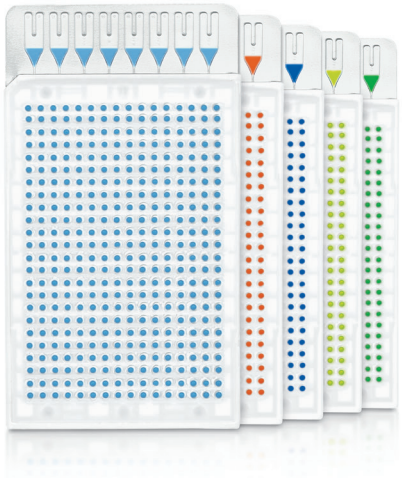
TaqMan Array Cards

Load 384 reactions accurately in 10 minutes without robotics

- **Easy and rapid setup**—load 384 wells in approximately 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 (both clinical and nonclinical) 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 validation and screening studies, whether your research involves cancer, stem cells, inflammation, or infectious diseases. Use the cards for validating tens or hundreds of initial hits generated from microarrays or next-generation sequencing, or use TaqMan Array Cards for screening biomarkers and toxicology panels, or for analyzing pathways, target classes, and complete disease sets.

A TaqMan Array Card is a 384-well microfluidic card designed for performing 384 simultaneous real-time PCR reactions without the need for expensive liquid-handling automation. TaqMan Array Cards are preloaded with dried-down high-quality TaqMan Assays (TaqMan probes and PCR primer sets), ready for 1 to 8 samples to be run in parallel against 12 to 384 Applied Biosystems™ TaqMan™ Gene Expression 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 research using TaqMan Array Cards for a variety of applications.

Research focus	Title	Publication
Stem cells	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)
	Isolation, characterization, and gene expression analysis of Wharton's jelly–derived mesenchymal stem cells under xeno-free culture conditions	*Stem Cells Cloning* 4:39 (2011)
Cancer	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)
	Oncogenic micro-RNAs and renal cell carcinoma	*Front Oncol* 4:49 (2014)
	Gene expression analysis of so called Asian dust extracts in human acute myeloid leukemia cells	*Toxicol Res* 26:21 (2010)
Inflammation	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)
	Inflammatory activation is associated with a reduced glucocorticoid receptor alpha/beta expression ratio in monocytes of inpatients with melancholic major depressive disorder	*Transl Psychiatry* 4:e344 (2014)
Toxicity	Selenoprotein P regulates 1-(4-Chlorophenyl)-benzo-2,5-quinone-induced oxidative stress and toxicity in human keratinocytes	*Free Radic Biol Med* 65:70 (2013)
	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	Detection and characterization of mycoplasma pneumoniae during an outbreak of respiratory illness at a university	*J Clin Microbiol* 52:849 (2014)
	Optimization of multiple pathogen detection using the TaqMan Array Card: application for a population-based study of neonatal infection	*PLoS One* 8:e66183 (2013)
	Field evaluation of TaqMan Array Card (TAC) for the simultaneous detection of multiple respiratory viruses in children with acute respiratory infection	*J Clin Virol* 57:254 (2013)

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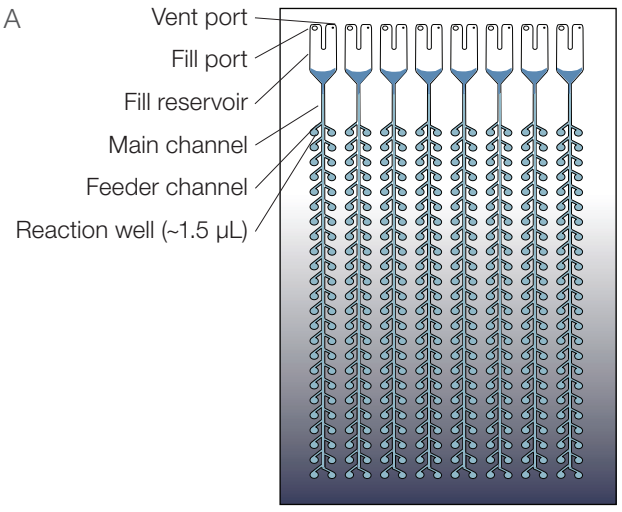

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Custom TaqMan Array Card format	No. of samples	No. of assays per sample	No. of replicates
Format 12	8	11 + 1 mandatory control	4
Format 16	8	15 + 1 mandatory control	3
Format 24	8	23 + 1 mandatory control	2
Format 32	4	31 + 1 mandatory control	3
Format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

Figure 1. TaqMan Array Card and custom formats. (A) The TaqMan Array Card, designed to be used with the Applied Biosystems™ QuantStudio™ 7, QuantStudio™ 12 Flex, ViiA™ 7, or 7900HT Real-Time PCR System, is a real-time PCR "lab on a chip" containing 384 wells connected by a series of microfluidic channels. Each loading port is 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 formats with 12, 16, 24, 32, 48, 64, 96 (2 choices), 192, and 384 assays.

