

# TaqMan® OpenArray® Digital PCR Kits

- Direct quantification—generate an absolute answer for the number of target molecules in a sample without reference to standards or controls
- Sensitive—enable precise detection of rare alleles and small changes in copy number
- Simple workflows—help minimize direct labor; with open-format digital PCR plates, simply add primers, sample, and master mix, cycle, and analyze results
- Experimental flexibility—select the sample, assay, or dilution format that best meets your digital PCR project needs



OpenArray® Digital PCR technology minimizes the need to refer to endogenous controls or standards. It is:

- **Accurate and sensitive**—detect and count individual molecules to quantify viral load, nucleic acids, or next-generation sequencing libraries
- **Flexible**—enables use of your existing assays, with capacity to test from 1 to 48 assay, sample, and dilution combinations per plate
- **Intuitive and efficient**—software includes a Poisson calculator to design your individual digital PCR experiment, eliminating optimization time and minimizing sample usage

## Rare-allele detection

OpenArray® digital PCR products can be used to partition mixtures of nucleic acid samples into individual wells for targeted enrichment, detection, and quantification of rare alleles (Figure 2). This ability to detect minority sequence variants in the presence of abundant nontarget sequence is critical for several applications, including monitoring of cancer biomarkers in blood samples and detection of genetically modified organism (GMO) content in foods.

## Copy number variation

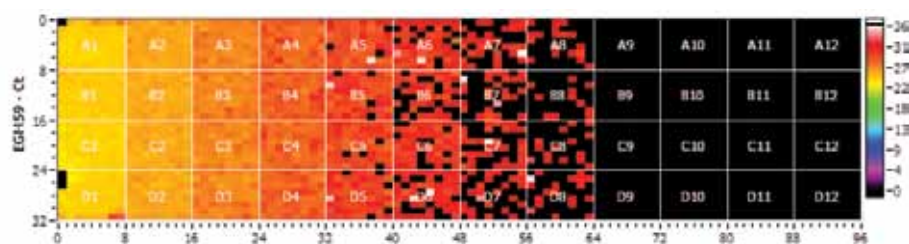
In contrast to the logarithmic nature of real-time PCR, OpenArray® Digital PCR Plates provide a linear measurement of nucleic acid concentration, enabling measurement of small differences in abundance between two nucleic acid targets and precise, sensitive measurement of copy number variation.

## Digital PCR

In digital PCR, each sample is partitioned into tens to thousands of individual real-time PCR reactions, some of which contain the target molecule (positive reactions) while the others do not (negative reactions). Following real-time PCR analysis, the ratio of positive-reaction answers to negative-reaction answers generates an absolute answer for the exact number of target molecules in the sample, without reference to standards or endogenous controls.

## Digital PCR using the OpenArray® Real-Time PCR System

The OpenArray® Real-Time PCR system enables digital PCR experiments at a scale previously unattainable. Achieve high sample throughput for mid-density gene expression—in a single day, one user can generate more than 36,000 digital PCR data points on the OpenArray® Real-Time PCR System without the use of robotics. Each OpenArray® Digital PCR Plate is pretreated to accept TaqMan® Assays and your samples—just combine TaqMan® OpenArray® Digital PCR Master Mix and assay, and then cycle and image.



**Figure 1. Direct quantification of BK virus using OpenArray® Digital PCR.** Two-fold serial dilutions of DNA isolated from AcroMatrix® BK Viral Standard were introduced across multiple subarrays of the OpenArray® plate. Each dilution was partitioned across 4 subarrays to yield 256 replicates per dilution; 8 dilutions were examined (column 9 contains a no-template control, and columns 10–12 are empty). The color intensity corresponds to the C<sub>t</sub> value obtained for each replicate. As seen from these data, dilutions 1–4 were above the nominal single copy limit required for digital analysis, while dilutions 5–8 indicate a mixture of PCR positive and PCR negative wells, allowing a digital calculation of copy number. These results indicate the presence of 15,800 copies of viral genome per microliter.

