
26	BAFF R	99	Dkk-4	172	GDF9	245	IL-2 R beta	318	Lefty-A	391	Osteoprotegerin	464	TIMP-1
27	BCMA	100	DR3	173	GDF11	246	IL-2 R gamma	319	Leptin	392	OX40 Ligand	465	TIMP-2
28	BD-1	101	DR6	174	GDF-15	247	IL-3	320	Leptin R	393	PARC	466	TIMP-3
29	BDNF	102	Dtk	175	GDNF	248	IL-3 R alpha	321	LFA-1 alpha	394	PD-ECGF	467	TIMP-4
30	beta-Catenin	103	EDA-A2	176	GFR alpha-1	249	IL-4	322	LIF	395	PDGF R alpha	468	DEFAs
31	Bax	104	EDAR	177	GFR alpha-2	250	IL-4 R	323	LIF R alpha	396	PDGF R beta	469	TLR1
32	beta-NGF	105	EDG-1	178	GFR alpha-3	251	IL-5	324	LIGHT	397	PDGF-AA	470	TLR2
33	BIK	106	EGF	179	GFR alpha-4	252	IL-5 R alpha	325	Lipocalin-1	398	PDGF-AB	471	TLR3
34	BLC	107	EGF R	180	GITR	253	IL-6	326	Lipocalin-2	399	PDGF-BB	472	TLR4
35	BMP-2	108	EG-VEGF	181	GITR Ligand	254	IL-6 R	327	LRP-1	400	PDGF-C	473	TMEFF1
36	BMP-3	109	EMAP-II	182	CBR1	255	IL-7	328	LRP-6	401	PDGF-D	474	TMEFF2
37	BMP-3b	110	ENA-78	183	Glut1	256	IL-7 R alpha	329	L-Selectin	402	PECAM-1	475	TNF-alpha
38	BMP-4	111	Endocan	184	Glut2	257	IL-8	330	Lymphotactin	403	Pentraxin3	476	TNF-beta
39	BMP-5	112	Endoglin	185	Glut3	258	IL-9	331	LTB	404	Persephin	477	TNF RI
40	BMP-6	113	Endostatin	186	Glut5	259	IL-10	332	LTBR	405	PF4	478	TNF RII
41	BMP-7	114	Endothelin	187	Glypican 3	260	IL-10 R alpha	333	MAC-1	406	PIGF	479	TRADD
42	BMP-8	115	EN-RAGE	188	Glypican 5	261	IL-10 R beta	334	MCP-1	407	PLUNC	480	TRAIL
43	BMP-15	116	Eotaxin	189	GM-CSF	262	IL-11	335	MCP-2	408	Pref-1	481	TRAIL R1
44	BMPR-IA	117	Eotaxin-2	190	GM-CSF R alpha	263	IL-12 p40	336	MCP-3	409	Progranulin	482	TRAIL R2
45	BMPR-IB	118	Eotaxin-3	191	Granzyme A	264	IL-12 p70	337	MCP-4	410	Prolactin	483	TRAIL R3
46	BMPR-II	119	Epregeulin	192	GREMLIN	265	IL-12 R beta 1	338	M-CSF	411	P-selectin	484	TRAIL R4
47	BTC	120	ErbB2	193	GRO	266	IL-12 R beta 2	339	M-CSF R	412	RAGE	485	TRANCE
48	Cardiotrophin-1	121	ErbB3	194	GRO-a	267	IL-13	340	MDC	413	RANK	486	TREM-1
49	CCL14	122	ErbB4	195	GH	268	IL-13 R alpha 1	341	MFG-E8	414	RANTES	487	TROY
50	CCL28	123	Erythropoietin	196	GHR	269	IL-13 R alpha 2	342	MFRP	415	RELMBeta	488	TSG-6
51	CCR1	124	E-Selectin	197	HB-EGF	270	IL-15	343	MICA	416	RELT	489	TSLP R
52	CCR2	125	FADD	198	HCC-4	271	IL-15 R alpha	344	MIF	417	ROBO4	490	TWEAK
53	CCR3	126	FAM3B	199	HCR	272	IL-16	345	MIG	418	S100 A8/A9	491	TWEAK R
54	CCR4	127	Fas	200	Hepassocin	273	IL-17	346	MIP-1a	419	S100A10	492	Ubiquitin+1
55	CCR5	128	Fas Ligand	201	GLO-1	274	IL-17B	347	MIP-1b	420	SAA	493	uPA
56	CCR6	129	FGF Basic	202	HGF	275	IL-17B R	348	MIP-1d	421	SCF	494	uPAR
57	CCR7	130	FGF-BP	203	HGFR	276	IL-17C	349	MIP 2	422	SCF R	495	Vasorin
58	CCR8	131	FGF R3	204	HRG-alpha	277	IL-17D	350	MIP-3 alpha	423	SDF-1	496	VCAM-1
59	CCR9	132	FGF R4	205	HRG-beta 1	278	IL-17E	351	MIP-3 beta	424	sFRP-1	497	VE-Cadherin
60	CD14	133	FGF R5	206	HVEM	279	IL-17F	352	MMP-1	425	sFRP-3	498	VEGF
61	CD27	134	FGF-4	207	I-309	280	IL-17R	353	MMP-2	426	sFRP-4	499	VEGF R2
62	CD30	135	FGF-5	208	ICAM-1	281	IL-17RC	354	MMP-3	427	sgp130	500	VEGF R3
63	CD30 Ligand	136	FGF-6	209	ICAM-2	282	IL-17RD	355	MMP-7	428	SIGIRR	501	VEGF-B
64	CD40	137	FGF-7	210	ICAM-3	283	IL-18 BPa	356	MMP-8	429	Siglec-5	502	VEGF-C
65	CD40 Ligand	138	FGF-8	211	ICAM-5	284	IL-18 R alpha	357	MMP-9	430	Siglec-9	503	VEGF-D
66	CD 163	139	FGF-9	212	IFN-alpha/beta R1	285	IL-18 R beta	358	MMP-10	431	SLPI	504	VEGI
67	Cerberus 1	140	FGF-10	213	IFN-alpha/beta R2	286	IL-19	359	MMP-11	432	Smad 1	505	WIF-1
68	Chem R23	141	FGF-11	214	IFN-beta	287	IL-20	360	MMP-12	433	Smad 4	506	WISP-1
69	Chordin-Like 1	142	FGF-12	215	IFN-gamma	288	IL-20 R alpha	361	MMP-13	434	Smad 5	507	XEDAR
70	Chordin-Like 2	143	FGF-13 1B	216	IFN-gamma R1	289	IL-20 R beta	362	MMP-14	435	Smad 7		
71	CLC	144	FGF-16	217	IGFBP-1	290	IL-21	363	MMP-15	436	Smad 8		
72	CNTF	145	FGF-17	218	IGFBP-2	291	IL-21 R	364	MMP-16	437	Prdx6		
73	CNTF R alpha	146	FGF-18	219	IGFBP-3	292	IL-22	365	MMP-19	438	Soggy-1		

