life IN THE lab

PRODUCTS, INFORMATION, AND SCIENTAINMENT

ISSUE 1 | SPRING / SUMMER 2015

Fisher Scientific

ThermoFisher SCIENTIFIC

Resurrection Biology
Science Fact or Science Fiction?
page 16

5 Principles
for Presentation Perfection
page 8

7 Small But Mighty
Benchtop Solutions
page 23

Perfect Cell Culture Pairings
Brought to you by Gibco® Life of Cells
page 27

What's Your Fluorescence IQ?
page 30

Better Together:
Thermo Fisher Scientific Integration Update
page 3

Thermo Scientific™ | Applied Biosystems® | Invitrogen™ | Gibco®

Free sample of SuperScript® IV Reverse Transcriptase

page 10

Save 35% on ReadyPouch™ Agarose Gels

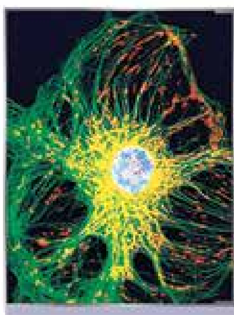
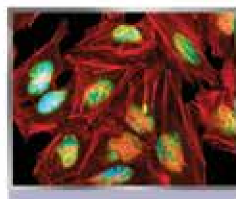
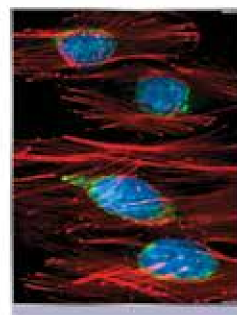
page 12

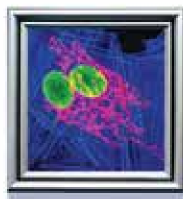
Free sample of Lipofectamine® MessengerMAX™ mRNA Transfection Reagent

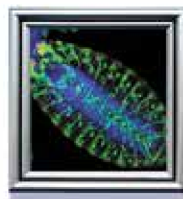
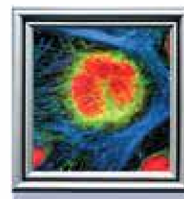
page 24

BET YOU DIDN'T KNOW WE HAVE

MORE THAN 40,000 ANTIBODIES



What do you get when you combine one of the largest catalogs of primary antibodies with the originator of Alexa Fluor® dyes for labeling? An incredibly comprehensive, user-friendly collection of primary and secondary, labeled and unlabeled antibodies, that's what.

From the most common IgG to rare antibodies unavailable elsewhere, and backed up by data in the most common applications—flow cytometry, western blot, immunohistochemistry, and immunofluorescence—our antibodies have stood the test, and passed.

lifetechnologies.com/antibodies

A LETTER FROM ALAN SACHS

CHIEF SCIENCE OFFICER
LIFE SCIENCES SOLUTIONS

Thermo Fisher Scientific spends almost $700 million (US) a year, employing nearly 4,600 scientists and engineers, to support its R&D priorities.

Dear Valued Customers,

It has been over a year since Life Technologies became part of Thermo Fisher Scientific. As the Chief Scientific Officer of Life Sciences Solutions, I have had ample time to consider the advantages this combination brings to our customers. One clear advantage is our focus on the company'smission—enabling our customers to make the world healthier, cleaner, and safer.

Thermo Fisher Scientific spends nearly $700 million (US) per year , employing nearly 4,600 scientists and engineers, to support our R&D priorities. We work jointly with more than 16,000 customer-facing employees to gather extensive requirements for new product development. All of this is done to enable you, our customer, to further your research goals.

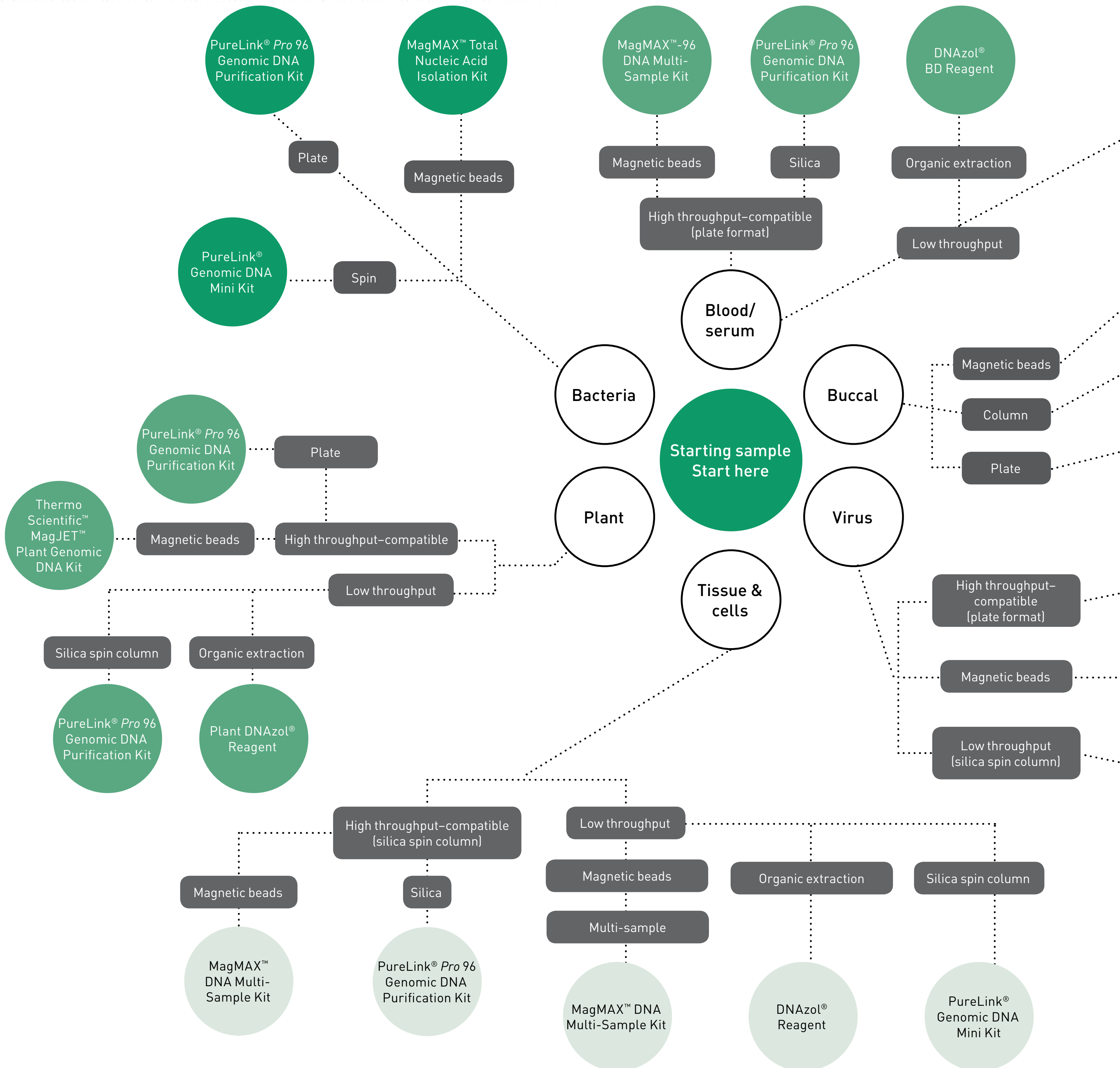
Recognizing this, it is natural to ask "if so much is being spent to enable me, how can I help influence future product development?" Providing feedback and ideas to your sales representative or to our customer care specialists (lifetechnologies.com/support) is an immediate avenue. If you are passionate about an idea that you believe could transform the way research is conducted, I encourage you to send me an email (alan.sachs@lifetech.com) and I will arrange for further follow up.

