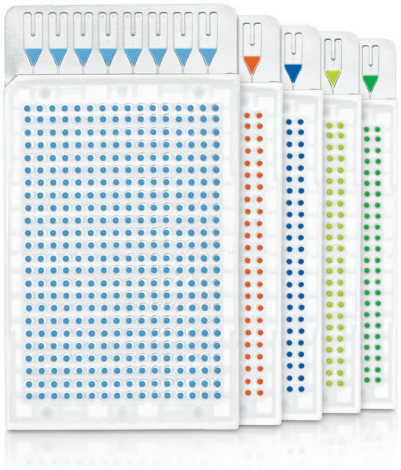
TaqMan Array Cards

Prepare 384 reactions accurately in <10 minutes without robotics

- **Easy and rapid setup**—prepare 384 wells in less than 10 minutes, without expensive liquid-handling robotics
- **Highly reproducible results**—ideal for low-expressing genes or precious samples
- **Flexible format designs**—choose from preconfigured panels or a full custom design
- **Easy data analysis**—enables rapid and accurate analysis across a large number of genes and samples



Introduction

As experimental throughput in research laboratories increases, so does the need for simple and efficient ways to run tests. Researchers are often left to choose between cumbersome, time-consuming manual approaches and costly automation. Applied Biosystems™ TaqMan® Array Cards provide an alternative that enables you to achieve highly reproducible and sensitive results with higher throughput, but without the expense of liquid-handling robotics.

Customized for your application

Widely cited in publications (Table 1), TaqMan Array Cards are ideal for medium-throughput verification and analysis studies, whether your research involves cancer, stem cells, inflammation, or infectious diseases. Use the cards for verifying tens or hundreds of initial hits generated from microarrays or next-generation sequencing, or for analyzing potential biomarkers and toxicology panels. TaqMan Array Cards are also ideal for measuring targets in biomarker, toxicology, pathway, or even miRNA panels.

A TaqMan Array Card is a 384-well microfluidic card designed to perform 384 simultaneous real-time PCR reactions. TaqMan Array Cards are preloaded with dried-down Applied Biosystems™ TaqMan® Assays (TaqMan probe and primer sets), ready for 1 to 8 samples to be run in parallel against 12 to 381 assay targets (including a manufacturing control) (Figure 1). Because of their design, TaqMan Array Cards make it easy to produce consistent results with low variability across multiple users and laboratories. You can rely on TaqMan Array Cards to help you quickly achieve highly reproducible and sensitive results.

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Table 1. Examples of published literature using TaqMan Array Cards for a variety of research applications.

Research focus	Title	Publication
Stem cells	Response of human oral mucosal epithelial cells to different storage temperatures: A structural and transcriptional study	*PLoS One.* 2020; 15(12): e0243914
	Different isolation methods alter the gene expression profiling of adipose-derived stem cells	*Int J Med Sci* 11:391 (2014)
	Stem cells expanded from the human embryonic hindbrain stably retain regional specification and high neurogenic potency	*J Neurosci* 33:12407 (2013)
Cancer	ER-Negative Breast Cancer Is Highly Responsive to Cholesterol Metabolite Signalling	*Nutrients*. 11(11); 2618 (2019)
	Differentially expressed miRNAs in Ewing sarcoma compared to mesenchymal stem cells: low miR-31 expression with effects on proliferation and invasion	*PLoS One* 9:e93067 (2014)
Inflammation	Pathobiome driven gut inflammation in Pakistani children with Environmental Enteric Dysfunction	*PLoS One* 14(8):e0221095 (2019)
	Expression of genes related to anti-inflammatory pathways are modified among farmers' children	*PLoS One* 9:e91097 (2014)
	Resolution of central nervous system astrocytic and endothelial sources of *CCL2* gene expression during evolving neuroinflammation	*Fluids Barriers CNS* 11:6 (2014)
Toxicity	Urinary miRNA Biomarkers of Drug-Induced Kidney Injury and Their Site Specificity Within the Nephron	*Toxicol Sci.* 2021 Mar*; 180(1): 1–16*
	Expression profiling of selected genes of toxication and detoxication pathways in peripheral blood lymphocytes as a biomarker for predicting toxicity of environmental chemicals	*Int J Hyg Environ Health* 216:645 (2013)
Infectious diseases	Evaluation of TaqMan Array Card (TAC) for the detection of 28 respiratory pathogens	*BMC Infectious Diseases.* 20:820 (2020)
	Detection of pathogenic microorganisms from bloodstream infection specimens using TaqMan Array Card technology	*Sci Rep* 8, 12828 (2018)
	Detection and characterization of *Mycoplasma pneumoniae* during an outbreak of respiratory illness at a university	*J Clin Microbiol* 52:849 (2014)