## B. RayBio® Human Antibody Array L-493 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	11b-HSD1	73	BLAME	145	C-peptide	217	FoxO1	289	KIF3B	361	PTH	433	Serpin G1
2	2B4	74	BMP-9	146	Creatinine	218	FoxP3	290	KLF4	362	Troponin C	434	SERTAD2
3	4-1BB	75	BMX	147	CRP	219	FRK	291	LAG-3	363	PDX-1	435	SHBG
4	ABL1	76	BNIP2	148	CRTAM	220	ARB1	292	pro-Glucagon	364	PEDF	436	SMAC
5	ACE	77	Btk	149	CSH1	221	Furin	293	Layilin	365	PEPSINOGEN I	437	SNCG
6	ACE-2	78	ApoC1	150	gamma-Thrombin	222	Fyn	294	LDL R	366	PEPSINOGEN II	438	SSTR5
7	ACK1	79	CA9	151	CutA	223	GADD45A	295	Legumain	367	Vasopressin	439	SCGF
8	ACPP	80	CA15-3	152	Troponin T	224	Galectin-1	296	LH	368	PPGR-S	440	SOST
9	ACTH	81	CA19-9	153	Cyclin D1	225	Galectin-3BP	297	LIMP1	369	PI 16	441	SOX17
10	ADAM-9	82	CA125	154	Cystatin A	226	Galectin-7	298	LIN41	370	PIK3R1	442	SOX2
11	Neurokinin A	83	Cadherin-13	155	Cystatin B	227	Gas1	299	Livin	371	PIM2	443	SPARCL1
12	ADAMTS1	84	CLEC14A	156	Cystatin C	228	Gastrin	300	LOX-1	372	PKM2	444	SPINK1
13	ADAMTS12	85	Calbindin D	157	Cytochrome C (d)	229	GATA-3	301	LPS	373	Plasminogen	445	SRMS
14	ADAMTS4	86	Calcitonin	158	Cytokeratin 8	230	GATA-4	302	LRG1	374	Podocalyxin	446	SSEA-1
15	ADAMTS5	87	Calreticulin	159	Cytokeratin 18	231	Gelsolin	303	LTf	375	POMC	447	SSEA-4
16	ADAMTS10	88	Calsyntenin-1	160	Cytokeratin 19	232	Ghrelin	304	LTk	376	PON1	448	SSTR2
17	ADAMTS13	89	CPN2	161	DBI	233	GLP-1	305	Lumican	377	PON2	449	Survivin
18	ADAMTS15	90	CART	162	DCBLD2	234	GPI	306	Lyn	378	PPARg2	450	SYK
19	ADAMTS17	91	Caspase-3	163	D-Dimer	235	GPBB	307	LYRIC	379	PPP2R5C	451	Syndecan-1
20	ADAMTS18	92	Caspase-8	164	DEFA1/3	236	GMNN	308	LYVE-1	380	NR3C3	452	Syndecan-3
21	ADAMTS19	93	Cathepsin B	165	CPA1	237	GPR-39	309	LZTS1	381	INSL3	453	TACE
22	Adipsin	94	Cathepsin D	166	Desmin	238	GPX1	310	Mammaglobin A	382	Pro-BDNF	454	TAF4
23	Afamin	95	Cathepsin L	167	DLL1	239	GPX3	311	Marapsin	383	Procalcitonin	455	Tyk2
24	AFP	96	Cathepsin S	168	DLL4	240	Pancreastatin	312	MATK	384	Pro-Cathepsin B	456	Tec
25	ALBUMIN	97	CBP	169	DMP-1	241	GRP	313	MBL	385	Thrombin	457	TFF3
26	IL-28B	98	CCK	170	DPPIV	242	GRP75	314	C1qTNF1	386	Prohibitin	458	Thrombomodulin
27	Aldolase A	99	CD23	171	BNP	243	GRP78	315	Mer	387	ProSAAS	459	TK1
28	Aldolase B	100	CD24	172	E-Cadherin	244	GSR	316	Mesothelin	388	Prostasin	460	Thyroglobulin
29	Aldolase C	101	CD36	173	Endorphin Beta	245	GST	317	MICB	389	PSP	461	TIM-1
30	ALK	102	CD38	174	EDNRA	246	HADHA	318	Midkine	390	Pro-MMP-7	462	TNK1
31	Alpha Lactalbumin	103	CD44	175	Enolase 2	247	HAI-1	319	MINA	391	Pro-MMP-9	463	TOPORS
32	Alpha 1 AG	104	CD45	176	ENPP2	248	HAI-2	320	FABP3	392	Protein p65	464	TPA
33	A1BG	105	CD46	177	EpCAM	249	hCG alpha	321	MSHa	393	PSA-Free	465	TRA-1-60
34	A1M	106	CD47	178	EphA1	250	hCgb	322	MTUS1	394	PSA-total	466	TRA-1-81
35	A2M	107	CD55	179	EphA2	251	Hck	323	Myoglobin	395	PTHLP	467	Transferrin
36	TPM1	108	CD59	180	EphA3	252	He4	324	NAIP	396	PTN	468	Trappin-2
37	ALPP	109	CD71	181	EphA4	253	Hemopexin	325	Nanog	397	PTPRD	469	TRKB
38	Pro-MMP-13	110	CD74	182	EphA5	254	Hepcidin	326	NELL2	398	PYK2	470	Troponin I
39	AMICA	111	CD90	183	EphA6	255	HSP32	327	Nephrilysin	399	PYY	471	TYRO10
40	AMPKa1	112	CD97	184	EphA7	256	HOXA10	328	Galanin	400	Ras	472	TRPC1
41	Amylin	113	CD79 alpha	185	EphA8	257	Haptoglobin	329	Nesfatin	401	RBP4	473	TRPC6
42	ANGPTL3	114	CD200	186	EphB1	258	HSP10	330	Nestin	402	RECK	474	TRPM7
43	ANGPTL4	115	CEA	187	EphB2	259	HSP20	331	NET1	403	RELM alpha	475	Trypsin 1
44	Annexin A7	116	CEACAM-1	188	EphB3	260	HSP27	332	Netrin G2	404	Resistin	476	TSH
45	APC	117	Ceruloplasmin	189	EphB4	261	HSP40	333	Netrin-4	405	RET	477	TSLP
46	APCS	118	CFHR2	190	EphB6	262	HSP60	334	Neuropeptide Y	406	RIP1	478	TXK
47	Apelin	119	Chemerin	191	ERRa	263	HSP70	335	NF1	407	ROCK1	479	Uromodulin
48	Apex1	120	CHI3L1	192	Erythropoietin R	264	HSP90	336	NM23-H1/H2	408	ROCK2	480	TFF1
49	APN	121	Chromogranin A	193	ESAM	265	HSPA8	337	Presenilin 2	409	ROR1	481	VDUP-1
50	ApoA1	122	Chymase	194	EV15L	266	HTRA2	338	Notch-1	410	ROR2	482	VEGF R1
51	ApoA2	123	ciAP-2	195	EXTL2	267	IBSP	339	NPTX1	411	ROS	483	VGf
52	ApoA4	124	Ck beta 8-1	196	FABP1	268	IGF2BP1	340	NPTXR	412	RYK	484	VIPR2
53	ApoB	125	CKMB	197	FABP2	269	IGFBP-5	341	Progesterone	413	S100A4	485	VDR
54	ApoC2	126	Claudin-3	198	FABP4	270	IDUA	342	Ntn1	414	S100A6	486	VDB
55	ApoB100	127	Claudin-4	199	FAK	271	IL-33	343	OCT3/4	415	S100A8	487	PROS1
56	ApoE	128	CLEC3B	200	FAP	272	IL-34	344	Omentin	416	S-100b	488	Vitronectin
57	ApoE3	129	Clusterin	201	Fcg RIIB/C	273	INSRR	345	Osteocalcin	417	SART1	489	VWF
58	ApoD	130	CNDP1	202	Fen-1	274	ITGAV	346	Osteopontin	418	SART3	490	WT1
59	ApoM	131	Fc gamma RIIB	203	FER	275	CD61	347	OX40	419	SCG3	491	XIAP
60	ApoH	132	Factor XIII B	204	Ferritin	276	Itk	348	p21	420	Selenoprotein P	492	ZAG
61	APP	133	COCO	205	Fetuin A	277	ITM2B	349	p27	421	SEMA3A	493	ZAP70
62	ASPH	134	C2	206	Fetuin B	278	Kallikrein 2	350	p53	422	Serotonin		
63	Attractin	135	C3a	207	FGFR1	279	ApoC3	351	PAI-1	423	Serpin A1		
64	B3GNT1	136	C5a	208	FGFR1 alpha	280	Kallikrein 5	352	PAK7	424	Serpin A12		
65	BAF57	137	C7	209	FGFR2	281	Kallikrein 6	353	Pappalysin-1	425	Serpin A3		
66	BAFF	138	C8b	210	Fibrinogen	282	Kallikrein 7	354	PP	426	Serpin A4		
67	BAI-1	139	C9	211	Fibrinopeptide A	283	Kallikrein 8	355	Presenilin 1	427	Serpin A5		
68	BCAM	140	CFH	212	Fibronectin	284	Kallikrein 10	356	PARK7	428	Serpin A8		
69	B2M	141	Contactin-1	213	Ficolin-3	285	Kallikrein 11	357	Visfatin	429	Serpin A9		
70	Beta Defensin 4	142	Contactin-2	214	FIH	286	Kallikrein 14	358	P-Cadherin	430	Serpin B5		
71	Beta IG-H3	143	CBG	215	FOLR1	287	KCC3	359	PCAF	431	Serpin D1		
72	Biglycan	144	COX-2	216	FOXN3	288	KCTD10	360	PD-1	432	Serpin I1		

