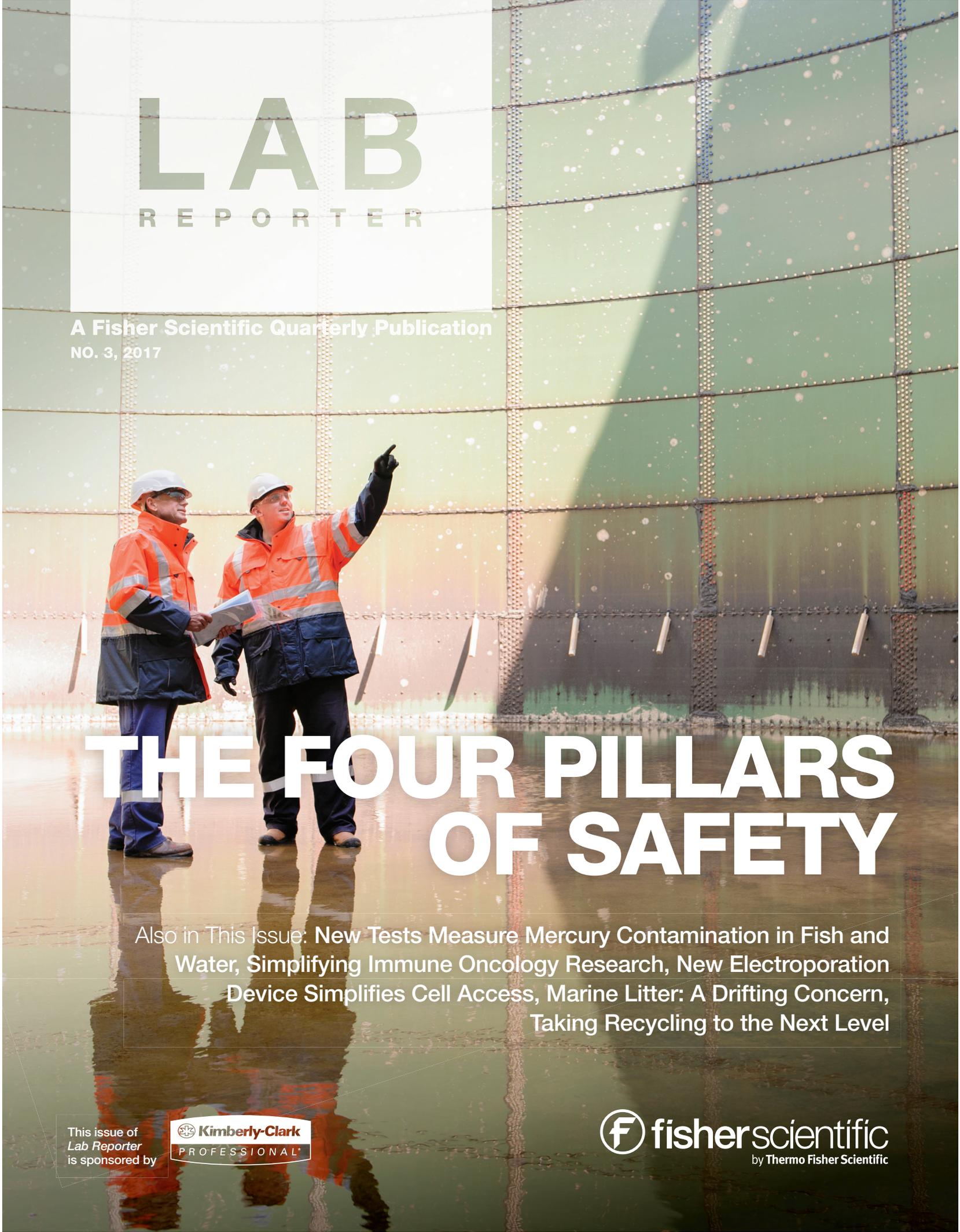




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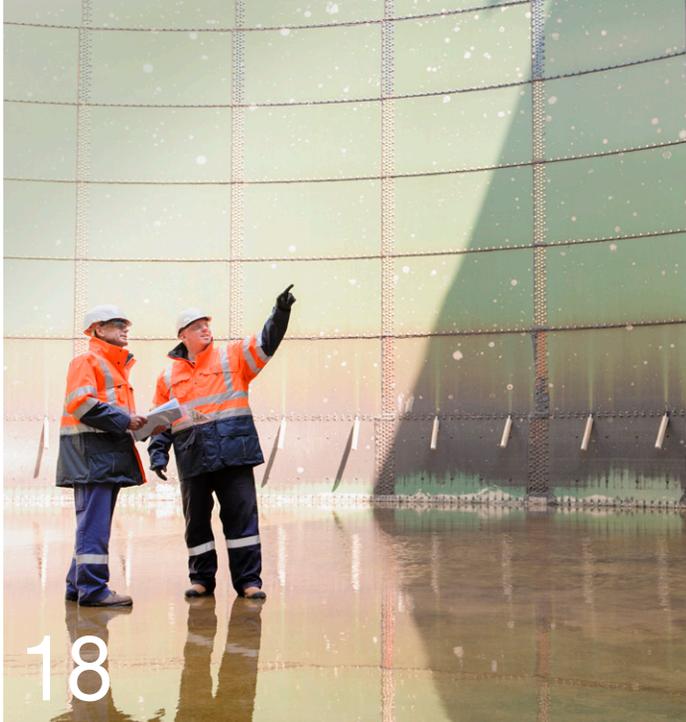
THE FOUR PILLARS OF SAFETY

Also in This Issue: New Tests Measure Mercury Contamination in Fish and Water, Simplifying Immune Oncology Research, New Electroporation Device Simplifies Cell Access, Marine Litter: A Drifting Concern, Taking Recycling to the Next Level

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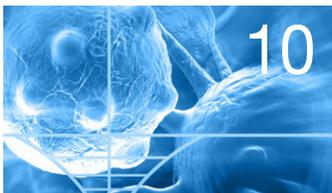
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New Tests Measure **MERCURY CONTAMINATION** IN FISH AND WATER

By Mike Howie

Mercury is a toxic metal many recognize as the reason why doctors tell pregnant women not to eat sushi. Fish are commonly contaminated with mercury and, when ingested, the metal can cause long-term neurological illnesses. In pregnant women, mercury can lead to reduced placental and fetal growth as well as small head circumferences. While these are not the most common risks that a mother and unborn child can face, they are still risks. Reduced placental size has been linked to high blood pressure in adulthood, and reduced head circumference is associated with cognitive development deficits.

Testing the Food

In the food chain, mercury is typically found in two forms: as organic methylmercury (MeHg^+) or as an inorganic salt (the cation Hg_2^{+}). Researchers at the University of Burgos in Spain recently developed a fluorescent polymer called JG25 that can detect both of these chemicals. According to Tomás Torroba, the lead author of the study, the polymer is placed into contact with a sample for

approximately 20 minutes and then irradiated with ultraviolet light. The fluorescence appears as a bluish light that varies in intensity in proportion to the amount of mercury present.

After testing a range of species, the researchers concluded that larger fish tend to have higher concentrations of mercury. They detected as much as 2ppm in swordfish, tuna and dogfish, and as little as 0.2ppm in panga. As Torroba noted, “contamination of above 0.5ppm in a food is already thought to be a considerable level.” The United States Food and Drug Administration (FDA) states that people should not consume more than one serving per week of fish with a concentration of over 1 μg of mercury per kilogram of fish.

Testing the Water

Earlier, another team of chemists at the same university developed a method of quickly testing for mercury contamination in water. They created an indicator sheet that turns red after just five minutes in water if mercury is present above a certain concentration. The sheet is calibrated to

detect concentrations of 2ppb of divalent mercury (the EPA limit for potable water), but the composition of the indicator can be adjusted for other levels.

“Changes can be seen by the naked eye and anyone, even if they have no previous knowledge, can find out whether a water source is contaminated with mercury above determined limits,” said José Miguel Garcia, one of the authors of the study. For a more precise reading, one can simply take a picture of the sheet and then look at the color values in an image manipulation program like Photoshop.

The timing of these new tests is important: in 2013, more than 125 countries signed the *Minamata Convention on Mercury*, a treaty designed to protect humans and the environment from mercury and named for the Japanese city where hundreds died from mercury poisoning in the 1950s. With an additional 40 countries now committed to the treaty, these testing methods can help to support the convention and its goals for human safety.



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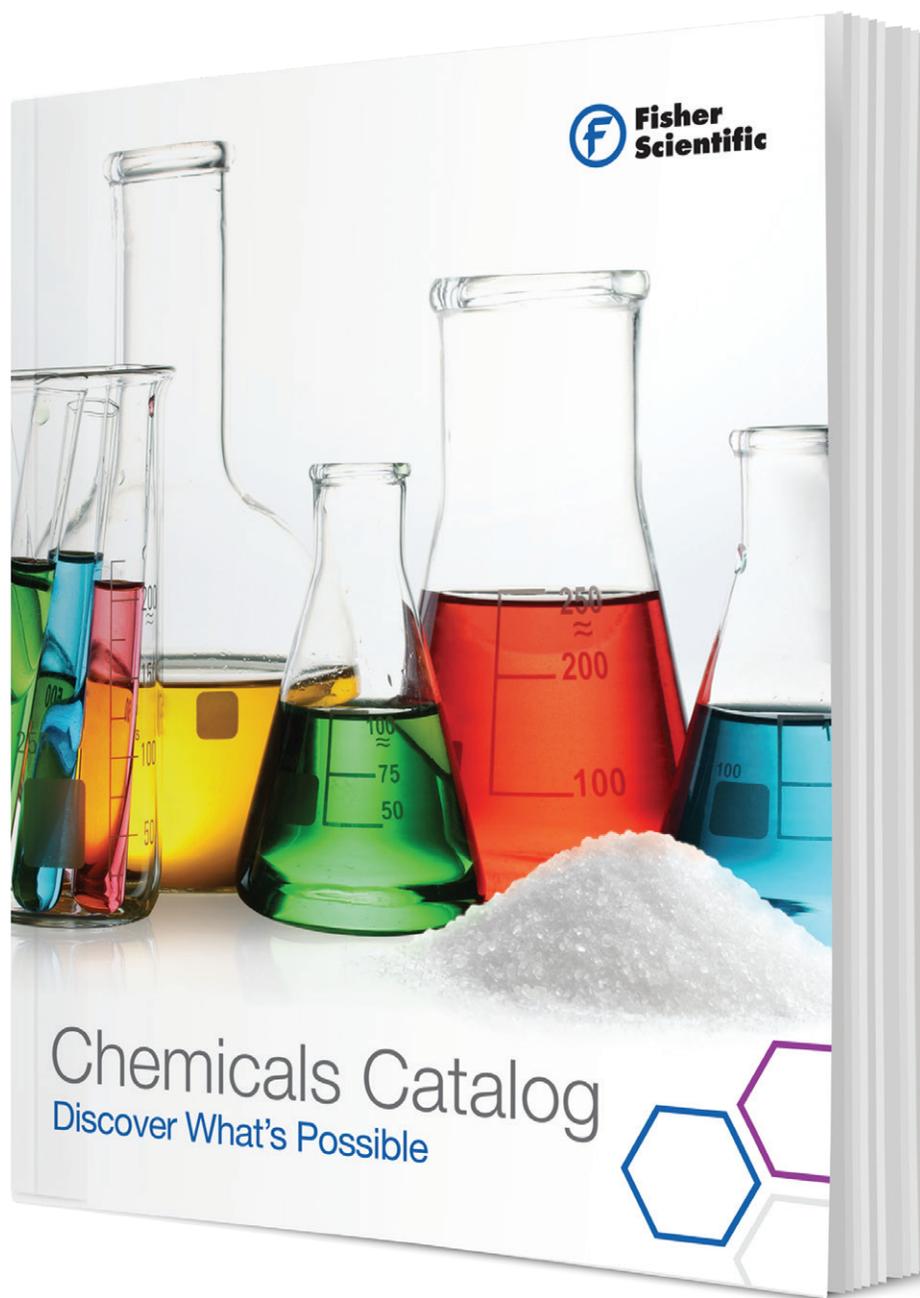
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SIMPLIFYING IMMUNE ONCOLOGY RESEARCH

NOVEL 3D TUMOR MODEL STREAMLINES HIGH THROUGHPUT IMMUNOTHERAPY TESTING

Immunotherapy has become a topic of increased interest for scientists studying cancer. By using a patient's own immune cells to attack cancer cells, immunotherapy treatments have shown positive results, including total cancer remission in some cases. But immunotherapy is not a one-size-fits-all approach; treatment strategy and efficacy can vary by patient and cancer type.

