

Corning Microarray Selection Guide



Life
Sciences





Introduction

Corning Life Sciences is pleased to present our Microarray Product Selection Guide. In this guide, you will find a selection of Corning's newest and most requested microarray products.

For up-to-date information on Corning Life Sciences' comprehensive range of products and services, go to www.corning.com/lifesciences where you can access:

- ▶ New Product Information
- ▶ Technical Information including:
 - Application Notes
 - Instruction Manuals
 - Product Bulletins
- ▶ Product Catalog Information
- ▶ Product Literature
- ▶ Complete Distributor Information

For additional product information, please visit www.corning.com/lifesciences, and for comprehensive information on Pronto![™] *Plus* Systems, visit www.prontosystems.com or call 1.800.492.1110. Customers outside the United States, please call 1.978.635.2200 or contact your local support office. See back cover.

Ordering Information

Corning products are available through any authorized Corning support office or distributor. Please see our web site for a complete listing. To place an order, simply contact the distributor of your choice. For each requested product, provide the Corning catalog number, product description, and desired quantity.



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Overview

The quality and reliability of microarray results largely depend on the quality and consistency of both the glass substrate and the reagents used to manufacture and process the arrays. Corning has a history rich in science and technology, with expertise in glass and surface modification, optics, biochemistry and molecular biology, which has led to many innovations for life science research. Using this broad-based knowledge, Corning provides complete solutions to customers' complex problems and enables the achievement of breakthrough discoveries.

TOOLS FOR EVERY STEP IN THE PROCESS

- ▶ Premium glass substrates for printing microarrays
- ▶ Optimized reagents for the highest possible performance and control throughout the microarray process
- ▶ Storage products to facilitate the process and preserve sample content

SUPERIOR TECHNICAL AND APPLICATIONS INFORMATION

- ▶ Protocols included with every case of product, optimized from Corning's vast research experience
- ▶ On-line tools to verify cDNA labeling efficiency at www.corning.com/lifesciences
- ▶ Expert assistance that is just an e-mail or phone call away
- ▶ Field Applications support with a direct link to our Applications Group

UNPARALLELED MANUFACTURING PROCESSES

Corning® glass slides are manufactured using a proprietary coating process in a Class 100 cleanroom and undergo numerous quality control tests. Every slide is meticulously inspected for the presence of contaminating particulates, scratches and other defects before and after coating, ensuring a substrate of unmatched cleanliness, consistency, reliability and integrity.

The reagents in the Pronto!™ Microarray Kits are quality controlled to deliver consistency at every step in the process. They are optimized for use with Corning microarray slides, allowing the highest possible level of performance, standardization, and control.

Slide Selection Chart

Slide	Attachment Chemistry	Probe Types	Recommended Spotting Media	Applications
Epoxide	Covalent, Epoxysilane	Oligonucleotides	150 mM sodium phosphate, pH 8.5, 0.005% SDS	<ul style="list-style-type: none"> ▶ Transcriptional profiling ▶ SNP analysis
UltraGAPS™	Ionic, aminosilane	Double-stranded DNA	Pronto!™ Universal Spotting Solution 30 to 50% DMSO 3xSSC 150 mM sodium phosphate, pH 7.5	<ul style="list-style-type: none"> ▶ Transcriptional profiling ▶ Array CGH ▶ ChIP on Chip
GAPS™ II	Ionic, aminosilane	Proteins	20% Glycerol in PBS (ligand dependent)	<ul style="list-style-type: none"> ▶ Antibody screening ▶ Functional assays



Microarray Printing



Epoxide Coated Slides

Corning® Epoxide Coated Slides provide the optimal, uniform surface chemistry for covalent attachment of **unmodified or amino-modified short oligonucleotides** (~30-mer), as well as long oligonucleotides (>50-mer) and cDNA. Use Corning Epoxide Coated Slides with the Pronto! Universal Hybridization Kit (see p. 11) to achieve the highest possible level of overall microarray performance.