# C. RayBio® Human Antibody Array L-3 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	14-3-3 beta	73	Antithrombin III	145	C4BPA	217	CHREBP	289	Cytokeratin 9	361	EVC2	433	Glyoxalase II
2	14-3-3 epsilon	74	APA	146	C5b-9	218	Chromogranin B	290	D4 GDI	362	Ezrin	434	GM2A
3	14-3-3 eta	75	APLP-1	147	C6	219	Chromogranin C	291	DAK	363	F11	435	GMF beta
4	14-3-3 gamma	76	APM2	148	C8G	220	CIP29	292	Contactin-4	364	FABP5	436	GNB1
5	14-3-3 sigma	77	Apo(a)	149	C9orf40	221	CKB	293	DARS2	365	Factor IX	437	GNPTG
6	14-3-3 theta	78	APOA1BP	150	CA1	222	CLIC1	294	DCI	366	Factor V	438	GOLPH2
7	14-3-3 zeta	79	ApoF	151	CA150	223	CLIC4	295	DCXR	367	Factor XII	439	GOLPH4
8	53BP1	80	ApoL1	152	CA2	224	CUP170	296	DDAH1	368	Factor XIII	440	GOT2
9	67LR	81	ApoL2	153	CA3	225	CL-P1	297	DDT	369	FAM20C	441	GPR116
10	ABAT	82	ARFBP1	154	CACNB4	226	CLPS	298	DDX3Y	370	FAM3C	442	GPLD1
11	ABCF1	83	ARFGEF3	155	CAD	227	CLTA	299	DEFA6	371	Fascin	443	GRHL1
12	ABI3BP	84	ASL	156	Cadherin 22	228	CNN2	300	DEP-1	372	FASN	444	Granzyme M
13	ACAA1	85	ArgR5	157	Cadherin-6	229	CNOT1	301	DNER	373	fast skeletal Myosin	445	GRNPR
14	ACAA2	86	ARP19	158	CALD1	230	CO4A2	302	Dermcidin	374	FASTKD5	446	GRP
15	ACACA	87	Arp2	159	CALML5	231	COG4	303	Desmocollin 1	375	FBP38	447	GSTM1
16	ACAA	88	ARP2/3	160	Calmodulin	232	COL19A1	304	Desmocollin-2	376	FBP2	448	GSTP1
17	ACLP	89	Arp3	161	Calpain 1	233	COL4A3	305	Desmocollin-3	377	FBPase 1	449	Guanylin
18	ACLY	90	ARPC2	162	Calpain S1	234	Col6A2	306	Desmoglein-1	378	FCGBP	450	GULP1
19	Aconitase 1	91	ARPC3	163	Calpastatin	235	COL9A3	307	Desmoglein-2	379	FDP5	451	H6PD
20	ACTBL2	92	ART3	164	Calretinin	236	COLEC10	308	Desmoplakin	380	FH	452	HABP2
21	ACTC1	93	ARTS1	165	Calumenin	237	Collagen Ia1	309	Desmuslin	381	Fibrillin 1	453	HBZ
22	Actinin alpha 1	94	ARX	166	CAP1	238	Collagen III	310	Destrin	382	FGG	454	HCFC1
23	ADAMDEC1	95	ASH2L1	167	CapG	239	Collagen IVa6	311	DGK	383	Fibrinogen-like 2	455	HOGF
24	ADAS	96	ASGR2	168	CAPZA1	240	Collagen IX	312	DISC 1	384	Fibrinopeptide B	456	HEG1
25	ADH1B	97	ASK1	169	CPB2	241	Collagen V	313	DMGDH	385	Fibulin 3	457	Hemoglobin
26	ADH1C	98	AST	170	CARHSP1	242	Collagen VI	314	DMRN9	386	Ficolin-2	458	Hemoglobin A1c
27	ADH4	99	DNPEP	171	Caspase-14	243	Collagen X	315	DBH	387	Filamin A	459	HBB
28	ADHS	100	ASXL1	172	Catalase	244	COL15A1	316	DOT1L	388	Filamin B	460	HBD
29	ADM	101	ATBF1	173	Cathelicidin	245	COMP	317	DPEP2	389	Filamin C	461	HBG2
30	Advillin	102	ATP5A	174	Cathepsin A	246	CFB	318	DPP3	390	FKBP12	462	HEXB
31	AFG3L2	103	ATP5O	175	Cathepsin G	247	Contactin-3	319	DPP1	391	FKBP25	463	HGFA
32	AGA	104	ATPB	176	Cathepsin H	248	COP58	320	DRIL1	392	FKBP51	464	hGH
33	Aggrecan	105	B3GNT2	177	Cathepsin Z	249	Corneodesmosin	321	DSCAM	393	FLG2	465	hHR23b
34	AGXT	106	B4GalT1	178	CBS	250	Coronin 3	322	DSPG3	394	FOLR3	466	HIBADH
35	AHNAK	107	B7-H2	179	CCDC126	251	Cortactin	323	Dystroglycan	395	Frizzled 8	467	HINT1
36	Ahsp	108	B7-H3	180	CCDC25	252	COTL1	324	UBA1	396	FRY	468	HIP1R
37	AIF	109	BAD	181	CCT3	253	CPE	325	ECHS1	397	FSH	469	Histone H1.2
38	AK2	110	Band 3	182	CD109	254	CPEB3	326	ECM-1	398	Azurocidin	470	Histone H1.3
39	AKAP9	111	BASP1	183	CD133	255	CPM	327	EEF1G	399	FUCA1	471	Histone H2A
40	AKR1B1	112	Bassoon	184	CD155	256	CPN1	328	EEF2	400	FUCA2	472	Histone H2A.Z
41	AKR1C3	113	BAZ2B	185	CD157	257	CPNE3	329	EFEMP2	401	FAH	473	Histone H2B K
42	AKR7A2	114	BCHC	186	CD16	258	CPS1	330	EFTUD2	402	G0/G1switch 2	474	Histone H3.3
43	ALAD	115	Bcl-w	187	CD21	259	CKMM	331	EHD1	403	G3BP	475	Histone H4
44	ALT	116	BCOR	188	CD32	260	CRF21	332	EHD3	404	GALNT2	476	HUA-C
45	ADH	117	beta 1 Spectrin	189	CD35	261	CRHBP	333	EIF3S2	405	gamma Catenin	477	HMGB1
46	AOX1	118	CRYBB1	190	CD39L4	262	Crkl	334	elF4A1	406	GAPDH	478	HMGB2
47	ALDH16A1	119	beta 1 Tubulin	191	CD41	263	CRMP2	335	elF5A	407	GARNL1	479	HMG83
48	ALDH1A1	120	CUBB3	192	CD42b	264	CRTAC1	336	ELAVL1	408	GART	480	HMG2
49	ALDH9A1	121	BID	193	CD48	265	CS	337	EMILUN1	409	Gastrokine 1	481	HN1
50	ALKP	122	BIN2	194	CD5L	266	Ctip2	338	EMSY	410	GATM	482	FoxA1
51	ALP	123	BIRC6	195	CD9	267	Cux2	339	EN2	411	GBE1	483	hnRNP A1
52	MAN1A1	124	BLMH	196	CD98	268	Cyclophilin A	340	Endorepellin	412	GCDFP 15	484	hnRNP A2B1
53	alpha Actinin 4	125	BLVRB	197	CDA	269	Cyclophilin B	341	ENO1	413	GCLC	485	hnRNP C1+C2
54	Alpha Fodrin	126	BMP-1	198	CDC5L	270	Cystatin D	342	ENO1+ENO2+ENO3	414	GCSH	486	hnRNP G
55	alpha Glucosidase II	127	BPGM	199	CDK2	271	Cystatin E	343	ENSA	415	GDA	487	hnRNP L
56	alpha-Synuclein	128	BPIFB1	200	CEACAM-8	272	Cystatin S	344	Envoplakin	416	GDF7	488	hnRNP M1-M4
57	alpha Tubulin	129	BPI1L	201	CECR1	273	Cystatin SN	345	EDN	417	GDI1	489	hnRNP U
58	CRYAA	130	BRCA 2	202	CENPF	274	CSRP1	346	EPB41	418	GDI2	490	Hornerin
59	ALS	131	BRD2	203	CEP57	275	CYTL1	347	EPCR	419	Gephyrin	491	Hoxb3
60	Als2	132	Brevican	204	CES1	276	Cytochrome b5	348	Ephrin B1	420	GFAP	492	HOXD11
61	ALS2CR1	133	Brg1	205	CETP	277	Cytochrome c (n)	349	Ephrin B2	421	GHRF	493	HP1BP3
62	Aminoacylase	134	BRSK1	206	Cezanne	278	Cytokeratin 1	350	EPHX2	422	GIP	494	HPD
63	Androgen Receptor	135	BTD	207	CFHR1	279	Cytokeratin 10	351	EPPK1	423	GLPR2	495	HPR
64	ANGPTL6	136	BTF3	208	CFHR4	280	Cytokeratin 13	352	Eps15	424	GLRX1	496	HPRT
65	ANGPTL8	137	C1q	209	CFHR5	281	Cytokeratin 14	353	ERAB	425	G6PD	497	HRG
66	ANK	138	C1qA	210	CFI	282	Cytokeratin 15	354	ERAP2	426	PRKCSH	498	HRS12
67	Ankrd26	139	C1qB	211	CFL1	283	Cytokeratin 16	355	Erp29	427	GLUD1	499	HSC70
68	Annexin A1	140	C1qR1	212	CFVII	284	Cytokeratin 17	356	Erp57	428	CGH	500	HSP47
69	Annexin A2	141	C1RL	213	CHC17	285	Cytokeratin 20	357	Erp72	429	GSTO1		
70	Annexin A6	142	C1s	214	Chitobiase	286	Cytokeratin 3	358	ESD	430	GSS		
71	Annexin V	143	ELP6	215	Chitotriosidase	287	Cytokeratin 4	359	ESR1	431	GPD1		
72	ANP	144	C4.4A	216	CHORDC1	288	Cytokeratin 5	360	ETL	432	Glycoprotein V		