To more carefully study immunotherapy as a cancer treatment, scientists need efficient, *in vitro* screening models to examine targeted therapy options. This type of research has historically been conducted with cell culture models that allow for the study of immune cell migration, which can be easily adapted for high throughput screening. However, these models typically utilize two-dimensional (2D) cell culture monolayers that do not accurately reflect a tumor's complexity in the human body. The current growing trend is to use more *in vivo*-like three-dimensional (3D) models.

To incorporate the immune cell component, these 3D models require the direct addition of immune cells to 3D spheroids. However, this may not be an accurate reflection of how immune cells migrate toward and further invade tumors *in vitro*. According to Hannah Gitschier, Corning Life Sciences Applications Lab Manager in Kennebunk, Maine, "With immunotherapy, it is imperative that researchers have solid models to best recapitulate the *in vivo* microenvironment and interactions between the engineered immune cells and patient tumor samples. These models must be easy to use and transferrable to a high throughput screening environment, enabling rapid screening of conditions to best predict clinical outcomes."

Traditionally, 2D assays were the method of choice given the high proliferation rate of cells in 2D culture, as well as the reproducibility of assays. However, with emerging technologies and the development of novel lab consumables, 3D assays are becoming easier to adapt and more relevant for researchers' end goals.

Creating a Better Way

Hilary Sherman, a Corning Applications Scientist, created a 3D culture model to observe immune cell and tumor cell interactions; she combined the Corning 96-well spheroid microplate with the high throughput screening (HTS) Transwell-96 tissue culture system. Coated with Corning's unique Ultra-Low Attachment surface, the spheroid microplate allows for highly reproducible, single multicellular tumor spheroids to form in each well. The HTS Transwell permeable support systems are commonly used in migration and invasion studies, with a flat-bottom receiver plate for monolayer culture. This novel combination of both products allows researchers to observe changes to tumor behavior — by adding immune cells to the Transwell insert, the rates of migration through the membrane and toward the tumor spheroids in the receiver plate can be observed. Combining the technologies allows one to study how these two cell types interact in a more *in vivo*-like environment.

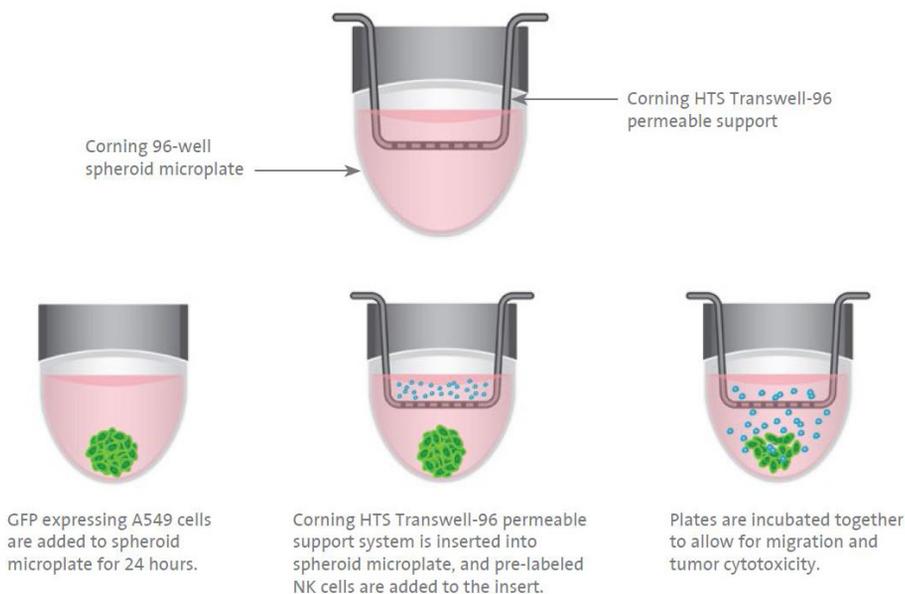


Figure 1. HTS Transwell 96-well permeable supports were placed into 96-well spheroid microplates for 3D immune cell migration and tumor invasion assays.

Sherman placed the spheroid microplate under the HTS Transwell insert plate instead of using the flat-bottom Transwell receiver plate. This enabled her to observe tumor cell activity in a 3D system while also facilitating migration of immune cells toward the tumor cell model. This technique supports the investigation of immune cell homing, tumor toxicity, and tumor immune evasion in an easy-to-use, reproducible, 3D high throughput assay.

Study Methods

Cells from a cancerous lung tissue cell line (A549 cells) were seeded into 96-well spheroid microplates to form the tumor spheroid models. The following day, Sherman placed the HTS Transwell 96-well permeable supports in the spheroid microplates. To assess immune cell homing and migration, natural killer (NK) cells were added into the inserts and were allowed to migrate for 24 hours. (See Figure 1.)

Implications on Future Research

A successful model allows for the immune cells to reach the tumor cells of interest in order to effectively study the body's response to targeted immunotherapy. Sherman's novel research model confirmed the NK cells in this study were not only able to reach the target tumor cells but could also infiltrate the 3D spheroid structure and lead to the desired cytotoxic outcome.

This creates a more streamlined model to observe all necessary components of this immunotherapy research in a single, high throughput, reproducible *in vivo*-like format.

“This model allows researchers to study immune system-tumor interactions in a more comprehensive way that also has the benefit of being high throughput and easy to use. The system can also be used to study other immune and cancer cells as well as the ability to form more complex models by adding endothelial or glial cells to the Transwell membrane to create more advanced blood brain barrier models,” says Gitschier.

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Pasteur Pipets

- Borosilicate glass, disposable
- Square-cut ends; restriction for cotton plug (not included)
- Meet ASTM E732 requirements



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Nonsterile, Length: 5.75 in.	13-678-20B	1,440/Case	\$181.51
Nonsterile, Length: 9 in.	13-678-20C	720/Case	\$101.62
Nonsterile, Length: 9 in.	13-678-20D	1,440/Case	\$189.16

Serological Pipets

- Borosilicate glass; disposable
- Bidirectional scales; negative graduations
- Sterile with cotton plugs
- Calibrated "To Deliver/Blow Out"
- Regular tip; standard length
- Packed in canisters, multipacks or individually wrapped
- Regular tip styles have volume tolerances that comply with ASTM E 714



Description	Cat. No.	Quantity	Price
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Sterile, Multipack, 1mL/0.01mL	13-678-25B	1,000/Case	\$261.65
Sterile, Multipack, 2mL/0.01mL	13-678-25C	500/Case	\$153.74
Sterile, Multipack, 5mL/0.1mL	13-678-25D	500/Case	\$196.64
Sterile, Multipack, 10mL/0.1mL	13-678-25E	500/Case	\$262.27
Sterile, Canisters, 1mL/0.1mL	13-678-26A	500/Case	\$160.25
Sterile, Canisters, 2mL/0.01mL	13-678-26B	500/Case	\$179.74
Sterile, Canisters, 5mL/0.1mL	13-678-26C	500/Case	\$218.81
Sterile, Canisters, 10mL/0.1mL	13-678-26D	500/Case	\$293.21
Nonsterile, Canisters, 0.5mL/0.05mL	13-678-31D	500/Case	\$157.12
Nonsterile, Canisters, 1mL/0.1mL	13-678-31E	1,000/Case	\$247.96
Sterile, Individually Wrapped, 0.5mL/0.01mL	13-678-27A	500/Case	\$208.84
Sterile, Individually Wrapped, 1mL/0.1mL	13-678-27B	1,000/Case	\$307.61
Sterile, Individually Wrapped, 1mL/0.01mL	13-678-27C	1,000/Case	\$299.54
Sterile, Individually Wrapped, 2mL/0.01mL	13-678-27D	500/Case	\$181.94
Sterile, Individually Wrapped, 5mL/0.1mL	13-678-27E	500/Case	\$245.49
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- Calibrated "To Contain"
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Standard, Nonsterile, 2.5mL	13-6502Y	12/Case	\$286.71
Standard, Nonsterile, 3mL	13-650-2D	12/Case	\$174.56
Standard, Nonsterile, 4mL	13-650-2E	12/Case	\$177.55
Standard, Nonsterile, 6mL	13-650-2G	12/Case	\$178.43
Standard, Nonsterile, 7mL	13-650-2H	12/Case	\$178.40
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Standard, Nonsterile, 12mL	13-6502X	12/Case	\$487.45

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Clear, 1.9L (64 oz.), PP Caps, PE Foam/PTFE Liners	02-912-280	6/Case	\$91.09
Clear, 1.9L (64 oz.), PP Caps, Pulp/Vinyl Liners	02-912-279	6/Case	\$127.74
Amber, 2.5L (84 oz.), Phenolic Caps, PE Foam/PTFE Liners	02-912-271A	6/Case	\$93.05
Clear, 3.8L (130 oz.), Phenolic Caps, PolyCone Liners	02-912-272	4/Case	\$65.83
Clear, 3.8L (130 oz.), Phenolic Caps, Rubber Liners	02-912-274	4/Case	\$46.35
Clear, 3.8L (130 oz.), PP Caps, PE Foam/PTFE Liners	02-912-278	4/Case	\$86.81
Clear, 3.8L (130 oz.), PP Caps, Pulp/Vinyl Liners	02-912-273	4/Case	\$93.67
Replacement Caps			
Phenolic Screw Caps, PolyCone Liner	02-912-063	576/Case	\$1,478.39
Phenolic Screw Caps, PolyCone Liner	02-911-727	1,600/Case	\$1,661.25
Phenolic Screw Caps, Rubber Liner	02-912-052A	576/Case	\$923.26
White PP Screw Caps, PE Foam Liner	02-912-097	500/Case	\$234.20
White PP Screw Caps, PE Foam Liner	02-912-053A	3,750/Case	\$322.65
White PP Screw Caps, PE Foam/PTFE Liner	02-912-072	500/Case	\$1,292.00

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02-911-701	40	\$805.57
02-911-702	120	\$2,295.84
96-Well Plate, Conical, 1mL		
02-912-401	20	\$321.28
02-912-402	40	\$623.29
02-912-403	120	\$1,776.40
96-Well Plate, Conical, 2mL		
02-912-404	20	\$450.66
02-912-405	40	\$743.14
02-912-406	120	\$2,117.95
384-Well Plate, Conical, 120µL		
02-911-703	20	\$383.74
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TILT Bottle Screw Cap, GL 56, PP, White	14-209-159	10/Pack	\$43.95
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Polystyrene scoops infused with stainless-steel powder are designed to show up under standard metal detectors and X-ray equipment, and help to protect against product contamination, recalls and quarantines. Available in blue or black and in 60, 125 and 250mL (2, 4 and 8 oz.) sizes.



Sampling Spatulas

Collect sterile samples and pierce packaging with these spatulas made of high-impact polystyrene. They're gamma-irradiation sterilized, individually packaged, lot stamped, and shipped with a Certificate of Processing. Choose between sterile (9 and 14 in.) and nonsterile (9 in. only) options.



Sampler Scoops

Manufactured from high-impact polystyrene, these scoops are designed for retrieving samples from a larger source. They stay upright on flat surfaces and can also be used as weigh boats.



