

Proteome Profiler™ Array

Human Kidney Biomarker Array Kit

Catalog Number ARY019

For the parallel determination of the relative levels of selected human kidney-associated and urinary proteins.

This package insert must be read in its entirety before using this product.
For research use only. Not for use in diagnostic procedures.

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INTRODUCTION

Analyzing the profile of kidney-associated and urinary proteins is important for understanding the roles these molecules play in renal cell and kidney function. The Proteome Profiler Human Kidney Biomarker Array is a rapid, sensitive, and economical tool to detect changes between samples. The relative expression levels of 38 proteins can be determined simultaneously without performing numerous immunoprecipitations or Western blots. Each capture and detection antibody was carefully selected using natural and recombinant proteins.

PRINCIPLE OF THE ASSAY

Capture and control antibodies have been spotted in duplicate on nitrocellulose membranes. Urine samples, cell culture supernates, cell lysates, or tissue lysates are diluted, mixed with a cocktail of biotinylated detection antibodies, and incubated overnight with the Proteome Profiler Human Kidney Biomarker Array. The membrane is washed to remove unbound material. Streptavidin-HRP and chemiluminescent detection reagents are applied, and a signal is produced at each capture spot corresponding to the amount of protein bound. Refer to the Appendix for a list and coordinates of analytes and controls.

TECHNICAL HINTS

- FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
- This kit should not be used beyond the expiration date on the kit label.
- **Do not mix or substitute reagents with those from other lots or sources. Substitution of some high intensity chemiluminescent reagents for Chemi Reagents 1 and 2 may cause either increased background or diminished signal depending on the reagent.**
- Any variation in sample handling, buffers, operator, pipetting technique, washing technique, and incubation time or temperature can alter the performance of the kit.
- The Human Kidney Biomarker Array membranes are validated for single use only.
- Always use gloved hands and flat-tipped tweezers to handle the membranes.
- Pick up the membranes from the edge on the side with the identification number avoiding the area with the printed antibodies.
- A thorough and consistent wash technique is essential for proper assay performance. Individual arrays should be washed in separate containers to minimize background. Wash Buffer should be removed completely from the membrane before proceeding to the next step.
- Do not allow the membrane to dry out. This will cause high background.
- Avoid microbial contamination of reagents and buffers.
- Soluble receptors and other proteins present in biological samples do not necessarily interfere with the measurement of analytes in samples. However, until these proteins have been tested with the Human Kidney Biomarker Array, the possibility of interference cannot be excluded.
- For a procedure demonstration video, please visit:
www.RnDSystems.com/ProteomeProfilerVideo.

PRECAUTIONS

Chemi Reagents 1 and 2 contain Boric Acid which is suspected of damaging fertility or the unborn child.

Some components in this kit contain a preservative which may cause an allergic skin reaction. Avoid breathing mist.

Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling. Refer to the SDS on our website prior to use.

MATERIALS PROVIDED & STORAGE CONDITIONS

Store the unopened kit at 2-8 °C. Do not use past kit expiration date.

PART	PART #	DESCRIPTION	STORAGE OF OPENED/RECONSTITUTED MATERIAL
Human Kidney Biomarker Array	893967	4 nitrocellulose membranes each containing 38 different capture antibodies printed in duplicate.	Return unused membranes to the foil pouch containing the desiccant pack. Reseal along entire edge of the zip-seal. May be stored for up to 3 months at 2-8 °C.*
Array Buffer 5	895876	21 mL of a buffered protein base with preservatives.	May be stored for up to 3 months at 2-8 °C.*
Array Buffer 6	893573	21 mL of a buffered protein base with preservatives.	
Wash Buffer Concentrate	895003	2 vials (21 mL/vial) of a 25-fold concentrated solution of buffered surfactant with preservative. <i>May turn yellow over time.</i>	
Human Kidney Biomarker Array Detection Antibody Cocktail	893966	1 vial of a biotinylated antibody cocktail; lyophilized.	
Streptavidin-HRP	893019	200 µL of streptavidin conjugated to horseradish peroxidase.	
Chemi Reagent 1	894287	1 vial (2.5 mL)	
Chemi Reagent 2	894288	1 vial (2.5 mL)	
4-Well Rectangular Multi-dish	607544	Clear 4-well rectangular multi-dish.	Store at room temperature.
Transparency Overlay Template	607747	1 transparency overlay template for coordinate reference.	

* Provided this is within the expiration date of the kit.

OTHER SUPPLIES REQUIRED

- Aprotinin (Tocris™, Catalog # 4139)
- Leupeptin (Tocris, Catalog # 1167)
- Pepstatin (Tocris, Catalog # 1190)
- Igepal® CA-630 (Sigma, Catalog # I3021)
- Pipettes and pipette tips
- Gloves
- Deionized or distilled water
- Rocking platform shaker
- Microcentrifuge
- A plastic container with the capacity to hold 50 mL (for washing the arrays)
- Plastic transparent sheet protector (trimmed to 10 cm x 12 cm and open on three sides)
Plastic wrap
- Paper towels
- Absorbent lab wipes (KimWipes® or equivalent)
- Autoradiography cassette
- Film developer
- X-ray film (Kodak® BioMax™ Light-1, Catalog # 1788207) or equivalent
- Flat-tipped tweezers
- Flatbed scanner with transparency adapter capable of transmission mode
- Computer capable of running image analysis software and Microsoft® Excel

SUPPLIES REQUIRED FOR CELL LYSATE SAMPLES

- Phosphate-Buffered Saline (PBS)
- Lysis buffer (1% Igepal CA-630, 20 mM Tris-HCl (pH 8.0), 137 mM NaCl, 10% glycerol, 2 mM EDTA, 10 µg/mL Aprotinin, 10 µg/mL Leupeptin, and 10 µg/mL Pepstatin)

SUPPLIES REQUIRED FOR TISSUE LYSATE SAMPLES

- PBS with protease inhibitors (10 µg/mL Aprotinin, 10 µg/mL Leupeptin, and 10 µg/mL Pepstatin)
- Triton™ X-100 (Sigma, Catalog # T9284)

SAMPLE COLLECTION & STORAGE

The sample collection and storage conditions listed below are intended as general guidelines. Sample stability has not been evaluated.