Enjoy reviewing all of the great products highlighted on the following pages. We at Thermo Fisher Scientific look forward to providing you with even more great products in the future!

Sincerely,

Alan Sachs, MD, PhD

SENSITIVE, SCALABLE PURIFICATION IS HERE



PURIFY DNA FROM A WIDE RANGE OF SAMPLES

sample prep

PureLink® Genomic DNA Mini Kit

Silica spin column

MagMAX™ DNA Multi-Sample Kit

PureLink® Genomic DNA Mini Kit

PureLink® *Pro* 96 Genomic DNA Purification Kit

PureLink® *Pro* 96 Viral RNA/DNA Purification Kit

MagJET™ Viral DNA and RNA Kit

PureLink® Viral RNA/DNA Mini Kit

Maximize process efficiency and downstream performance

Find a range of Invitrogen™ genomic DNA purification kits that enable sensitive, scalable purification from an expansive set of starting materials to maximize process efficiency and downstream performance.

lifetechnologies.com/gdnaprep

PureLink® RNA Mini Kits

Simple and safe total RNA isolation

Use the column-based PureLink® RNA Mini Kit for easy, reliable, and rapid isolation of high-quality total RNA from a wide variety of sources. Bonus: there's no need for hazardous reagents like phenol.

lifetechnologies.com/purelink

MagMAX™ DNA Multi-Sample Kits

MagMAX™ DNA Multi-Sample Kits provide a consistent, reliable method for the rapid purification of highly pure DNA. By utilizing magnetic beads, this kit provides a flexible format that is easily scalable and enables better binding and washing efficiencies than filter based technologies resulting in cleaner, more abundant nucleic acid that works well in most downstream applications.

lifetechnologies.com/magmax

SAVE 25%

On selected PureLink® purification kits

See website for eligible products and promotion codes. Offer expires June 30, 2015. Terms and conditions apply.

Find out more at: fishersci.com/life

SLIDE

5 Principles for Presentation Perfection

- **S**IMPLIFY
- **L**OSE THE CLICHÉS
- **I**NFORMATION NEEDS EMPHASIS
- **D**ESIGNATE ELEMENTS
- **E**MPATHY FOR THE AUDIENCE

Your PowerPoint® presentation has one job—to back up what you're saying. Nancy Duarte, author and presentation design guru, created the SLIDE mnemonic to illuminate 5 guiding principles to remember when creating PowerPoint® presentations. Use these principles to avoid common pitfalls, and to make your next presentation a visual aid instead of a visual distraction.

S

1: SIMPLIFY

It's tempting to load up slides with many ideas and bulleted items, but don't do it. Try to stick to one idea per slide, and let that one concept really stick with your audience. They will focus on what you're saying, rather than reading your slide. Author Seth Godin's rule of thumb: No more than six words on a slide. EVER. He claims that there is no presentation so complex that this rule needs to be broken.

TAKEAWAY: Use one idea per slide. Don't use your slide as a teleprompter. Use the slide's notes to cue yourself what you need to say.

L

2: LOSE THE CLICHÉS

Resist using the cliché images, concepts, and clip-art that come standard with most presentation software. Having trouble coming up with clever ways to communicate your ideas? Try brainstorming with colleagues to find novel concepts. Use an online image resource such as Getty or Corbis, or use your own original images.

TAKEAWAY: Don't clutter your slides with images unless they add value. Empty space on the slide will actually enhance readability.

PLANNING

- ☑ Create a simple design template
- ☑ Use appropriate font and size
- ☑ Develop a color scheme
- ☑ Use good quality images
- ☑ Avoid special effects
- ☑ Check spelling and grammar
- ☑ Practice delivering your presentation
- ☑ Learn keyboard shortcuts for easy navigation

ON THE DAY

- ☑ Do an on-site equipment check to make sure everything is working properly
- ☑ Do not read from your slides or speak to them
- ☑ Do not turn your back on your audience
- ☑ Do not go over the allotted time
- ☑ Relax—you've done the hard work necessary to ensure presentation perfection
- ☑ Prepare for rave reviews!

I

D

E

3: INFORMATION NEEDS EMPHASIS

According to Duarte, if your slide takes longer than 10 seconds for the audience to comprehend, it's probably too complex. Your slides should simply convey even complex ideas, which you'll enhance with your words. Your audience will listen to what you say if the image or words on the screen behind you have real impact.

TAKEAWAY: The sweet spot for slide comprehension is around 3 seconds. Split up complex ideas and allow them to flow across multiple slides. Go ahead and use more slides; they're free.

4: DESIGNATE ELEMENTS

Use the Slide Master feature to create a template, and stick to it. Using elements such as font, colors, and background consistently throughout the presentation is essential.

FONT: Choose your font style and size carefully. Sans serif fonts—such as Arial, Verdana, and Calibri—are good options. Choose one font for the entire presentation. Avoid all caps, and excessive use of bold, underline, and italics.

COLORS: You don't need a deep understanding of color theory to create harmonious color schemes. Try using an online resource such as ColorSchemer, Colourlovers, or Kuler to create a perfect palette.

AVOID SPECIAL EFFECTS.

TAKEAWAY: When it comes to designing presentations, less is more, and consistency is key.

5: EMPATHY FOR THE AUDIENCE

The most important thing to do is take the time to think through who the audience is, then develop your presentation from a place of empathy toward them. Do you have a message that your audience can connect to? Take a walk in their shoes to craft a presentation that will be valuable and memorable.

TAKEAWAY: Develop an audience-centric perspective to create a deeper connection to you and your material. By flipping that paradigm, your message will resonate more strongly with your audience.

PLANNING TIP:

Before sitting down at the computer, go old school and plan your presentation on paper.

Using sticky notes or index cards to lay out the main ideas and supporting data is a good way to see the entire presentation at once.

Now decide where visuals will add to your message and what those visuals should be.

SUGGESTED READING:

Resonate: Present Visual Stories that Transform Audiences
by Nancy Duarte

slide:ology
by Nancy Duarte

Presentation Zen
by Garr Reynolds

Really Bad PowerPoint: (and how to avoid it)
by Seth Godin

APPLIED BIOSYSTEMS®

When accuracy and ease of use are critical in your ENDPOINT PCR APPLICATIONS

Yes, there's an Applied Biosystems® PCR system for that!

