

# RT<sup>2</sup> Profiler™ PCR Array:

## Human Drug Transporters

**Catalog Number**

PAHS-070A

PAHS-070C

PAHS-070D

PAHS-070E

PAHS-070F

PAHS-070G

**For Real-Time Instruments:**

ABI Standard Blocks; Bio-Rad iCycler, MyiQ, and (MJ Research) Chromo 4 and Stratagene Mx3005p, Mx3000p

ABI 7500 and 7900HT FAST 96-Well Blocks, ABI StepOnePlus

Bio-Rad (MJ Research) Opticon and Opticon 2, Stratagene Mx4000

ABI 7900HT 384-Well Block

Roche LightCycler 480 96-well Block

Roche LightCycler 480 384-well Block

**Description**

The Human Drug Transporters RT<sup>2</sup> Profiler PCR Array contains 84 transporter genes. Transporters play key roles in pharmacology, affecting entry and extrusion of drugs into and out of cells. Transporters important to the absorption, distribution, metabolism and excretion of many drugs are included on this array. In addition, transporters that contribute to sensitivity and resistance of tumor cells to anticancer agents are represented. Using real-time PCR, you can easily and reliably analyze expression of a focused panel of genes related to drug transporters with this array.

**Functional Gene Groupings**

**ABC Transporters Involved in Drug Transport:** ABCA1, ABCA2, ABCA3, ABCA4, ABCA9, ABCA12, ABCA13, ABCB1, ABCB4, ABCB5, ABCB6, ABCB11, ABCC1, ABCC2, ABCC3, ABCC4, ABCC5, ABCC6, ABCC10, ABCC11, ABCC12, ABCD1, ABCD3, ABCD4, ABCF1, ABCG2, ABCG8, TAP1 (ABCB2), TAP2 (ABCB3).

**SLC Transporters Involved in Drug Transport:**

SLC10: SLC10A1, SLC10A2.

SLC15: SLC15A1, SLC15A2.

SLC16: SLC16A1, SLC16A2, SLC16A3.

SLC19: SLC19A1, SLC19A2, SLC19A3.

SLC22: SLC22A1, SLC22A2, SLC22A3, SLC22A6, SLC22A7, SLC22A8, SLC22A9.

SLC25: SLC25A13.

SLC28: SLC28A1, SLC28A2, SLC28A3.

SLC29: SLC29A1, SLC29A2.

SLC2: SLC2A1, SLC2A2, SLC2A3.

SLC3: SLC3A1, SLC3A2.

SLC31: SLC31A1.

SLC38: SLC38A2, SLC38A5.

SLC5: SLC5A1, SLC5A4.

SLC7: SLC7A5, SLC7A6, SLC7A7, SLC7A8, SLC7A9, SLC7A11.

SLCO: SLCO1A2, SLCO1B1, SLCO1B3, SLCO2A1, SLCO2B1, SLCO3A1, SLCO4A1.

**Other Transporters Involved in Drug Transport:**

Vacuolar H<sup>+</sup>-ATPase: ATP6V0C.

Copper Pumps: ATP7A, ATP7B.

Aquaporins: AQP1, AQP7, AQP9.

Major Vault Protein: MVP.

Voltage-dependent Anion Channels: VDAC1, VDAC2.

## **Storage Conditions**

Please check the kit components immediately after you receive this package. We are only responsible for missing items reported within two (2) business days of receipt.

**Storage Conditions:** PCR Arrays are shipped at ambient temperature. Keep plates at -20 °C for long-term storage.

**NOTE:** Be sure that you have the correct PCR Array format for your instrument before starting the experiment.

## **References**

1. Y. Huang. Pharmacogenetics/genomics of membrane transporters in cancer chemotherapy. *Cancer Metastasis Rev* (2007).
2. Y. Huang, P. Anderle, K. J. Bussey, C. Barbacioru, U. Shankavaram, Z. Dai, W. C. Reinhold, A. Papp, J. N. Weinstein, and W. Sadee. Membrane Transporters and Channels: Role of the Transportome in Cancer Chemosensitivity and Chemoresistance. *Cancer Res* **64**: 4294-4301 (2004).
3. Y. Huang and W. Sadee. Membrane transporters and channels in chemoresistance and -sensitivity of tumor cells. *Cancer Lett* **239**: 168-82 (2006).
4. G. Szakacs, J. P. Annereau, S. Lababidi, U. Shankavaram, A. Arciello, K. J. Bussey, W. Reinhold, Y. Guo, G. D. Kruh, M. Reimers, J. N. Weinstein, and M. M. Gottesman. Predicting drug sensitivity and resistance: profiling ABC transporter genes in cancer cells. *Cancer Cell* **6**: 129-37 (2004).
5. P. M. Beringer and R. L. Slaughter. Transporters and their impact on drug disposition. *Ann Pharmacother* **39**: 1097-108 (2005).
6. R. H. Ho and R. B. Kim. Transporters and drug therapy: implications for drug disposition and disease. *Clin Pharmacol Ther* **78**: 260-77 (2005).