Since the Human Kidney Biomarker Array detects relative expression levels of individual analytes, it is important to include appropriate control samples.

Note: Sample amount may be empirically adjusted to attain optimal sensitivity with minimal background. Suggested starting ranges are: 200-500 μL for cell culture supernates, 20-500 μg for cell and tissue lysates, and 50-500 μL for urine samples.

Urine - Collect urine and centrifuge to remove particulate matter. Assay immediately or aliquot and store at $\leq -20\text{ }^{\circ}\text{C}$. Avoid repeated freeze-thaw cycles.

Cell Culture Supernates - Remove particulates by centrifugation. Assay immediately or aliquot and store samples at $\leq -20\text{ }^{\circ}\text{C}$. Avoid repeated freeze-thaw cycles.

Cell Lysates - Rinse cells with PBS, making sure to remove any remaining PBS before adding lysis buffer. Solubilize cells at 1×10^7 cells/mL in lysis buffer. Pipette up and down to resuspend and rock the lysates gently at $2-8\text{ }^{\circ}\text{C}$ for 30 minutes. Microcentrifuge at $14,000 \times g$ for 5 minutes, and transfer the supernate into a clean test tube. Quantitation of sample protein concentrations using a total protein assay is recommended. Assay immediately or aliquot and store at $\leq -70\text{ }^{\circ}\text{C}$. Avoid repeated freeze-thaw cycles.

Tissue Lysates - Excise tissue and homogenize in PBS with protease inhibitors. After homogenization, add Triton X-100 to a final concentration of 1%. Freeze samples at $\leq -70\text{ }^{\circ}\text{C}$, thaw, and centrifuge at $10,000 \times g$ for 5 minutes to remove cellular debris. Quantitation of sample protein concentrations using a total protein assay is recommended. Assay immediately or aliquot and store samples at $\leq -70\text{ }^{\circ}\text{C}$. Avoid repeated freeze-thaw cycles.

REAGENT PREPARATION

Bring all reagents to room temperature before use.

Human Kidney Biomarker Array - Four nitrocellulose membranes each containing 38 different capture antibodies printed in duplicate. **Handle the membranes only with gloved hands and flat-tipped tweezers.**

Detection Antibody Cocktail - Before use, reconstitute the Human Kidney Biomarker Detection Antibody Cocktail in 100 μL of deionized or distilled water.

1X Wash Buffer - If crystals have formed in the concentrate, warm the bottles to room temperature and mix gently until the crystals have completely dissolved. Add 40 mL of 25X Wash Buffer Concentrate to 960 mL of deionized or distilled water to prepare 1000 mL of 1X Wash Buffer.

Note: Wash Buffer Concentrate may turn yellow over time.

Chemi Reagent Mix - Chemi Reagents 1 and 2 should be mixed in equal volumes within 15 minutes of use. **Protect from light. 1 mL of the resultant mixture is required for each membrane.**

ARRAY PROCEDURE

Bring all reagents to room temperature before use. Keep samples on ice. To avoid contamination, wear gloves while performing the procedures.

1. Prepare all reagents and samples as directed in the previous sections.
2. Pipette 2 mL of Array Buffer 6 into each well of the 4-Well Multi-dish to be used. Array Buffer 6 serves as a block buffer.
3. Using flat-tip tweezers, remove each membrane to be used from between the protective sheets and place in a well of the 4-Well Multi-dish. The number on the membrane should be facing upward.

Note: *Upon contact with Array Buffer 6, the blue dye from the spots will disappear, but the capture antibodies are retained in their specific locations.*

4. Incubate for one hour on a rocking platform shaker. Orient the tray so that each membrane rocks end to end in its well.
5. While the membranes are blocking, prepare the samples by adding up to 500 μ L of sample to 500 μ L of Array Buffer 6. Adjust volume to 1.5 mL with Array Buffer 5 as necessary.
6. Add 15 μ L of reconstituted Detection Antibody Cocktail to each prepared sample. Mix and incubate at room temperature for one hour.
7. Aspirate Array Buffer 6 from the wells of the 4-Well Multi-dish and add sample/antibody mixtures prepared in step 5 and 6. Place the lid on the 4-Well Multi-dish.
8. Incubate overnight at 2-8 °C on a rocking platform shaker.

Note: *A shorter incubation time may be used if optimal sensitivity is not required.*

9. Carefully remove each membrane and place into individual plastic containers with 20 mL of 1X Wash Buffer. Rinse the 4-Well Multi-dish with deionized or distilled water and dry thoroughly.
10. Wash each membrane with 1X Wash Buffer for 10 minutes on a rocking platform shaker. Repeat two times for a total of three washes.
11. Dilute the Streptavidin-HRP in Array Buffer 5 using the dilution factor on the vial label. Pipette 2 mL of diluted Streptavidin-HRP into each well of the 4-Well Multi-dish.
12. Carefully remove each membrane from its wash container. Allow excess Wash Buffer to drain from the membrane. Return the membrane to the 4-Well Multi-dish containing the diluted Streptavidin-HRP. Cover the wells with the lid.
13. Incubate for 30 minutes at room temperature on a rocking platform shaker.