- Versatility**
 - Ideal for short oligonucleotides, long oligonucleotides, and cDNA
 - Print with unmodified or amino-modified oligonucleotides
 - No UV crosslinking or baking step required for DNA coupling
- Reproducibility**
 - Minimal contribution to interarray variability (less than 3% CV)
- Sensitivity**
 - Detect 1 µg RNA spiked into 4 µg of total RNA sample
- Specificity**
 - Differentiate between 90% homologous oligos (3 mismatches in 30-mer oligonucleotides)

Epoxide Coated Slides Ordering Information

Cat. No.	Description	Slides/Pk	Slides/Cs
40040	Epoxide Slide Starter Kit (10 Epoxide Coated Slides, 0.8 mL Short Oligo and 0.8 mL cDNA/Long Oligo Hybridization Solution)	5	10
40041	Epoxide Coated Slides with Bar Code	5	25
40042	Epoxide Coated Slides without Bar Code	5	25
40043	Epoxide Coated Slides with Bar Code, Bulk Pack	25	25
40044	Epoxide Coated Slides without Bar Code, Bulk Pack	25	25

Number of Mismatches	BS7 (Relative Net RFU)	BS1 (Relative Net RFU)
0	1.00	1.00
1 (A)	~0.95	~0.65
1 (C)	~0.75	~0.45
1 (T)	~0.90	~0.65
2	~0.25	~0.35
3	~0.00	~0.00

Differentiate Between 90% Homologous Oligonucleotides
 Corning Epoxide Coated Slides and the reagents from Pronto! Universal Hybridization Kits perform together to differentiate between 90% homologous oligonucleotides (3 mismatches in 30-mer oligonucleotides). A study using mismatch oligonucleotides designed for two *B. subtilis* genes (BS7 and BS1) was performed. No mismatches (0), 1 mismatch (A, C, T) or multiple mismatches (2, 3) were tested for specificity of detection under identical processing conditions. As indicated in the above graph, there is a reduction in signal for each successive mismatch until no detectable signal is observed for 3 mismatches.

Use Unmodified or Amino-Modified Oligonucleotides
 Oligonucleotides (30-mer) were printed onto Corning Epoxide Coated Slides and a competitor's covalent slides, following recommended protocols. Oligonucleotides were either C6-amino modified at the 5' end (A columns) or unmodified (B columns). Cy⁵/Cy³ ratios correlated strongly between modified and unmodified oligonucleotides for Corning Epoxide Slides, but the competitor's slides showed an absolute requirement for amino modification of the oligonucleotides.



UltraGAPS™ Coated Slides

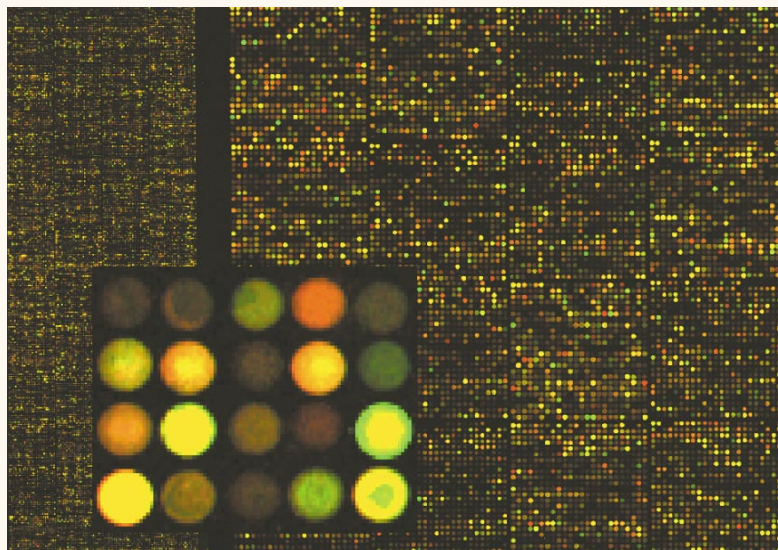
The Gamma Amino Propyl Silane surface on UltraGAPS Coated Slides is ideal for printing long (>50-mer) oligonucleotides, as well as cDNA. UltraGAPS Coated Slides have a more hydrophobic surface than competitors' slides, resulting in smaller, more consistent spot size. Each lot is tested for consistent spot morphology, signal intensity, and low background in a hybridization assay. Some of the applications for which UltraGAPS Coated Slides are ideally suited include: gene expression analysis, genotyping, and CGH (comparative genomic hybridization).