# D. RayBio® Human Antibody Array L-4 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	HEXA	73	LIMS1	145	Nectin-1	217	Peroxioredoxin 3	289	PTK 7	361	Serpin A7	433	Thymosin b10
2	HTRA1	74	LMAN2	146	Nectin-3	218	Peroxioredoxin 5	290	PTMA	362	Serpin B3	434	Titin
3	Agrin	75	ACP1	147	NEDD8	219	PF4V1	291	PTP gamma	363	Serpin B6	435	TLS
4	IBP160	76	LOK	148	Neogenin	220	PGAM1	292	PTP kappa	364	Serpin B8	436	TMEM223
5	IDH1	77	LOX	149	Nesprin2	221	PGAM2	293	PTP mu	365	Serpin F2	437	TOB2
6	IDH3A	78	LOXL1	150	Neurabin 1	222	PGD	294	PTPRS	366	Serpin A10	438	TOP2B
7	IFRD1	79	LRP 4	151	Neural Cadherin	223	PHGDH	295	PTPRZ	367	SERPINB1	439	TPM4
8	IGF2BP2	80	LTA4H	152	PAM	224	PGK-1	296	PYGL	368	SerpinB4	440	TPP1
9	ITGB5	81	LTBP4	153	Neurogranin	225	PGLS-C-t	297	PZP	369	SerpinE2	441	TALDO1
10	IGSF4B	82	Lubricin	154	Neuropeptide B	226	PGM1	298	QDPR	370	SerRS	442	TALDO
11	Ihh	83	LUZP1	155	Neuropilin-1	227	PGRPL	299	QPRT	371	SET	443	Transthyretin
12	ILK	84	LYPA1	156	Neurotrimin	228	PHAP1	300	Quiescin Q6	372	SEZ6L2	444	TRAP1
13	Inhibin beta	85	Lysozyme	157	NF-M	229	PSAT1	301	Rab7a	373	SF20	445	TRAP220
14	ITGB1	86	MAGI2	158	Nidogen-2	230	PIK3C2B	302	Ran	374	SH3BGR	446	TRF 2
15	ITGB6	87	MAGP-2	159	NIT2	231	plgR	303	RanGAP1	375	SH3BGR3	447	TPIS
16	ITGA6	88	MAN1	160	NME3	232	PIK3IP1	304	RAP1AB	376	SHANK1	448	Tropomyosin 3
17	IQGAP1	89	MANF	161	nNOS	233	PIN	305	Rbm15	377	SHC1	449	Twist-1
18	IQGAP2	90	Mannosidase II	162	Noelin	234	PISD	306	RCL	378	SHIP	450	TRPS1
19	IRE1	91	MAP1A	163	Non-muscle Actin	235	PKLR	307	Reg1A	379	SHMT1	451	Trypsinogen-2
20	IRS2	92	MAPRE1	164	Myosin IIA	236	PLA2G1B	308	Reg3A	380	SHP-1	452	Trypsin Pan
21	ISOC2	93	MARCKS	165	Notch-2	237	Plakophilin 1	309	RHOC	381	Siglec-1	453	WRS
22	ITGB4BP	94	MASP3	166	Notch-2 ICD	238	Plastin L	310	RhoGDI	382	SIGLEC14	454	TSR2
23	ITIH1	95	MBD2	167	NPAS3	239	PLC-gamma 1	311	RNASE1	383	SIM2	455	TUBA6
24	ITIH2	96	MBP	168	NPM1	240	Pleckstrin	312	RNH1	384	SIRP beta 1	456	TWF2
25	ITIH3	97	MCAM	169	NQO2	241	Plectin	313	RNASET2	385	Six3	457	TXNDC4
26	ITIH4 a	98	Mcl-1	170	NTSC3	242	Plexin B1	314	RKIP	386	SLC38A10	458	TXNDC5
27	JAM-A	99	MCM	171	NUCB1	243	Plexin B2	315	POLR2A	387	SLITRK1	459	TXNRD2
28	JARID2	100	MCM5	172	NUP98	244	PLOD1	316	RNASE4	388	SLURP1	460	UBE2D3
29	KPNB1	101	MCMP2	173	OBCAM	245	PLOD2	317	RNASE6	389	SMA	461	Ube2L3
30	Keratin 36	102	MDH1	174	OIT3	246	PLS3	318	RPL10	390	SMC4	462	UBE2N
31	Keratin 38	103	MDH2	175	Olfactomedin-2	247	Pldc2	319	RPL10A	391	SMPD4	463	Ubiquitin
32	KHSRP	104	ME1	176	OTC	248	PNP	320	RPL11	392	SOD1	464	UCH-L1
33	KIAA0319L	105	MEP1A	177	Orosomucoid 2	249	POR	321	RPL12	393	SOD2	465	UFM 1
34	KIAA1468	106	Metallothionein	178	ORP150	250	PPCS	322	RPL14	394	SOD-3	466	UGGT
35	KIAA1967	107	Metavinculin	179	OSBP1	251	PPOX	323	RPL17	395	SOD4	467	UNC13D
36	KIF5B	108	MFAP4	180	OSCAR	252	PPP2R1B	324	RPL22	396	Somatostatin	468	UNC45A
37	Kilon	109	MF12	181	OSM R beta	253	PPP2R4	325	RPL5	397	SORD	469	UNC5H4
38	KLK-B1	110	mGLUR5	182	Osteoadherin	254	PRCP	326	RPL7A	398	SorLA	470	UPB1
39	KMD4B	111	MGP	183	OXT	255	PRDM13	327	RPLP0	399	SOX4	471	UQCRB
40	KMT2B	112	Mimecan	184	p16 ARC	256	PRDX 1	328	RPS10	400	SP-D	472	UQCRH
41	KRT31	113	MINPP1	185	P205b3	257	PRELP	329	RPS11	401	Spectrin beta-5	473	URB
42	KRT72	114	MLCK	186	p23	258	PREP	330	RPS12	402	SPEN	474	URB2
43	Krt73	115	MMR	187	p39	259	PRG2	331	RPS19	403	SPINK7	475	UROC1
44	KRT82	116	MMRN1	188	P4HB	260	PRNP	332	RPS2	404	SPTBN1	476	UROD
45	KRT85	117	MN1	189	p73	261	Profilin 1	333	RPS20	405	Src	477	URP2
46	KRTDAP	118	Moesin	190	PA2G4	262	Properdin	334	RPS23	406	SREC-II	478	USP14
47	KRTHA3B	119	MP1	191	PABP	263	Prosaposin	335	RPS25	407	STAT3	479	USP5
48	KSR1	120	MPCA	192	PACS1	264	PTGDS	336	RPS28	408	Stathmin 1	480	Uteroglobin
49	LAD	121	MPO	193	PARVB	265	PSMB6	337	RPS3	409	SCP2	481	Utrophin
50	LAF4	122	MRP 1	194	PCBP1	266	PSMA3	338	RPS5	410	STI1	482	VAP-1
51	LAIR1	123	MSH6	195	PCBP2	267	PSMA5	339	RREB1	411	STOM	483	VAP-A
52	LAM b1	124	mTOR	196	PCCA	268	PSMB7	340	RSU1	412	SUCLG1	484	VCP
53	LAMA	125	MUCDHL	197	PCDH7	269	PSMD5	341	S100A1	413	SUMO3	485	VDAC1
54	LMNA	126	Multimerin 2	198	PCDX8	270	PSMB1	342	S100A11	414	Symplekin	486	Versican
55	LMNB1	127	MyBPC3	199	PCK2	271	PSMA6	343	S100A7	415	SyncAM	487	Vimentin B
56	LMNB2	128	MYH2	200	PCMT1	272	PSB2	344	S100A9	416	Syntaxin 7	488	VNN1
57	LAMA2	129	MYH6	201	PCNA	273	PSB4	345	S100P	417	TAB182	489	VSIG4
58	LAMB2	130	MYH7	202	PCPE-1	274	Protein C	346	TIM-4	418	TAGLN2	490	WDR1
59	LAMC1	131	MYHC	203	PCSK9	275	Protein Z	347	SAA4a	419	Talin1	491	WISP2
60	LAMP	132	MYL12B	204	PCYOX1	276	Prouroguanylin	348	aAmylase	420	Talin1&2	492	WNK2
61	LAMP1	133	MYL3	205	PDE1B	277	PRSS23	349	SAMSN1	421	TAX1BP3	493	YB1
62	LAMP2	134	MYO5A	206	PDIA6	278	PRSS3	350	SBP-1	422	TBCA	494	YY1
63	LAP3	135	Myoferlin	207	PDLIM1	279	PRTN3	351	SBSN	423	TCEB2	495	ZBTB4
64	LASP1	136	Myosin 18B	208	PDLIM5	280	PSMA1	352	SDF4	424	Tcf20	496	ZC3H4-N-t
65	LTBP2	137	Myotrophin	209	PDZD2	281	PSMA2	353	SDNSF	425	TCN1	497	ZC3H8
66	LCAT	138	NABC1	210	PEBP4	282	PSMA4	354	SDPR	426	TCP1 eta	498	ZDHHC18
67	LCMT2	139	NAGLU	211	PEPD	283	PSMA7	355	SCG5	427	Tenascin C	499	ZNF671
68	LDHA	140	NAP111	212	PER1	284	PSMB5	356	Semaphorin 6B	428	Tenascin X	500	Zyxin
69	LDHB	141	NAPRT1	213	perilipin 3	285	PSMC3	357	Semaphorin 7A	429	TFF2		
70	LEDGF	142	NASP	214	Perilipin-1	286	PSMD1	358	SEMG1	430	TGM3		
71	SPINK5	143	NCAM2	215	Periostin	287	PSMD9	359	SEMG2	431	Thioredoxin-1		
72	LILRA3	144	Nebulin	216	Peroxioredoxin 2	288	PTEN	360	Serpin A11	432	THOP1		

# E. RayBio® Human Antibody Array L-5 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	A4GNT	73	CLDN1	145	F2RL1	217	ITGB8	289	NETO2	361	PSMD4	433	SPRED2
2	AAK1	74	CLDN10	146	FAM123B	218	ITLN2	290	NEUROD2	362	PTCH1	434	SPRY2
3	ABI1	75	CLDN12	147	FERMT2	219	ITM2A	291	NFAM1	363	PTGER1	435	SPRYD4
4	ACKR1	76	CLDN15	148	FLI1	220	ITM2C	292	NFATC1	364	PTGER2	436	SPTBN2
5	ADAM33	77	CLDN17	149	FOS	221	KDM4A	293	NKX2-1	365	PTGER3	437	SRPK2
6	ADAMTS3	78	CLDN19	150	FOXC1	222	KDM4C	294	NKX3-1	366	PTK6	438	STMN2
7	ADAMTS8	79	CLDN6	151	FOXO3	223	KDM5B	295	NME2	367	PTPN14	439	STXBP2
8	ADGRA2	80	CLTCL1	152	FOXF2	224	KHDRBS1	296	NNMT	368	PTPRN	440	STXBP3
9	ADGRE3	81	CNMD	153	FOXJ3	225	KIAA1303	297	NOD1	369	PTPRT	441	SULF2
10	ADGRG3	82	COMMD1	154	FOXK1	226	KLF12	298	NOMO1	370	PYCARD	442	SUSD2
11	ADIPOR1	83	COP55	155	FOXL2	227	KLF2	299	NR1D2	371	PYGO1	443	SVEP1
12	ADNP	84	COX41	156	FOXP2	228	KLF5	300	NR1I3	372	RACGAP1	444	SVIL
13	ADORA2A	85	COX4I2	157	FOXP4	229	KLF6	301	NR2C1	373	RAP2B	445	SWAP70
14	ADRB1	86	CRNN	158	FRAT2	230	KPNA1	302	NR2C2	374	RARA	446	SYBU
15	ADRBK2	87	CRTC2	159	FXYD5	231	KPNA4	303	NR2E1	375	RARB	447	SYN1
16	AFAP1	88	CRTC3	160	GAB2	232	LEF1	304	NR2E3	376	RARG	448	SYT
17	AGR2	89	CRX	161	GABBR1	233	LGALS12	305	NR2F6	377	RARRS1	449	TAP2
18	AGTR1	90	CSR2P	162	GAK	234	LGJ2	306	NR4A3	378	RB1	450	TBK1
19	AICDA	91	CTBP1	163	GALNT4	235	LHX1	307	NUB1	379	RBPJ	451	TBX5
20	AIRE	92	CTCF	164	GAPDHS	236	LPI	308	NXN	380	RELB	452	TCF7
21	ANXA10	93	CUX1	165	GBX2	237	LMO4	309	OAS2	381	RHBDF2	453	TCL1A
22	ANXA13	94	CX3CR1	166	GCHFR	238	LOXL3	310	OCLN	382	RHEB	454	TCL1B
23	APBA3	95	CYTH1	167	GF11	239	LPAR2	311	ONECUT1	383	RIPK2	455	TDRD1
24	APH1A	96	DACH2	168	GJA1	240	LPAR4	312	OPA1	384	RIPK3	456	TFR2
25	APPL1	97	DACT3	169	GLI1	241	LPAR5	313	OTOR	385	RIT1	457	TGFB11
26	ARAF	98	DAXX	170	GLS1	242	LPL	314	PADI2	386	RIT2	458	TIAM1
27	ARHGEF12	99	DB2	171	GPR101	243	LPP	315	PAK1	387	RND3	459	TICAM2
28	ASCL2	100	DDIT3	172	GPR12	244	LRMP	316	PAK3	388	RNF14	460	TINAG
29	ATAD2	101	DDX17	173	GPR183	245	LRP1B	317	PALLD	389	RNF8	461	TLE1
30	ATF1	102	DDX5	174	GPR22	246	LRP5	318	PANX2	390	RORA	462	TLR5
31	ATF4	103	DDX58	175	GPR26	247	LRK2	319	PAR3	391	RP56KA6	463	TM4SF1
32	ATG5	104	DEC1	176	GPR34	248	MAD11	320	PAWR	392	RUNX1	464	TMEM59
33	ATN1	105	DGKB	177	GPR37L1	249	MAF	321	PAX5	393	RXRA	465	TMPRSS9
34	AURKB	106	DGKD	178	GPRCSA	250	MAFF	322	PAX6	394	RXR8	466	TNKS
35	AXIN2	107	DGKI	179	GPRCSB	251	MAFG	323	PCDH19	395	RXRG	467	TNS4
36	BACH1	108	DGKZ	180	GSK3A	252	MAFK	324	PCDH1	396	SACS	468	TRAF1
37	BCR	109	DISP2	181	GUCY2C	253	MAOA	325	PDZK1	397	SALL1	469	TRAF5
38	BRCA1	110	DMPK	182	GZMK	254	MAP2	326	PEA15	398	SALL4	470	TRAF6
39	BRIX1	111	DNAH17	183	HAX1	255	MAP2K3	327	PHOX2B	399	SAMHD1	471	TRIM28
40	BTN3A2	112	DNMT1	184	HES1	256	MAP2K4	328	PIBF1	400	SATB1	472	TRIM5
41	BTRC	113	DOCK2	185	HEXIM1	257	MAP3K10	329	PIK3CB	401	SCAMP3	473	TSC2
42	C12orf5	114	DOCK3	186	HHEX	258	MAP3K11	330	PIK3CD	402	SCGB3A2	474	TSPAN2
43	C1QTNF3	115	DOK3	187	HIF1AN	259	MAP3K14	331	PIK3R2	403	SGCA	475	TSPAN9
44	C3AR1	116	DPPA2	188	HIST3H3	260	MAP3K3	332	PIK3R4	404	SGCD	476	TSP0
45	C5AR1	117	DRD1	189	HMGAA1	261	MAP3K7IP1	333	PIK3R5	405	SHB	477	TWIST2
46	C6orf190	118	DRD2	190	HMGAA2	262	MAP4K5	334	PINK1	406	SIGMAR1	478	UCP1
47	CARD9	119	DUSP1	191	HNF1B	263	MAPK11	335	PIWIL4	407	SIN3A	479	UCP2
48	CAV3	120	DVL1	192	HNF4G	264	MAPK7	336	PKD1	408	SLC12A2	480	VISA
49	CBLN4	121	DVL3	193	HOXB13	265	MATN1	337	PLA2G16	409	SLC16A1	481	VSIG10L
50	CCNA2	122	E2F1	194	HR	266	MATN4	338	PLCB1	410	SLC17A7	482	VWA1
51	CCND3	123	E2F2	195	HS6ST2	267	MBD3	339	PLCB3	411	SLC18A2	483	WASF1
52	CCNE2	124	EBF1	196	HSD11B2	268	MCPH1	340	PLCD3	412	SLC1A3	484	WASF3
53	CCR10	125	EBF2	197	HSF2	269	MDC1	341	PLCG2	413	SLC22A1	485	WDR5
54	CCRL1	126	EBF3	198	HSF4	270	MEGF9	342	PLD1	414	SLC22A2	486	WNT10A
55	CD1B	127	EGFL7	199	ICA1	271	MELK	343	PLD2	415	SLC27A1	487	WNT6
56	CD1C	128	EGLN1	200	ID2	272	MEN1	344	PLEKHA1	416	SLC27A2	488	XBP1
57	CD1D	129	EGLN2	201	IFITM3	273	MFN1	345	PLSCR1	417	SLC27A5	489	XG
58	CD1E	130	EGLN3	202	IFNA17	274	MGMT	346	POU3F2	418	SLC6A3	490	ZBTB17
59	CDC73	131	EIF2AK3	203	IFNA6	275	MITF	347	PPARA	419	SLC7A5	491	ZBTB7A
60	CDK8	132	EIF2AK4	204	IFNGR2	276	MLK	348	PPARD	420	SLC8A1	492	ZEB1
61	CDKN2AIP	133	EIF4B	205	IGDCC3	277	MLX	349	PPARGC1A	421	SMAGP	493	ZEB2
62	CDKN2B	134	EIF4G1	206	IKBK3	278	MRC2	350	PPM2C	422	SMARCA5	494	ZFP90
63	CDKN2C	135	EMCN	207	IKZF1	279	MSH2	351	PPP1R1B	423	SMO	495	ZG16B
64	CDX2	136	ENAH	208	IKZF3	280	MSX2	352	PRDM16	424	SNAPIN	496	ZMI1Z
65	CEBPE	137	ENPP3	209	IL17RE	281	MTF2	353	PREX1	425	SOC54	497	ZNF366
66	CELSR2	138	EPAS1	210	IL4I1	282	MUC19	354	PRF1	426	SOS2	498	ZNF71
67	CFTR	139	EPS8	211	IRAK1	283	MX1	355	PRKAA2	427	SOX18	499	ZSCAN10
68	CHD1L	140	ESRRG	212	IRAK2	284	MX1	356	PRKAB2	428	SOX5	500	ZSCAN21
69	CHRM3	141	ETV1	213	IRF2BP1	285	MYOCD	357	PROKR1	429	SOX6		
70	CHRM5	142	ETV5	214	ITGAB	286	MYO1D	358	PROM2	430	SP3		
71	CHUK	143	ETV6	215	ITGA9	287	NANOS2	359	PRSS22	431	SP7		
72	CIDEA	144	EZH2	216	ITGB1BP1	288	NCOA3	360	PSENN	432	SPIB		