ARRAY PROCEDURE *CONTINUED*

14. Wash each array as described in steps 9 and 10.

Note: *Complete the remaining steps without interruption.*

15. Carefully remove each membrane from its wash container. Allow excess Wash Buffer to drain from the membrane by blotting the lower edge onto paper towels. Place each membrane on the bottom sheet of the plastic sheet protector with the identification number facing up.

16. Pipette 1 mL of the prepared Chemi Reagent Mix evenly onto each set of membranes.

Note: *Using less than 1 mL of Chemi Reagent Mix per membrane may result in incomplete membrane coverage.*

17. Carefully cover with the top sheet of the plastic sheet protector. Gently smooth out any air bubbles and ensure Chemi Reagent Mix is spread evenly to all corners of each membrane. Incubate for 1 minute.

18. Position paper towels on the top and sides of the plastic sheet protector containing the membranes and carefully squeeze out excess Chemi Reagent Mix.

19. Remove the top plastic sheet protector and carefully lay an absorbent lab wipe on top of the membranes to blot off any remaining Chemi Reagent Mix.

20. Leaving membranes on the bottom plastic sheet protector, cover the membranes with plastic wrap taking care to gently smooth out any air bubbles. Wrap the excess plastic wrap around the back of the sheet protector so that the membranes and sheet protector are completely wrapped.

21. Place the membranes with the identification numbers facing up in an autoradiography film cassette.

Note: *Use an autoradiography cassette that is not used with radioactive isotope detection.*

22. Expose membranes to X-ray film for 1-10 minutes. Multiple exposure times are recommended.

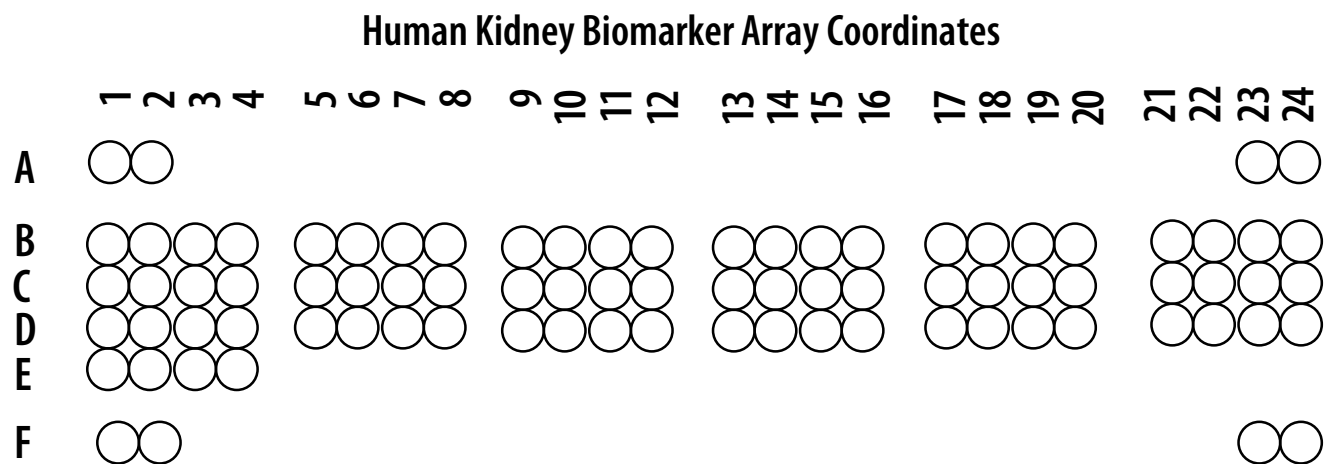
DATA ANALYSIS

The positive signals seen on developed film can be quickly identified by placing the transparency overlay template on the array image and aligning it with the pairs of reference spots in three corners of each array. The stamped identification number on the array should be placed on the left hand side. The location of controls and capture antibodies is listed in the Appendix.

Note: Reference spots are included to align the transparency overlay template and to demonstrate that the array has been incubated with Streptavidin-HRP during the assay procedure.

Pixel densities on developed X-ray film can be collected and analyzed using a transmission-mode scanner and image analysis software.

1. Create a template to analyze pixel density in each spot of the array.
2. Export signal values to a spreadsheet file for manipulation in a program such as Microsoft Excel.
3. Determine the average signal (pixel density) of the pair of duplicate spots representing each biomarker.
4. Subtract an averaged background signal from each spot. Use a signal from a clear area of the array or negative control spots as a background value.
5. Compare corresponding signals on different arrays to determine the relative change in biomarker levels between samples.



This image is not to scale. It is for coordinate reference only.
Please use the transparency overlay for analyte identification.