Red Sterile Sampling Scoops

These one-piece sterile scoops are molded from red high-impact polystyrene for greater visibility. Use them for gathering samples from wide-mouth containers. Available in 2, 4, and 8 oz. sizes.



Bent Handle Scoop

Polystyrene flat-bottom scoops are designed with a curved handle to keep your hand away from the sample to help reduce the risk of contamination or accidental exposure. They're available in 60 and 125mL (2 and 4 oz.) sizes, both of which are 7.6 in. long.

Visit fishersci.com to request your complimentary sample.

Maximize Your Volume

Corning 5L Erlenmeyer Flasks

Corning 5L Erlenmeyer flasks let you grow large quantities of cells in a single vessel, saving the time and effort involved with using multiple flasks. This 5L flask has the same footprint as a traditional 3L Erlenmeyer flask, which saves valuable space on your lab bench and inside your incubator.

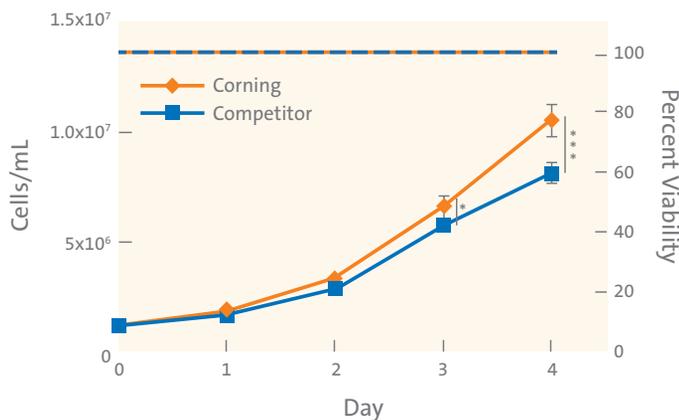
Key Features

- Use this uniquely designed flask to culture larger volumes without compromising cell viability or density
- Available with either baffled or plain bottoms
- Molded-in graduations for accuracy
- Large vent cap for continuous gas exchange while ensuring sterility and preventing leakage
- Sterility Assurance Level (SAL) of 10^{-6}
- RNase- and DNase-free
- Nonpyrogenic

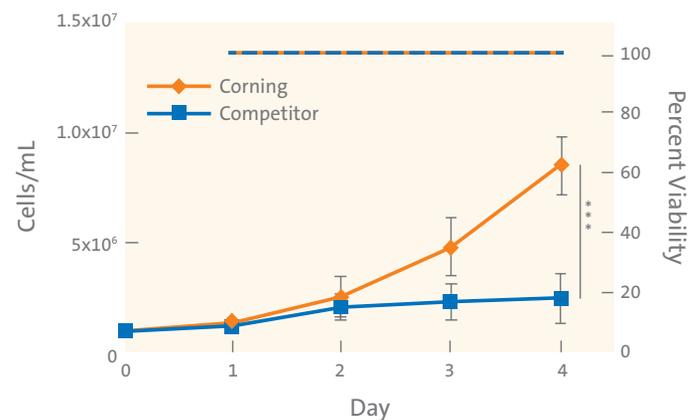
The Corning 5L Erlenmeyer flask is part of a family of Corning shaker flask products, which includes 1, 2, and 3L Erlenmeyer flasks, and customizable aseptic transfer accessories.



Data Average Sf9 Viability and Cell Density (2.5L)



Average Sf9 Viability and Cell Density (3.5L)



Description	Mfr. No.	Cat. No.	Quantity	Price
5L Erlenmeyer Flask, Plain Bottom, Vent Cap	431685	07-200-927	4/Case	\$510.73
5L Erlenmeyer Flask, Baffled Bottom, Vent Cap	431684	07-200-926	4/Case	\$561.78
5L Erlenmeyer Flask, Plain Bottom, Aseptic Transfer Cap	11501	07-200-929	2/Case	\$549.87
5L Erlenmeyer Flask, Baffled Bottom, Aseptic Transfer Cap	11502	07-200-930	2/Case	\$561.35
Vent Caps	431682	07-200-925	24/Case	\$238.53
Aseptic Transfer Caps	11500	07-200-928	4/Case	\$488.78

THE FOUR PILLARS OF SAFETY

AN APPROACH TO STRENGTHENING YOUR SAFETY FOUNDATION

By Tim Van Hoecke
Sr. Program Manager, Safety, North America
 Thermo Fisher Scientific

Most organizations currently have some sort of safety program in place. Whether you are working in a small administrative office for a corporation or stocking supermarket shelves, hazards and risks exist that need to be identified and addressed to ensure employee, facility and environmental safety.

Workplace hazards can present unique and sometimes extreme challenges for workers involved in various laboratory environments, such as chemical, biotech, industrial and academic settings. There are many issues to consider when developing an effective plan to comprehensively protect people and property while managing costs and profits.

How Strong Is Your Foundation?

When evaluating the strength of your safety foundation, ask yourself the following questions:

- What resources comprise your organization’s safety foundation?
- Do you have a dedicated safety representative or manager?
- Has a full hazard assessment been

completed, and is there a hazards communication (HazCom) plan in place?

- Have you identified any changes that would reduce or control hazards?
- Do you have the correct personal protective equipment (PPE) available?
- Who responds in an emergency?

To effectively build on your existing foundation, you will need a sound plan and specific strategies to accomplish any desired improvements. We recommend an approach that we refer to as the “Four Pillars of Safety” — prepare, prevent, protect and respond — to help ensure that your people and facilities are safer and more productive.

or administrative controls. If this sounds like an audit, you’re exactly right! Consider the prepare pillar as a regular check of your “foundation” to look for “cracks” or “structural deficiencies.” Effective auditing takes time, resources (both money and staff), and a comprehensive system. Recent innovations in safety auditing software allow for more frequent, uniform and comprehensive auditing. A review of recent incidents can also be used to identify training gaps. Effective training is another area that requires resources, expertise and management support. Your Fisher Scientific Safety Specialist can help you build on your safety foundation with cutting-edge auditing and training solutions.



Prepare

Regulations require employers to be prepared by providing a safe work environment, approved safety equipment and effective training. To be properly prepared, first observe and understand workplace processes, the duration of hazard exposures, and the processes where risk could be reduced through engineering



Prevent

After following the prepare pillar philosophy and conducting hazard assessments, audits and training, you may have uncovered some cracks in your safety foundation. Preventive measures can help you fill some of those gaps and may include improvements in signage, storage cabinets, work area organization and ergonomics,



cleaning materials, or waste disposal. It's important to choose the highest level of protection when determining the best preventative equipment or solutions for your organization. That's why we work closely with industry experts to provide affordable hazard assessments for chemical handling and storage, HazCom labeling, eyewash and safety shower placement, and other safety solutions to protect your facility and employees.

Protect

With the prepare and prevent pillars clearly established, it's time to face the challenges of the all-important protect pillar. Personal protective equipment (PPE) includes eye, hand and body protection, and involves the critically important step of identifying, addressing and managing respiratory hazards. PPE is the last line of defense for employees. The correct PPE must always be available and worn properly in order for it to protect workers from any remaining hazards. PPE selection should always be based on necessary levels of protection and any applicable ANSI standard requirements. Train employees on the

proper use, fit, limitations and maintenance of PPE, and enforce its use. Rely on your Fisher Scientific Sales Representatives and our supplier partners to assist you in selecting the PPE that will protect what matters most — your people.



Respond

Lastly, if the first three pillars have been well constructed, the respond pillar may require infrequent use. But even the best intentions and thorough planning will not always prevent hazards that need to be mitigated quickly and properly, like an injury, acute medical condition (e.g. a heart attack), or a hazardous material spill. Response products identified during the prepare, prevent, and protect steps include AEDs, first-aid kits, spill-control materials, fire blankets and extinguishers, and eyewash stations or emergency showers. Keep response equipment properly stored and maintained, and train personnel to be ready to use them as needed. We're here to advise you if you have any questions

about maintenance or strategic placement of these critical items.

Regular Inspections

Your safety foundation should be strong and broad enough to meet the challenges and changes that encompass your organization's processes and goals. New employees and updated compliance regulations and requirements may require more training and auditing, so it's important to perform regular inspections.

Above all, make sure that your safety equipment and service provider proactively works for you to strengthen your safety foundation. The Fisher Scientific Safety Team and the resources we provide can help you prepare, prevent, protect and respond, allowing you to build a safety foundation that positively impacts your safety program, employees and the bottom line.

*This issue of
Lab Reporter
is sponsored by:*



Designed for Multiple Applications

Fisherbrand Media Bottles

Fisherbrand Reusable Glass Media Bottles with Caps are ideal for a variety of general laboratory applications. They feature a convenient wide opening, enhanced graduations and a clear (natural), drip-free, replaceable polypropylene pour ring.

- Borosilicate glass
- Autoclavable (to 140°C)
- Permanent white enamel marking spot
- GL 45 screw thread
- Linerless blue polypropylene caps



Description	Cat. No.	Quantity	Price
100mL (3.3 oz.)	FB800100	10/Case	\$93.83
250mL (8.45 oz.)	FB800250	10/Case	\$104.30
500mL (17 oz.)	FB800500	10/Case	\$117.32
1000mL (33.8 oz.)	FB8001000	10/Case	\$154.74
2000mL (67.6 oz.)	FB8002000	1/Case	\$39.95
5000mL (169.1 oz.)	FB8005000	1/Case	\$132.11
10000mL (338.1 oz.)	FB80010000	1/Case	\$229.85

Visit fishersci.com or fishersci.ca for more information.

Break the 3D Barrier

Get there fast with Corning.

Are you just getting started in 3D cell culture?
Looking for proven ways to scale up?
Or making the move to high throughput screening?

Corning Matrigel matrix and spheroid microplates can help you conduct more biologically relevant research and better predict how your next discovery will behave in the real world. Whatever your challenge, Corning can help you break through the barriers to create more *in vivo*-like environments and predictive models.



Visit fishersci.com/corningcellculturesolutions to learn more about Corning cell culture solutions.

The Power of Simplicity

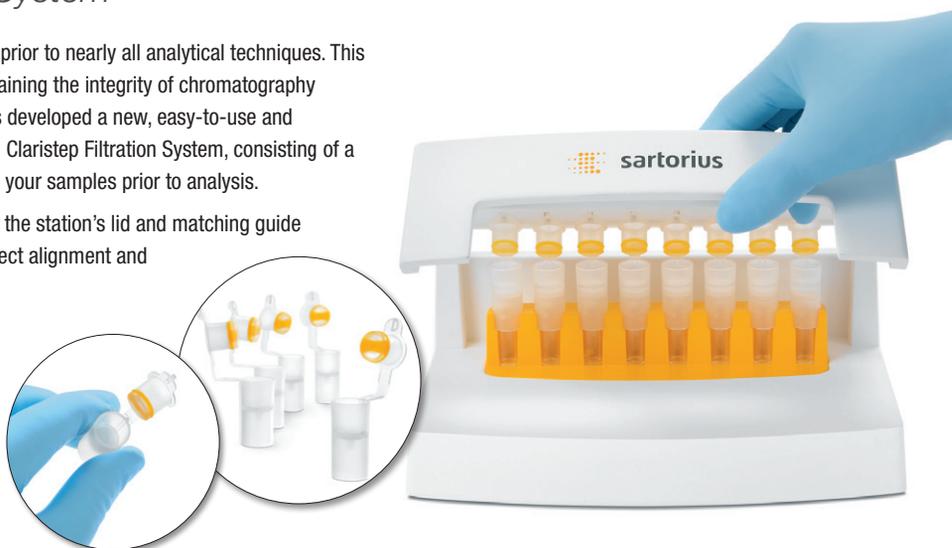


Sartorius Claristep Filtration System

Preparing samples by clarification is an essential step prior to nearly all analytical techniques. This filtration step to eliminate particles is crucial for maintaining the integrity of chromatography columns and maximizing their operation. Sartorius has developed a new, easy-to-use and straightforward filtration setup. The manually operated Claristep Filtration System, consisting of a station and filter units, offers a novel way for clarifying your samples prior to analysis.