## F. RayBio® Human Antibody Array L-6 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	AADAC	73	CA10	145	DEFB118	217	IFT81	289	NUDT2	361	RASA1	433	SYNGR3
2	AARS1	74	CABP5	146	DEPTOR	218	IGHMBP2	290	OFD1	362	RBPM5	434	YS1
3	AARS1	75	CACNB3	147	DFFB	219	IGLL1	291	OPHN1	363	RFXANK	435	SYT11
4	ABCB5	76	CACNG1	148	DHRX	220	ING5	292	OPTN	364	RLG4	436	TAOK3
5	ABI3	77	CACNG4	149	DIAPH2	221	IRAK4	293	OSBPL3	365	RGSS5	437	TARBP2
6	ACHE	78	CALCR	150	DLGAP2	222	IRX4	294	OTOA	366	RG56	438	TBC1D14
7	ADAM20	79	CALCRL	151	DLX6	223	IRX6	295	OTUB2	367	RHCE	439	TCF4
8	ADGRF3	80	CAMLG	152	DMBT1	224	IVD	296	PAK4	368	RHOA	440	TESK2
9	ADRA1B	81	CAPN3	153	DNAIC12	225	KANK1	297	PAK6	369	RMND5B	441	TE3
10	ADRA2A	82	CARD11	154	DRP2	226	KARS1	298	PALM	370	RNF11	442	TEX13B
11	ADRA2B	83	CARM1	155	DTX1	227	KCNA6	299	PANX1	371	RNF12	443	TEX264
12	ADR2	84	CASQ1	156	DZIP3	228	KCN3	300	PAX8	372	RNF2	444	TGIF2LX
13	ADR3	85	CASZ1	157	EZF4	229	KCNG1	301	PAXBP1	373	RNF217	445	THAP6
14	AFTPH	86	CCDC134	158	EZF6	230	KCNH7	302	PCDH17	374	RNF26	446	TIMM10B
15	AGGF1	87	CCDC8	159	EBAG9	231	KCNIP3	303	PCDH18	375	ROBO1	447	TIMM17A
16	AGO4	88	CCDC9	160	EDN3	232	KCNS3	304	PCDH83	376	ROM1	448	TIMM17B
17	AGTR2	89	CCDC91	161	EEFSEC	233	KIAA0355	305	PCIF1	377	RPGR	449	TMC2
18	AHCY	90	CCNA1	162	EGR4	234	KIF25	306	PCMTD2	378	RRAS2	450	TMCC2
19	AIMP1	91	CCNO	163	EHMT1	235	KIFAP3	307	PCP4	379	RRM1	451	TMED10
20	AKAP10	92	CD19	164	EHMT2	236	KIFC1	308	PDCD5	380	RRM2B	452	TMEM199
21	AKAP7	93	CD200R1L	165	EIF4E	237	KIR2DL1	309	PDCD6	381	RTN1	453	TMEM25
22	ALDH3A1	94	CD37	166	EIF5	238	KLHL17	310	PDE2A	382	RXFP1	454	TNFAIP8
23	ALDH7A1	95	CD3D	167	ELL2	239	KLHL32	311	PFDN2	383	S100A3	455	TNIP1
24	ALKBH1	96	CD72	168	EMC8	240	KLK4	312	PFDN4	384	SAE1	456	TNM2
25	ALPI	97	CDH8	169	ENDOU	241	L3MBTL2	313	PHF2	385	SCML2	457	TNN4
26	ALS2CR12	98	CDK11B	170	EPDR1	242	LHX6	314	PHOSPHO1	386	SEC13	458	TNRC6A
27	AMACR	99	CDK13	171	ERBIN	243	ULRB3	315	PHYH	387	SEC14L1	459	TRAP1
28	AMH	100	CDK3	172	ERN2	244	LN2	316	PIAS4	388	SECISBP2L	460	TRAK1
29	AMMECR1	101	CDKN2D	173	ETFDH	245	LRFN5	317	PIN1	389	SELPLG	461	TRIAP1
30	ANKH	102	CDON	174	ETHE1	246	LRR29	318	PITPNA	390	SEMA3F	462	TRIM23
31	ANKMY1	103	CDX1	175	ETV3	247	LSM1	319	PIWIL2	391	SEN8P	463	TRIM31
32	ANXA3	104	CDYL	176	EXOC6	248	LYPD6	320	PKN2	392	SERINC2	464	TRIM7
33	ANXA9	105	CEBPZ	177	FAM161B	249	MAP2K2	321	PLCB4	393	SERPINB9	465	TSC1
34	APBB1IP	106	CEND1	178	FAM43B	250	MAP2K5	322	PLEKHA2	394	SERPINI2	466	TSC22D1
35	APTX	107	CFAP410	179	FAM83C	251	MAPK14	323	PLSCR4	395	SETD7	467	TSEN34
36	ARIH2	108	CHEK1	180	FAM9B	252	MED3L1	324	PMVK	396	SFXN2	468	TSPAN7
37	ARL4A	109	CHEK2	181	FANCA	253	MED28	325	PNLP	397	SIAE	469	TTC14
38	AS3MT	110	CHRM2	182	FBXL7	254	MEOX2	326	POLG	398	SIAH2	470	TUB
39	ASS1	111	CHRN3	183	FBXO11	255	MERIT40	327	POLG2	399	SIN3B	471	TUBA1A
40	ATF2	112	CIB2	184	FBXO27	256	MID1P1	328	PPCDC	400	SIX6	472	UBE2D1
41	ATG4B	113	CKAP4	185	FBXO28	257	MKI67	329	PIPG	401	SLBP	473	UBE2D4
42	ATP5D	114	CLDN8	186	FBXO34	258	MKKS	330	PPIL1	402	SLC12A1	474	UBR5
43	ATP6V0A4	115	CLN6	187	FBXO7	259	MLPH	331	PHL2	403	SLC13A1	475	UBXN2A
44	ATP6VOC	116	CLOCK	188	FBXW7	260	MMAA	332	PPM1B	404	SLC25A2	476	USH1C
45	ATP6V1B2	117	CLPX	189	FCER1G	261	MOAP1	333	PPM1G	405	SLC35A2	477	USP13
46	ATP6V1C1	118	CMPPK1	190	FFAR2	262	MOP1B	334	PPM1L	406	SLC35A3	478	USP36
47	ATP6V1C2	119	CNKSRI	191	FKBP6	263	MPP2	335	PPP1R10	407	SLC6A18	479	USP38
48	ATP6V1D	120	CNR1	192	FKBP7	264	MRPL45	336	PPP1R8	408	SLT2	480	VANGL2
49	ATP6V1E1	121	CNR2	193	GAS2	265	MRPS25	337	PPP1R9B	409	SMPDL3A	481	WASL
50	ATP8B4	122	COG3	194	GAS7	266	MSH5	338	PRDM5	410	SNAPC2	482	WNT2B
51	ATRIP	123	COL4A3BP	195	GCNT1	267	MSRB2	339	PRKAB1	411	SNIP1	483	WNT7A
52	ATXN7L1	124	COP22	196	GFPT1	268	MTRF1	340	PRKAR1B	412	SNPH	484	WNT9B
53	AUP1	125	COQ7	197	GGPS1	269	MTRR	341	PRKCB	413	SNX8	485	XK
54	BAG4	126	COQ8A	198	GPATCH2	270	MYBP1C1	342	PRKCG	414	SPINK4	486	ZBTB20
55	BBOX1	127	CORO2A	199	GPR150	271	MYL2	343	PRKD3	415	SPL2A	487	ZCCHC4
56	BBS2	128	COX5B	200	GPR19	272	MYO7A	344	PROKR2	416	SRCIN1	488	ZFH2
57	BCAP29	129	CPLX2	201	GPR63	273	MYT1	345	PRTFDC1	417	SRFBP1	489	ZIM2
58	BCAP31	130	CPNE1	202	GRAP	274	MZB1	346	PSG1	418	SRI	490	ZNF219
59	BCKDK	131	CRHR1	203	GRB14	275	N4BP2	347	PSG6	419	SRPK1	491	ZNF232
60	BHLHE41	132	CRIP2	204	GRK7	276	NCF2	348	PSPH	420	ST3GAL2	492	ZNF280A
61	BLZF1	133	CRY1	205	GSTT2B	277	NCKIPSD	349	PTGFRN	421	STAC	493	ZNF280B
62	BOK	134	CSR3P	206	H2AFY2	278	NEMP1	350	PTP4A2	422	STK17B	494	ZNF282
63	BPI	135	CTHRC1	207	HAS1	279	NFB1	351	PTPN9	423	STK31	495	ZNF384
64	BRF1	136	CTNBP1P1	208	HDAC4	280	NLGN3	352	PTPRU	424	STX1B	496	ZNF410
65	BRIP1	137	CYB561	209	HEMK1	281	NLK	353	PTS	425	STX3	497	ZNF483
66	BSND	138	CYGB	210	HES6	282	NLRP5	354	RAB11A	426	STX5	498	ZNF512B
67	BST2	139	CYP7A1	211	HLA-DQA1	283	NMT2	355	RAB27A	427	STXBP1	499	ZP2
68	BTBD9	140	DACH1	212	HOXB9	284	NPHP1	356	RAB5F1	428	SUB1	500	ZWINT
69	BUB1	141	DARS1	213	HPCA	285	NRAS	357	RABGEF1	429	SULT1A1		
70	BUB3	142	DCDC2	214	HSF1	286	NRG4	358	RAD18	430	SUN1		
71	C1D	143	DCTPP1	215	IFNA4	287	NSL1	359	RAP1A	431	SUN2		
72	C20orf96	144	DDHD1	216	IFT122	288	NUBPL	360	RAP2A	432	SYN3		