PROFILING PROTEINS IN HUMAN URINE SAMPLES

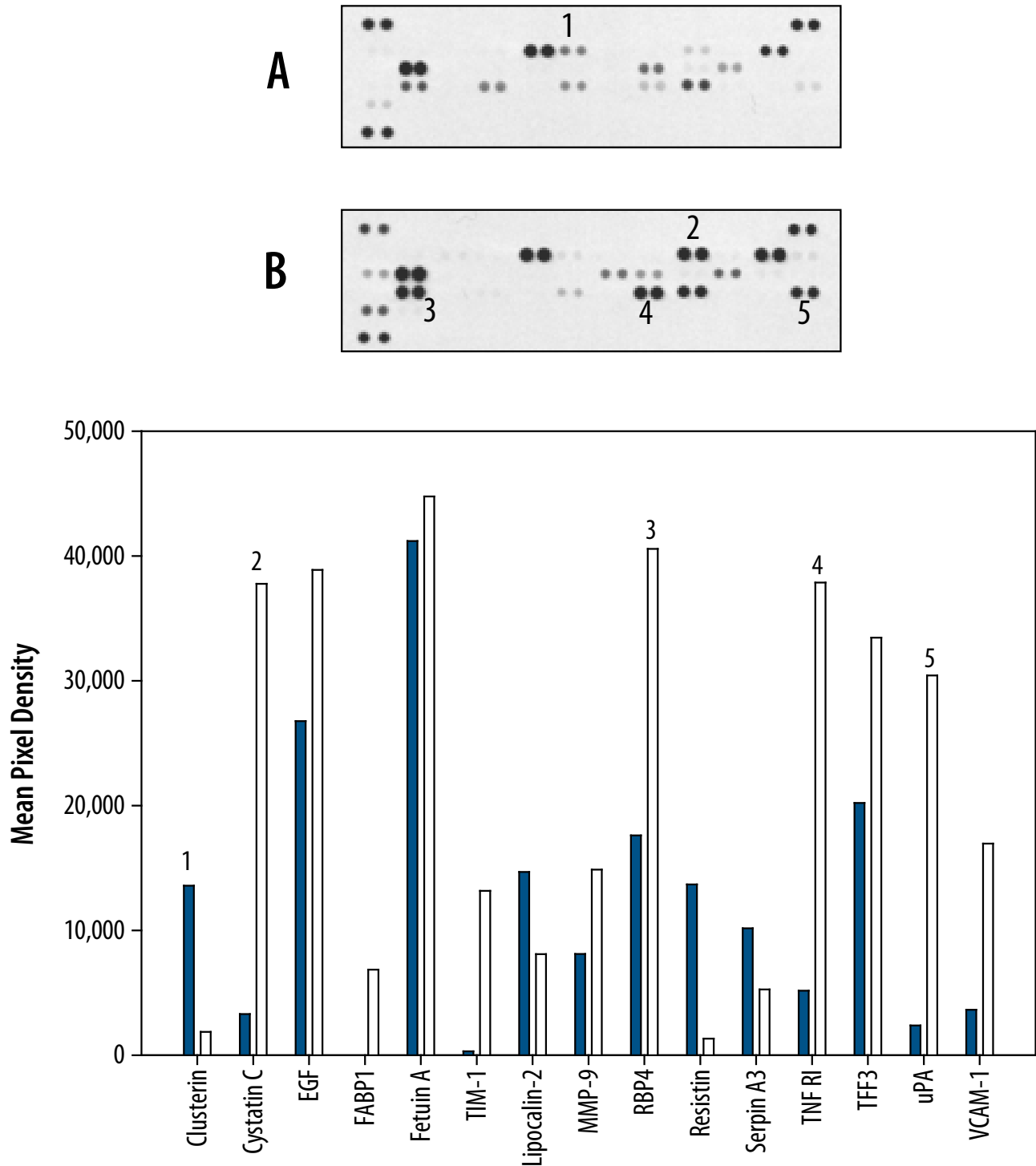


Figure 1: The Human Kidney Biomarker Array detects multiple analytes in urine samples. 500 μ L of sample was run on each array. Data shown are from a two minute exposure to X-ray film.