The patent-pending design features unique grooves in the station's lid and matching guide ridges on Claristep filter units to enable intuitively correct alignment and convenient handling of the system.

- Process up to eight samples simultaneously
- No syringe required
- No need for a vacuum source
- For low sample volumes ranging from 60µL to 600µL
- Hold-up volume <30µL



Description	Mfr. No.	Cat. No.	Quantity	Price
Filter, 0.2µm	17C07FT-96	14-556-010	96/Pack	\$240.00
Filter, 0.2µm	17C07FT-480	14-556-011	480/Pack	\$1,033.00
Filter, 0.45µm	17C06FT-96	14-556-012	96/Pack	\$240.00
Filter, 0.45µm	17C06FT-480	14-556-013	480/Pack	\$1,033.00
Station	17C-M8	14-556-014	1 Each	\$340.00
Single Tray	17C-S1	14-556-015	1 Each	\$79.00

New and Improved Pipette and Tips

fisherbrand

Fisherbrand HandyStep S Repeating Pipette

The NEW Fisherbrand HandyStep S Repeating Pipette is comfortable, dependable and simple to operate.

- **Comfortable:** slim design; lightweight and well-balanced; one-handed volume selection
- **Reliable:** mechanical design; innovative corrosion-resistant polymers
- **Contact-free:** tip ejection system
- **Flexible:** 10 tip sizes (59 different volume settings)



Description	Cat. No.	Price
Repeating Pipette, Includes Performance Certificate, Shelf/Rack Mount, Syringe Tips (One Each 0.1mL, 1mL, and 10mL), Operating Manual	13-668-722	\$425.86

Dispenser Tips and Adapters

Manufactured from high-quality virgin plastics with no chemical additives. Tips may be used with all standard, repeating pipettes and are available in sterile and nonsterile versions.

Description	Cat. No.	Quantity	Price	Cat. No.	Quantity	Price
	Non-Sterile			Sterile		
Dispenser Tips, 0.1mL	13-668-700	100/Pack	\$152.50	13-668-710	100/Pack	\$198.85
Dispenser Tips, 0.5mL	13-668-701	100/Pack	\$162.75	13-668-711	100/Pack	\$198.09
Dispenser Tips, 1mL	13-668-702	100/Pack	\$157.29	13-668-712	100/Pack	\$192.00
Dispenser Tips, 1.25mL	13-668-703	100/Pack	\$162.12	13-668-713	100/Pack	\$195.78
Dispenser Tips, 2.5mL	13-668-704	100/Pack	\$163.18	13-668-714	100/Pack	\$190.45
Dispenser Tips, 5mL	13-668-705	100/Pack	\$161.81	13-668-715	100/Pack	\$197.05
Dispenser Tips, 10mL	13-668-706	100/Pack	\$157.81	13-668-716	100/Pack	\$185.90
Dispenser Tips, 12.5mL	13-668-707	100/Pack	\$157.45	13-668-717	100/Pack	\$192.00
Dispenser Tips, 25mL	13-668-708	50/Pack	\$87.60	13-668-718	25/Pack	\$56.57
Dispenser Tips, 50mL	13-668-709	25/Pack	\$49.09	13-668-719	25/Pack	\$47.91
Adapters, 25 and 50mL Tips	13-668-720	10/Pack	\$97.83	13-668-721	5/Pack	\$69.03

Achieve Precise Meniscus Control

BRANDTECH
SCIENTIFIC, INC.

BRAND accu-jet pro Pipette Controller



The BRAND accu-jet pro offers precise, sensitive control to end “meniscus jumping,” even with low-volume pipettes. An insulated motor provides quiet, vibration-free pipetting. Color code by laboratory or application using the four available colors (royal and dark blue, forest green and magenta).

- Contoured grip comfortably fits small or large hands
- Lightweight — prevents pipetting fatigue
- Pressure-sensitive buttons control pipetting speed
- Motor-speed limiter for low-volume pipettes
- NiMH battery provides up to eight hours of continuous pipetting on a single charge

Description	Mfr. No.	Cat. No.	Price
Dark Blue	26330	03-840-310	\$594.16
Magenta	26331	03-840-311	\$594.16
Forest Green	26332	03-840-312	\$594.16
Royal Blue	26333	03-840-313	\$594.16

YOU JUST BECAME THE SUPERHERO OF YOUR LAB

xTIP[®]
By Biotix

Biotix innovation is now available for the Rainin LTS pipette!

“Pipette tips aren’t usually something to get excited about...that is until I used the new Biotix xTIP. After a cross-comparison between other tips — I found Biotix to be highly effective, precise, and accurate. Amazingly low retention compared to other leading tips.

Fearing sounding like an infomercial — I should just say that these tips are pretty awesome and leave it at that.”

— Review from SelectScience

Save your lab from indifference!

Biotix manual tips are designed and tested to improve ergonomics while providing ultra-low retention and precise delivery.

fishersci.com/xTip



NEW ELECTROPORATION DEVICE SIMPLIFIES CELL ACCESS

By Kevin Ritchart

A research team from Rutgers University has developed a new electroporation device that could help to deliver therapeutic drugs to cells more effectively.

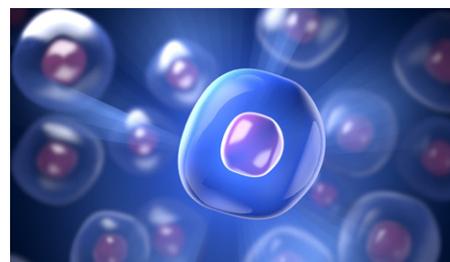
Electroporation is a widely used method of delivering foreign vectors into many different types of cells. When cells are exposed to electric fields of a specific strength, the outer membrane forms transient pores that allow molecular transport into the cells. The controlled delivery of biomolecules enables scientists to study the fundamental cellular processes that take place and develop advancements in biomedical research and clinical medicine.

By monitoring changes in individual cells when they're exposed to short, high-strength electric fields, researchers can identify the point at which a cell becomes permeable and determine the exact conditions that will allow for molecular delivery while maintaining cell viability. This technological advancement has expedited the transfection process by eliminating trial-and-error electroporation protocols safely and effectively across all cell types and applications.

Checking the Pulse

The team from Rutgers reported high levels of sensitivity and membrane permeabilization in a continuous-flow environment that had not been previously reported. The researchers performed extensive theoretical monitoring of the micro-electroporation platform, then designed and built a microfluidic device that consisted of a converging microfluidic “electroporation zone” and a set of electrodes that can both pulse the passing cell in transit and sense the degree of cell membrane permeabilization. When the device detects a cell, an electrical pulse is applied to the cell and the electrical signal is checked for changes in the permeability of its membrane; this determines a cell’s payload potential.

By altering both the strength of the electric field and the duration of electrical pulses, researchers were able to measure the membrane impedance response at different levels of intensity. When measurements were taken immediately following pulse application, they found that the degree of membrane permeabilization was dependent on the intensity of the applied pulse. A significant increase in permeabilization occurred when the pulse duration was 0.8 to 1ms.



What's Next?

The Rutgers team is hoping to build on its recent discovery by further developing this technology into an autonomous system that can use electrical signals to create a flow-through, feedback-controlled, single cell-level electroporation platform. By continuing to improve transfection efficiency, electroporation-based cellular transformation will become more widely used and eventually replace viral-based approaches.

The system could eventually consist of a docking station and software that applies the electrical pulses and monitors permeabilization in real time. The system would be reproducible and easy to use, and it would give laboratories and clinics the ability to perform a wide range of applications, including direct gene editing and transfection for transplantation and cellular therapies.



But It's a Dry Heat

Our newly designed dry baths, which now feature digital controls, maintain your desired temperature with greater accuracy and consistency.



AC600 Series Ductless Chemical Workstation

The AC600 Series ductless chemical workstation is an economical solution for protecting the operator and environment from toxic vapors, gases, fumes and particulates. Ships fully assembled and can be configured in a variety of common applications.

Standard Features:

- Microprocessor controller has audible and visible alarms for both airflow velocity and filter change
- 360° visibility
- Ideal for low-volume chemical applications

Description	Mfr. No.	Cat. No.	Price
Workstation, 32"	AC632A	36-100-4271	\$3,577.65
Workstation, Tall, 32"	AC632TA	36-100-4272	\$3,991.30
Workstation, 48"	AC648A	36-100-4274	\$4,808.26
Workstation, Tall, 48"	AC648TA	36-100-4275	\$5,027.03

* Filters sold separately, application worksheet required

Endeavour Ductless Fume Hood

Endeavour ductless fume hood is designed to provide superior operator protection from potential toxic fumes, vapors, and particulates. AirSafe NXT provides simple and effective user interaction with fume hood operational parameters.

Standard Features:

- Microprocessor controller has audible and visible alarms for both airflow velocity and filter change
- Bonded carbon filters — no dust!
- Polypropylene construction — excellent chemical resistance

Description	Mfr. No.	Cat. No.	Price
Fume Hood, 36"	ACPT3000	36-100-0059	\$7,286.25
Fume Hood, 48"	ACPT4000	36-100-0063	\$8,569.25
Fume Hood, 60"	ACPT5000	36-100-0067	\$9,159.47
Fume Hood, 72"	ACPT6000	36-100-0069	\$10,294.37

* Filters sold separately, application worksheet required



PowderSafe Type C Enclosure

The PowderSafe Type C balance enclosure incorporates the airflow dynamics and HEPASafe features of the PowderSafe Type B with the user-friendly features and chemical fume containment capabilities of the ductless fume hood. Thermally fused polypropylene makes the PowderSafe Type C perfect for weighing powders or solvents.

Standard Features:

- Horizontal HEPA-filtered airflow pattern
- HEPASafe filtration system for simple and easy maintenance
- Thermally fused design for vibration reduction and balance stability

Description	Mfr. No.	Cat. No.	Price
Enclosure, 36"	AC760C	36-101-8906	\$9,167.61
Enclosure, 48"	AC770C	36-101-8908	\$9,768.61
Enclosure, 72"	AC780C	36-101-8910	\$13,728.75



MILLI-Q IQ 7000: ULTRAPURE WATER WITH A TOUCH OF INTELLIGENCE

MilliporeSigma has been the partner of choice for water purification systems and services for half a century. Now, they've released their seventh generation of ultrapure water systems: the Milli-Q IQ 7000. The new system is the first in an offering that replaces the Milli-Q Advantage A10 systems.

Developed with You in Mind

Designed around your feedback, the Milli-Q IQ 7000 helps make your work in the lab easier and more efficient than ever. The system consistently provides water purity to the trace contaminant level, helping you avoid the uncertainty and misinterpreted results that can lead to repeating costly, time-consuming analyses. With the Milli-Q IQ 7000, you can have full confidence in your water.



Scientist using the Milli-Q IQ 7000 Q-POD dispenser to deliver ultrapure water.

An Ergonomic Design for Improved Efficiency

The system's new Q-POD dispenser offers superior flexibility and intuitive controls. Just twist the dispensing wheel to deliver water at the flow rate you need — from drop-by-drop to two liters per minute. Or, select dispensing options from the Q-POD *Home* screen and

check water quality parameters onscreen even during dispensing.

Each system can be used with up to four Q-POD dispensers installed in the same lab or in two or more adjacent spaces. The compact water production unit can easily be mounted to a wall or under a bench, and the customizable-length system cables are enclosed in protective sheaths. Choose from a range of POD-Pak cartridge filters to produce the precise water quality you need.



The Milli-Q IQ 7000 Purification System

Intuitive Graphic Interface

Everyday interactions with the Milli-Q IQ 7000 are performed on the high-definition digital touchscreen. Navigation is intuitive, and information is organized to provide an efficient user experience. The system can also be connected to lab networks through an integrated data management system for quick and easy access to information.