SimpliAmp™ Thermal Cycler
Easy, accurate, and small for everyday PCR

- **Responsive color touch-screen**—for quick and easy setup
- **VeriFlex™ technology**—enables simple and accurate optimization
- **Small footprint**—helps save precious bench space

lifetechnologies.com/simpliamp

TRY IT LOVE IT

Want to try one of our thermal cyclers in your lab? Speak to your Fisher Scientific sales representative to schedule a demo of the instrument that best suits your needs.

ProFlex™ PCR System
Flexible control to fit how you work today

- **Accessible by multiple users**—run three independent experiments at once
- **Flexible block configuration**—accepts five types of thermal blocks
- **Convenient remote access**—connect by Wi-Fi and monitor your instrument with a free mobile app

lifetechnologies.com/proflexpcr

Veriti® Thermal Cycler
More precise control with easy programming

- **VeriFlex™ technology**—offers precise control for optimization
- **Color touch-screen**—enables rapid and simpler programming
- **VeritiLink™ software**—option to link and control multiple Veriti® Thermal Cyclers by a single laptop

lifetechnologies.com/veriti

Envision it
with EnduraPlate™ optical microplates

The optical microplate for higher-throughput genetic analysis applications is here: EnduraPlate™ optical microplates.

- Automation-ready, barcoded, rigid
- 5 fun colors for easy well identification
- Packs of 20 or cases of 500

lifetechnologies.com/enduraplate

INVITROGEN

FOR EXCEPTIONAL

SENSITIVITY, SPECIFICITY, AND YIELD

CHOOSE INVITROGEN™ PCR ENZYMES AND REVERSE TRANSCRIPTASE

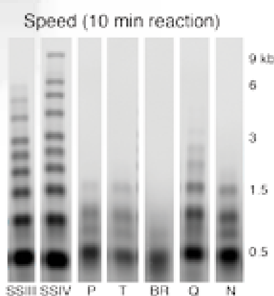
FREE SAMPLE

NEW! SuperScript® IV Reverse Transcriptase

LET NO SAMPLE GO UNCONQUERED

Challenging samples don't stand a chance against new SuperScript® IV Reverse Transcriptase.

- Significantly improved resistance to a variety of inhibitors that interfere with cDNA synthesis
- Robust and specific cDNA synthesis from a wide range of sample types
- Fast reverse transcriptase reaction to reduce the reaction time from 50+ minutes to 10 minutes



Fast cDNA synthesis rate of SuperScript® IV (SSIV) compared to SuperScript® III (SSIII) and RTs from other vendors.

Watch the video "SuperScript® IV—cDNA synthesis in confidence" at:
lifetechnologies.com/ssiv

TECH TALK

Our tech service experts answer a few of your questions.

Q What are the key differences between SuperScript® III and SuperScript® IV Reverse Transcriptases?

A The SuperScript® IV enzyme has been further engineered for performance optimization in the presence of inhibitors, and the reaction buffer has also been optimized for robust cDNA synthesis from a wide range of samples.

Q Can I get a comparable level of cDNA yield and length using the SuperScript® IV Reverse Transcriptase 10-minute reaction time as when using the 50-minute reaction time for SuperScript® III Reverse Transcriptase?

A When compared with SuperScript® III Reverse Transcriptase (and other manufacturers' RTs) in a synthesis reaction of a 9 kb cDNA, SuperScript® IV Reverse Transcriptase performed successful synthesis in just 10 minutes and did so with comparable (or improved) yield (as shown by gel band density). See figure at left.

Q For real-time applications, do you recommend the SuperScript® IV first-strand synthesis system over the SuperScript® VILO™ Master Mix?

A For qPCR applications, we continue to recommend the SuperScript® VILO™ kit and master mix. The SuperScript® VILO™ kit has been specifically designed for great performance and convenience for qRT-PCR applications.

Q Are there any significant changes in the SuperScript® IV protocol compared to the SuperScript® III protocol?

A The only change is that the reverse transcription incubation time has been reduced from 50 minutes to 10 minutes. All the other parameters and steps are the same.

FREE SAMPLE

Of SuperScript® IV Reverse Transcriptase

No promotion code needed. 10-reaction sample size. Offer expires June 30, 2015.
Terms and conditions apply.

Find out more at: lifetechnologies.com/ssiv

TRUSTED AND TRUE HOT-START POLYMERASE

Platinum® *Taq* DNA Polymerase

For high specificity PCR, you need a true hot-start polymerase. Platinum® *Taq* DNA Polymerase is widely trusted and cited by researchers enabling robust, reliable results.

lifetechnologies.com/truehotstart

WANT TO AMPLIFY 500 BP AMPLICONS IN AS LITTLE AS 25 MINUTES?

Use these 3 easy steps to convert to *Taq* fast protocol

1. Use the *Taq* and thermal cycler with which you are comfortable. Both *Taq* and Platinum® *Taq* (hot-start) polymerase work right out of the box.
2. Shorten the denaturation time and increase the activation temperature.
3. Combine the annealing and extending steps with a recommended extension time of 25 sec per kb.

Learn about fast PCR reagents, ideal when only gel detection of PCR products is needed, at: lifetechnologies.com/elevatepcr

49¢ PER REACTION

For a limited time, order Platinum® *Taq* DNA Polymerase for just 49¢ per reaction

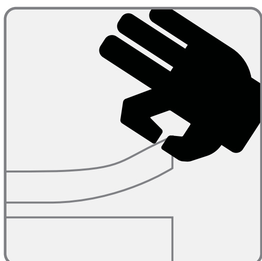
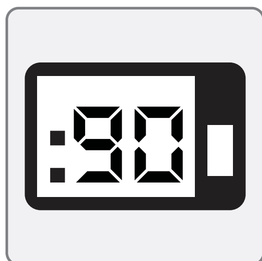
Use promotional code 10966034PMO. Offer expires June 30, 2015.
Terms and conditions apply.

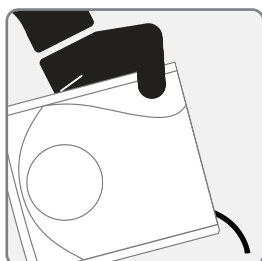
Find out more at: fishersci.com/life

INVITROGEN™

I CHOOSE CONVENIENCE!

How about reliability and innovation? Then check out these great reagents.



VENT, HEAT, ADD STAIN, POUR

Introducing a simplified solution to agarose gel preparation

ReadyPouch™ Agarose Gels are packaged in a ready-to-microwave pouch that contains the right amount of agarose and buffer for a 100 mL gel. They come with an easy-to-use stain dropper. All you need to do is vent the pouch, heat in a microwave, add stain, and pour.

lifetechnologies.com/readypouch

SAVE 35%

On ReadyPouch™ Agarose Gels

Use promotional code A25647PMO (10 pouches) or A25648PMO (30 pouches). Offer expires June 30, 2015. Terms and conditions apply.