A. Urine with a creatinine level of 8.5 mg/dL (filled bars).

B. Urine with a creatinine level of 401.8 mg/dL (open bars).

PROFILING PROTEINS IN HUMAN URINE SAMPLES *CONTINUED*

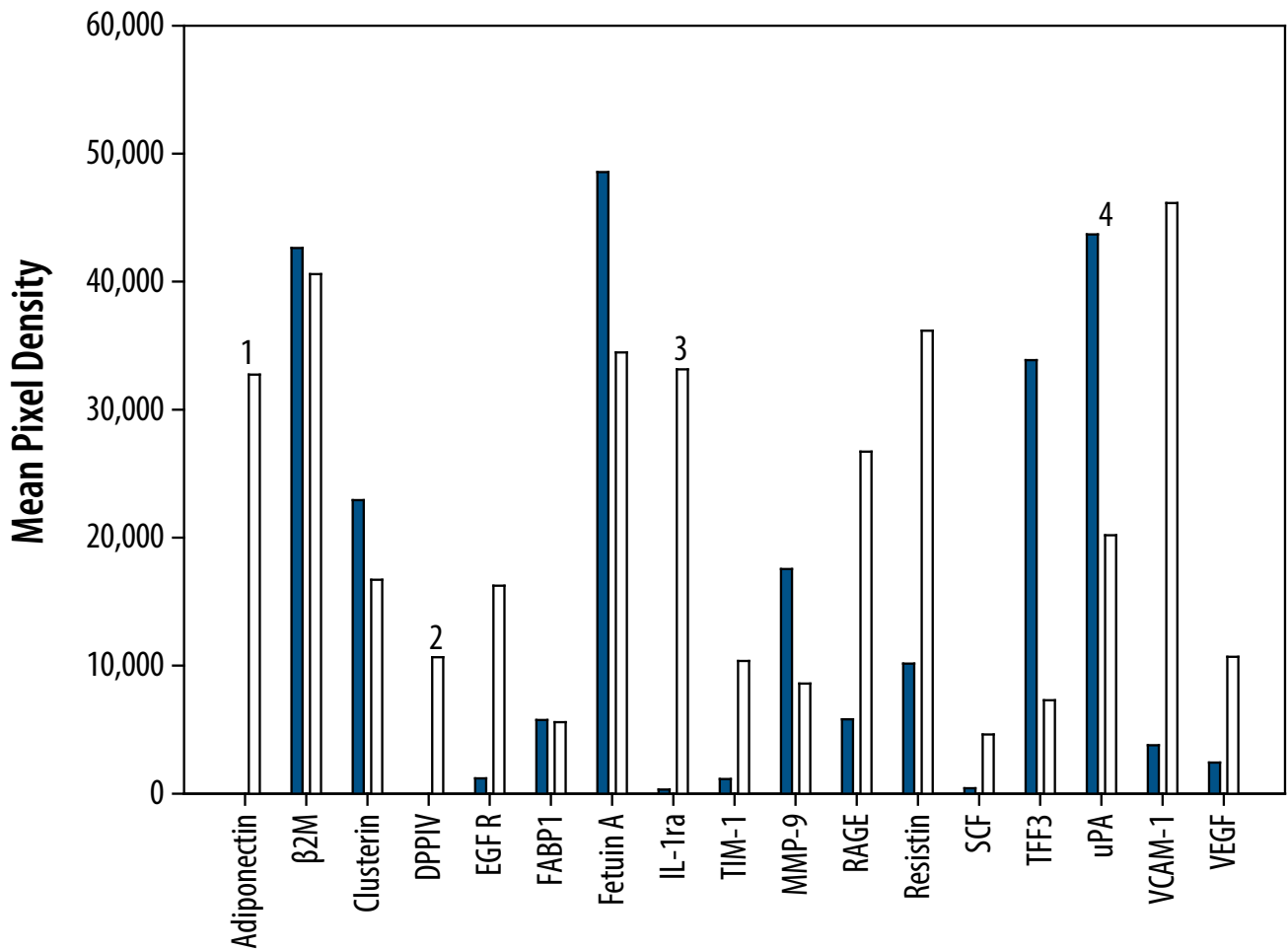
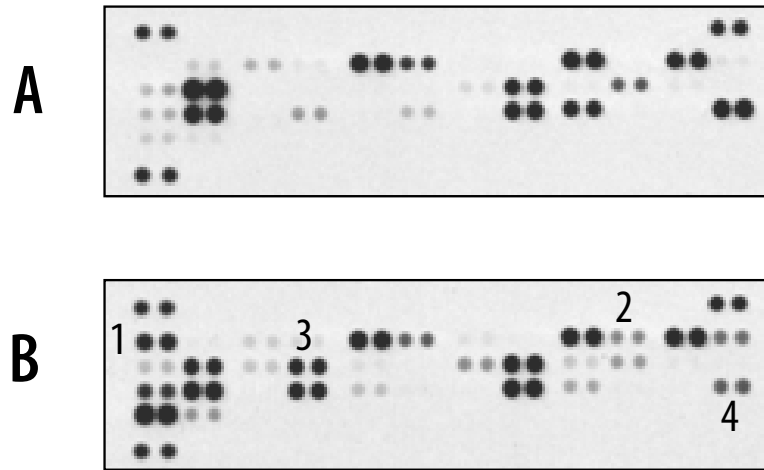


Figure 2: The Human Kidney Biomarker Array detects multiple analytes in urine samples. 500 μL of sample was run on each array. Data shown are from a two minute exposure to X-ray film.

