



Tools for microbiology detection and research

2007





Contents

Environmental detection	3
Dynabeads® immunomagnetic separation (IMS) microbiology beads	3
Bacteria detection	4
<i>E. coli</i> O157:H57 detection	5
Protozoa detection	5
Dynabeads® IMS bead processing tools	6
Molecular technologies for pathogen detection	7
Genomic DNA sample preparation	7
PCR solutions	7
Viral RNA/DNA sample preparation	8
RT-PCR solutions	8
Certified LUX™ primer sets for RT-PCR	8
<i>Cryptosporidium</i> genotyping kits	10
PathAlert™ detection system	10
Fluorescent dyes for microbial visualization and assessment	11
Bacteria	11
Detection	11
Viability and vitality	12
Enumeration	13
Tracing	13
Fluorescent antibiotics	13
Lectins	14
Biofilms	15
BioParticles® labeled bacteria	16
Cholera toxins	16
Yeast	17
Viability and vitality	17
Vacuole and organelle markers	17
Other antibodies	18
Viruses	18
Related products for fluorescence-based applications	18
Antifade reagents	18
Molecular biology products	18

Environmental detection

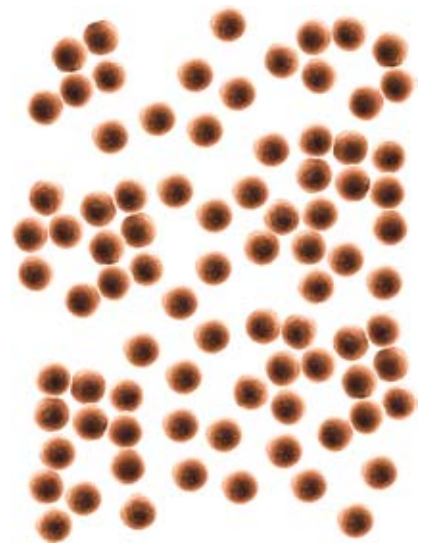
Building on a broad portfolio of advanced tools for microbiology research, Invitrogen's environmental detection products are designed for the specific capture, enrichment, and detection of microbial pathogens—bacteria, yeast, protozoa, and viruses—from a wide range of samples. Environmental detection products provide rapid, specific, and high-sensitivity solutions to users addressing microbial testing objectives in food, water, animal, environmental, and biodefense applications.

- Immunomagnetic separation (IMS) microbiology bead-based systems for selective capture and concentration of intact organisms
- DNA-based systems designed for the isolation of genomic DNA and PCR-based detection
- RNA isolation and detection technologies for viral identification

Dynabeads® immunomagnetic separation (IMS) microbiology beads

The Dynabeads® IMS microbiology beads consist of magnetic beads covalently affixed with affinity-purified antibodies that recognize specific surface markers on microbial pathogens. Our current microbiology product range targets common contaminants present in food, water, and/or environmental samples. All products are performance tested to assure results when working with the target samples. Since their launch, the Dynabeads® microbiology products have become widely accepted and routinely used in food and environmental microbiology laboratories around the world. Indeed, validations have been awarded from government bodies in the USA, UK, Japan, and Canada.

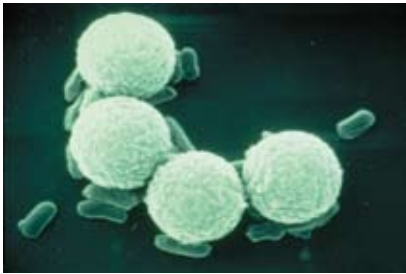
In addition to standard IMS microbial bead products (see below), we can also prepare custom antibody-coated beads. Please contact us to discuss your needs (environmental@invitrogen.com).



Dynabeads® superparamagnetic beads.



Labeling and Detection Technologies



E. coli bound to Dynabeads® anti-*E. coli* O157:H57.

Bacteria detection

Dynabeads® for bacterial detection significantly improve traditional media-based selective enrichment. The microbial capture and concentration enabled by this method is rapid and simple to perform and is sensitive enough to detect 1 viable organism per 25 g of pre-enriched sample or as few as 100 organisms per milliliter of pre-enrichment sample or broth. These products are widely utilized in food testing applications.