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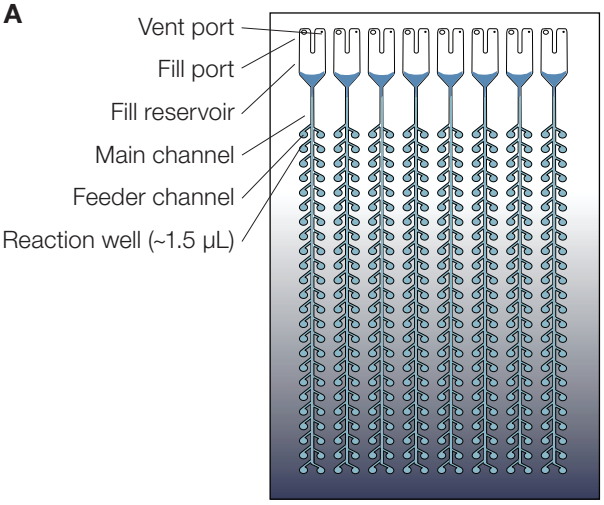

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Custom TaqMan Array Card format	No. of samples	No. of assays per sample	No. of replicates
Format 12	8	11 + 1 manufacturing control	4
Format 16	8	15 + 1 manufacturing control	3
Format 24	8	23 + 1 manufacturing control	2
Format 32	4	31 + 1 manufacturing control	3
Format 48	8	47 + 1 manufacturing control	1
Format 64	2	63 + 1 manufacturing control	3
Format 96a	4	95 + 1 manufacturing control	1
Format 96b	2	95 + 1 manufacturing control	2
Format 192	1	191 + 1 manufacturing control	2
Format 384	1	380 + 4 manufacturing controls	1

Figure 1. TaqMan Array Card and custom formats. (A) The TaqMan Array Card is designed to be used with the Applied Biosystems™ QuantStudio™ 7 Pro, QuantStudio™ 7 Flex, QuantStudio™ 12K Flex, or ViiA™ 7 Real-Time PCR Systems. Each card contains 384 wells connected by a series of microfluidic channels. There are 8 loading ports, each connected to 48 microwells of ~1.5 µL containing selected dried TaqMan Assays. **(B)** Each port can be loaded with the same or different samples, allowing analysis of 1 to 8 samples per card. Custom TaqMan Array Cards are available in 10 different configurations with 12, 16, 24, 32, 48, 64, 96 (2 choices), 192, and 384 assays.

Simple and effortless loading

Using TaqMan Array Cards is efficient and simple (Figure 2). The card has 8 sample-loading ports, each connected to a set of 48 reaction wells. Simply pipette your cDNA sample premixed with Applied Biosystems™ TaqMan® Fast Advanced Master Mix (recommended*) into each port, briefly centrifuge to disperse mixture into each reaction well, and seal the card to close the wells. In less than 10 minutes, your card is ready to run on QuantStudio 7 Pro, QuantStudio 7 Flex, QuantStudio 12K Flex, or ViiA 7 Real-Time PCR Systems equipped with a TaqMan Array Card block. This streamlined reaction setup saves time and reduces labor-intensive pipetting steps.

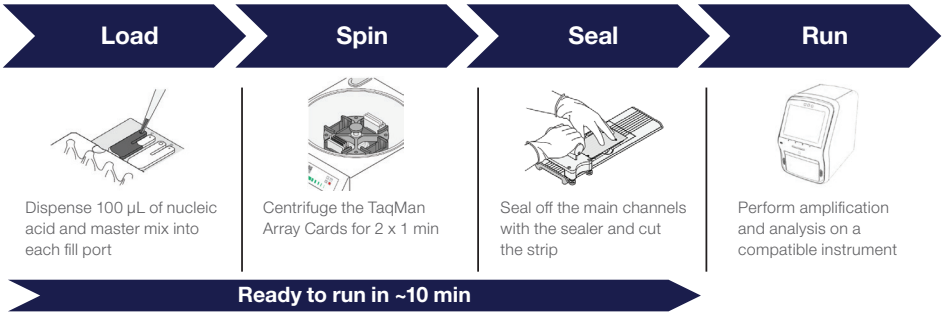

Figure 2. TaqMan Array Card workflow.