A. Urine with a total protein level of 8 mg/dL (filled bars).

B. Urine with a total protein level of 390 mg/dL (open bars).

PROFILING PROTEINS IN HUMAN URINE SAMPLES *CONTINUED*

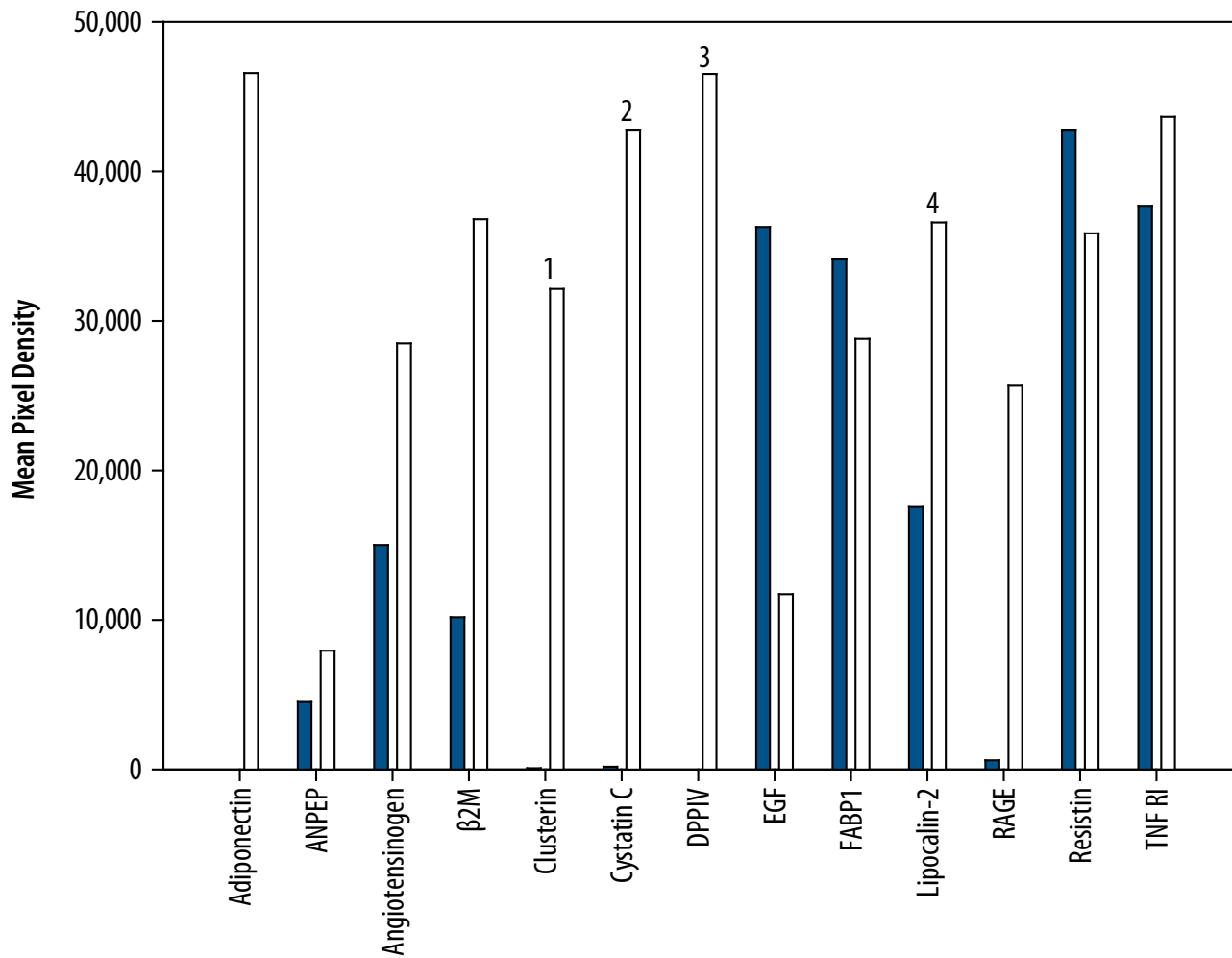
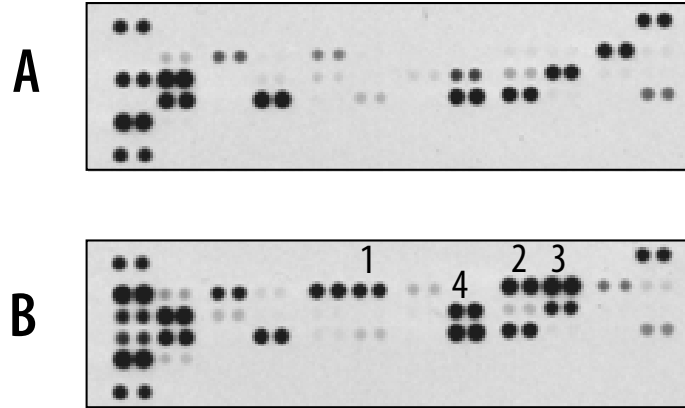


Figure 3: The Human Kidney Biomarker Array detects multiple analytes in urine samples. 500 µL of sample was run on each array. Data shown are from a two minute exposure to X-ray film.

- A.** Urine with a microalbumin level of 23.4 mg/dL (filled bars).
- B.** Urine with a microalbumin level of 111 mg/dL (open bars).