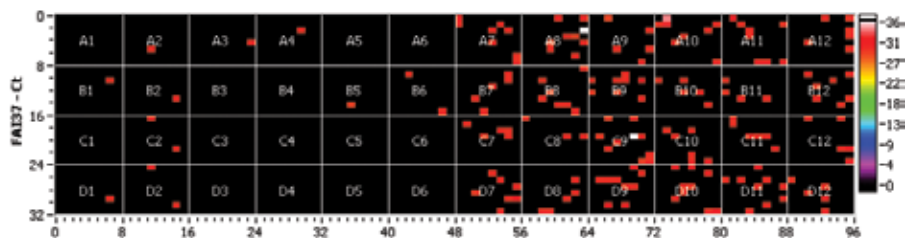
## Absolute quantification

When reliance on endogenous controls is not an option, OpenArray® Digital PCR Plates help deliver precise, absolute answers. You can perform absolute quantification of viral load, nucleic acids from single cells, or next-generation sequencing libraries (Figure 1).

## OpenArray® Digital PCR Software

OpenArray® Digital PCR Software enables quick and easy data analysis and management. It accommodates any plate layout that you choose, displays data for review, and allows you to adjust analysis parameters. The software analyzes real-time PCR data by fitting it to a Poisson statistical model and, at a 95% confidence interval, can display digital results as copies per through-hole.

Data from many OpenArray® plates may be combined into the same data project; the software calculates a digital answer for an individual subarray or combined data from multiple dilutions. Data can be viewed numerically or graphically and are easily exported to a comma-separated values (.csv) file for further analysis by many third-party analysis packages.



**Figure 2. Rare-allele detection and quantification using digital PCR.** A 1:21.6 mixture of male to female genomic DNA was analyzed. An image from a single OpenArray® Digital PCR Plate is shown. All through-holes contain the sample mixture and TaqMan® OpenArray® Digital PCR Master Mix. In addition, replicates in columns 1–6 contain a TaqMan® Assay targeting the Y chromosome, and replicates in columns 7–12 contain a TaqMan® Assay targeting the X chromosome. PCR-positive wells appear red. In columns 1–6, 13 positives in 1536 replicates indicates  $0.2576 \pm 0.1485$  Y chromosomes per microliter. In columns 7–12, 159 positives in 1536 replicates indicates  $3.312 \pm 0.05182$  X chromosomes per microliter. The digital PCR results are consistent with the 1:21.6 mixture as originally formulated, demonstrating the capability of digital PCR to detect and quantify a DNA target present at 4.6% concentration relative to background DNA. Results were analyzed using OpenArray® Digital PCR Software.

- **Helps design your studies**—includes Poisson calculator for use in designing digital PCR experiments
- **Assists in OpenArray® workflow**—automatically produces plate setup files from OpenArray® Plate barcode
- **Intuitively presents results**—produces heat map plate views and graphical outputs that represent number of copies per sample dilution, while simple copy-and-paste functions enable easy export and presentation of results

## Ordering information

Product	Description	Part number
TaqMan® OpenArray® Digital PCR, 10 pack	Includes 10 OpenArray® Digital PCR Plates, 2X TaqMan® OpenArray® Digital PCR Master Mix (5 mL), OpenArray® Real Time PCR Accessories Kit (enough to run 10 Plates)	4458070
TaqMan® OpenArray® Digital PCR, 3 pack (requires additional purchase—see below)	Includes 3 OpenArray® Digital PCR Plates, 2X TaqMan® OpenArray® Digital PCR Master Mix (1.5 mL)	4460585
OpenArray® Digital PCR Software 1.0	FREE WEB DOWNLOAD: <a href="http://www.appliedbiosystems.com/openarraydpcr">www.appliedbiosystems.com/openarraydpcr</a>	4459279

### Required for use with 3-pack kit, must be purchased separately

OpenArray® Real-Time PCR Accessories Kit	Includes 10 OpenArray® Real-Time PCR Cases, 10 OpenArray® Immersion Fluids, 2 OpenArray® Case Sealing Glues	4453975
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Contact your local Life Technologies support representative for more information on OpenArray® Digital PCR products and sample preparation details.

Life Technologies offers a breadth of products DNA | RNA | PROTEIN | CELL CULTURE | INSTRUMENTS

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