Find out more at: fishersci.com/life

TRUSTED SPIN COLUMN TECHNOLOGY TO PURIFY DNA AND RNA

Thermo Scientific™ GeneJET™ kits

- High yields of pure nucleic acids
- Convenient spin columns with trusted silica membrane technology
- Specialized protocols for a wide variety of sample types

lifetechnologies.com/genejet

RESTRICTION DIGESTION AS EASY AS IT GETS

Thermo Scientific™ FastDigest™ restriction enzymes

- 100% activity of all FastDigest™ enzymes in one universal reaction buffer
- Complete digestion in 5 to 15 minutes
- Green buffer for direct loading on gels
- Up to 100% buffer compatibility with downstream applications

Discover all 176 FastDigest™ enzymes at: thermoscientific.com/fastdigest

Conventional restriction enzymes — Sequential digestion

Step	Description	Time
1	Reaction setup for ApaI	~2 minutes
2	Incubation at 37°C	60 minutes
3	Reaction setup for XhoI	>2 minutes
4	Incubation at 37°C	60 minutes
	TOTAL TIME	>2 hours

FastDigest™ restriction enzymes — One reaction mixture

Step	Description	Time
1	Set up one reaction mixture with: FastDigest ApaI and FastDigest XhoI	~2 minutes
2	Incubation at 37°C	5 minutes
	TOTAL TIME	7 minutes

Helps save more than 2 hours when performing double digestion reactions.

INVITROGEN

GO FROM PCR TO CLONE WITH 95% RECOVERY IN 5 MINUTES

CHOOSE TO GO TOPO®

Invitrogen™ TOPO® technology revolutionized the science of high-performance cloning, and is designed to deliver simplicity, efficiency, speed, and unparalleled yield—no matter how difficult the sample or downstream application. That's why it's the most widely cited and highly trusted brand in PCR cloning.

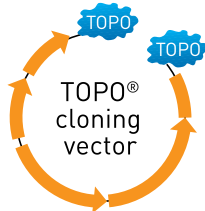
TOPO® PCR CLONING IS AS EASY AS 1, 2, 3!

Perform PCR with *Taq* or proofreading polymerase.

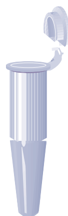
1 Add 1 µL of PCR reaction to 1 µL of TOPO® cloning vector.

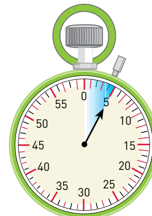
2 Incubate 5 min at room temperature.

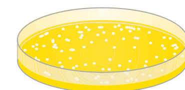
3 Transform *E. coli.*



A PCR product







Forget about those extra steps!

With TOPO® cloning, the additional time, steps, and reagents required for ligase-mediated cloning are eliminated. You also don't have to worry about gel purification or post-PCR modification steps.

Amplifying with *Taq* polymerase? Using a high-fidelity polymerase?

We've got the TOPO® PCR cloning kit for you. Our kits come in various formats to accommodate TA, blunt-end, or long fragment cloning. They also come with or without competent cells for added flexibility.

Cloning support center

One resource for all your cloning support needs. Navigate through the cloning support categories at the link below to obtain relevant technical information, view tips and tricks when starting an experiment, and find answers to everyday cloning problems.

Find all these TOPO® products and resources at: lifetechnologies.com/topo

DIRECT PCR
Amplify without purification

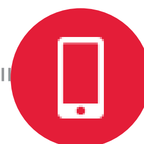
The Thermo Scientific™ direct PCR approach allows DNA amplification from unpurified samples. A tiny amount of source material is added directly in the PCR reaction without any DNA purification steps, enabling significant savings in time and cost.

lifetechnologies.com/directpcr

E-Gel® precast agarose electrophoresis system

E-Gel® precast agarose gels are designed for fast, convenient, and easy-to-run electrophoresis. Ready-to-use cassettes precast with agarose, electrodes, and in-gel stains. Just load your samples and run. Enabling excellent resolution and clarity in as little as 10 minutes.

lifetechnologies.com/egels



MOBILE PRODUCTIVITY

Real-Time PCR

This easy-to-use collection of real-time PCR resources is an excellent learning tool for both new and experienced researchers. The application's main feature is a real-time PCR handbook covering all aspects of real-time PCR from the basics of how the technology works to data analysis and interpretation.

PCR Essentials

Find product information on *Taq* polymerases, dNTP, gels and stains, RT-PCR products, cDNA products, and master mixes. Also included is a convenient master mix calculator for quick mix calculations.

CloningBench 2.0

Completely redesigned and optimized for iOS® 8, CloningBench 2.0 is now better than ever. Join the more than 25,000 users to find out what's new in cloning, and to get tips on how you can make your life at the bench a little easier.

DailyCalcs Science Calculator

Calculate molarity, dilution, molecular weight, and more with the new DailyCalcs Science Calculator.

Download these free mobile apps at:
lifetechnologies.com/mobileapps

RESURRECTION BIOLOGY

SCIENCE FACT OR SCIENCE FICTION?

With the forthcoming theatrical release of *Jurassic World* on the horizon, we began to wonder whether the idea of bringing an extinct species back to life is within the realm of science fact or science fiction.

A little background: mankind has had a large—and largely negative—impact on earth's animal and plant species. Biologists estimate that we are losing thousands of species year after year. And while no one is certain exactly how many species are currently in danger, it's clear that we risk losing many thousands of species to extinction in the coming decades.

How are scientists approaching this problem? One ambitious idea is de-extinction—also called resurrection biology, species revivalism, or zombie zoology—which is the process of re-creating an extinct species from ancient DNA.

Why should we bring these creatures back to life? For the same vital reasons we attempt to protect our currently endangered species: to preserve biodiversity, to restore damaged ecosystems, to strengthen reproductive health through gene pool enrichment, and to mitigate at least some of the harm that we humans have created.

Using cutting-edge developments in genetic technology, molecular biologists and conservation biologists are working on projects that may bring extinct animals back to life, or endangered animals back from the brink. Possible candidates for de-extinction, genetic rescue, or genetic assistance are easy to isolate because the very material required for revival—the animal's DNA—is relatively easy to obtain.

According to The Long Now Foundation (longnow.org), "The "ancient DNA" of many extinct species can be recovered from museum specimens and fossils via Ancient Genome Assembly. New techniques still being further developed (synthetic DNA and CRISPR genome editing) may be able to bring the reassembled genomes back to life via a close living relative. But species that died out so long ago that no DNA remains, such as dinosaurs, are unrecoverably extinct."

The science is not without significant controversy. Opponents of de-extinction posit that efforts and resources used to resurrect extinct species would be better spent in protecting currently endangered species. *Scientific American*, in an editorial condemning de-extinction, opined that research "should be conducted under the mantle of preserving modern biodiversity rather than conjuring extinct species from the grave."

So, while a pet archaeopteryx or dodo is probably not in your future, this research may give us another chance to see some of these species in living, breathing form again.

Sources:
The Long Now Foundation and *Scientific American*.

SPECIES DEPICTED:

Carolina parakeet, Dodo, Great auk, Woolly mammoth, Xerces blue butterfly, Thylacine (Tasmanian tiger), Archaeopteryx

ThermoFisher SCIENTIFIC

THERMO SCIENTIFIC™

HOW DO YOU MEASURE PROTEIN?