# G. RayBio® Human Antibody Array L-7 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	AAMDC	73	CBX1	145	DDB1	217	FN3KRP	289	MSH4	361	PPID	433	SRRM4
2	ABCC8	74	CBX3	146	DDRGK1	218	FTSJ3	290	MTCOX3	362	PPP1R13B	434	SS18
3	ABCF2	75	CBX8	147	DDX19A	219	FXYD2	291	MTFR2	363	PPP1R3C	435	SSB
4	ABHD11	76	CCDC114	148	DDX19B	220	FXYD3	292	MUC15	364	PPP3CB	436	SSPN
5	ABHD16A	77	CCDC124	149	DDX24	221	G6PC	293	MYBPH	365	PRPH	437	SSX2
6	ACOT9	78	CCDC40	150	DDX39A	222	GADD45B	294	NAB2	366	PSMC2	438	ST8SIA6
7	ACSF2	79	CCDC47	151	DDX47	223	GALK2	295	NCF1	367	PSMC4	439	STARD10
8	ACTL6A	80	CCDC6	152	DDX50	224	GATAD2A	296	NCOA4	368	PSMC5	440	STRADA
9	ACTL6B	81	CCIN	153	DDX53	225	GATAD2B	297	NDN	369	PSMC6	441	SUPT3H
10	ACY3	82	CCM2L	154	DDX56	226	GBAS	298	NDUFA10	370	PSMD13	442	SUPT7L
11	ADAMTSL4	83	CCND2	155	DENR	227	GCA	299	NDUFA13	371	PSMD14	443	SZRD1
12	ADCY5	84	CCNF	156	DERL1	228	GFFT2	300	NDUFA2	372	PSMD2	444	TAF4B
13	ADCY7	85	CCNT1	157	DGCR8	229	GHTM	301	NDUFA3	373	PSMD6	445	TAF7L
14	ADD1	86	CT5	158	DIMT1L	230	GIMAP1	302	NDUFA5	374	PSMD7	446	TANGO2
15	ADRM1	87	CD2BP2	159	DLEC1	231	GIMAP6	303	NDUFB5	375	PYGM	447	TC2N
16	AFAP1L2	88	CCD23	160	DLGAP4	232	GJA8	304	NDUFB7	376	R3HDM2	448	TE11
17	AFF4	89	CDC42EP4	161	DNAH8	233	GJA9	305	NDUFB8	377	RAB18	449	TFAM
18	AGO3	90	CDC45	162	DNAJB4	234	GJB6	306	NDUFB9	378	RAB38	450	THAP12
19	AHCTF1	91	CDC48	163	DNAJB8	235	GLMN	307	NDUFC1	379	RABEP1	451	TLX2
20	AHNAK2	92	CDK9	164	DNAL1	236	GNA15	308	NDUFS2	380	RAC3	452	TMEM106C
21	AIP1	93	CEACAM16	165	DNMTIP2	237	GNB5	309	NDUFS3	381	RAD9B	453	TMEM8B
22	ANKF1	94	CEACAM21	166	DPF2	238	NGT2	310	NDUFS6	382	RASL10A	454	TMPRSS2
23	ANKRD30B	95	CENPI	167	DPH5	239	GNL1	311	NDUFV2	383	RASSF1	455	TNN
24	AP2A2	96	CEP55	168	DR1	240	GOLGA1	312	NEMF	384	RASSF5	456	TOMM40L
25	AP2B1	97	CGAS	169	DRAP1	241	GORASP2	313	NOG	385	RBL1	457	TPM2
26	APBB1	98	CGGBP1	170	DROSHA	242	GNP1	314	NRS2	386	RBM6	458	TRABD
27	APEH	99	CHCHD5	171	DUSP26	243	GRPEL1	315	NRSN2	387	RCAN3	459	TRIB3
28	APOBR	100	CHD4	172	ECI2	244	GSTA3	316	NUCD1	388	RCVRN	460	TRIM13
29	ARHGAP12	101	CHD5	173	EIF2D	245	GSTM3	317	NUDT13	389	REM1	461	TRIM36
30	ARHGAP4	102	CHML	174	EIF3M	246	GTFA21L	318	OARD1	390	REFL2	462	TRIM42
31	ARHGEF1	103	CHMP2A	175	EIF4ENIF1	247	GYS2	319	OAZ2	391	RHOBTB2	463	TRIM43
32	ARHGFE6	104	CIP2A	176	EIF4H	248	H1FO	320	OCIAD1	392	RIPK4	464	TRIM55
33	ARIH1	105	CISD2	177	ELAC2	249	HAP1	321	OCIAD2	393	RNF115	465	TRMO
34	ARL1	106	CLASP1	178	EN1	250	HAUS1	322	OGT	394	RSPH14	466	TRMT10C
35	ARL3	107	CLCC1	179	ENDOD1	251	HAUS7	323	PACRG	395	RTN3	467	TRMU
36	ARL6	108	CLUC3	180	ENOX2	252	HDAC11	324	PAQR6	396	RTP4	468	TROVE2
37	ARMC1	109	CLPP	181	EPB41L3	253	HKDC1	325	PARP12	397	SARG	469	TSPAN17
38	ASB11	110	CLYBL	182	EPB42	254	HLA-E	326	PBX1	398	SCGB2A1	470	TTC16
39	ASB12	111	CMC1	183	EPS8L2	255	HOPX	327	PBXIP1	399	SCNN1B	471	TTC23
40	ASB6	112	CNPY3	184	EPS8L3	256	HS3ST6	328	PCDH12	400	SEC14L4	472	TTC6
41	ASMTL	113	CNTNAP4	185	ERCC6L	257	HYPK	329	PCDH10	401	SEL1L3	473	TUBA1B
42	ATG13	114	COA6	186	ESPN	258	IFT57	330	PCDHAC1	402	SEPTIN12	474	TUBB4A
43	ATG2A	115	COBL1	187	ETF8	259	JCAD	331	PCDHAC2	403	SHC2	475	TUBE1
44	ATP13A3	116	COL5A3	188	EURL	260	JPH3	332	PCDHGA4	404	SIGLEC12	476	UBA52
45	ATP1B2	117	COL8A1	189	EXOC5	261	KCNQ1	333	PCDHGB1	405	SLC12A3	477	UBAP1
46	ATP1B3	118	COLCA1	190	EXPH5	262	KCTD9	334	PCDHGB3	406	SLC15A2	478	UBE2J1
47	ATP1B4	119	COMMD10	191	F2RL3	263	KIF20B	335	PCDHGC4	407	SLC16A6	479	UGT1A6
48	ATP2A1	120	COPG1	192	FADS3	264	KIF5C	336	PCED1A	408	SLC1A5	480	UQCRC1
49	ATP6V0D1	121	COP52	193	FAM1	265	KIF9	337	PCYT1A	409	SLC20A1	481	UQCRC2
50	ATP6V0E2	122	CORO1B	194	FAM107A	266	KLC3	338	PDHA1	410	SLC23A2	482	USP32
51	ATPAF2	123	COX5A	195	FAM111B	267	KLC4	339	PDZRN4	411	SLC26A1	483	VAV2
52	ATXN10	124	COX6B1	196	FAM129B	268	KNSTRN	340	PEL3	412	SLC2A8	484	WBP1L
53	ATXN2	125	CREB3L2	197	FAM13C	269	LACTB	341	PFKFB3	413	SLC2A9	485	WDR23
54	ATXN7L2	126	CRISPLD1	198	FAM175B	270	LCN8	342	PFTK1	414	SLC35E3	486	WDR34
55	BCAS2	127	CRISPLD2	199	FAM181B	271	LDOC1	343	PHACTR1	415	SLC36A4	487	WDR35
56	BCAS3	128	CRMP1	200	FAM217B	272	LETMD1	344	PHF11	416	SLC38A2	488	WDC1
57	BRME1	129	CRATP	201	FAM45BP	273	LYRM1	345	PIK3C3	417	SLC3A1	489	WHSC1
58	BRWD1	130	CRYM	202	FAM53C	274	LZTS2	346	PIP5K1B	418	SLC43A1	490	WNT1
59	BTF3L4	131	CTDSPL	203	FAM96B	275	MAGEA10	347	PKD2	419	SLC44A1	491	WNT2
60	BZW2	132	CTNNA3	204	FAM98B	276	MAGEB10	348	PKD2L2	420	SLC44A3	492	WNT5B
61	C12orf57	133	CTR9	205	FASTKD3	277	MED19	349	PLA2G4F	421	SLC4A1AP	493	WRB
62	C1QTNF6	134	CWF19L1	206	FBXL16	278	MGST1	350	PLCD1	422	SLC7A2	494	XP32
63	C20orf144	135	CYP1B1	207	FBXL2	279	MGST2	351	PLCL1	423	SLC7A7	495	ZBED6CL
64	C5orf22	136	CYP24A1	208	FBXO10	280	MIA3	352	PLEKHA4	424	SLC9A1	496	ZDHHC19
65	C7orf25	137	CYP2A13	209	FBXO16	281	MIS18A	353	PLEKHAB	425	SLCO2B1	497	ZGPAT
66	C9orf78	138	CYP2E1	210	FBXO33	282	MKL1	354	PMEL	426	SLCO3A1	498	ZNF14
67	CAMK2B	139	DAP3	211	FBXO39	283	MLF2	355	PNOC	427	SMG8	499	ZBP2
68	CAND1	140	DAPK2	212	FBXO42	284	MLLT3	356	POLB	428	SNCAIP	500	ZSWIM3
69	CAPN6	141	DBNL	213	FDX1	285	MORC1	357	POLR2B	429	SNRPD1		
70	CAPN9	142	DBR1	214	FDXR	286	MROH8	358	POLR2C	430	SNTB1		
71	CAPRIN1	143	DCTN3	215	FGD6	287	MRPL47	359	POLR2D	431	SNW1		
72	CAPRIN2	144	DCTN6	216	FLVCR1	288	MRPL58	360	PPHLN1	432	SPECC1L		