## Product Specification Sheet

### Array Layout: Human Drug Transporters PCR Array

	1	2	3	4	5	6	7	8	9	10	11	12
A	ABCA1	ABCA12	ABCA13	ABCA2	ABCA3	ABCA4	ABCA9	ABCB1	ABCB11	ABCB4	ABCB5	ABCB6
B	ABCC1	ABCC10	ABCC11	ABCC12	ABCC2	ABCC3	ABCC4	ABCC5	ABCC6	ABCD1	ABCD3	ABCD4
C	ABCF1	ABCG2	ABCG8	AQP1	AQP7	AQP9	ATP6V0C	ATP7A	ATP7B	MVP	SLC10A1	SLC10A2
D	SLC15A1	SLC15A2	SLC16A1	SLC16A2	SLC16A3	SLC19A1	SLC19A2	SLC19A3	SLC22A1	SLC22A2	SLC22A3	SLC22A6
E	SLC22A7	SLC22A8	SLC22A9	SLC28A1	SLC28A2	SLC28A3	SLC29A1	SLC29A2	SLC2A1	SLC2A2	SLC2A3	SLC31A1
F	SLC38A2	SLC38A5	SLC3A1	SLC3A2	SLC5A1	SLC5A4	SLC25A13	SLC7A11	SLC7A5	SLC7A6	SLC7A7	SLC7A8
G	SLC7A9	SLCO1A2	SLCO1B1	SLCO1B3	SLCO2A1	SLCO2B1	SLCO3A1	SLCO4A1	TAP1	TAP2	VDAC1	VDAC2
H	B2M	HPRT1	RPL13A	GAPDH	ACTB	HGDC	RTC	RTC	RTC	PPC	PPC	PPC