The Pronto!™ Universal Spotting Solution (see p. 7) has been optimized for use with the UltraGAPS Coated Slides and provides excellent spot morphology for microarray printing. Use the Pronto! Universal Hybridization Kit (see p. 11) in conjunction with these slides to achieve the highest level of microarray performance.

- Reproducibility** ▶ Minimal contribution to interarray variability (less than 5% CV)
- Dynamic Range** ▶ Low background autofluorescence
- Manufacturing Excellence**
 - ▶ Consistent spot morphology
 - ▶ Uniform surface treatment
 - ▶ Higher hydrophobicity

UltraGAPS Coated Slides Ordering Information

Cat. No.	Description	Slides/Pk	Slides/Cs
40015	UltraGAPS Coated Slides with Bar Code	5	25
40016	UltraGAPS Coated Slides without Bar Code	5	25
40017	UltraGAPS Coated Slides with Bar Code, Bulk Pack	25	25
40018	UltraGAPS Coated Slides without Bar Code, Bulk Pack	25	25
40019	UltraGAPS Slide Starter Kit (Includes 10 UltraGAPS Coated Slides, 5 mL Universal Spotting Solution)	5	10
40024	Pronto! Universal Validation Kit (Includes 10 UltraGAPS Coated Slides, 15 mL Universal Spotting Solution, Pronto! Hybridization Kit for 10 arrays)	5	10
40025	Pronto! Universal Printing Kit (Includes 25 UltraGAPS Coated Slides, 50 mL Universal Spotting Solution)	25	25



27,000 Feature Array on UltraGAPS Coated Slides (three magnifications)

A 27,000 feature array was printed on UltraGAPS slides, processed and hybridized using the reagents in the Pronto! Universal Hybridization Kit. The inset shows a magnification to highlight the low background, uniform spot morphology, and signal intensity of a the array.

Data courtesy of A. Borg, Ph.D., Lund University, Sweden.



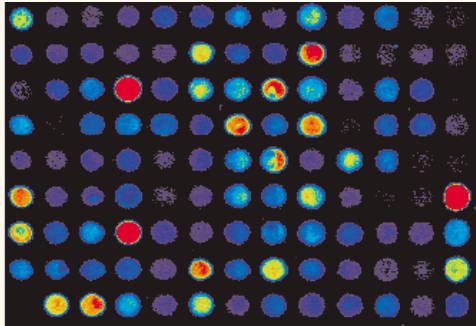
GAPS™ II Coated Slides

GAPS II Coated Slides are manufactured from a proprietary ultraflat glass that enhances microarray performance, enabling more accurate reading of microarrays by confocal laser scanners. GAPS II Coated Slides are manufactured using the same coating process and attachment chemistry as the original GAPS amino-silane coated slides, enabling researchers to use the same protocols that they optimized for GAPS slides. Use GAPS II Coated Slides with the Pronto!™ Universal Hybridization Kit (see p. 11) to achieve maximum microarray performance.

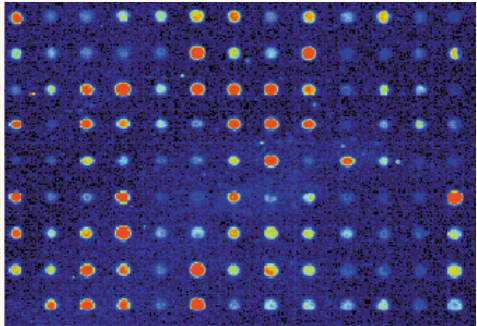
- Flexibility** ▶ Recommended for both DNA and protein arrays
- Binding Capacity** ▶ High DNA retention for maximum signal strength
- Dynamic Range** ▶ Low background autofluorescence

GAPS II Coated Slides Ordering Information

Cat. No.	Description	Slides/Pk	Slides/Cs
40003	GAPS II Coated Slides with Bar Code	5	25
40004	GAPS II Coated Slides without Bar Code	5	25
40005	GAPS II Coated Slides with Bar Code, Bulk Pack	25	25
40006	GAPS II Coated Slides without Bar Code, Bulk Pack	25	25