PROFILING PROTEINS IN HUMAN URINE SAMPLES *CONTINUED*

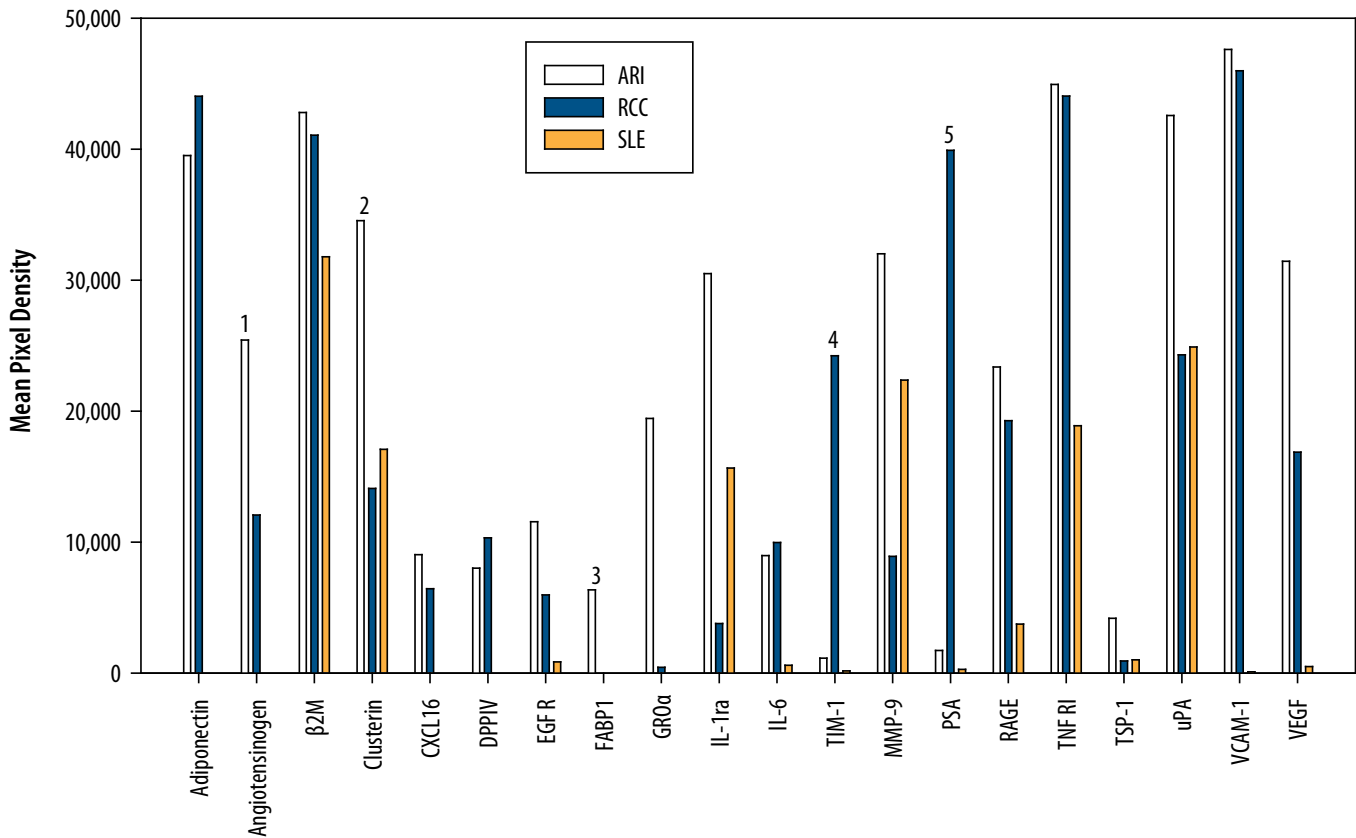
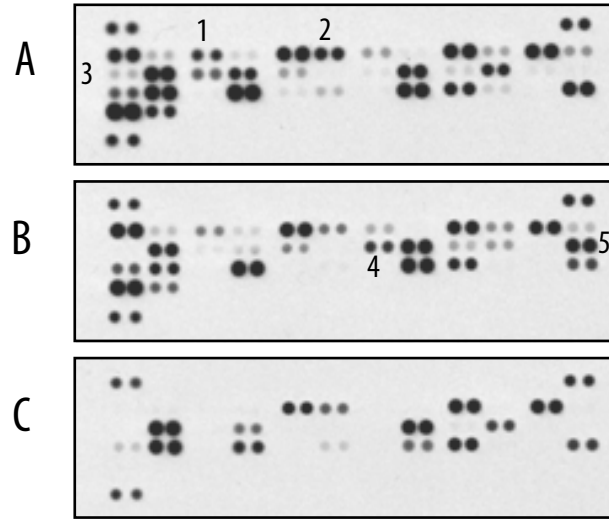


Figure 4: The Human Kidney Biomarker Array detects multiple analytes in urine samples. 500 μ L of sample was run on each array. Data shown are from a two minute exposure to X-ray film.

- A.** Urine from a patient with Acute Renal Injury (ARI).
- B.** Urine from a patient with Renal Cell Carcinoma (RCC).
- C.** Urine from a patient with Systemic Lupus Erythematosus (SLE).