WHATEVER YOUR PREFERENCE, WE HAVE A PERFECT FIT FOR YOUR LAB

Immunoassays your way

Antibody pairs, ELISA kits, and Luminex® assays

- Measure cytokines, chemokines, beta amyloids, and signaling targets
- Designed for sensitive, accurate, and consistent performance
- Validated on serum, plasma, tissue culture supernant, or lysate
- Convenient ready-to-use assays enable results in half a day

Use our online Immunoassay Selection Guide to find the right ELISA kit, Luminex® assay, or antibody pair. Simply search by keyword, then filter your results by assay type, species, detection method, and even by the protein family.

lifetechnologies.com/elisa

2,000 references and counting. Published in journals from *ACS Nano* to *Xenotransplantation*, and almost every one in between, our ELISAs have been used by thousands of scientists to unravel complex biological processes. Put them to work in your lab.

lifetechnologies.com/rethinkELISA

ONE POWER STATION + TWO CASSETTES = POWERFUL POSSIBILITIES

Discover the power to accomplish two essential protein detection steps with one fast and powerful system. The Thermo Scientific™ Pierce™ Power System allows you to get your protein research moving faster by efficiently staining or transferring protein gels in about 10 minutes.

lifetechnologies.com/powersystem

PRECAST GELS: OPTIONS TO FIT YOUR PROTEIN SEPARATION NEEDS

Precast gels offer convenience, speed, and consistency. We offer precast gels in a wide variety of percentages, gradients, and number of wells, as well as the most popular chemistries and running buffers.

lifetechnologies.com/proteingels

BOLT® BIS-TRIS PLUS GELS

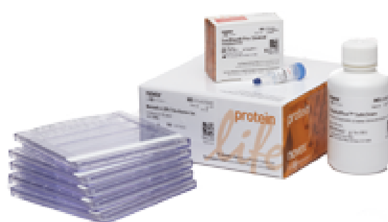
With high-volume wedge wells for sensitive western blot analysis

- Superior band quality and band volume
- Better protein resolution—10% greater resolving distance and optimized gradient format
- Preserved protein integrity—neutral-pH formulation that minimizes protein modifications
- Excellent lot-to-lot consistency
- High sample loading capacity—2x more sample volume

CLASSIC NuPAGE® GELS

For high resolution and long shelf life

- Superior protein band resolution and stability
- Faster sample run times, at 35 to 50 minutes
- Long product shelf life—16 months
- More efficient western blot transfer



TRIS-GLYCINE MINI GELS

For precast gel convenience with Laemmli chemistry

- Individually packaged gels for optimal experiment design
- Compatible with most protein standards
- Usable for native and denaturing protein assays

ONE TANK—181 GELS!
MINI GEL TANK

Now run your favorite NuPAGE®, Novex®, and Bolt® gels in the same tank. Our Mini Gel Tank enables versatility, easy loading, and enhanced visualization.

lifetechnologies.com/minigeltank

Western Workflow

Easy As: 1 2 3

When doing protein detection, so much can ride on the question, "Is my protein expressed in this sample?" Let us help you find the answer with these protein analysis options.

1. Separate

See western blot bands clearly

Bolt™ Bis-Tris Plus Gels

Preserve the integrity of your proteins with Novex® neutral-pH formulation and mild sample preparation conditions. With the Bolt™ Bis-Tris neutral pH system, protein integrity is preserved throughout sample prep, electrophoresis, and western transfer, resulting in beautiful western blots without the protein degradation that is common to Tris-glycine gels.

To get a Bolt™ Mini Gel Tank included in your Bolt™ Welcome Pack, go to:
lifetechnologies.com/bolt

2. Transfer

7-minute protein transfer? Yes!

iBlot® 2 Dry Blotting System

Our revolutionary 7-minute blotting system just got better. Introducing the iBlot® 2 Dry Blotting System. Enjoy fast western transfer without sacrificing efficiency and uniformity. The new iBlot® 2 system is compatible with both PVDF and nitrocellulose membranes, and has performance comparable to traditional wet transfer methods in a fraction of the time. Now with a new touch screen, less consumable waste, and sturdier design, fast western transfer never looked better.

Learn about our iBlot® 2 Dry Blotting System with Bolt® Welcome Pack at:
lifetechnologies.com/iblot

3. Detect

Enjoy automated western blotting

iBind™ Western Device

The iBind™ Western Device is an automated western processing device. It offers hands-free western blotting, and is reproducible, fast, and compatible with western protocols. The blocking, primary and secondary antibody binding, and all wash steps are automated for you. The iBind™ Western Device offers automated convenience, and superior sensitivity and reproducibility compared to traditional manual methods without the need for any external power source.

Want to try it?

Get your iBind™ Western System Starter Kit at:
lifetechnologies.com/ibind

GET STARTED

FROM THE BENCH

NuPAGE® precast gel

"While Laemmli's method, the most widely used SDS-PAGE system, uses strongly alkaline separation gels (pH 8.9), NuPAGE® gels are neutral. Because of that, the NuPAGE® system stabilizes proteins during electrophoresis, and has the advantages of high separation capacity and long life. These attributes of NuPAGE® gels made a significant contribution in the analysis of tRNA-protein ester conjugates (peptidyl-tRNA) and thioester conjugates of proteins. While wondering if there was an easier way to separate thioester intermediates of autophagy-related (Atg), ubiquitin-like conjugation reactions, I recalled having successfully separated unstable peptidyl-tRNA molecules using NuPAGE® precast gels. Thanks to the NuPAGE® system, we were able to easily detect two kinds of intermediates by electrophoresis. It has allowed us to track, in detail, the time course of the membrane-binding reaction of Atg8, which plays a central role in autophagosome formation, and also to identify reactions in rate-limiting steps, providing much information."

Hitoshi Nakatogawa, PhD
Associate Professor
Tokyo Institute of Technology

INVITROGEN™

BENCHTOP SOLUTIONS

7 Small But Mighty Benchtop Solutions

TO MAKE YOUR LAB HUM

You spend hours working to complete your research. Whether it's unlocking the next cancer pathway or saving you time at the bench, we have solutions to help simplify your work.

Check out these easy-to-use benchtop solutions that help make the most of your time and research dollars.

ANALYZE

1

Simply stunning EVOS® cell imaging systems
Smarter systems | Easier cell imaging | Faster results
Minimize the complexities of microscopy without compromising performance.