GAPS II Coated Slide

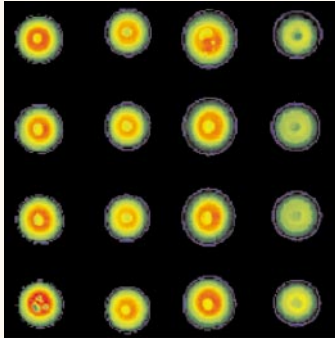


Ordinary Silane Coated Slide

Spot Morphology on GAPS II Coated Slides
 Note uniform spot morphology, high signal strength, and ultra-low background with the GAPS II Coated Slide.
Images courtesy of Dr. John Quackenbush of the Institute for Genomic Research (TIGR), Rockville, MD.

Caspase-8 Caspase-3

- + - +



Functional Peptide Array on GAPS II Coated Slides

The Caspase-3 substrate NH₂-DEVDA-Biotin was suspended in Corning® Epoxide Spotting Solution and printed in quadruplicate onto anhydride-derivitized GAPS II Coated Slides. Peptide arrays were incubated with avidin-Cy³ in the absence or presence of Caspase-8 or Caspase-3 (as indicated), and scanned at 532 nm. The printed DEVDA peptide retained function on the array, as indicated by the reduced fluorescence seen in the spots treated with Caspase-3, but not Caspase-8. Note: GAPS II Coated Slides have also been used successfully for protein arraying without derivitization.

Data generated by Corning R&D.



Pronto!™ Universal Spotting Solution

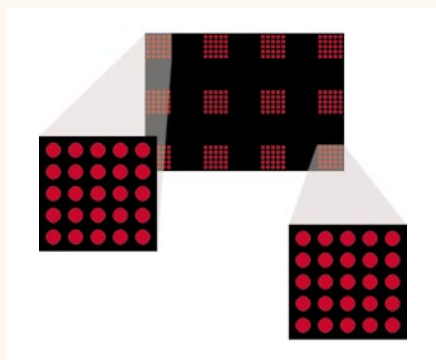
Pronto! Universal Spotting Solution is optimized for both long oligonucleotides (>50-mer) and cDNA printed on UltraGAPS™ Coated Slides. The proprietary formulation provides excellent spot morphology and has an extremely low evaporation rate. Pronto! Universal Spotting Solution is available in bulk as well as part of both the UltraGAPS Slide Starter Kit and Pronto! Universal Printing Kit.

- ▶ Low background autofluorescence
- ▶ Low evaporation rate
- ▶ Ensures consistent DNA printing concentration
- ▶ Eliminates need for volume adjustments
- ▶ Provides for even distribution of spotted DNA across entire array

Pronto! Universal Spotting Solution Ordering Information

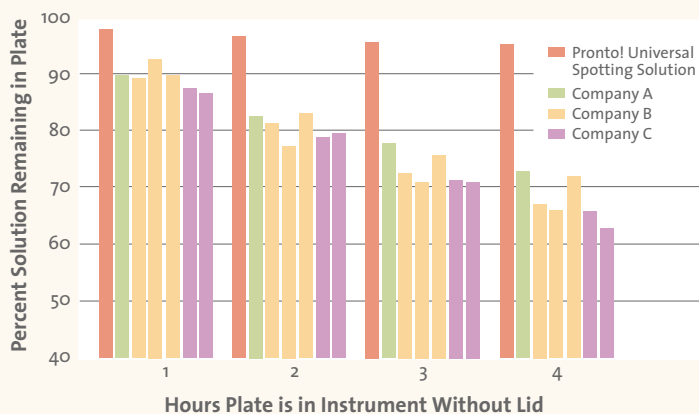
Cat. No.	Description	Qty/Pk	Qty/Cs
40027	Pronto! Universal Spotting Solution, 250 mL	1	1

Cat. No.	Description	Slides/Pk	Slides/Cs
40019	UltraGAPS Slide Starter Kit (Includes 10 UltraGAPS Coated Slides, 5 mL Universal Spotting Solution)	5	10
40025	Pronto! Universal Printing Kit (Includes 25 UltraGAPS Coated Slides and 50 mL Universal Spotting Solution)	25	25



Pronto! Universal Spotting Solution – Spot Uniformity

Quality control testing for Pronto! Universal Spotting Solution requires consistent spots when using 12 pins printed 25 times.