Product	Quantity	Cat. no.
Dynabeads® anti- <i>Salmonella</i> For selective capture and concentration of <i>Salmonella</i> from samples; meets the requirements of AOAC RI License no. 970401	5 ml	710-02
Dynabeads® anti- <i>Legionella</i> For selective capture and concentration of <i>Legionella</i> species (spp.) from water samples and water concentrates	100 tests	730-03
Dynabeads® anti- <i>Listeria</i> For selective capture and concentration of <i>Listeria</i> directly from samples	5 ml	710-06
Dynabeads® anti- <i>E. coli</i> O157 For selective capture and concentration of <i>E. coli</i> O157:H57 directly from samples	1 ml 5 ml	710-03 710-04
Dynabeads® EPEC/VTEC O145 For the rapid selective concentration of <i>E. coli</i> O145:H57 from samples	2 ml	710-07
Dynabeads® EPEC/VTEC O111 For the rapid selective concentration of <i>E. coli</i> O111 from samples	2 ml	710-09
Dynabeads® EPEC/VTEC O103 For the rapid selective concentration of <i>E. coli</i> O103 from samples	2 ml	710-11
Dynabeads® EPEC/VTEC O26 For the rapid selective concentration of <i>E. coli</i> O026 from samples	2 ml	710-13

E. coli O157:H57 analysis

A significant number of food contamination–caused illnesses are increasingly traced to the presence of *E. coli* O157:H57. A common method for detecting and identifying its presence is the use of culture media combined with visual analysis of colonies formed. Following the selection and concentration of *E. coli* O157:H57 from samples using Dynabeads® IMS microbiology bead processing, these media can be used for identification:

- The conventional medium for the detection of *E. coli* O157:H57 is sorbitol MacConkey agar. The specificity of this medium can be enhanced when supplemented with potassium tellurite and cefixime.
- CHROMagar® O157:H57 is a chromogenic plating medium which increases the specificity and sensitivity of food sample analysis when used in combination with IMS.

Product	Quantity	Cat. no.
CT Supplement Added to standard sorbitol MacConkey media (SMAC) to form CT-SMAC; CT Supplement contains 1 mg cefixime powder and 50 mg potassium tellurite powder	1,000 tests	740-01
CHROMagar® O157 CHROMagar® distinguishes between <i>Pseudomonas</i> spp and <i>E. coli</i> O157:H57 by a specific color reaction; recommended as a second medium to CT-SMAC	4 x 250 ml	740-02

CHROMagar® is a trademark of Dr. A. Rambach, Paris, France.

Protozoa detection

Dynabeads® for *Cryptosporidium* and *Giardia* detection are the water industry standard for selective enrichment of these protozoa from water samples. This status has been achieved through regulatory agency–approved methods (US EPA Methods 1622

and 1623, UK DETR Water Supply Regulation 2000 SI No. 3184 (England), and UK DETR Water Supply Regulation 2001 SI No. 3911 (Wales)) for concentration and isolation of *Cryptosporidium* oocysts and *Giardia* cysts in water.

Product	Quantity	Cat. no.
Dynabeads® anti- <i>Cryptosporidium</i> Kit For the selective enrichment of <i>Cryptosporidium</i> oocysts directly from water sample concentrates (US EPA Method 1622 and by UK DETR Water Supply Regulations 2000 SI No. 3184 (England), 2001 SI No. 3911 (Wales))	1 ml 5 ml	730-01 730-11
Dynabeads® GC-Combo Kit For the selective enrichment of <i>Giardia</i> cysts and <i>Cryptosporidium</i> oocysts directly from water sample concentrates (US EPA Method 1623)	1 ml 5 ml	730-02 730-12
Dynal® L10 tubes Flat-sided reusable glass tubes necessary for optimal recovery of cysts/oocysts during magnetic separation with the Dynal® MPC®-1 or MPC®-6 concentrator when using Dynabeads® anti- <i>Cryptosporidium</i> or GC-Combo kits	5 tubes	740-03
Dynal® Spot-On Treated glass slides (each contains a single 9 mm well) for microscopic analysis of oocysts and cysts; this product is used in combination with the Dynabeads® anti- <i>Cryptosporidium</i> and GC-Combo kits	100 slides	740-04



Labeling and Detection Technologies



The BeadRetriever™ system.