TaqMan Array Card centrifuge compatibility chart available at **thermofisher.com/centrifugecompatibility**

Versatile content options

TaqMan Array Cards are available in various content formats to meet your laboratory's needs (Table 2).

- **Inventoried**—choose preconfigured gene expression research panels (categorized by specific disease, pathway, or biological process) or microRNA panels formulated and ready to ship (Table 3).
- **Flexible (made-to-order)**—select a predefined panel of commonly studied pathways, diseases, biological processes, or cellular functions (human, mouse, or rat), then modify layout and assay content to suit your specific needs. Save time and effort by starting with genes of interest, expertly chosen and compiled.
- **Custom**—Start from a blank slate and choose from more than 2.8 million predesigned TaqMan Gene Expression Assays available for 32 species, or more than 5,000 TaqMan miRNA Assays. Design and ordering are simple with the online configuration tool, which helps you find and select genes and assays. Custom TaqMan Array Cards are available in 10 different configurations (Figure 1).
- **Specialty**—design your own TaqMan Array Card configured to your specifications using any combination of TaqMan SNP genotyping, copy number, gene expression, microRNA, or custom-designed assays.

Table 2. TaqMan Array Card formats and research application compatibility.

	Inventoried	Flexible (made-to-order)	Custom	Specialty
Definition	Preconfigured gene expression or miRNA panels (Table 3)	Modifiable, predefined panels	Customize using predesigned gene expression or microRNA assays	Unique and special requested designs using any combination of predesigned and/or custom assays
Web page	**thermofisher.com/taqmanarrays**	**thermofisher.com/flexiblepanels**	**thermofisher.com/arraycards**	**specialty-taqman-arrays.com**
Application supported				
Gene expression	✓	✓	✓	✓
MicroRNA	✓		✓	✓
Genotyping				✓

Table 3. Inventoried TaqMan Array Cards.

Panel	Cat. No. (Human)	Cat. No. (Mouse)	Cat. No. (Rat)
Gene expression research panels			
ABC transporter	4378700		
Alzheimer's	4378713	4378714	
Angiogenesis	4378710		
Apoptosis	4378701		
Endogenous control	4367563	4378702	4378704
GPCR	4367785	4378703	4378709
Immune	4370573	4367786	
Inflammation	4378707		4378708
Nuclear receptor	4379961		
Phosphodiesterase	4378705		4378706
Protein kinase	4367784		
Stem cell pluripotency	4385344	4385363	
Respiratory panel 2.0	A49047		
Respiratory tract microbiota	A41238		

Panel	Cat. No. (Human)	Cat. No. (Rodent)
miRNA research panels		
Advanced miRNA chemistry		
Advanced miRNA human A and B card	A31805	
Advanced miRNA human A card	A34714	
Advanced miRNA human B card	A34715	
Advanced miRNA human control card	A34716	
Advanced miRNA human serum plasma card	A34717	
miRNA stem-loop chemistry		
MicroRNA A+B cards set v3.0	4444913	4444909
MicroRNA A cards v2.0	4398965	4398967
MicroRNA B cards v3.0	4444910	4444899

Powerful data analysis

Applied Biosystems™ qPCR Analysis Modules are free, easy-to-use data analysis tools for comparative C_t analysis, also known as relative quantification (RQ or ΔΔCT) and standard curve analysis. They provide integrated analysis of multiple data sets, while offering new functionalities such as an online file storage system, flexible plate setup, analysis groups, and robust visualization to place your data fully in your control (Figure 3). Analyze up to 500 TaqMan Array Cards in one study with these robust analysis modules.

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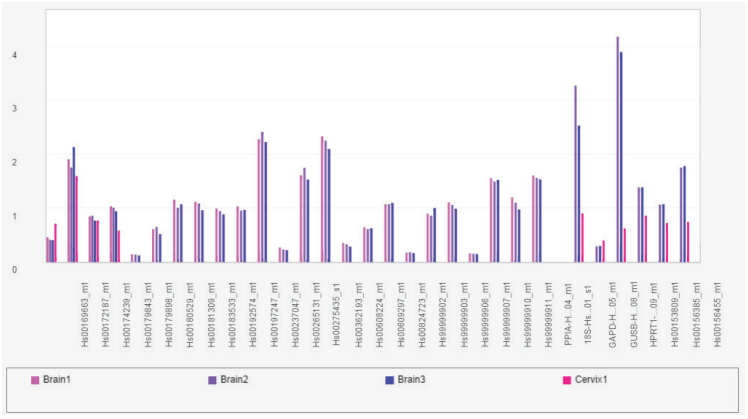