Pronto! Universal Spotting Solution – Low Evaporation

Pronto! Universal Spotting Solution evaporative losses are <5% over 4 hours, as compared to evaporate losses of >25% with other commercial spotting solutions.

Pronto!™ Epoxide Spotting Solution



Pronto! Epoxide Spotting Solution should be used for printing all types of DNA, including short oligonucleotides (~30-mer), long oligonucleotides (>50-mer), and cDNA printed on Corning® Epoxide Coated Slides. When used with Corning Epoxide Coated Slides, this spotting solution provides spot size control for printing high density arrays without contributing to background fluorescence.

- ▶ Provides controlled spot size for high density arrays
- ▶ No significant contribution to background fluorescence of arrays
- ▶ Low evaporation rate
- ▶ Enhanced spot morphology

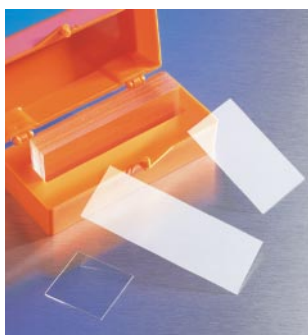
Pronto! Epoxide Spotting Solution Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
40047	Pronto! Epoxide Spotting Solution, 250 mL	1	1

Varying Spotting Solution Formulations to Adjust Spot Size

Pronto! Epoxide Spotting Solution formulation can be adjusted to alter spot size at will. DNAs were dissolved in Pronto! Epoxide Spotting Solution to which varying amounts of sodium dodecyl sulfate (SDS) had been added, and were printed in quadruplicate onto Epoxide Coated slides using 120 μm solid pins. The top row (80 μm feature diameter) had no addition, whereas adding increasing amounts of SDS resulted in correspondingly larger feature diameters.

Corning® Cover Glass



Corning Cover Glass is manufactured from special, optically clear glass. The cover glass is resistant to surface attack or weathering and will remain clear for extended periods of time. The flatness is controlled by a machine process resulting in a trouble-free fit to slides for a wettable and bubble-free mount.

The thickness of No. 1½ cover glass is 0.16 to 0.19 mm. Cover glass is packaged in plastic boxes for protection and convenience. Cover glasses in sizes and thicknesses other than those listed are available.

Cover Glass Ordering Information

Cat. No.	Description	Approx. Pcs/Oz	Qty/Cs
2870-22	Corning Cover Glass, Square, 22 x 22 mm, No. 1½	135	10 oz
2940-223	Corning Cover Glass, Rectangular, 22 x 30 mm, No. 1½	97	10 oz
2940-224	Corning Cover Glass, Rectangular, 22 x 40 mm, No. 1½	73	10 oz
2940-225	Corning Cover Glass, Rectangular, 22 x 50 mm, No. 1½	58	10 oz
2940-243	Corning Cover Glass, Rectangular, 24 x 30 mm, No. 1½	89	10 oz
2940-244	Corning Cover Glass, Rectangular, 24 x 40 mm, No. 1½	67	10 oz
2940-245	Corning Cover Glass, Rectangular, 24 x 50 mm, No. 1½	54	10 oz
2940-246	Corning Cover Glass, Rectangular, 24 x 60 mm, No. 1½	45	10 oz

384 Well Microarray Printing Plates



Corning 384 well polypropylene microplates are available in both low and full volume well formats to meet source plate requirements for printing DNA content onto microarray slides. The plates are manufactured from solvent resistant, virgin polypropylene that is compatible with many organic solvents including DMSO. The plates feature rigid, full length skirts for full compatibility with automation.

The 384 Well Low Volume Microarray Printing Plate (Cat. No. 3672), with a working volume of 2 to 20 μ L, has a conical V-bottom, square well geometry that provides for maximum sample recovery. The 384 Well Full Volume Storage Plate (Cat. No. 3656) has a total well volume of 95 μ L.