# H. RayBio® Human Antibody Array L-8 Target List

Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
1	AASDHPT	73	HPS3	145	MSC	217	PLP2	289	SCFD1	361	TCAP	433	WBSCR22
2	ABHD12B	74	HRSLS2	146	MX2	218	PNKP	290	SCN3B	362	TCEAL3	434	WDR4
3	ACADS	75	HSDL2	147	MYH11	219	PNMA2	291	SCO1	363	TCTN3	435	WDR44
4	ACADSB	76	HSF2BP	148	MYO10	220	POGK	292	SCRT2	364	TEP1	436	WDR54
5	ACADVL	77	HSFY1	149	MYO9B	221	POLQ	293	SCYL1	365	TGM6	437	WDR64
6	AGXT2	78	HTATP2	150	NAA50	222	POPDC2	294	SEC14L3	366	THYN1	438	WDR77
7	ALAS2	79	HTATSF1	151	NACC1	223	PPL3	295	SELENON	367	TIMM8A	439	WNK3
8	ALDH18A1	80	IER5	152	NAP1L2	224	PPME1	296	SETBP1	368	TIPRL	440	ZADH2
9	ALDH1L1	81	IFIT1	153	NCAPH	225	PPP1R18	297	SFTPA1	369	TM95F1	441	ZBTB12
10	ALDH3A2	82	IFIT2	154	NDE1	226	PPP1R7	298	SH3BGR	370	TM95F3	442	ZBTB2
11	ALDH5A1	83	IGHG4	155	NDRG3	227	PPP2R1A	299	SHROOM2	371	TMCC3	443	ZBTB26
12	ALDH8A1	84	IPP	156	NDRG4	228	PPP2R2A	300	SKAP2	372	TMED2	444	ZBTB3
13	AMHDH1	85	KCNH2	157	NECAP2	229	PPP4R2	301	SLA2	373	TMEM109	445	ZBTB45
14	ANKRD9	86	KCNH3	158	NEK3	230	PRMT7	302	SLC13A2	374	TMEM115	446	ZBTB46
15	AQP12A	87	KCNH6	159	NFKB1L1	231	PROSC	303	SLC13A3	375	TMEM132A	447	ZBTB9
16	ARF1	88	KCNK12	160	NFYA	232	PRPSAP2	304	SLC16A8	376	TMEM184B	448	ZC3H3
17	ARG2	89	KCNK13	161	NIFK	233	PRRC1	305	SLC14A	377	TMEM260	449	ZDHHC11
18	ARHGFE25	90	KCTD13	162	NIN	234	PRRG1	306	SLC25A14	378	TMEM43	450	ZDHHC13
19	ARHGFE26	91	KCTD4	163	NKX3-2	235	PRSS16	307	SLC25A19	379	TMEM59L	451	ZDHHC14
20	ARPC1A	92	KDM2A	164	NLE1	236	PRSS21	308	SLC25A22	380	TMEM9	452	ZFAND1
21	ASB3	93	KIAA0825	165	NLRC4	237	PSG4	309	SLC25A29	381	TMEM91	453	ZFP28
22	ASPA	94	KIAA1755	166	NOLC1	238	PSMG1	310	SLC25A32	382	TMOD2	454	ZFP64
23	ASP	95	KIAA1958	167	NOP9	239	PSMG3	311	SLC25A39	383	TMPS54	455	ZFP91
24	ATP10D	96	KLHL12	168	NOVA1	240	PTGR2	312	SLC26A5	384	TNRC6B	456	ZFYVE19
25	ATP11C	97	KLHL40	169	NRIP3	241	QTRT1	313	SLC2A6	385	TOMM70A	457	ZFYVE28
26	BCL6B	98	KLHL41	170	NSMCE1	242	RAB15	314	SLC35C1	386	TOR1AIP2	458	ZIC5
27	BEST4	99	KLHL42	171	NTAN1	243	RAB3B	315	SLC35F6	387	TOX2	459	ZIM3
28	BRD4	100	KLHL5	172	NUDCO2	244	RAB5B	316	SLC37A1	388	TP53RK	460	ZKSCAN1
29	C2CD2L	101	KRT23	173	NUDT11	245	RAB5C	317	SLC39A2	389	TPD52L2	461	ZMYM2
30	CALCOCO2	102	KRT6A	174	NUTF2	246	RAB6C	318	SLC39A7	390	TRAF3IP3	462	ZMYM3
31	CASP4	103	KRT6C	175	NXF1	247	RABEP2	319	SLC45A4	391	TRAPPC2L	463	ZMYM5
32	CDC27	104	KRT76	176	OGFR	248	RABGAP1	320	SLC4A10	392	TRAPPC6B	464	ZMYM6
33	CDH20	105	LCN15	177	OLFML1	249	RABGGTA	321	SLC7A3	393	TRIM29	465	ZNF100
34	CDH24	106	LEPREL1	178	OPN1MW	250	RALY	322	SLC05A1	394	TRIM3	466	ZNF101
35	CDH26	107	LHX2	179	OSBP19	251	RALYL	323	SLMAP	395	TRIM33	467	ZNF117
36	CDH9	108	LIMCH1	180	OSER1	252	RANBP3	324	SMARCA2	396	TRIM34	468	ZNF140
37	CENPB	109	LIN7A	181	OSTF1	253	RANBP9	325	SMARCC1	397	TRIM56	469	ZNF195
38	CEP41	110	LIN7C	182	OTUD6B	254	RBCK1	326	SMARCD1	398	TRIO	470	ZNF205
39	CLCN3	111	LMCD1	183	OVGP1	255	RBM11	327	SNAPC5	399	TRIP13	471	ZNF248
40	CLCN5	112	LRXN	184	OXER1	256	RBM14	328	SNX10	400	TRPM3	472	ZNF250
41	CLCN7	113	LRRCL4	185	OXR1	257	RBM3	329	SNX15	401	TSC22D2	473	ZNF264
42	CLDN18	114	LRRC2	186	P4HTM	258	RBM45	330	SNX9	402	TSNAX	474	ZNF275
43	CLMN	115	LRRC25	187	PACSN1	259	RBM7	331	SON	403	TSPAN10	475	ZNF285
44	CTIF	116	LRRCS9	188	PACSN2	260	RBP1	332	SOX12	404	TSPAN3	476	ZNF300
45	DHX34	117	LUC7L2	189	PACSN3	261	RCN1	333	SP140	405	TSPAN11	477	ZNF319
46	DHX35	118	LYG2	190	PADI3	262	RECQL	334	SPAG11B	406	TSPAN5	478	ZNF320
47	DHX37	119	LYPLAL1	191	PAGE1	263	RFFL3	335	SPC24	407	TSSC1	479	ZNF335
48	DIP2A	120	LZTF1L	192	PAPLN	264	RFX2	336	SPPL2B	408	TSSC4	480	ZNF33A
49	DMTN	121	MAK10	193	PCDHB16	265	RGS22	337	SPPL3	409	TSTD1	481	ZNF354C
50	DYNCL1U1	122	MAP1B	194	PCDHB2	266	RHAG	338	SRRM2	410	TTC12	482	ZNF407
51	DYSF	123	MAP3K7CL	195	PCDHB5	267	RHBDL2	339	SSRP1	411	TTC17	483	ZNF451
52	EEF1A2	124	MAP7	196	PCM1	268	RHOF	340	ST6GALNAC2	412	TTC19	484	ZNF462
53	EVI2B	125	MAP7D2	197	PCMTD1	269	RHOG	341	STAU1	413	TTL12	485	ZNF501
54	EXOG	126	MAPRE2	198	PCYOX1L	270	RIC8A	342	STOML1	414	TUFM	486	ZNF502
55	FAM71D	127	MARK3	199	PDAP1	271	RNF114	343	STOML2	415	TWSG1	487	ZNF512
56	FBXL5	128	MAST4	200	PDE4D	272	RNF146	344	SUPT16H	416	TXNDC16	488	ZNF543
57	GABRD	129	MBNL2	201	PDIA2	273	RNF25	345	SUPT5H	417	TXNL1	489	ZNF558
58	GLI3	130	MBTD1	202	PDIA5	274	RNF38	346	SUSD6	418	UBAP2L	490	ZNF580
59	GPS2	131	MED8	203	PDLM4	275	RNPEPL1	347	SYNE1	419	UBLCP1	491	ZNF599
60	GRIPI	132	MFAP3L	204	PDPR	276	RPA3	348	SYNGR1	420	UBTF	492	ZNF606
61	GSC2	133	MIS12	205	PDSSA	277	RRAB	349	SYT4	421	UBXN1	493	ZNF644
62	HCFC2	134	MOB4	206	PDXDC1	278	RSL1D1	350	SYT5	422	UBXN10	494	ZNF665
63	HDDC2	135	MORC3	207	PGRMC1	279	RUNDC3A	351	TADA2A	423	UBXN4	495	ZNF684
64	HDGFRP2	136	MOXD1	208	PHF21A	280	RWDD4	352	TAPT1	424	UCHL5	496	ZNF799
65	HDHD2	137	MPZL2	209	PHF6	281	SAFB2	353	TATDN1	425	UEVLD	497	ZNF823
66	HDHD3	138	MRGPRX3	210	PHGR1	282	SAMMS0	354	TBC1D10B	426	USP10	498	ZNF93
67	HDLBP	139	MRPL37	211	PHLDB2	283	SAR1A	355	TBC1D2	427	USP18	499	ZNF173
68	HEBP1	140	MRPL40	212	PIN4	284	SATB2	356	TBC1D9B	428	USP26	500	ZW10
69	HLA-H	141	MRPS22	213	PITPNB	285	SBN01	357	TBCC	429	UGL2		
70	HMCN1	142	MRPS23	214	PITRM1	286	SCAF8	358	TBCE	430	VPS16		
71	HMG20A	143	MRPS26	215	PLEKHF2	287	SCAMP5	359	TBRG4	431	VPS53		
72	HOMER	144	MRPS36	216	PLP	288	SCAPER	360	TBX10	432	VSTM2L		