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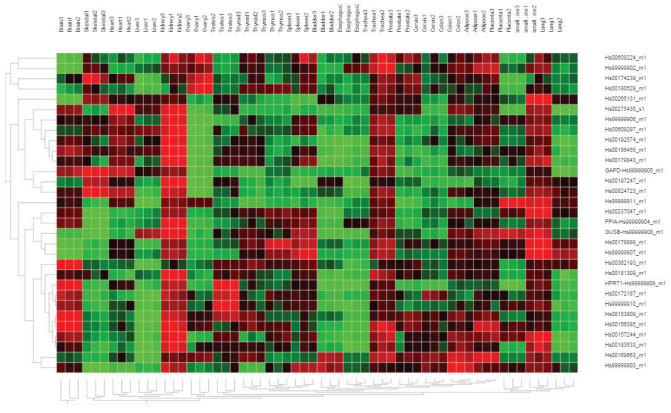

Figure 3. Example of data visualization with Applied Biosystems analysis modules. (A) Relative quantification (RQ) plot view. **(B)** Heat map view for an RQ study.

High-quality results

Results from TaqMan Array Cards are highly reproducible, both within and across individual cards. Uniform distribution of samples to the well chambers and normalization to a passive reference provide high levels of precision between technical replicates. Further, minimal handling steps reduce the risk of contamination. Rely on the high precision and sensitivity of the results that TaqMan Array Cards can help you achieve, especially for precious samples with minimally expressed targets (Figure 4). You may also use the optional Applied Biosystems™ TaqMan® PreAmp Master Mix and Custom PreAmp Pools to generate a comprehensive expression profile with a small sample input—as little as 1 ng of total RNA. Preamplification can enhance the ability to detect low-abundance RNA targets and help your precious sample last for many more real-time PCR runs.

TaqMan Array Card specifications

Loading time	<10 minutes
Volume per well	~1.5 µL
Nucleic acid template	30–1,000 ng (no pre-amp) or <10 ng (with pre-amp)
Loading volume	800 µL/card (100 µL per port, cDNA and master mix combined)
Assay throughput	12–381 including a manufacturing control (18s rRNA or GAPDH)
Sample throughput	1–8 samples/card

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Dilution	Concentration	Card 1		Card 2		Card 3		Cards 1–3	
	pg/well	C_t mean	C_t SD	C_t mean	C_t SD	C_t mean	C_t SD	C_t mean	C_t SD
1	10,000	6.32	0.13	6.57	0.26	6.39	0.11	6.43	0.13
2	1,000	9.86	0.24	9.81	0.07	9.71	0.15	9.79	0.08
3	100	13.23	0.08	13.17	0.16	13.15	0.04	13.18	0.04
4	10	16.58	0.17	16.58	0.09	16.45	0.20	16.54	0.08
5	1	20.00	0.13	20.02	0.28	19.92	0.24	19.98	0.05
6	0.1	23.37	0.13	23.34	0.14	23.29	0.17	23.33	0.04
7	0.01	26.80	0.14	26.99	0.15	26.80	0.17	26.86	0.11
8	0.001	30.51	0.20	30.44	0.33	30.36	0.57	30.44	0.07

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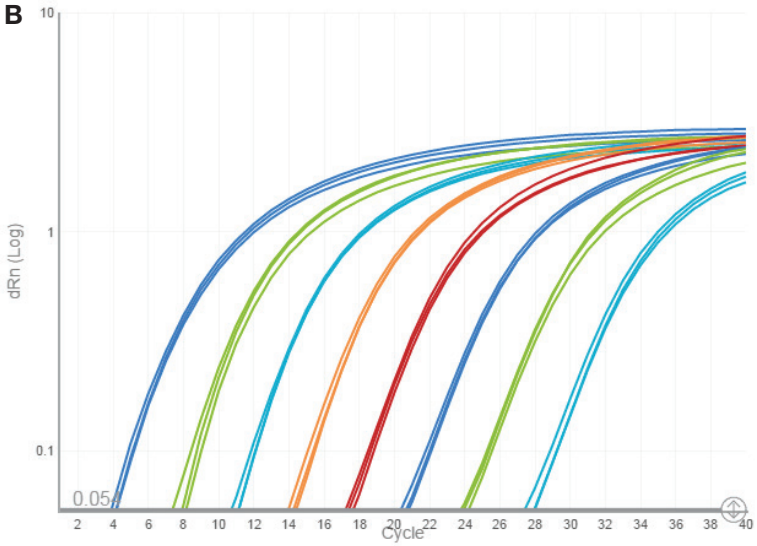