See which EVOS® cell imaging system is best for you at:
lifetechnologies.com/evos

2

E-Gel® Imager System
Capture high-quality images and analyze agarose gels using a lightweight, portable, easy-to-use benchtop imaging system.

lifetechnologies.com/gelimager

3

iBind® Western Device
Obtain greater sensitivity and reproducibility as compared to manual processing methods. Automated, hands-free processing enables better blot-to-blot consistency, while using up to 80% less primary antibody.

lifetechnologies.com/ibind

4

QUANTITATE

Countess® II FL Automated Cell Counter
Get fast, easy, and accurate cell counting without using a hemocytometer, and avoid the tedium and subjectivity of manual cell counting. Now with two optional fluorescent channels and bright-field—researchers can count cells, monitor fluorescent protein expression, and measure cell viability all in as little as 10 seconds per count.

lifetechnologies.com/countessII

Qubit® 3.0 Fluorometer

The Qubit® 3.0 Fluorometer measures DNA, RNA, and protein using the highly sensitive Qubit® quantitation assays. The easy-to-use touch-screen menus make it easy to select and run the assays you need, with results displayed in just a few seconds.

lifetechnologies.com/qubit

5

TRY IT LOVE IT

Want to try one of these benchtop solutions in your lab? Complete our online form* and we'll follow up to schedule a demo of the device that best suits your needs.

* To request a demo, go to the URL shown with each device. HulaMixer® Sample Mixer not included in demo program.

PREP

6

HulaMixer® Sample Mixer
Every lab needs a flexible and robust mixer. This one will tilt, rotate, and vortex your sample to help ensure thorough mixing.

lifetechnologies.com/hulamixer

7

MODIFY

Neon® Transfection System
Transfect your cells, typically in less than 20 seconds, using the uniquely designed Neon® pipette tip. Great for any cell type, including cells that are difficult to transfect.

lifetechnologies.com/neon

INVITROGEN™

TRANSFECTING PRIMARY CELLS?

Lipofectamine® MessengerMAX™ reagent is your ticket 'in'

Discover the mRNA transfection reagent that out performs other leading DNA and mRNA reagents.

- 5x the efficiency of DNA reagents in neurons and primary cell types
- Up to 80% transfection efficiency in neurons and primary cell types
- Faster protein expression with no risk of genomic integration
- Up to 10x higher cleavage efficiency with CRISPR mRNA

lifetechnologies.com/messengermax

Lipofectamine® MessengerMAX™ mRNA reagent outperforms leading DNA and mRNA delivery reagents in fresh isolated hNSCs. Lipofectamine® MessengerMAX™ reagent and the leading mRNA delivery reagent were used to deliver GFP mRNA (250 g/well) in a 48-well format. The leading DNA delivery reagent was used to deliver GFP DNA (250g/well), and GFP expression was analyzed 24 hours posttransfection.

TECH TALK

Q We currently use DNA for transfection. Can you tell me what the advantages of mRNA transfection are, and are they cell line specific?

A There are many advantages to using mRNA rather than DNA for transfection, and they are cell line specific.

- **A much higher level of transfection efficiency**

If you are working with a difficult-to-transfect cell type, where DNA transfection yields less than 30% efficiency, transfecting an mRNA alternative can provide up to 80% transfection efficiency.

- **A footprint-free method with no risk of genomic integration**

This is a result of its ability to deliver the highest amount of mRNA to the cytoplasm of the cell. There is no nuclear entry required for protein expression and this eliminates the risk of the foreign nucleic acid integrating with the host genomic DNA.

See more Q&A at:
lifetechnologies.com/messengermax

FREE SAMPLE

Of Lipofectamine® MessengerMAX™ Transfection Reagent

No promotion code needed. Valid for 0.1 mL sample size. While supplies last. Offer expires June 30, 2015. Terms and conditions apply.

Find out more at: lifetechnologies.com/messengermax

LIGHT UP YOUR LAB

With Molecular Probes®
FLUORESCENT REAGENTS

Illuminating research for decades

With Alexa Fluor® dyes—the leading and most trusted fluorescent dyes—you can count on stunning images every time.

lifetechnologies.com/alexa

NEW

Image-iT® Hypoxia Reagent

A novel fluorogenic compound for measuring hypoxia in live cells. Real-time detection of hypoxia with dynamic oxygen concentration detection.

lifetechnologies.com/hypoxia

Superior cell proliferation analysis—generation after generation

Distinguish up to 8 generations or cell divisions by flow cytometry with minimum cytotoxicity using CellTrace™ Violet stain.

lifetechnologies.com/celltrace

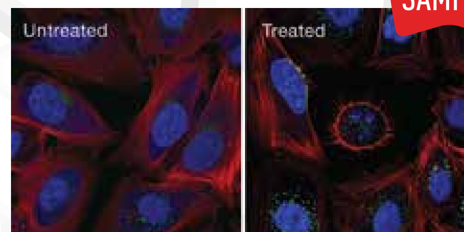
> Nature composes some of her loveliest poems for the microscope.
>
> Theodore Roszak
> *Where the Wasteland Ends*

School of fluorescence

Our bench scientists share the best tips, tricks, and protocols that will help you capture beautiful images again and again.

lifetechnologies.com/imagingbasics

FREE SAMPLE



Imaging basics tip

Problem: High diffuse background in image

Possible cause: Nonspecific binding to proteins other than the target

Tip: BlockAid™ Blocking Solution is an optimized mix of protein blocking components designed to reduce background signal from cells or tissues

Request a free sample at:
lifetechnologies.com/fixedcellimaging

FREE SAMPLE

Of Molecular Probes® Fixed-Cell Imaging Reagent

No promotion code needed. Valid for 2 mL sample size. While supplies last. Offer expires June 30, 2015. Terms and conditions apply.

Find out more at: lifetechnologies.com/fixedcellimaging

GIBCO®

MAKE YOUR CELLS EXTRAORDINARY

WITH INNOVATIVE GIBCO® CELL CULTURE PRODUCTS

From culture to discovery, every passage, every step, you're covered

IS TRYPSIN DIGESTING YOUR CELL SURFACE PROTEINS?

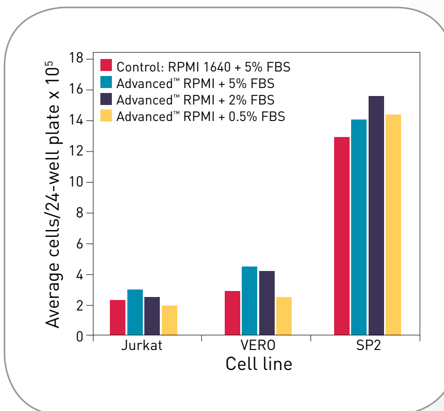
Test the alternative—TrypLE™ reagents are highly purified, recombinant cell-dissociation enzymes that replace porcine trypsin and can be directly substituted for trypsin without protocol changes.

- Gentle on cells—to help protect your cell's surface proteins
- Stable at room temperature—no need to freeze means they're ready when you need them
- Animal origin-free—important if you're looking for a product without animal-derived components

lifetechnologies.com/tryple

Get reproducible results at a lower cost with Gibco® Advanced™ media
Enriched with normal-serum constituents, Gibco® Advanced™ media require 50-90% less FBS supplementation, enabling equivalent or superior cell growth, with no change in morphology or function in many common cell lines. Plus you'll use less serum, which means fewer lot-to-lot changes.

lifetechnologies.com/advancedmedia



PERFECT CELL CULTURE PAIRINGS

BROUGHT TO YOU BY GIBCO® LIFE OF CELLS

1

It's springtime, and love is in the air for CHO-K1.