Simple and straightforward loading

Using the TaqMan Array Card is fast 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™ Universal Master Mix II into each port, briefly centrifuge to fill the wells, and seal the card to close the wells.* Within 10 minutes, your card is ready to run on the Applied Biosystems QuantStudio 7, QuantStudio 12K Flex, ViiA 7, or 7900HT Real-Time PCR System equipped with an Applied Biosystems™ TaqMan™ Array block. This streamlines reaction setup, saves time, and reduces labor-intensive pipetting steps. No need for hours of training to master the preparation of the card—a simple 5-minute video provides step-by-step instructions to make learning easy.

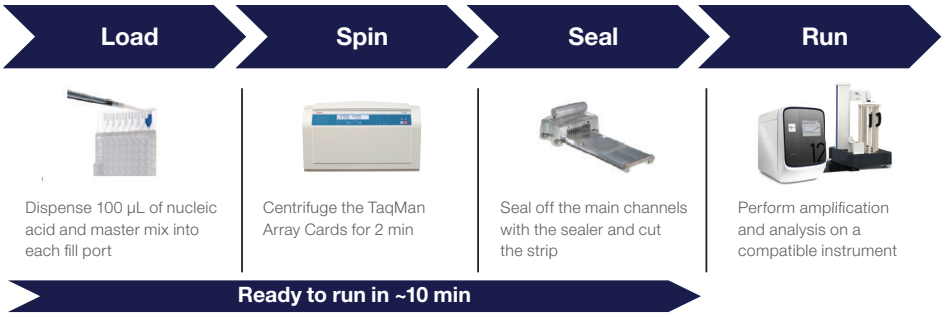

Figure 2. TaqMan Array Card workflow.*

Versatile formats

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

- **Preconfigured (fixed-content) TaqMan Array Cards**—choose premade cards that contain the most widely used predefined gene expression panels (categorized by specific disease, pathway, or biological process) or miRNA panels (Table 3)
- **Flexible-content TaqMan Array Cards**—select pre-configured pathway panels and modify assay content to suit your needs
- **Custom TaqMan Array Cards**—design them yourself, choosing from any of over 1.3 million predesigned Applied Biosystems™ TaqMan™ Gene Expression Assays available for 24 species, or over 3,000 Applied Biosystems™ TaqMan™ miRNA assays. Ordering is easy with the online Applied Biosystems™ Custom TaqMan Array Card configuration tool, which helps you find and select genes and assays. Custom TaqMan Array Cards are available in 10 different formats (Figure 1).
- **Custom formatting service**—design your own TaqMan Array Card configured to your specifications (e.g., Applied Biosystems™ TaqMan™ SNP Genotyping Assays, Applied Biosystems™ TaqMan™ Copy Number Assays, combined

Table 2. TaqMan Array Card formats and application compatibility.

	Preconfigured TaqMan Array Cards	Flexible-content TaqMan Array Cards	Custom TaqMan Array Cards	Custom formatting service
Definition	Fixed, predefined gene expression or miRNA panels (Table 3)	Modifiable, predefined panels	Configurable predesigned assays	Customized designs
Web page	thermofisher.com/taqmanarrays	thermofisher.com/flexiblepanels	thermofisher.com/arraycards	thermofisher.com/customformattingservice
Application supported				
Gene expression	√	√	√	√
MicroRNA	√		√	√
Genotyping				√

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

Table 3. Preconfigured (fixed-content) TaqMan Array Cards.