The system puts help for daily use right at your fingertips, and will alert you with

an onscreen message when consumables need to be replaced. It even automatically provides step-by-step guidance for changing the cartridges.

Novel Mercury-Free UV Lamps

The Milli-Q IQ 7000 pioneers the use of environmentally friendly, mercury-free UV lamps. It also features a 23% smaller system footprint as well as IPAK Meta and IPAK Quanta cartridges that are 33% smaller than before. With these changes, the system requires less plastic for manufacturing and fewer packaging materials to reduce shipping costs and waste volume. Online documentation reduces paper use, and the unique *LabClose* mode places the system in hibernation to reduce water and electricity consumption.

Precise A10 TOC Monitoring

The Milli-Q IQ 7000 delivers ultrapure water with low TOC (Total Organic Carbon) levels (≤ 2 to ≤ 5 ppb). The A10 TOC monitor is also equipped with an ech₂o mercury-free UV oxidation lamp that has been redesigned for greater accuracy. (Its 0.5 – 999.9 range and precision comply with ESP and EP suitability tests.)

Content provided by:

**MILLIPORE
SIGMA**
by Thermo Fisher Scientific

WEIGH ALL YOUR OPTIONS WHEN CHOOSING A BALANCE

A balance is a common piece of laboratory equipment. Today's electronic balances are capable of much more than simple mass determination. They can be used for many other applications, including density determination, pipette calibration, and animal or dynamic weighing.

It is critical to choose a balance that meets both performance and application requirements: specific application modes, connectivity, and GLP/GMP compliance assistance.

When choosing a balance, carefully consider the following:

Capacity: The largest weight that can be accurately weighed with the balance.

- What range of weights will be measured?
- Does the capacity of the balance allow for the heaviest samples to be measured (including the weight of tare containers like beakers)?

Readability: The smallest change in mass that corresponds to a change in the displayed value.

Is the readability of the balance sufficient to accurately weigh your samples?

Types	Readability
Precision models	1mg to 0.1g
Analytical models	0.1mg
Semi-micro models	0.01mg
Micro models	0.001mg

Accuracy: The closeness of a measurement to the true value of that measurement.

A balance with a smaller readability will typically offer greater accuracy than a balance with a larger readability. For example, a balance capable of reading by 0.1mg will be more accurate than a 1mg balance.

Does your laboratory need to comply with a minimum weight standard, such as USP 41?

If so, select a balance with the readability and repeatability that will ensure that even your smallest samples will not exceed the minimum weight tolerance of the balance.

Other Features

Modern electronic balances can have specialized weighing modes such as parts counting, dynamic weighing (for live animals), formulation and pipette calibration. These modes can help to save time and reduce operator error.

- Will the balance need to interface with existing equipment (computers, printers, LIMS)?
- Which communication interfaces are needed (ethernet, USB, RS-232)?

Compliance and Recordkeeping*

- What degree of data integrity and measurement traceability is required?
- Can the chosen balance produce attributable, contemporaneous and accurate physical or electronic records?

Total Cost

- Does the cost of the balance include all necessary options and accessories?
- Will one balance meet all of the laboratory's requirements or will more than one balance be needed? (In some cases, the purchase of multiple balances for different weighing tasks may be preferred over the purchase of a single balance.)

*For ISO, GLP or GMP requirements





Durably Constructed

Explorer Series Balances

Featuring readabilities from 0.01mg to 0.1g and capacities up to 35kg, the OHAUS Explorer Series is a robust family of durably constructed balances specifically designed to offer outstanding accuracy and weighing performance. Fully featured to meet all of your weighing needs, the Explorer Series is outfitted with:

- A large color graphic touch screen and intuitive user interface, available in 14 operating languages
- Measurement traceability for easy compliance with GLP and GMP standards
- 14 specialized applications, including formulation, dynamic (animal) weighing, and pipette adjustment
- RS-232, USB, and ethernet interfaces for printer or PC connectivity and system integration

Visit fishersci.com to see the entire line of Explorer balances.



Explorer Precision

Explorer Analytical

Description	Capacity	Readability	Cat. No.	Price
Model EX125D Semi-Micro Balance	52g/120g	0.015mg	01-919-370	\$5,125.50
Model EX225D Semi-Micro Balance	120g/220g	0.015mg	01-919-372	\$6,231.00
Model EX124 Analytical Balance	120g	0.0001g	01-920-232	\$4,187.77
Model EX324 Analytical Balance	320g	0.0001g	01-920-234	\$5,404.94
Model EX223 Precision Balance	2200g	0.001g	01-920-235	\$3,305.78
Model EX623 Precision Balance	620g	0.001g	01-920-237	\$3,931.71
Model EX2202 Precision Balance	2200g	0.01g	01-920-239	\$3,317.45
Model EX6202 Precision Balance	6200g	0.01g	01-920-241	\$3,937.01
Model EX6201 Precision Balance	6200g	0.1g	01-920-243	\$3,371.55
Model EX12001 High-Capacity Precision Balance	12000g	0.1g	02-112-245	\$3,826.01

70 Years of Innovation A Balance for Every Need

Since 1945, METTLER TOLEDO has pioneered weighing solutions. We continue to revolutionize the industry to meet customer demands in the laboratory. With three distinct performance levels, backed by the largest network of service technicians, we ensure that all your balance needs are covered.

Visit fishersci.com/mettlertoledo to find your customized solution today.



METTLER TOLEDO

Affordable, Quantitative Microscopy and Multi-Mode Detection



BioTek Cytation 1 Cell Imaging Multi-Mode Reader

The new BioTek Cytation 1 can be configured for automated digital microscopy, conventional microplate detection, or both, and you'll get easy, yet powerful image capture, plate reading and analysis every time with the Gen5 Software.

With a magnification range from 1.25X to 60X in fluorescence and high-contrast brightfield, one can view whole organisms, examine intracellular morphology, or take advantage of the temperature adjustment (to 45°C), CO₂/O₂ gas controls and shaking to perform live cell assays.

Its multi-mode detection includes sensitive, filter-based fluorescence, luminescence and monochromator-based UV-Vis absorbance to support a wide range of applications.



Description	Cat. No.	Price
Fluorescence and High-Contrast Brightfield Imaging, Includes Imaging System Controller and Gen5 Software	BTCYT1V	\$35,900.00

Cost-Effective Hybrid

BioTek Synergy H1 Multi-Mode Reader

- Patented Hybrid Technology combines monochromator- and dichroic-based detection
- Control and monitor CO₂ and O₂
- Fast and accurate DNA/RNA quantification in samples as small as 2µL with Take3 Micro-Volume Plates
- Quadruple grating monochromator for maximum flexibility and ease of use
- Dichroic-based filter optics for optimal performance with fluorescence polarization and time-resolved fluorescence



Description	Cat. No.	Price
Top/Bottom Monochromator Fluorescence, UV-Vis Absorbance and Luminescence Detection, Includes Gen5 Software	11120533	\$35,075.00

Advanced Plate Washing

BioTek 405 TS Washer

- High-resolution, touchscreen user interface
- Two USB flash drive ports for convenient file transfer, storage and operation
- Automated, internal four-buffer switching
- Compatible with robotics, biomagnetic separation and vacuum filtration
- Patented, built-in Ultrasonic Advantage automatically cleans clogged tubes
- Built-in automatic maintenance programs



Description	Cat. No.	Price
96-Well Microplate Washing, Four-Buffer Switching, Ultrasonic Advantage	BT405TSRVS	\$14,620.00

Catalog numbers shown may not reflect all product features listed.

Contact your **Fisher Scientific Sales Representative** to learn about other available configurations.

Real-Time Compliance, Automatic Results



Heidolph Hei-AuditPRO

Heidolph Hei-AuditPRO is a web-based safety and compliance management system. AuditPRO enables comprehensive, self-directed OSHA and EPA compliance and reporting activities for thorough, accurate and professional audits — automatically. Issues are identified through intuitive survey questions and automatically linked to a pre-populated database of reference points. You immediately know the citation, potential fine value and action steps to resolve any compliance issue identified.

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Description	Mfr. No.	Cat. No.	Price
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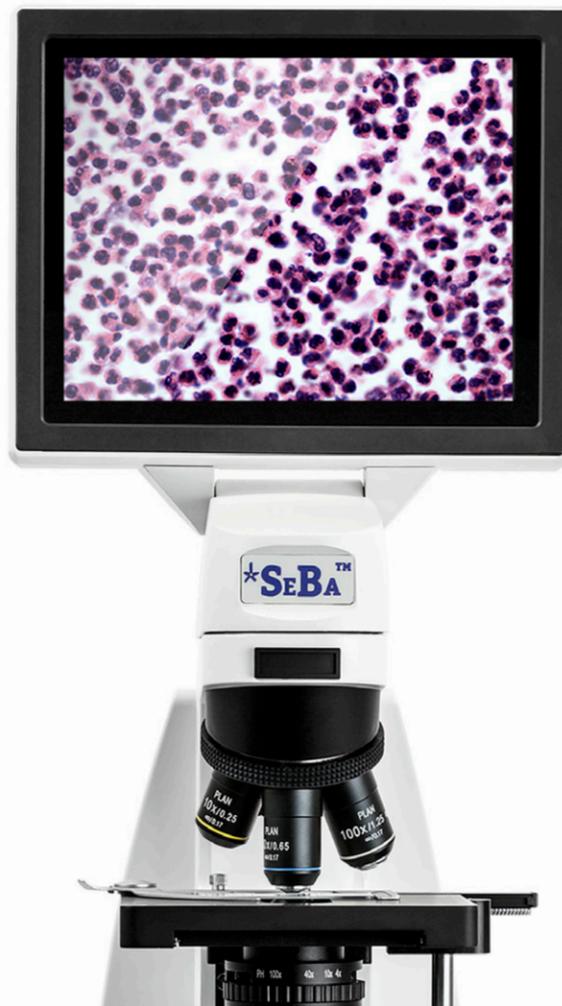
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Description	Mfr. No.	Cat. No.	Price
FreeZone 4.5L -105°C Benchtop Freeze Dry System, 115V	7382020	16-080-200	\$17,772.81
FreeZone 4.5L -105°C Benchtop Freeze Dry System, PTFE, 115V	7382021	16-080-201	\$19,116.66
FreeZone Freeze Dry Glassware Kit: One 300mL and One 600mL Fast-Freeze Flask (Complete), One Straight and One Bent (45°) 0.75" SS Adapter	7540100	10-269-826	\$564.81

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Fisherbrand Executive Mesh Office Chair

- Tilting and locking functions
- Optional headrest

Fisherbrand Modern Mesh Office Chair

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- Optional synchro tilt adjustment



Description	Cat. No.	Price
Executive Mesh Office Chair		
Executive Chair with 2-Way Adjustable Arms, with Headrest	14-400-440	\$340.00
Executive Chair with 2-Way Adjustable Arms, without Headrest	14-400-441	\$316.00
Executive Chair with 3-D Adjustable Arms, with Headrest	14-400-442	\$344.00
Executive Chair with 3-D Adjustable Arms, without Headrest	14-400-443	\$318.00
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Modern Chair with 2-Way Adjustable Arms, Standard Lift Control	14-400-444	\$249.00
Modern Chair with 3-D Adjustable Arms, Standard Lift Control	14-400-445	\$252.00
Modern Chair with 2-Way Adjustable Arms, Synchro Tilt Control	14-400-446	\$277.00
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Bead Mill 24 Homogenizer

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Description	Cat. No.	Price
Bead Mill 4 Homogenizer	15-340-164	\$1,995.00
Bead Mill 24 Homogenizer	15-340-163	\$6,900.00
Fisherbrand Bead Mill Tubes*		
Tubes for Soft Tissue Homogenization, 2mL, Pack of 50	15-340-153	\$150.00
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*Fisherbrand Bead Mill Tubes are compatible with all other bead mill homogenizers.