### Gene Table

Position	UniGene	GenBank	Symbol	Description
A01	Hs.429294	NM_005502	ABCA1	ATP-binding cassette, sub-family A (ABC1), member 1
A02	Hs.134585	NM_173076	ABCA12	ATP-binding cassette, sub-family A (ABC1), member 12
A03	Hs.226568	NM_152701	ABCA13	ATP-binding cassette, sub-family A (ABC1), member 13
A04	Hs.421202	NM_001606	ABCA2	ATP-binding cassette, sub-family A (ABC1), member 2
A05	Hs.26630	NM_001089	ABCA3	ATP-binding cassette, sub-family A (ABC1), member 3
A06	Hs.416707	NM_000350	ABCA4	ATP-binding cassette, sub-family A (ABC1), member 4
A07	Hs.131686	NM_080283	ABCA9	ATP-binding cassette, sub-family A (ABC1), member 9
A08	Hs.489033	NM_000927	ABCB1	ATP-binding cassette, sub-family B (MDR/TAP), member 1
A09	Hs.158316	NM_003742	ABCB11	ATP-binding cassette, sub-family B (MDR/TAP), member 11
A10	Hs.287827	NM_000443	ABCB4	ATP-binding cassette, sub-family B (MDR/TAP), member 4
A11	Hs.404102	NM_178559	ABCB5	ATP-binding cassette, sub-family B (MDR/TAP), member 5
A12	Hs.107911	NM_005689	ABCB6	ATP-binding cassette, sub-family B (MDR/TAP), member 6
B01	Hs.391464	NM_004996	ABCC1	ATP-binding cassette, sub-family C (CFTR/MRP), member 1
B02	Hs.55879	NM_033450	ABCC10	ATP-binding cassette, sub-family C (CFTR/MRP), member 10
B03	Hs.652267	NM_032583	ABCC11	ATP-binding cassette, sub-family C (CFTR/MRP), member 11
B04	Hs.410111	NM_033226	ABCC12	ATP-binding cassette, sub-family C (CFTR/MRP), member 12
B05	Hs.368243	NM_000392	ABCC2	ATP-binding cassette, sub-family C (CFTR/MRP), member 2
B06	Hs.463421	NM_003786	ABCC3	ATP-binding cassette, sub-family C (CFTR/MRP), member 3
B07	Hs.508423	NM_005845	ABCC4	ATP-binding cassette, sub-family C (CFTR/MRP), member 4
B08	Hs.368563	NM_005688	ABCC5	ATP-binding cassette, sub-family C (CFTR/MRP), member 5
B09	Hs.460057	NM_001171	ABCC6	ATP-binding cassette, sub-family C (CFTR/MRP), member 6
B10	Hs.159546	NM_000033	ABCD1	ATP-binding cassette, sub-family D (ALD), member 1
B11	Hs.76781	NM_002858	ABCD3	ATP-binding cassette, sub-family D (ALD), member 3
B12	Hs.94395	NM_005050	ABCD4	ATP-binding cassette, sub-family D (ALD), member 4
C01	Hs.9573	NM_001090	ABCF1	ATP-binding cassette, sub-family F (GCN20), member 1
C02	Hs.480218	NM_004827	ABCG2	ATP-binding cassette, sub-family G (WHITE), member 2
C03	Hs.413931	NM_022437	ABCG8	ATP-binding cassette, sub-family G (WHITE), member 8 (sterolin 2)
C04	Hs.76152	NM_198098	AQP1	Aquaporin 1 (Colton blood group)
C05	Hs.455323	NM_001170	AQP7	Aquaporin 7
C06	Hs.104624	NM_020980	AQP9	Aquaporin 9
C07	Hs.389107	NM_001694	ATP6V0C	ATPase, H+ transporting, lysosomal 16kDa, V0 subunit c
C08	Hs.496414	NM_000052	ATP7A	ATPase, Cu++ transporting, alpha polypeptide (Menkes syndrome)
C09	Hs.492280	NM_000053	ATP7B	ATPase, Cu++ transporting, beta polypeptide
C10	Hs.632177	NM_017458	MVP	Major vault protein
C11	Hs.952	NM_003049	SLC10A1	Solute carrier family 10 (sodium/bile acid cotransporter family), member 1
C12	Hs.194783	NM_000452	SLC10A2	Solute carrier family 10 (sodium/bile acid cotransporter family), member 2
D01	Hs.436893	NM_005073	SLC15A1	Solute carrier family 15 (oligopeptide transporter), member 1
D02	Hs.518089	NM_021082	SLC15A2	Solute carrier family 15 (H+/peptide transporter), member 2
D03	Hs.75231	NM_003051	SLC16A1	Solute carrier family 16, member 1 (monocarboxylic acid transporter 1)