And just what, you might ask, has CHO all googly-eyed? Why, Gibco® sera and media, of course.

If you work with CHO, you'll want to see why she's completely gaga for Gibco® cell culture products.

Medium: Ham's F-12 [K]
Serum: 10% FBS standard USDA
Antibiotics: Pen-Strep, Gentamicin
Supplement/Growth Factor: GlutaMAX™-I Supplement, or L-Glutamine
Balanced Salts/Buffers: PBS/HBSS without Ca and Mg
Dissociation Reagent: TrypLE™ Express or Trypsin
Transfection Reagent: Lipofectamine® 3000
Selection Antibiotics: G418, Puromycin, Zeocin™ Antibiotic, Mycophenolic acid, Hygromycin B

2

Call him a teacher, or selfless, or altruistic if you like. All Jurkat wants is to be as helpful to scientists as possible. Need to study the mechanism of differential susceptibility of cancers to drugs and radiation? How about a reliable producer of IL-2? Then Jurkat is your guy.

To keep up his energy to continue his selfless devotion to science, Jurkat nourishes himself with Gibco® cell culture media.

Medium: RPMI 1640
Serum: 10% FBS standard USDA
Antibiotics: Pen-Strep, Gentamicin
Supplement/Growth Factor: GlutaMAX™-I Supplement, or L-Glutamine
Transfection Reagent: Lipofectamine® 3000
Selection Antibiotics: G418, Puromycin, Zeocin™ Antibiotic, Mycophenolic acid, Hygromycin B

3

To quote The Bard, "All the world's a stage...And one man in his time plays many parts."

Since Stem is asked to play so many roles, Shakespeare must have had him in mind when he penned those immortal words.

So, you may ask, how does Stem keep himself in shape for the demands of the job? Stem uses Gibco® special treatments and all the best media.

Medium: Essential 8™ Medium
Transfection Reagent: Lipofectamine® 3000
Supplement/Growth Factor: GlutaMAX™-I Supplement, or L-Glutamine
KnockOut™ Serum Replacement

Find your cells' perfect pairings at:
lifetechnologies.com/gibco

cell culture

GIBCO®

WHAT'S ON THE MENU?

YOUR CELLS ARE HUNGRY. FEED THEM THE GIBCO® PRODUCTS THEY CRAVE.

NEW

Use the new Gibco® Perfect Pairing Wheel to find your cells' perfect meal. Ask your sales representative to drop one by your lab.

"My students were overwhelmingly thankful to have access to these Gibco® training materials. This online course is an excellent resource."

Douglas Bruce MS
Biomanufacturing Instructor
Laney College
Oakland, California, USA

TAKE IT TO THE NEXT LEVEL

WITH GIBCO® EDUCATIONAL RESOURCES

GET CERTIFIED, GET AHEAD

The Gibco® Cell Culture Basics Certification course is designed to introduce you to the practice of laboratory cell culture, although even seasoned hands will learn a thing or two.

Find out how you can get certified at:
lifetechnologies.com/cellculturebasics

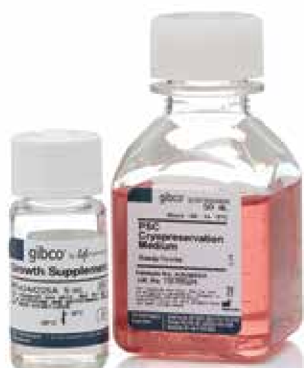
PERFECT YOUR SKILLS

LifeLab™ Stem Cell Workshops are three-day courses with both lecture and hands-on laboratory work. Our experienced trainers work with you one-on-one to help ensure you are successful in learning new stem cell methods.

See a list of upcoming workshops at:
lifetechnologies.com/lifelab

PSC SOLUTIONS for CULTURE and DIFFERENTIATION

CHECK OUT NEW GIBCO® SOLUTIONS FOR PLURIPOTENT STEM CELLS (PSCs)



MAXIMIZE PSC CRYOPRESERVATION AND RECOVERY

Up to 50% more viable cells postthaw

The PSC Cryopreservation Kit—which includes a xeno-free cryopreservation medium and a chemically defined growth supplement—enables recovery of the maximum number of viable cells postthaw. Compared to traditional methods of cryopreservation, the PSC Cryopreservation Kit is designed to consistently recover up to 50% more viable cells.

lifetechnologies.com/psccryokit

SINGLE CELL PASSAGING FOR PSCs

Expanded applications for Essential 8™ Medium

Coupled with RevitaCell™ Supplement, Essential 8™ Medium can be used for routine single cell passaging of PSCs. This system enables maximum cell viability and provides more efficient recovery of cells while retaining normal morphology, pluripotency, and karyotype.

View application note at:
lifetechnologies.com/essential8scp

STREAMLINE DIFFERENTIATION FOR ANY GERM LAYER

Simple, efficient tools for differentiating PSCs to endoderm, mesoderm, and ectoderm

Differentiation of PSCs to any lineage is not easy. There are multiple protocols to reference and getting the mix-and-match media formulations just right can be painful. Check out our collection of differentiation kits to move PSCs to (neural stem cells) NSCs, cardiomyocytes, or definitive endoderm using streamlined protocols to help save you time and effort.

lifetechnologies.com/differentiation

What's your fluorescence IQ?

Think you know your fluorescence and Molecular Probes® reagents? Take our quiz and see how much you really know. Answers are provided below, but remember, no peeking!

1. LIVE/DEAD® Fixable Cell Stains have been used successfully by flow cytometrists for years to determine the viability of cells prior to fixation and permeabilization. With eight different colors of LIVE/DEAD® Fixable Cell Stains available, which color is not one of them?

A) Aqua
B) Magenta
C) Far Red
D) Near-IR

2. CellLight® reagents are ready-to-use fluorescent protein constructs targeted to specific subcellular structures. Which technology provides the efficient delivery and robust expression of CellLight® reagents?

A) BacMam
B) PacMan
C) ViraSure
D) CellPack

3. In addition to its use in monitoring cell cycle phases by flow cytometry in living cells, Vybrant® DyeCycle™ Violet Stain can also be used to identify which cell population?

A) Embryonic cardiomyocytes
B) Osteosarcomas
C) Glial cells
D) Stem cell side populations

4. pHrodo™ dyes have been widely used to measure and visualize phagocytosis. How do pHrodo™ dyes function?

A) By binding to internalization receptor
B) By becoming fluorescent after a cleavage event following internalization
C) By detecting changes in intracellular pH levels
D) By detecting changes in intracellular calcium

5. The most complete fluorescent labeling and detection reference available, *The Molecular Probes® Handbook—A Guide to Fluorescent Probes and Labeling Technologies*, contains over 3,000 technology solutions representing a wide range of biomolecular labeling and detection reagents. How many products were in the first *Molecular Probes® Handbook* published in 1977?