PROFILING PROTEINS IN CELL CULTURE SUPERNATES

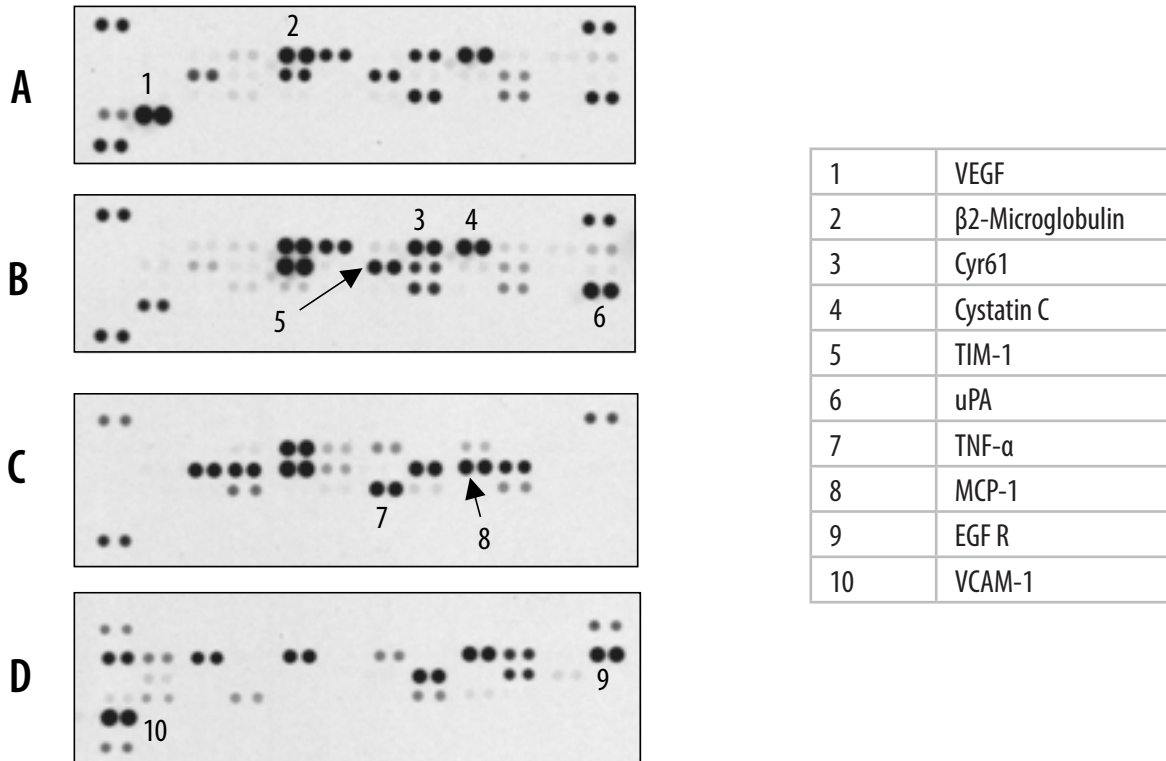


Figure 5: The Human Kidney Biomarker Array detects multiple analytes in cell culture supernate samples. Cells were untreated or treated as below. 500 μ L of cell culture supernate was run on each array. Data shown are from a two minute exposure to X-ray film.

A. 786-O human renal cell adenocarcinoma cells.

B. HK-2 human proximal tubule epithelial cells.

C. Peripheral blood mononuclear cells treated with 10 μ g/mL of PHA for 72 hours.

D. THP-1 human acute monocytic leukemia cells treated with 1 μ g/mL of recombinant human IFN- γ (R&D Systems®, Catalog # 285-IF) for 8 hours followed by the addition of 1 μ g/mL of LPS for 16 hours.

PROFILING PROTEINS IN CELL LYSATES

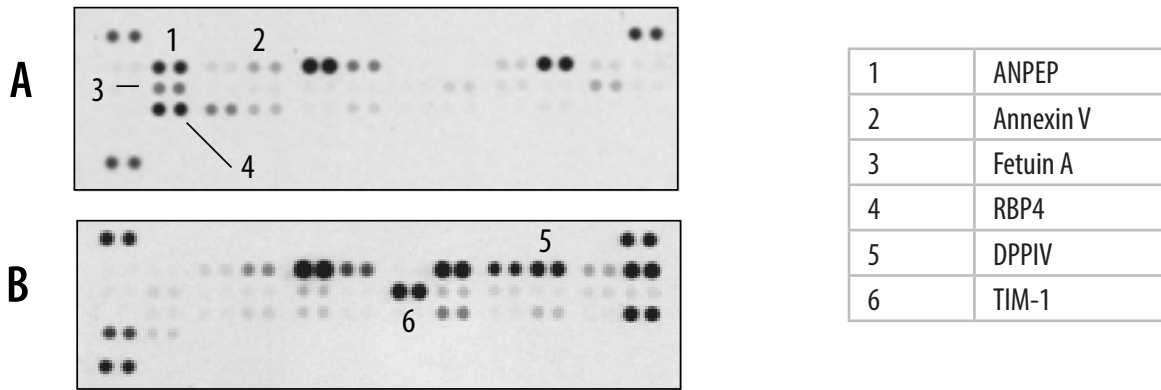


Figure 6: The Human Kidney Biomarker Array detects multiple analytes in cell and tissue lysates. Cell lysates (see quantities below) were run on each array. Data shown are from a two minute exposure to X-ray film.

A. Kidney cortex lysate (20 µg).

B. HK-2 human proximal tubule epithelial cells (150 µg).

APPENDIX

Refer to the table below for the Human Kidney Biomarker Array coordinates.

Coordinate	Analyte/Control	Alternate Nomenclature
A1, A2	Reference Spots	—
A23, A24	Reference Spots	—
B1, B2	Adiponectin	Acrp30
B3, B4	ANPEP	Aminopeptidase N
B5, B6	Angiotensinogen	Serpin A8
B7, B8	Annexin V	—
B9, B10	β 2-Microglobulin	β 2M
B11, B12	Clusterin	Apolipoprotein J
B13, B14	CXCL16	—
B15, B16	Cyr61	CCN1
B17, B18	Cystatin C	—
B19, B20	DPPIV	CD26
B21, B22	EGF	—
B23, B24	EGF R	ErbB1
C1, C2	FABP1	L-FABP
C3, C4	Fetuin A	AHSG
C5, C6	GRO α	CXCL1
C7, C8	IL-1ra	IL-1F3
C9, C10	IL-6	—
C11, C12	IL-10	—
C13, C14	TIM-1	KIM-1/HAVCR
C15, C16	Lipocalin-2	NGAL
C17, C18	MCP-1	CCL2
C19, C20	MMP-9	—
C21, C22	Nepriylisin	CD10
C23, C24	PSA	KLK-3

continued on next page....

APPENDIX CONTINUED

Coordinate	Analyte/Control	Alternate Nomenclature
D1, D2	RAGE	—
D3, D4	RBP4	—
D5, D6	Renin	—
D7, D8	Resistin	—
D9, D10	SCF	—
D11, D12	Serpin A3	α 1-antichymotrypsin
D13, D14	TNF- α	TNFSF1A
D15, D16	TNF RI	TNFRSF1A
D17, D18	TFF3	Trefoil Factor 3
D19, D20	Thrombospondin-1	TSP-1/THBS-1
D21, D22	TWEAK	TNFSF12
D23, D24	uPA	Urokinase
E1, E2	VCAM-1	CD106
E3, E4	VEGF	VEGF-A
F1, F2	Reference Spots	—
F23, F24	PBS (Negative Control)	Control (-)

NOTES

NOTES

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