Figure 4. Achieve high reproducibility with broad dynamic range with TaqMan Array Cards. (A) Amplification of the *18S* gene using 1 µg–0.1 pg of cDNA per well was performed on 3 different TaqMan Array Cards to evaluate card-to-card reproducibility. The table shows average C_t values and standard deviations (SD) for each dilution for each card. Card-to-card standard deviation of the C_t mean is 0.13 or less for all dilutions, showing good reproducibility at both low and high target concentrations. **(B)** The amplification plot for card 1 (n = 3).

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Ordering information

Product	Cat. No.
Custom TaqMan Array Cards	
Custom Gene Expression TaqMan Array Card - Format 12	4342247
Custom Gene Expression TaqMan Array Card - Format 16	4346798
Custom Gene Expression TaqMan Array Card - Format 24	4342249
Custom Gene Expression TaqMan Array Card - Format 32	4346799
Custom Gene Expression TaqMan Array Card - Format 48	4342253
Custom Gene Expression TaqMan Array Card - Format 64	4346800
Custom Gene Expression TaqMan Array Card - Format 96a	4342259
Custom Gene Expression TaqMan Array Card - Format 96b	4342261
Custom Gene Expression TaqMan Array Card - Format 192	4346802
Custom Gene Expression TaqMan Array Card - Format 384	4342265
Custom TaqMan Array Advanced miRNA Cards - Format 12	A34718
Custom TaqMan Array Advanced miRNA Cards - Format 16	A34719
Custom TaqMan Array Advanced miRNA Cards - Format 24	A34720
Custom TaqMan Array Advanced miRNA Cards - Format 32	A34721
Custom TaqMan Array Advanced miRNA Cards - Format 48	A34722
Custom TaqMan Array Advanced miRNA Cards - Format 64	A34723
Custom TaqMan Array Advanced miRNA Cards - Format 96a	A34724
Custom TaqMan Array Advanced miRNA Cards - Format 96b	A34725
Custom TaqMan Array Advanced miRNA Cards - Format 192	A34726
Custom TaqMan Array Advanced miRNA Cards - Format 384	A34727

Product	Cat. No.
Custom TaqMan Array Cards (continued)	
Custom TaqMan Array MicroRNA Cards - Format 12	4449135
Custom TaqMan Array MicroRNA Cards - Format 16	4449136
Custom TaqMan Array MicroRNA Cards - Format 24	4449137
Custom TaqMan Array MicroRNA Cards - Format 32	4449138
Custom TaqMan Array MicroRNA Cards - Format 48	4449139
Custom TaqMan Array MicroRNA Cards - Format 64	4449140
Custom TaqMan Array MicroRNA Cards - Format 96a	4449141
Custom TaqMan Array MicroRNA Cards - Format 96b	4449142
Custom TaqMan Array MicroRNA Cards - Format 192	4449143
Custom TaqMan Array MicroRNA Cards - Format 384	4449144
PreAmp pool reagents	
TaqMan PreAmp Master Mix, 2 x 1 mL	4391128
TaqMan PreAmp Master Mix, 2 x 5 mL	4488593
Custom TaqMan PreAmp Pools, 5 mL	4441856
TaqMan Master Mix	
TaqMan Fast Advanced Master Mix, 2 x 5 mL	4444557
TaqMan Universal Master Mix II, 2 x 5 mL	4440047
TaqMan Array Card blocks**	
QuantStudio 12K Flex TaqMan Array Card Block	4453546
QuantStudio 7 Pro TaqMan Array Card Block	A45956
QuantStudio 7 Flex TaqMan Array Card Block	4453546
ViiA 7 TaqMan Array Card Block	4453546

** TaqMan Array Card instrument blocks include a sample block, TaqMan Array Card sealer, custom centrifuge buckets with adaptors, getting started guide, and a chemistry installation kit.

* Please reference user guide for more information on TaqMan Assay / master mix compatibility.

Find out more at **thermofisher.com/taqmanarrays**

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