- ▶ Well design provides for maximum sample recovery
- ▶ Resistant to many organic solvents including DMSO
- ▶ Certified DNase- and RNase-free
- ▶ Automation compatible

384 Well Microarray Printing Plates Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
3672	384 Well Microarray Printing Plate, Polypropylene, Low Volume	10	50
3656	384 Well Storage Plate, Polypropylene, Full Volume	25	100
6569	Aluminum Sealing Tape for 384 Well Microplates	100	100
3099	Universal Lid for 384 Well Microplates	25	50
3085	DMSO Resistant Lid for 384 Well Microplates	25	50

Microarray Slide Mailers/Storage Boxes

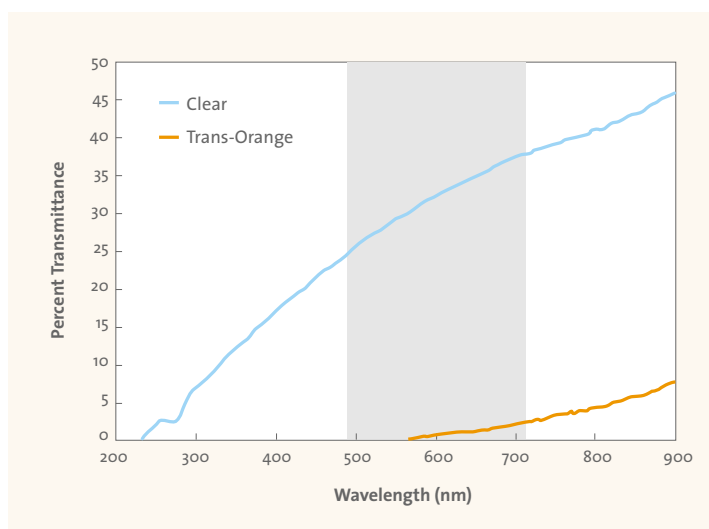


The plastic containers in which UltraGAPS™ Coated Slides are shipped also function as storage boxes for printed arrays. These containers are available as either 5 slide mailers or 25 slide storage boxes. The trans-orange plastic has low transmittance in the 500 to 700 nm wavelength range which helps protect Cy[®]3 and Cy[®]5 dyes from photobleaching. These rigid plastic containers do not shed particles or outgas volatile chemicals that may contaminate microarray slides.

The Corning® 25 Slide Storage Box has a lift off lid which is easy to open and close. The 5 Slide Mailer has a hinged lid that snaps closed tightly to prevent slides from accidentally falling out.

Microarray Slide Mailers/Storage Boxes Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
40082	5 Slide Mailer for Microarrays	50	50
40081	25 Slide Storage Box for Microarrays	10	20



Transmittance Through Corning Trans-Orange Slide Mailers

Low transmittance (500-700 nm) helps protect Cy3 and Cy5 from photobleaching.

Microarray Storage Pouches



Corning® Microarray Storage Pouches for 5- and 25-slide holders are the same pouches in which Corning UltraGAPS and Epoxide Coated Slides are shipped. These tear-resistant, foil-laminated pouches can be used to store and ship microarrays.

When heat-sealed, the pouches protect microarrays from light, humidity, and environmental contaminants. Each pouch comes affixed with a 3" x 4" white marking label.

Microarray Storage Pouches Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
40085	5 Slide Storage Pouch	50	50
40086	25 Slide Storage Pouch	50	50