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Position	UniGene	GenBank	Symbol	Description
D04	Hs.75317	NM_006517	SLC16A2	Solute carrier family 16, member 2 (monocarboxylic acid transporter 8)
D05	Hs.500761	NM_004207	SLC16A3	Solute carrier family 16, member 3 (monocarboxylic acid transporter 4)
D06	Hs.84190	NM_194255	SLC19A1	Solute carrier family 19 (folate transporter), member 1
D07	Hs.30246	NM_006996	SLC19A2	Solute carrier family 19 (thiamine transporter), member 2
D08	Hs.221597	NM_025243	SLC19A3	Solute carrier family 19, member 3
D09	Hs.117367	NM_003057	SLC22A1	Solute carrier family 22 (organic cation transporter), member 1
D10	Hs.436385	NM_003058	SLC22A2	Solute carrier family 22 (organic cation transporter), member 2
D11	Hs.567337	NM_021977	SLC22A3	Solute carrier family 22 (extraneuronal monoamine transporter), member 3
D12	Hs.369252	NM_004790	SLC22A6	Solute carrier family 22 (organic anion transporter), member 6
E01	Hs.485438	NM_006672	SLC22A7	Solute carrier family 22 (organic anion transporter), member 7
E02	Hs.266223	NM_004254	SLC22A8	Solute carrier family 22 (organic anion transporter), member 8
E03	Hs.502772	NM_080866	SLC22A9	Solute carrier family 22 (organic anion/cation transporter), member 9
E04	Hs.459187	NM_004213	SLC28A1	Solute carrier family 28 (sodium-coupled nucleoside transporter), member 1
E05	Hs.367833	NM_004212	SLC28A2	Solute carrier family 28 (sodium-coupled nucleoside transporter), member 2
E06	Hs.591877	NM_022127	SLC28A3	Solute carrier family 28 (sodium-coupled nucleoside transporter), member 3
E07	Hs.25450	NM_004955	SLC29A1	Solute carrier family 29 (nucleoside transporters), member 1
E08	Hs.569017	NM_001532	SLC29A2	Solute carrier family 29 (nucleoside transporters), member 2
E09	Hs.653218	NM_006516	SLC2A1	Solute carrier family 2 (facilitated glucose transporter), member 1
E10	Hs.167584	NM_000340	SLC2A2	Solute carrier family 2 (facilitated glucose transporter), member 2
E11	Hs.419240	NM_006931	SLC2A3	Solute carrier family 2 (facilitated glucose transporter), member 3
E12	Hs.532315	NM_001859	SLC31A1	Solute carrier family 31 (copper transporters), member 1
F01	Hs.221847	NM_018976	SLC38A2	Solute carrier family 38, member 2
F02	Hs.195155	NM_033518	SLC38A5	Solute carrier family 38, member 5
F03	Hs.112916	NM_000341	SLC3A1	Solute carrier family 3 (cystine, dibasic and neutral amino acid transporters, activator of cystine, dibasic and neutral amino acid transport), member 1
F04	Hs.502769	NM_002394	SLC3A2	Solute carrier family 3 (activators of dibasic and neutral amino acid transport), member 2
F05	Hs.1964	NM_000343	SLC5A1	Solute carrier family 5 (sodium/glucose cotransporter), member 1
F06	Hs.130101	NM_014227	SLC5A4	Solute carrier family 5 (low affinity glucose cotransporter), member 4
F07	Hs.489190	NM_014251	SLC25A13	Solute carrier family 25, member 13 (citrin)
F08	Hs.390594	NM_014331	SLC7A11	Solute carrier family 7, (cationic amino acid transporter, y+ system) member 11
F09	Hs.513797	NM_003486	SLC7A5	Solute carrier family 7 (cationic amino acid transporter, y+ system), member 5
F10	Hs.351571	NM_003983	SLC7A6	Solute carrier family 7 (cationic amino acid transporter, y+ system), member 6
F11	Hs.513147	NM_003982	SLC7A7	Solute carrier family 7 (cationic amino acid transporter, y+ system), member 7
F12	Hs.632348	NM_182728	SLC7A8	Solute carrier family 7 (cationic amino acid transporter, y+ system), member 8
G01	Hs.408567	NM_014270	SLC7A9	Solute carrier family 7 (cationic amino acid transporter, y+ system), member 9
G02	Hs.46440	NM_005075	SLCO1A2	Solute carrier organic anion transporter family, member 1A2
G03	Hs.449738	NM_006446	SLCO1B1	Solute carrier organic anion transporter family, member 1B1
G04	Hs.504966	NM_019844	SLCO1B3	Solute carrier organic anion transporter family, member 1B3
G05	Hs.518270	NM_005630	SLCO2A1	Solute carrier organic anion transporter family, member 2A1
G06	Hs.7884	NM_007256	SLCO2B1	Solute carrier organic anion transporter family, member 2B1
G07	Hs.311187	NM_013272	SLCO3A1	Solute carrier organic anion transporter family, member 3A1
G08	Hs.235782	NM_016354	SLCO4A1	Solute carrier organic anion transporter family, member 4A1
G09	Hs.352018	NM_000593	TAP1	Transporter 1, ATP-binding cassette, sub-family B (MDR/TAP)
G10	Hs.502	NM_000544	TAP2	Transporter 2, ATP-binding cassette, sub-family B (MDR/TAP)
G11	Hs.519320	NM_003374	VDAC1	Voltage-dependent anion channel 1
G12	Hs.355927	NM_003375	VDAC2	Voltage-dependent anion channel 2
H01	Hs.534255	NM_004048	B2M	Beta-2-microglobulin
H02	Hs.412707	NM_000194	HPRT1	Hypoxanthine phosphoribosyltransferase 1 (Lesch-Nyhan syndrome)
H03	Hs.546356	NM_012423	RPL13A	Ribosomal protein L13a
H04	Hs.544577	NM_002046	GAPDH	Glyceraldehyde-3-phosphate dehydrogenase
H05	Hs.520640	NM_001101	ACTB	Actin, beta
H06	N/A	SA_00105	HGDC	Human Genomic DNA Contamination
H07	N/A	SA_00104	RTC	Reverse Transcription Control
H08	N/A	SA_00104	RTC	Reverse Transcription Control
H09	N/A	SA_00104	RTC	Reverse Transcription Control
H10	N/A	SA_00103	PPC	Positive PCR Control
H11	N/A	SA_00103	PPC	Positive PCR Control
H12	N/A	SA_00103	PPC	Positive PCR Control