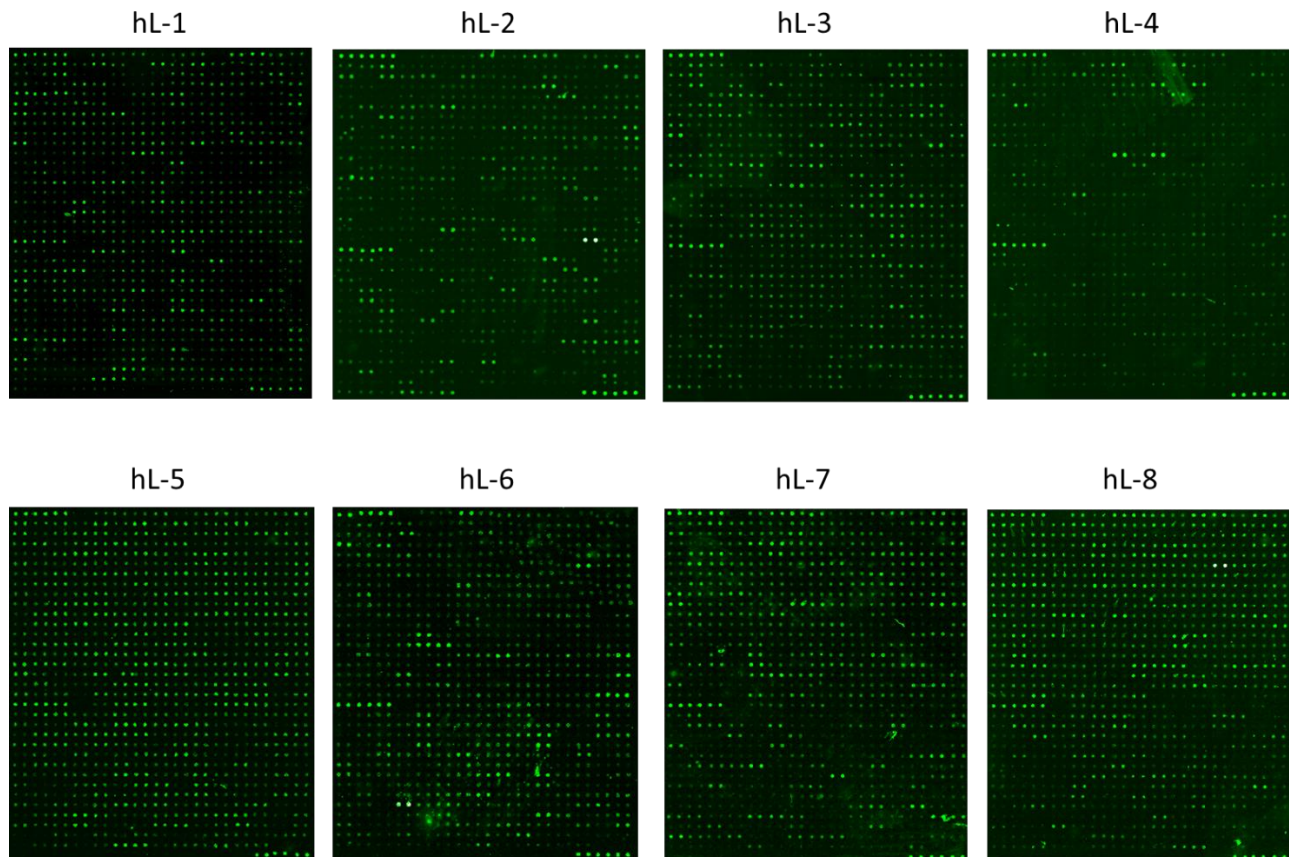
## VII. Interpretation of Results:

### A. Explanation of Controls Spots

There are three Positive Controls (POS1, POS2, POS3) in each array. These are three levels of standardized biotinylated IgG. All other variables being equal, the Positive Control intensities will be the same for each sub-array. This allows for normalization based upon the relative fluorescence signal responses to a known control. Some arrays may have beta-actin and GAPDH as internal controls, much as “housekeeping” genes or proteins are used to normalize results in PCR or Western blots, respectively.

### B. Typical Results

The following figure shows the typical result of this array probed with sample(s). The images were captured using an Axon GenePix laser scanner. The Positive control signals in the upper left and lower right corners of each array can be used to identify the orientation and help normalize the results between arrays.



*Note: In the absence of an external standard curve for each protein detected, there is no means of assessing absolute or relative concentrations of different proteins in the same sample using immunoassays. If you wish to obtain quantitative data (i.e., concentrations of the various analytes in your samples), try using our Quantibody® Arrays as a targeted follow-up experiment.*

### **C. Background Subtraction**

Once you have obtained fluorescence intensity data, you should subtract the background and normalize to the Positive Control signals before proceeding to analysis.

Most laser fluorescence scanners' software has an option to automatically measure the local background around each spot. For best results, we recommend comparing signal intensities representing the MEAN signals minus local background. If your resulting fluorescence signal intensity reports do not include these values (e.g., a column labeled as "F532 Mean - B532"), you may need to subtract the background manually or change the default settings on your scanner's data report menu.

### **D. Normalization of Array Data**

To normalize signal intensity data, one sub-array is defined as "reference" to which the other arrays are normalized. This choice is arbitrary. For example, in our Analysis Tool Software (described below), the array represented by data entered in the left-most column each worksheet is the default "reference array."

You can calculate the normalized values as follows:

$$X(Ny) = X(y) * P1/P(y)$$

Where:

P1 = mean signal intensity of POS spots on reference array

P(y) = mean signal intensity of POS spots on Array "y"

X(y) = mean signal intensity for spot "X" on Array "y"

$X(N_y)$  = normalized signal intensity for spot "X" on Array "y"

The RayBio® Analysis Tool software is freely available for use with data obtained using RayBio® Biotin Label-based Antibody Arrays. You can copy and paste your signal intensity data (with and without background) into the Analysis Tool, and it will automatically normalize signal intensities to the Positive Controls. Analysis Tool software can be downloaded from the product page on the RayBiotech website.

### **E. Threshold of Significant Difference**

After subtracting background signals and normalization to Positive Controls, comparison of signal intensities between and among array images can be used to determine relative differences in expression levels of each protein between samples or groups.

Any  $\geq 1.5$ -fold increase or  $\leq 0.65$ -fold decrease in signal intensity for a single analyte between samples or groups may be considered a measurable and significant difference in expression, provided that both sets of signals are well above background (Mean background + 2 standard deviations, accuracy  $\approx 95\%$ ).

### **F. Pathway Analysis of the Array Proteins**

Human antibody array L-4000 detects 4000 unique human proteins, including most analyzed cytokines, chemokines, adipokines, extracellular matrix proteins, growth factors, angiogenic factors, proteases, enzymes, soluble and transmembrane receptors and transport proteins, adhesion molecules and other proteins. All the array proteins are provided with their Uniprot number and GeneID, which are essential for further data mining. Raybiotech offers affordable biostatistics and bioinformatics service, including data clean-up, differential expression analysis, cluster analysis, biomarker selection, pathway analysis and experimental design. See more details on the website: <https://www.raybiotech.com/biostatistics-and-bioinformatics-services>

## VIII. Troubleshooting Guide

<b>Problem</b>	<b>Cause</b>	<b>Recommendation</b>
<b>Weak Signal</b>	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	Dilute starting sample less or concentrate sample
	Improper storage of kit	Store kit as suggested temperature. Don't freeze/thaw the slide.
<b>Uneven signal</b>	Bubble formed during incubation	Handle and pipette solutions more gently; De-gas solutions prior to use
	Arrays are not completely covered by reagent	Prepare more reagent and completely cover arrays with solution
	Reagent evaporation	Cover the incubation chamber with adhesive film during incubation
<b>General</b>	Cross-contamination from neighboring wells	Avoid overflowing wash buffer between wells
	Comet tail formation	Air dry the slide for at least 1 hour before usage
	Inadequate detection	Increase laser power so the highest standard concentration for each cytokine receives the highest possible reading yet remains unsaturated
<b>High background</b>	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	Minimize dust in work environment before starting experiment
	Slide is allowed to dry out	Take additional precautions to prevent slides from drying out during experiment

## IX. Selected References

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