Microarray Processing



Pronto!™ Universal Hybridization Kits

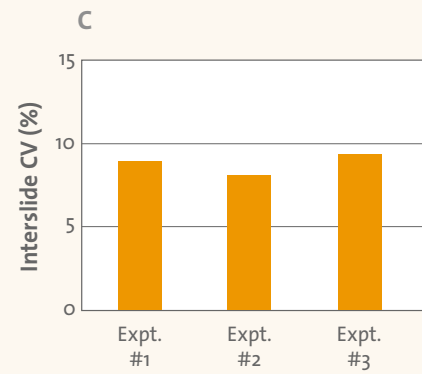
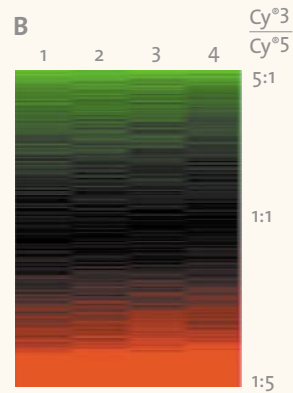
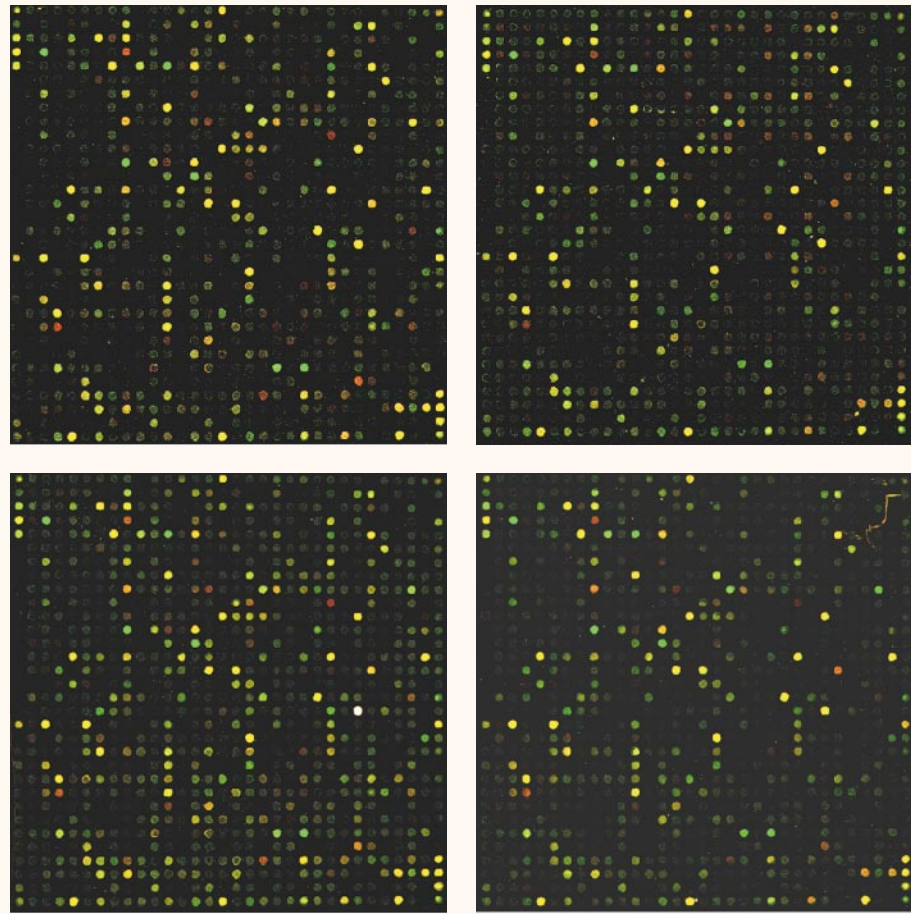
Pronto! Universal Hybridization Kits (Cat. Nos. 40026 and 40028) provide all of the reagents necessary to perform hybridizations of fluorescently labeled cDNA to microarrays printed on Corning® Epoxide, UltraGAPS™, or GAPS™ II Coated Slides. The Pronto! Universal Validation Kit (Cat. No. 40024) contains all of the reagents from above as well as 10 UltraGAPS Coated Slides and 15 mL of Universal Spotting Solution.

- Pre-Soak Solution** ▶ Remove existing autofluorescence from printed microarrays
- Pre-Hybridization Solution** ▶ Block background fluorescence during array hybridization
- Hybridization Solutions** ▶ Solutions compatible with cDNA, long oligonucleotide, and short oligonucleotide content
- ▶ Ready to use (no dilution required)
- ▶ Contain blockers to increase specificity
- Wash Solutions** ▶ Quality tested to ensure manufacturing consistency