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LOW WATER — Water level is too low

COMPLETE — Full cycle has run properly and is complete

Description	Cat. No.	Each
SterilElite16 Autoclave and Accessories		
SterilElite16 Autoclave	STE-1622004	\$6,700.00
Sterilization Box for SterilElite16 Autoclave	STE-1652012	\$339.57
Tray for SterilElite16 Autoclave	STE-1652013	\$127.76
Tray Frame for SterilElite16 Autoclave	STE-1652014	\$196.81
SterilElite24 Autoclave and Accessories		
SterilElite24 Autoclave	STE-2422005	\$7,400.00
Sterilization Box for SterilElite24 Autoclave	STE-2452017	\$513.47
Tray for SterilElite24 Autoclave	STE-2452018	\$133.54
Tray Frame for SterilElite24 Autoclave	STE-2452019	\$215.45

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Specifications	SterilElite16 Autoclave	SterilElite24 Autoclave
Water System	Auto Fill	Auto Fill
Dry Function	Auto Dry	Auto Dry
Overall Dimensions (D x W x H)	58 x 51 x 41cm	66 x 54 x 44cm
Chamber Size (Dia. x D)	23 x 41cm	26 x 45cm
Water Capacity per Cycle	250mL	300mL
Water Tank Capacity	4200mL	4200mL
Chamber Capacity	16L	24L
Weight	48kg	56kg
Power Supply	115V ± 10%; 50/60Hz	115V ± 10%; 50/60Hz
Warning Indicator	Door Open, Low Water, Overheat	Door Open, Low Water, Overheat
Max. Power Consumption	1400W	1800W
Sterilization Temperature	121°C/135°C	121°C/135°C
Overpressure Protection	Pressure Protection Switch	Pressure Protection Switch
Water Level Sensors	Low Water Level, Chamber Water Level	Low Water Level, Chamber Water Level
Door Lock	Auto Pressure Lock	Auto Pressure Lock
Optional Accessories	Sterilization Box, Tray and Tray Frame	Sterilization Box, Tray and Tray Frame
Warranty	2 Years	2 Years

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- Support a wide variety of tubing materials and differential pressure applications

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- Separate, single-turn speed control
- Flow-direction switch with center OFF position
- PRIME button for rapid priming or tubing flushing
- Reversible pump direction to purge tubing
- Remote start/stop terminal on back of unit

Easy to Maintain

- Simple, fast tubing changes
- No adjustment needed after tubing changes; operate against pressure up to 2 bar (30psig)

High Purity Assured

- Most tubing materials exceed USP* Class VI and EP** standards
- For high-purity requirements, use BioPharm silicone tubing
- Use recommended peristaltic pump tubing for all FH10/FH15/FH30 pump systems

* U.S. Pharmacopeia

** European Pharmacopeia



Description	Speed	Channels	Flow Capacity/Channel	Cat. No.	Price
Model FH10	1.2 to 10rpm	1	0.002 to 1.65mL/min.	13-310-651	\$751.00
Model FH15	50 to 300rpm	1	0.7 to 50mL/min.	13-310-653	\$751.00
Model FH30	20 to 100rpm	1	0.8 to 105mL/min.	13-310-654	\$767.00
Model FH30	20 to 100rpm	2	0.8 to 14mL/min.	13-310-655	\$798.00

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Recommended for Distillation of	Flowrate	End Vacuum	Cat. No.	Price
High Boiling Point Solvents, Reflux Reactions	34L/min.	1.5 torr	13-878-35	\$5,631.83
High/Medium Boiling Point Solvents, Reflux Reactions	34L/min.	6 torr	13-878-29	\$3,752.44
Medium/Low Boiling Point Solvents	20L/min.	6 torr	13-878-27	\$2,790.32
Low Boiling Point Solvents	34L/min.	75 torr	13-878-44	\$2,706.60

Flowrate	End Vacuum	Pressure	Cat. No.	Price
5.5L/min.	120 torr (25.2" Hg)	35psi	13-878-38	\$734.69
13L/min.	75 torr (27" Hg)	15psi	13-880-34	\$853.109
16L/min.	15 torr (29.3" Hg)	7.4psi	13-880-30	\$1,291.43
30L/min.	120 torr (25.2" Hg)	7.4psi	13-880-32	\$1,337.21

MARINE LITTER: A DRIFTING CONCERN

By Rita Waimer

The oceans, lakes and seas of the world are many things: a home to varied marine life, a vacation spot, a source of income, and much more. They're also full of trash.

Anywhere you find humans (and even in some places you don't) you'll likely find litter. Our waterways are no different — everything from old clothing and plastic bags to cigarette butts and glass bottles can be found floating in water or washing up on beaches. The majority of these items are made from plastic, and in 2015 a team of researchers estimated that 18.5 billion pounds of land-based plastic waste entered our oceans.

Global Impact

Plastic is the most dangerous type of marine litter, and it poses three distinct threats. First, many animals will mistake plastic for food. A sea turtle, for example, might think a plastic grocery bag is a jellyfish. Once ingested, the plastic can make the animal choke, irreparably damage the digestive system, or even give a false sense of being full that leads to starvation.

Second, plastic may carry an invasive species to a new ecosystem. While this type of transfer happened for millions of years with driftwood and ash, plastic remains intact for longer periods of time and is easy

to cling to, making it possible for species to travel greater distances. A 2002 study showed that marine debris more than doubled the opportunities for species to reach 30 remote islands around the world.

And third, animals can become tangled in plastic and other types of litter, hampering their ability to move, eat or breathe. Such is the case with plastic rings that hold six-packs of cans or bottles together, as well as fishing lines and nets that can trap and kill everything from small fish to large whales.

It's not just animals who suffer from all this litter — humans pay a steep price for it, too. Most obviously, it can have huge effects on the tourism industry. Nobody wants to sit on a dirty beach, so beachfront communities have to continually combat litter. But it's expensive: the cost for just 90 California communities to keep their shorelines clean comes to more than \$520 million a year. In harbors and marinas, floating trash can get tangled in propellers and anchors or clog intake pipes, all leading to costly repairs. For commercial fishermen, time spent removing debris from lines and nets is time spent without a catch. For communities in general, polluted waterways threaten sources of drinking water. And don't forget, fish and crustaceans are popular and important food sources. If the tuna on your plate was eating plastic, so are you.

Multiple frameworks are in place — including national and regional legislation, international agreements, and various action plans — to regulate land- and marine-based litter. They're difficult to enforce, however, and the litter is hard to combat precisely because it's in the water, where it can quickly be carried great distances.

Successfully combating marine litter will take a global effort, and that can start with examining our own habits of using and disposing of plastic products.



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DETECTING PHENOL IN NUCLEIC ACID SAMPLES WITH THE NANODROP ONE SPECTROPHOTOMETER

Sample evaluation is a key step in many DNA- and RNA-based workflows since the success of an experiment is partially dependent on sample quality. The Thermo Scientific NanoDrop One Microvolume UV-Vis Spectrophotometer enables research scientists to accurately qualify and quantify nucleic acid samples. Built with the novel Acclaro Sample Intelligence technology, the NanoDrop One instrument detects common contaminants in nucleic acid samples. This data is valuable for troubleshooting problematic extractions and enables scientists to make more informed decisions about the suitability of samples for their experiments.

Purity Ratios: Only Part of the Story

DNA and RNA quantification, typically done by measuring absorbance at 260nm, is a crucial step for many molecular techniques performed in life sciences research. Absorbance at this wavelength (also known as A260) is proportional to the amount of nucleic acid in the sample; the nucleic acid concentration can be calculated using the Beer-Lambert law.

In addition to the concentration, scientists also want to know the purity level of their samples. The A260 value can be affected by the presence of substances that absorb in the same UV range as nucleic acids. Residual chemicals from nucleic acid extraction processes (such as guanidine

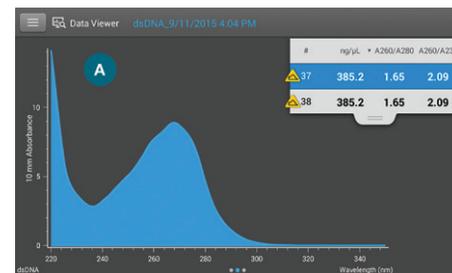
salts or phenol) or cell components that co-extract with the nucleic acids (such as protein) can artificially inflate the A260 value.

To eliminate the effects of these contaminants, scientists may use the absorbance spectra to calculate purity ratios: A260/A280 and A260/A320. NanoDrop instruments routinely include purity ratios with reported results. DNA samples with purity ratios that range from 1.8 to 2.0 are typically considered pure. Although purity ratios are very useful and informative, they do not always provide a complete picture of sample purity.

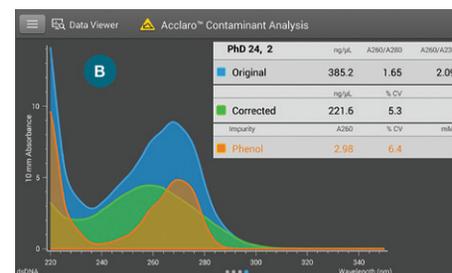
Contaminant Identification

A new Acclaro Contaminant Identification (ID) feature has been added to the NanoDrop One Spectrophotometer to detect protein, phenol and guanidine-salt contaminants in nucleic acid samples. During sample measurement, the user is alerted in real time by a yellow contaminant ID icon (Figure 1A), which appears next to the sample number on the NanoDrop One touchscreen. Tapping the icon will reveal the full details of the Acclaro contaminant analysis (Figure 1B). The screen displays the deconvolved spectra, the contaminant contribution to the overall A260, and the corrected DNA concentration of the sample (Figure 1B). The corrected concentration is obtained by subtracting the contaminant A260 contribution from the original result.

Figure 1 Acclaro Contaminant ID identifies possible contaminants in a sample.



1A Measurement screen: the yellow icon indicates that the Acclaro algorithms have detected a potential contaminant in this dsDNA sample.



1B Contaminant analysis screen: displays the comparison of original absorbance spectrum (DNA plus phenol, blue), the corrected spectrum (original minus contaminant, green), the contaminant spectrum (orange), and the original and corrected DNA concentrations.

Continued on page 40

Continued from page 39

Mixture	1	2	3	4	5	6	7	8	9
Phenol content (ppm)	0.00	18.75	37.50	75.00	150.00	300.00	600.00	1200.00	1600.00
Original (Uncorrected) DNA conc. ng/μL	245.75	253.50	264.34	284.75	318.35	387.55	523.59	851.29	1041.50
Corrected DNA conc. ng/μL			240.61	243.26	244.38	242.51	245.26	265.96	265.45
Corrected DNA conc. ng/μL Std dev	0.61	0.95	0.79	1.24	0.76	0.85	0.87	5.47	3.26
260/280 Purity Ratio	1.89	1.85	1.83	1.79	1.75	1.70	1.71	1.53	1.54
260/230 Purity Ratio	2.43	2.38	2.32	2.27	2.19	2.11	2.08	1.89	1.94
Acclaro Flag	No Flag	No Flag	⚠	⚠	⚠	⚠	⚠	⚠	⚠

Table 1 The DNA concentration of each mixture (2-9) and the DNA-only control (1) were determined with the NanoDrop One spectrophotometer using the dsDNA application. The corrected DNA concentration for mixtures 3 through 9 was obtained directly from the Acclaro contaminant analysis screen. The Acclaro Contaminant ID icon (⚠) denotes mixtures that have levels of phenol contamination high enough to trigger an Acclaro result.

Acclaro Detects Phenol, Corrects Concentrations

Phenol extraction is an established and trusted method for separating proteins from nucleic acids and is the basis for various nucleic acid extraction kits. Most extraction kits use varying formulations of phenol, guanidinium thiocyanate, and chloroform to lyse cells and denature proteins. Traces of these reagents (including phenol and guanidine salts) can be found in purified nucleic acid samples and may affect downstream experiments. The presence of phenol can prompt extensive troubleshooting since it can denature proteins and affect subsequent enzymatic steps. The NanoDrop Technical Support Group frequently receives calls that pertain to problems with extraction reagent contaminants.