Gene expression panels			
Panel	**Cat. No. (Human)**	**Cat. No. (Mouse)**	**Cat. No. (Rat)**
ABC transporter	4378700		
Alzheimer's	4378713	4378714	
Angiogenesis	4378710		
Apoptosis	4378701		
Endogenous control	4367563	4378702	4378704
GPCR	4367785	4378703	4378709
Hepatocarcinogenicity			4465484
Immune	4370573	4367786	
Inflammation	4378707		4378708
Nuclear receptor	4379961		
Phosphodiesterase	4378705		4378706
Protein kinase	4367784		
Stem cell pluripotency	4385344	4385363	
Viral pathogen screening	4465485		

miRNA panels		
Panel	**Cat. No. (Human)**	**Cat. No. (Rodent)**
TaqMan Array MicroRNA A+B Cards Set v3.0	4444913	4444909
TaqMan Array MicroRNA A Cards v2.0	4398965	4398967
TaqMan Array MicroRNA B Cards v3.0	4444910	4444899

assays for mRNA and miRNA or other species)

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), and standard curve analysis. It provides 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 Applied Biosystems analysis modules.

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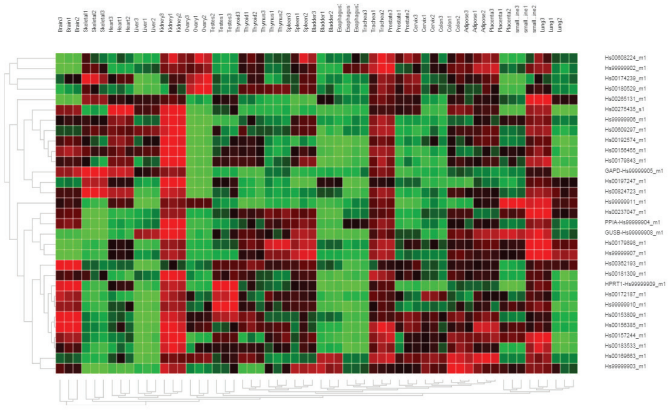

Figure 3. Example of data visualization with Applied Biosystems analysis modules. (A) Relative quantification (RQ) plot view. **(B)** Heat map view for an RQ study.

High-quality results

Results from TaqMan Array Cards are highly reproducible, both within and across individual array cards. Uniform distribution of samples to the well chambers with minimal handling helps to significantly reduce the risk of introducing variability or cross-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
Loading volume	800 µL/card (100 µL per port, cDNA and master mix combined)
Run mode support	Standard and fast modes
Assay throughput	11–380 assays/card
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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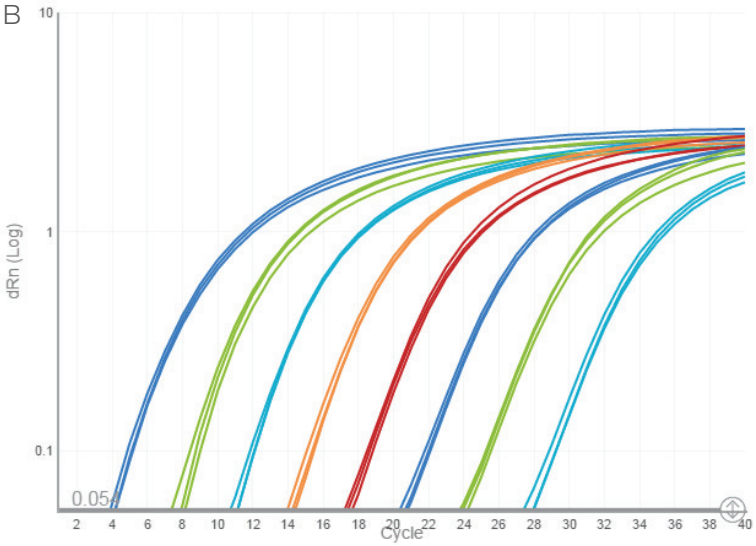

Figure 4. Achieve high reproducibility with broad dynamic range with TaqMan Array Cards. (A) Amplification of the *18S* gene using 1 µg–0.1 pg of cDNA per well was performed on 3 different TaqMan Array Cards to evaluate card-to-card reproducibility. The table shows average C_t values and standard deviations (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 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	**Quantity**	
TaqMan PreAmp Master Mix (2X)	40 reactions	4391128
TaqMan PreAmp Master Mix (2X)	200 reactions	4488593
Custom TaqMan PreAmp Pools	250 reactions	4441856
TaqMan Array Card Blocks†		
QuantStudio 12K Flex TaqMan Array Card Block		4453546
QuantStudio 7 TaqMan Array Card Block		4453546
ViiA 7 TaqMan Array Card Block		4453546
7900HT TaqMan Array Card Block		4329012

†Applied Biosystems™ 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.

To find compatible TaqMan master mixes, go to **thermofisher.com/taqmanmm**

To find out more, go to **thermofisher.com/taqmanarrays**

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