A) 75 products
B) 250 products
C) 500 products
D) 1,000 products

From the Molecular Probes® Gallery

Questions 6-8 match the pictures to the answers below

A) Zebrafish tissue section. Texas Red®-X goat anti–mouse IgG, Alexa Fluor® 350 wheat germ agglutinin, SYTOX® Green nucleic acid stain.

B) A muntjac cell stained with antibodies against cytoskeletal, nuclear and mitochondrial proteins.

C) Subcellular structures in fixed and permeabilized bovine pulmonary artery endothelial cells visualized with several fluorescent dyes.

9. Now widely used in real-time master mixes, SYBR® Green dye was originally developed for what application?

A) DNA gel stain
B) Nuclear counterstain
C) Chromatin condensation
D) Apoptosis

10. Developed by Molecular Probes® scientists, fura-2 truly revolutionized the study of biological pathways. What ion does fura-2 detect?

A) Zinc
B) Calcium
C) Magnesium
D) Sodium

11. CellROX® reagents simply and reliably detect what molecules in live cells?

A) Hydrocarbons
B) Oxidoreductases
C) Radioactive oxygen
D) Reactive oxygen species (ROS)

How did you do?

1–4 correct: You're still a little green. Here's a little help. lifetechnologies.com/tutorials

5–8 correct: Don't be blue, you're on your way to becoming a fluorophore pro! Get a copy of the *Molecular Probes® Handbook* to get there faster. lifetechnologies.com/handbook

9 or more correct: You are red-hot! You really know your fluorescence. Check out products to make your research even more colorful. lifetechnologies.com/probes

Key: 1=B; 2=A; 3=D; 4=C; 5=A; 6=C; 7=A; 8=B; 9=A; 10=B; 11=D.

To help you get your lab off to a productive start, **the New Lab Start-Up Program** offers more than 100 special offers just for new labs.

Congratulations on your new lab! We'd like to help you get started.

Let the 2015 Fisher Scientific™ New Lab Start-Up (NLSU) Program work for you as an effective, economical way to obtain special time- and money-saving offers on the supplies you need.

From empty shelves to a fully functioning lab in three easy steps!

1. APPLY

If you have:

- Built or established a new lab
- Received your first research grant
- Moved to a new location

You qualify for the New Lab Start-Up Program!

Visit fishersci.com/newlab

2. ORDER

After receiving your personal identification number (PIN), place your orders for the special-offer products.

fishersci.com

800-766-7000

3. REDEEM

To request your free products, click the redemption tab at fishersci.com/newlab

Online redemption: Complete the online redemption form and submit. You will be asked to provide your PIN and Fisher Scientific™ order number for redemption processing.

Fax redemption: Download and complete a redemption form and fax the form with your Fisher Scientific™ proofs of purchase to 412-249-5010.

For promotion and redemption details go to: fishersci.com/newlab

See back cover for exclusive NLSU offers!

For Research Use Only. Not for use in diagnostic procedures.

Abbreviated terms and conditions

Use promotion codes as noted. All promotions are open to qualified customers in the US (excluding Puerto Rico) and Canada. All offers will apply to qualifying orders received by Life Technologies no later than June 30, 2015 (unless otherwise noted), or until promotional supplies are depleted, whichever comes first. Promotion code must be presented at the time of order. Discounts apply to the list price in effect at the time the order is received by Life Technologies. Each promotion cannot be combined with other discounts or promotions. All offers are void where prohibited, licensed, or restricted by federal, state, provincial, or local laws or regulation or agency/institutional policy. Other restrictions may apply. To see complete terms and conditions, go to fishersci.com/life

© 2015 Thermo Fisher Scientific Inc. All rights reserved. All other trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. TaqMan is a registered trademark of Roche Molecular Systems, Inc., used under permission and license. Luminex is a registered trademark of Luminex Corporation. iOS is a registered trademark of Apple, Inc. Android is a trademark of Google, Inc. PowerPoint is a trademark of Microsoft Corp. Essential 8 is a trademark of Cellular Dynamics International, Inc. BN03191512 0315

THERMO FISHER SCIENTIFIC
707 Lind Avenue SW
Renton, WA 98057

PRSRT STD
US POSTAGE
PAID
SEATTLE, WA
PERMIT NO 2191

WE'RE HERE TO HELP YOU SAVE

To make your research a bit more affordable, we've featured many money-saving promotions throughout this issue. For your convenience, some favorites are listed here.

If you'd like more information about any of these promotions, or other promotions found in this issue, simply go to: fishersci.com/life

GET STARTED

Bolt® Welcome Pack A with iBlot™ 2 Transfer Stack
No promotion code needed. Valid for Cat. No. NW0412AIB2.

iBind™ Western Starter kit
No promotion code needed. Valid for Cat. No. SLF1000SPMO.

FREE SAMPLE

SuperScript® IV Reverse Transcriptase
No promotion code needed. 10-reaction sample size.
For details, go to: lifetechnologies.com/ssiv

SAVE BIG

New Lab Start-Up exclusive offers

For promotion details and redemption, go to: fishersci.com/newlab

Stock up on the essentials and receive up to $2,000 in free products

Purchase up to $2,000 of the following products through Fisher Scientific and receive the same amount at no additional cost.*

- Thermo Scientific™ molecular biology products
- Thermo Scientific™ GeneJET™ nucleic acid purification products
- Invitrogen™, Novex®, Molecular Probes®, Applied Biosystems®, Ambion®, or Gibco® products

Stock up on protein biology products and receive up to $1,000 in free products

Purchase up to $1,000 of Thermo Scientific™ Pierce™ protein biology products and receive an equal amount at no additional cost. This offer includes sample prep, protein function, and protein detection products and catalog antibodies.**

Get an additional antibody with the purchase of 3

Purchase any three Thermo Scientific™ Pierce™ antibodies and receive a fourth antibody at no additional cost. This offer includes catalog antibodies found on thermoscientific.com/pierce-abs†

* Matched amount value is based on Fisher Scientific list price. Offer is not valid for instruments, custom products and services, and any products that are not available through Fisher Scientific.

** This offer excludes custom services or bulk orders and all protein biology instrumentation. Purchase must be on a single order. Limit one redemption per lab. Not valid with any other offer. Free products calculated at Fisher Scientific list price.

† Purchase must be on a single order. Fourth antibody must be of equal or lesser value. This offer excludes all custom antibodies, antibody kits, and bulk orders. Limit one redemption per lab. Not valid with other offers.

See full terms and conditions for all New Lab Start-Up offers at fishersci.com/newlab

Thermo Scientific™ Marketplace magazine

Check out special promotional offers and learn more about Thermo Scientific™ molecular biology products.

fishersci.com/TSMolecularBio (US)
thermoscientific.com/tmb (CAN)

Thermo Scientific™ | Applied Biosystems® | Invitrogen™ | Gibco®

ThermoFisher SCIENTIFIC

In the United States:
For customer service, call 1-800-766-7000
To fax an order, use 1-800-926-1166
To order online: www.fishersci.com

In Canada:
For customer service, call 1-800-234-7437
To fax an order, use 1-800-463-2996
To order online: www.fishersci.ca

For Research Use Only. Not for use in diagnostic procedures.