Table 1 shows data collected on the NanoDrop One spectrophotometer using the dsDNA application. Sample 1 is pure DNA in Tris-EDTA buffer. Samples 2-9 have been spiked with increasing concentrations of phenol.

This data illustrates that the Acclaro Contaminant ID feature:

- Accurately identifies phenol contamination present in nucleic acid samples
- Accurately calculates the amount of phenol contamination
- Provides corrected nucleic acid concentration values that are within 10% of the actual DNA concentration

These data also illustrate that increasing amounts of phenol contamination have minimal effect on the purity ratios. A DNA sample with a phenol contamination of 600ppm has an A₂₆₀/A₂₈₀ ratio of 1.71 and an A₂₆₀/A₂₃₀ ratio of 2.08, values that are within the generally accepted range for “pure” nucleic acid samples. However, the DNA concentration is generally off by greater than two-fold with this level of phenol contamination.

These results demonstrate that one cannot rely solely on purity ratios to assess the

purity of nucleic acid samples. Using the Acclaro algorithms, the NanoDrop One instrument can detect phenol contamination and provide corrected concentrations that overcome the purity ratio limitation. This critical information helps scientists decide if the sample can still be used or if it must be re-purified.



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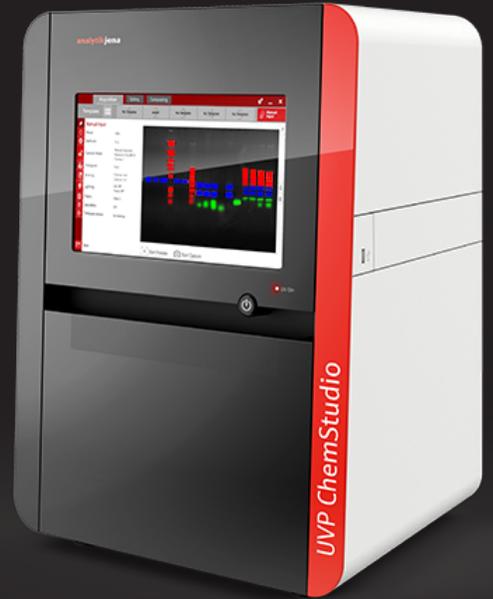
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Description	Cat. No.	Price
ChemStudio Imager, 120V	84-997-084803	\$16,192.00
ChemStudio Imager, 220V	84-997-084804	\$16,192.00
ChemStudio touch+ Imager, 120V	84-997-092801	\$25,300.00
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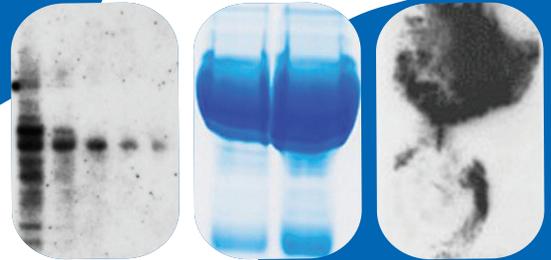
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TAKING RECYCLING TO THE NEXT LEVEL

By Camille Hegwood

Waste diversion is an essential goal for labs and cleanrooms and can be achieved in a variety of ways — source reduction, reuse, composting and/or recycling. In 2014, more than 89 million tons of municipal solid waste were recycled and composted, which provided an annual reduction of over 181 million metric tons of carbon dioxide-equivalent emissions, according to the U.S. Environmental Protection Agency (EPA).

As recycling becomes the norm rather than the exception, labs and cleanrooms are getting pretty good at recycling primary commodities such as cardboard, paper, plastic and aluminum. But to attain a higher level of diversion and potentially reach the target of zero waste, other non-traditional or secondary commodities must also be diverted from landfill to be recycled and repurposed into usable products and durable goods.

The RightCycle Program

Glove and apparel recycling is a relatively new effort that is beginning to gain traction in lab and cleanroom settings. In 2011, Kimberly-Clark Professional launched the RightCycle Program, the first large-scale recycling effort for non-hazardous lab, cleanroom and industrial waste. Since then it has diverted more than 400 tons of waste from landfills.

When labs participate in The RightCycle Program, they ship used products to

domestic recycling facilities where the items are turned into nitrile pellets and then reprocessed to make new items. Any non-biohazardous gloves, garments and accessories can be safely recycled and turned into lawn furniture, flower pots, shelving and storage bins.

It All Adds Up

Gloves are ubiquitous in labs and cleanrooms, and workers can use and discard multiple pairs in the course of a work day. Although this use is necessary to protect the workers and the process, the amount of waste can quickly add up. Consider these statistics:

- One university estimated that nearly 30 percent of its waste stream came from laboratory and research buildings
- A University of Washington lab waste audit found that 22 percent of its research waste consisted of nitrile gloves
- An assessment at the University of California Santa Cruz (UCSC) found that nitrile gloves made up a majority of laboratory waste destined for landfills

Putting Glove Recycling into Practice

The University of Washington and UCSC now participate in The RightCycle Program, as does the Illinois Sustainable Technology

Center (ISTC) at the University of Illinois and Purdue University.

ISTC began recycling used nitrile gloves in 2013. The results?

- Glove recycling in the labs has reached 89 percent compliance, a higher number than paper and cardboard recycling
- The center and university have diverted 4,945 pounds (approximately 320,480 gloves) from landfills
- A pilot to expand the recycling program to the university's main dining hall has achieved an estimated diversion rate of 90 percent

Purdue University boasts an 85 percent diversion rate and is always seeking new and different ways to reduce its solid waste stream. In 2014, it added glove recycling to its list of sustainability accomplishments when it adopted The RightCycle Program. Since November 2014, the chemistry department at Purdue has diverted 8,163 pounds of lab gloves from landfills.

The university is now considering expanding the program to other campus labs as well as food preparation areas.

Camille Hegwood is channel marketing manager for the Kimberly-Clark Professional Scientific Business.

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Description	Size	Mfr. No.	Cat. No.	Quantity	Price
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	L/XL	47993	17-986-051	100/Case	\$380.00
	2X-Large	47994	17-986-052	100/Case	\$410.00
Purple Nitrile-XTRA Exam Gloves	X-Small	55090	19-149-864	50/Pack	\$37.27
	Small	50601	19-149-864A	500/Case	\$316.80
				50/Pack	\$37.27
	Medium	50602	19-149-864B	500/Case	\$316.80
				50/Pack	\$37.27
500/Case				\$316.80	
Large	50603	19-149-864C	50/Pack	\$37.27	
			500/Case	\$316.80	
X-Large	50604	19-149-864D	50/Pack	\$37.27	
				500/Case	\$316.80
Kimtech Pure A7 Ankle-High Shoe Covers	Universal	47972	19-169-980	300/Case	\$542.91
Jackson Safety V80 Revolution Goggle Protection	Universal	14399	19-130-0480	30/Case	\$445.29
				1/Each	\$17.46
Fluidshield N95 Particulate Filter Respirator	Regular	46727	18-999-1445	35/Pack	\$80.97
				210/Case	\$412.94
Guardall Shield Face Shield	Universal	41204	18-999-2886	40/Case	\$313.17
KleenGuard A10 Bouffant Cap	Medium	36850	17-981-43A	1,000/Case	\$153.34

Superior Protection from Toxic Chemicals



DuPont Tychem 6000 FR Aprons

Tychem 6000 FR aprons combine the trusted chemical protection of Tychem and the thermal/arc protection of Nomex into a single-layer garment. Tychem 6000 FR fabric provides at least eight hours of breakthrough protection against 20 of the 21 standard ASTM F1001 chemicals and at least 30 minutes of protection for more than 180 chemical challenges, including chemical warfare agents. The arc rating of Tychem 6000 FR fabric is 15 cal/cm² Ebt, which exceeds the requirements for NFPA70E Hazard Risk Category 2.

Typical Applications:

- HazMat teams in fire departments
- Industrial fire brigades
- Clandestine lab investigations
- Industrial chemical processing plants
- Laboratories



Description	Cat. No.	Price	Description	Cat. No.	Price
Sleeveless Aprons, 4/Case					
Orange, Small	19-122-004	\$817.00	Gray, Small	19-122-000	\$817.00
Orange, Medium	19-122-005	\$817.00	Gray, Medium	19-122-001	\$817.00
Orange, Large	19-122-006	\$817.00	Gray, Large	19-122-002	\$817.00
Orange, X-Large	19-122-007	\$817.00	Gray, X-Large	19-122-003	\$817.00
Orange, 2X-Large	19-141-761	\$866.00			

Description	Cat. No.	Price	Description	Cat. No.	Price
Sleeved Aprons, 2/Case					
Orange, Small	19-122-055	\$522.00	Gray, Small	19-122-048	\$522.00
Orange, Medium	19-122-056	\$522.00	Gray, Medium	19-122-049	\$522.00
Orange, Large	19-122-057	\$522.00	Gray, Large	19-122-050	\$522.00
Orange, X-Large	19-122-058	\$538.00	Gray, X-Large	19-122-051	\$538.00
Orange, 2X-Large	19-122-059	\$570.00	Gray, 2X-Large	19-122-052	\$570.00
Orange, 3X-Large	19-122-060	\$604.00	Gray, 3X-Large	19-122-053	\$604.00
Orange, 4X-Large	19-122-061	\$633.00	Gray, 4X-Large	19-122-054	\$633.00

Be Prepared, Stay Safe

fisherbrand

Fisherbrand Absorbents

Fisherbrand Absorbent products help keep your employees and work environment safer. Choose universal, chemical or oil-only absorbents to address spills, leaks, drips or other accidents.

Absorbent Pads

Universal absorbent pads (gray) can be used to clean up oils, coolants, solvents and water-based fluids. Use them for drips and leaks around machinery, under leaky pipes, in traffic areas or for general maintenance.

Chemical absorbent pads (yellow) are ideal for spills of citric acid, hydrofluoric acid, sodium hydroxide and many other chemicals.

Absorbent SOC's

Chemical absorbent SOC's (green) are made of a surfactant-treated polypropylene and can be used on a wide range of chemicals, acids and bases, including hydrofluoric acid. Chemically inert, they will not react with aggressive fluids and their flexible design allows them to be easily shaped around spills.

Universal absorbent SOC's (gray) can be used to clean up oils, coolants, solvents and water-based fluids; their gray color masks any stains, so leave them in place until they are fully saturated.

Absorbent Pillows

- Oil-only absorbent pillows (white) are made of polypropylene; they repel water and water-based liquids and can be placed in waste troughs, coolant tanks, fluid reservoirs and sump wells.
- Universal absorbent pillows (gray) are a drip- and leak-containment solution for most liquids. Made of polypropylene, they are ideal for hard-to-reach places like sumps or catch basins.



Description	Cat. No.	Quantity	Price
Absorbent Pads, Universal (Gray), Light Absorbency, 19 x 15 in. (48 x 38cm)	19-140-910	200/Case	\$85.00
Absorbent Pads, Universal (Gray), Medium Absorbency, 19 x 15 in. (48 x 38cm)	19-140-911	100/Case	\$70.00
Absorbent Pads, Chemical (Yellow), 19 x 15 in. (48 x 38cm)	19-140-918	100/Pack	\$63.00
Absorbent SOC's, Universal (Gray), 3 x 42 in. (7.6 x 106cm)	19-140-915	20/Case	\$81.00
Absorbent SOC's, Chemical (Green), 3 x 48 in. (7.6 x 122cm)	19-140-920	12/Case	\$77.00
Absorbent Pillows, Oil Only (White), 18 x 18 in. (46 x 46cm)	19-140-924	16/Case	\$71.55
Absorbent Pillows, Universal (Gray), 18 x 18 in. (46 x 46cm)	19-140-912	16/Case	\$137.00

Visit fishersci.com or fishersci.ca to see the full selection of absorbent products.