Pronto! Universal Hybridization Kit Ordering Information

Cat No.	Product	Reactions
40024	Pronto! Universal Validation Kit (Includes 10 UltraGAPS Coated Slides, 15 mL Universal Spotting Solution)	10
40028	Pronto! Universal Hybridization Kit	10
40026	Pronto! Universal Hybridization Kit	25
40030	Pronto! Hybridization Kit without Pre-soak	25
40090	Pronto! cDNA Long Oligo Hybridization Solution, 20 mL	
40048	Pronto! Short Oligo Hybridization Solution, 4 mL	

A



Superior Reproducibility

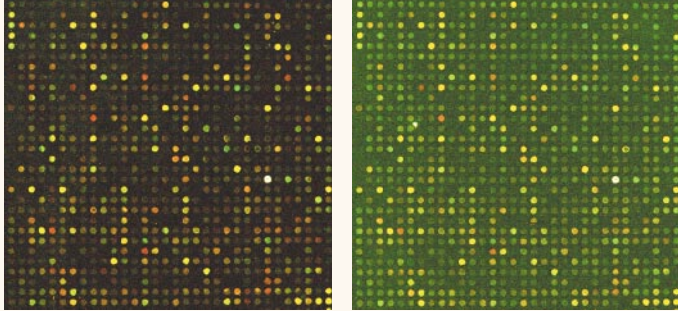
Four separate 4K arrays were processed using the Pronto™ Universal Hybridization Kit to demonstrate reproducibility (A). Differential gene expression patterns as represented by ratios of normalized Cy³/Cy⁵ in the cluster diagram were found to be very consistent between the four arrays (B). Interslide CVs were shown to be <10% for each of 3 separate experiments performed (C).

Pronto!™ Background Reduction Kit

The Pronto!™ Background Reduction Kit is designed to eliminate background autofluorescence and prepare printed arrays for hybridization. It also can be used as the final step in the array fabrication process. The strong reducing effect of this treatment leads to increased sensitivity and specificity by removing autofluorescent background due to oxidation. The kit includes 10 Pre-Soak Tablets and 1 L of Pre-Soak Solution which provides enough reagents for the treatment of at least 50 arrays.

Pronto! Background Reduction Kit Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
40029	Pronto! Background Reduction Kit	1	1



With Presoak
Without Presoak

Detect Low Expressing Genes

Use of the Pronto! Background Reduction Kit results in the increased detection of low expressing genes (see table). Reduction of background autofluorescence is evident when 4K human arrays were processed using the presoak reagents in the Pronto! Background Reduction Kit. Arrays that were processed with the presoak reagents (left image) had a lower background detection cutoff than those processed without presoak (right image).

	With Presoak	Without Presoak
Background cutoff (RFU)	100.6	183.3
Number of features ≥ 2X background	1221	891

Hybridization Chambers



Corning® Hybridization Chambers are designed to hold microarray slides (25 x 75 mm) at constant humidity during hybridization incubations. The O-ring and retaining clips ensure that the reusable chambers remain watertight when submerged in waterbaths and airtight in hybridization ovens. Wells in the base hold 10 to 15 µL of water to maintain optimal interior humidity.

The original Corning Hybridization Chamber (Cat. No. 2551) provides the ideal interior height and volume for use with one slide of the standard 1 mm thickness and a standard coverglass. The Corning Hybridization Chamber II (Cat. No. 40080) has an increased interior depth which not only allows for single slide hybridizations, but also allows the user to place two arrays face-to-face and hybridize using a single labeled target. This chamber can also be used with raised-edge cover-slips (Erie Scientific M-Series Lifter Slips™) that are thicker or taller than standard thin coverglass.

Hybridization Chambers Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
2551	Hybridization Chamber	1	5
40080	Hybridization Chamber II with Increased Depth	1	5
40001	Replacement O-rings (fit both chambers)	5	5

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For up-to-date information on Corning Life Sciences' comprehensive range of products and services, go to www.corning.com/lifesciences.

Contact Corning

For one-stop shopping from an innovation-driven global company, contact Corning Incorporated, Life Sciences. Our worldwide sales and distribution network delivers fast, individualized service – anywhere around the globe.

For additional product or technical information, please visit www.corning.com/lifesciences or call 1.800.492.1110. Customers outside the United States, call +1.978.635.2200 or contact your local Corning sales office listed below.

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