Get 30% Off



Brady IP Thermal Transfer Printers

Hassle-free Brady IP series thermal transfer printers are the brand's most popular benchtop printing solution for laboratory sample identification. Printers feature smart-chip technology and an easy-to-use material change-out system to reduce set up and calibration times.

- Print up to 5,000 labels a day
- Choose labels from 0.2 to 4 inches wide
- LCD screen displays user information and which materials and ribbons are loaded
- Monocolor printing — PC Connect only (not stand-alone)
- Use software (included) to create templates — then just click and print
- Optional automatic cutter

Ideal for moderate printing volumes, frequent label type changes, or when you want to start printing with only limited training.



BRADY 360°
5 YEAR
WARRANTY

Size	Cat. No.	Price
Model BP-IP300, 300 dpi	22-500-844	\$2,185.00
Model BP-IP300-C, 300 dpi, with Cutter	19-104-498	\$2,864.00
Model BP-IP600, 600 dpi	11-878-505	\$3,365.84
Model BP-IP600-C, 600 dpi, with Cutter	19-104-499	\$4,081.00

Visit fishersci.com/brady30 to save now.

Comfortable Fit, Easy Use, Serious Protection



MSA Advantage 3200 Twin-Port Respirators



MSA Advantage 3000 series respirators provide full-face protection with soft silicone seals for a pressure-free fit. With NIOSH 42CFR84 approval for use against a variety of hazards and a lens that exceeds ANSI Z87.1 requirements, these respirators are the right choice for use in a wide range of settings, including chemical handling, nuclear, oil and gas, and more.

- Designed for lower breathing resistance
- Large, scratch-resistant and optically corrected lens for a clear, undistorted view
- Preset upper straps make donning quick and simple — no hair pulling
- Fog-reducing standard nose cup
- Patented silicone Advantage head harness provides consistent fit and seal
- Dual-canister bayonet-mount filters can be replaced in seconds

Choose from a variety of cartridges and filters (sold separately) to protect yourself against particulates and chemicals:

- Organic Vapors
- Ammonia
- Formaldehyde
- Mercury Vapor
- Acid Gases
- Methylamine
- Hydrogen Fluoride

Description	Mfr. No.	Cat. No.	Price
Small	10028996	19-041-906A	\$229.51
Medium	10028995	19-041-906B	\$229.51
Large	10028997	19-041-906C	\$229.51

Required Accessories : NIOSH-approved Advantage series cartridges and filters

Protect Against Chemicals, Gases and Vapors

Honeywell
Honeywell Glovebox Gloves


Contact **Fisher Scientific Customer Service** at **1-800-772-6733** for information about chemical resistance, materials, sizes and pricing.

Black Neoprene Box Gloves

- Manufactured from premium milled neoprene for high-permeation resistance to vapors and gases
- Resistant to a broad range of chemicals

Black Butyl Box Gloves

- High-permeation resistance to vapors and gases
- Exceptional resistance to a broad range of chemicals, including ketones and esters
- Soft, flexible feel enhances comfort and reduces fatigue
- Solvent-based manufacturing process creates multiple layers of polymer for superior quality

White GSM Glove Box Gloves

- Superior resistance to ozone and oxidizing chemicals
- Highly resistant to UV radiation from sunlight and artificial light

General Information

- Gloves are 32 in. long by 8 in. diameter; ambidextrous styles are available in 9.75 and 10.5 in. diameters
- All gloves are sold one pair per pack
- Comply with USDA and FDA regulations 21 CFR for use in food processing

Thinnest Chemical-Resistant Disposable Glove

MICROFLEX
Ansell Microflex 93-260 Gloves

Introducing the Microflex 93-260, the glove that's changing the face of chemical hand protection.

Innovative 3-Layer Design*

The flexible middle layer of these gloves delivers maximum protection against acids and bases, while the durable exterior provides a superior defense against organic solvents. Because the tough exterior stands up to demanding physical and chemical conditions longer, workers may need to change gloves less frequently, saving both time and money.

Tough Chemical Protection

When tested against aggressive chemicals like sulfuric acid, n-heptane, hexane and methanol, the Microflex 93-260 demonstrated impressive permeation breakthrough times — often outperforming other gloves in its class.

Unparalleled Comfort

Made with an innovative composite of nitrile and neoprene, the Microflex 93-260 maintains the user dexterity and tactile sensitivity of a disposable glove while offering reliable protection against a broad range of chemicals.

** The process used to manufacture this glove is patent pending.*



Description	Cat. No.	Quantity	Price
X-Small	19-010-151	50/Pack	\$31.77
		10 Packs/Case	\$285.90
Small	19-010-152	50/Pack	\$31.77
		10 Packs/Case	\$285.90
Medium	19-010-153	50/Pack	\$31.77
		10 Packs/Case	\$285.90
Large	19-010-154	50/Pack	\$31.77
		10 Packs/Case	\$285.90
X-Large	19-010-155	50/Pack	\$31.77
		10 Packs/Case	\$285.90
2X-Large	19-010-156	50/Pack	\$31.77
		10 Packs/Case	\$285.90

Clean Safely



Peroxigen ST Sterile, 6% Hydrogen Peroxide



Peroxigen ST from Decon Labs is the ONLY gamma-irradiated sterile peroxide solution available. It is a sterile, double-bagged, ready-to-use 6% hydrogen peroxide solution in a convenient trigger spray bottle.

- Made with water-for-injection (WFI)
- Lot-specific documentation ships with each case
- Safe to use, breaks down into water and oxygen and leaves no residues
- Low toxicity, non-flammable, and zero VOC profile assists in VOC compliance
- Used for cleaning hard, non-porous surfaces in labs and production areas

Peroxigen 6% Hydrogen Peroxide

Peroxigen is a ready-to-use 6% hydrogen peroxide solution in a convenient trigger bottle.

- Safe to use, does not leave residues and it breaks down into water and oxygen
- Low toxicity, non-flammable, and zero VOC profile assists in VOC compliance
- Used for cleaning hard, non-porous surfaces in labs and production areas

Description	Mfr. No.	Cat. No.	Quantity	Price
Peroxigen ST, Trigger Bottle, 16 oz.	9716	04-355-161	12/Case	\$325.00
Peroxigen, Trigger Bottle, 16 oz.	9816	04-355-160	1	\$14.30
			12/Case	\$171.62

Visit fishersci.com/deconlabs or fishersci.ca/deconlabs to learn more.



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Bouffant Caps

29633748	Bouffant Caps 21" White - In Box
29633749	Bouffant Caps 21" Blue - In Box
29633751	Bouffant Caps 24" White - In Box
29633752	Bouffant Caps 24" Blue - In Box

100 Units/Pkg 5 Pkg/Case



Shoe Covers

296351382	Shoe Cover N-Conduct N-Skid-XL - Blue
29633754	Shoe Cover N-Conduct N-Skid-Reg - Blue
29633756	Shoe Cover N-Conduct Reg - Blue

100 Units/Pkg 3 Pkg/Case



Isolation Gowns

296358988	Isolation Gown XL - Yellow
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10 Units/Pkg 5 Pkg/Case



Lab Gowns

296359544	Lab Gown S - Sky Blue
296359545	Lab Gown L - Sky Blue
296359546	Lab Gown XL - Sky Blue

10 Units/Pkg 5 Pkg/Case



Fluid Impervious Gowns

296360717	Fluid Imperv Gown Reg - White
296360718	Fluid Imperv Gown XL - White

10 Units/Pkg 5 Pkg/Case



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Youngstown Barrel & Drum Co. has a containment product to fit spills as small as a five-gallon drum or as large as an entire rail car to help you stay compliant with EPA and SPCC regulations. Hold up to four 55-gallon drums with Ultra-Spill Pallets, or get low-profile containment with Ultra-Spill Decks.



Description	Cat. No.	Price
Ultra-Bung Access Funnels, Capacity: 6 gal. (22.7L)	19-130-4814	\$69.00
Ultra-Spill Deck Bladder Systems, Capacity: 77 gal. (291.4L)	19-058-005	\$473.00
Ultra-Drain Seal Mats, 36 x 36 in.	19-823-211	\$449.00
Ramp, Non-Slip, Polyethylene, 55½ x 28½ x 8¾ in.	19-130-4953	\$402.00
Ultra-Spill Pallets Plus, 62 x 62 x 8.75 in.	19-130-4780	\$799.00
Ultra-Drum Rack P2 Racks, Holds 2 (55 gal.) Drums	19-820-937	\$474.00
Ramp, 24 x 32 x 5.75 in.	19-058-033	\$245.00
Ultra-Spill Deck Four-Drum, 52 x 52 x 5¼ in.	19-058-074	\$538.00
Ultra-Spill Berm, Orange, 10 ft. x 4 in.	19-058-009	\$808.00
Ultra-Spill Trays, Capacity: 1.8 gal. (6.8L), 17 x 12 x 4 in.	19-130-2734	\$57.00
Ultra-Spill Trays, Capacity: 2.9 gal. (11L), 21 x 17 x 4 in.	19-130-2735	\$82.00



Superior Comfort, High Performance



PIP Bouton Optical Goggles

PIP Bouton Optical Goggles are ideal for industrial, construction and medical applications. Indirect ventilation offers excellent protection from liquid splash, various fits and materials provide the comfort you need, and PVC frames promise the durability you expect.

Choose from three models:



Stone

- Optional visor attachment for face protection
- Will fit over prescription glasses



Contempo

- Modern styling with swivel headband adjustment
- Will fit over prescription glasses



Reaction

- Optical dual-lens design prevents fogging
- Will not fit over prescription glasses

bouton
OPTICAL

Description	Standards Met	Lens Color	Frame Color	Cat. No.	Price
Stone Goggles with Anti-Scratch/FogLess 3Sixty Lens Coating, Elastic Headband	ANSI Z87.1+, ANSI D3 DROPLET	Clear	Transparent Gray	19-036-880	\$22.17
Contempo Goggles with Anti-Scratch Lens Coating, Elastic Headband	ANSI Z87.1+	Clear	Blue	19-148-214	\$15.82
Contempo Goggles with Anti-Scratch/Anti-Fog Lens Coating, Neoprene Rubber Headband	ANSI Z87.1+	Clear	Blue	19-148-215	\$19.63
Reaction Goggles with Anti-Scratch/Anti-Fog Lens Coating, Neoprene Rubber Headband	ANSI Z87.1+	Clear	Gray	19-148-206	\$61.22

Note: Other options available; also sold in case quantities.

Meet OSHA and Fire Protection Regulations



Justrite Sure-Grip EX Safety Cabinets

Fully compliant, FM-approved steel cabinets feature a fire-resistant design with double-walled, all-welded, 18-gauge steel construction for safe storage of flammables.

High-performance features include:

- U-Loc handle with cylinder lock and key set that accepts optional padlock
- Three-point stainless-steel bullet latching system
- Leak-proof 2 in. bottom sump
- Haz-alert reflective warning labels are visible under fire conditions



Description	Capacity	Dimensions (H x W x D)	Cat. No.	Price
2 Manual Doors, 1 Shelf	30 gal. (114L)	44 x 43 x 18 in.	19-120-2333	\$1,300.00
2 Self-Close Doors, 1 Shelf			19-120-2334	\$1,447.00
2 Manual Doors, 2 Shelves	45 gal. (170L)	65 x 43 x 18 in.	19-120-2335	\$1,654.00
2 Self-Close Doors, 2 Shelves			19-120-2336	\$1,844.00
2 Manual Doors, 2 Shelves	60 gal. (227L)	65 x 34 x 34 in.	19-120-2337	\$1,758.00
2 Self-Close Doors, 2 Shelves			19-120-2338	\$1,998.00

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You qualify for the program if you have:

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Find everything you need to design and build your lab.

3: Save

Take advantage of more than 100 great offers to get your lab up and running.

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