Dynabeads® IMS bead processing tools

- Magnets: Dynal® Magnetic Particle Concentrators (MPC) are fitted with strong rare earth magnets to provide a focused magnetic capture area. This ensures optimal isolation of bead-bound target and easy removal of supernatant, leaving Dynabeads® and your isolated target in the tube.
- Mixers: Dynal® sample mixers provide the continuous gentle motion essential to obtain optimal binding of Dynabeads® to target populations.
- BeadRetriever™ Instrument: Bench-top instrument used to perform automated immunomagnetic separation with Dynabeads® IMS microbiology beads. Processes up to fifteen 1 ml samples within 20 minutes. Prepared samples can be used in any subsequent detection method.

Product	Quantity	Cat. no.
Magnets	Dynal® MPC™-S Optimal working volume 20 µl to 2 ml. Holds up to six separate 1.5 ml conical microcentrifuge tubes or 2 ml round-bottomed microtubes with diameter 8–10 mm.	1 unit 120-20D
	Dynal® MPC™-1 Optimal working volume 5 ml to 50 ml. Holds one tube of variable diameter (10–30 mm, 5–50 ml tube).	1 unit 120-01D
	Dynal® MPC™-6 Optimal working volume 5–15 ml. Holds six tubes with variable diameters (10–30 mm).	1 unit 120-02D
Mixers	Dynal® MX1 Sample mixer with a 12 tube mixing wheel. Tube sizes can range from 1.5 ml microcentrifuge tubes up to 17 mm diameter tubes. (European usage, 220V)	1 unit 159-07
	Dynal® MX2 Sample mixer with an 8-tube mixing wheel. Tube sizes can range from 15 to 27 mm in diameter. (European usage, 220V)	1 unit 159-08
	Dynal® MX4 Sample mixer with a mixing wheel specifically designed to hold two Dynal® MPC®-S racks. This gives the capacity to mix up to 12 microcentrifuge tubes at any one time. (European usage, 220V)	1 unit 159-10
	Dynal® MX7 Sample mixer with attachment for Dynal® MPC®-6 magnetic unit. (US usage, 110V)	1 unit 159-15D
	Dynal® MPC™-6 Semi-automated Mixer Head Sample mixer attachment specifically designed to hold one Dynal® MPC®-6 rack or one Dynal® MPC®-S rack; provides standardized wash steps for <i>Giardia</i> and <i>Cryptosporidium</i> protocols. (US usage, 110V)	1 unit 159-14D
	Dynal® Sample Mixer A rotisserie-style mixer with interchangeable rods to accommodate different tube sizes and sample volumes. (US usage, 110V)	1 unit 94701
	Dynal® Sample Mixer 30–50 ml Mixing Rod Optimal working volume: 5–50 ml. Holds one tube of variable diameter (10–30 mm, 5–50 ml tube). (US usage, 110V)	1 unit 94702
	BeadRetriever™ System	BeadRetriever™ instrument Benchtop instrument for automated immunomagnetic separation using standard Dynabeads® bacterial and protozoal products.
BeadRetriever™ tubes and tips		240 tests 159-51
BeadRetriever™ tube rack		1 unit 159-52

Molecular technologies for pathogen detection

Molecular biology–based detection methods are capable of rapidly achieving highly specific identifications of even low numbers of microbial organisms present in a wide range of sample types. Over the last decade, many of these technologies have been incorporated into routine sample analysis. Invitrogen is a leading provider of advanced molecular biology technologies that have found applications in microbial pathogen analysis.

Genomic DNA sample preparation

A critical step in DNA-based molecular detection protocols is the preparation of purified genomic DNA. We recommend these qualified products for genomic DNA preparation. For more information on DNA purification and quantitation products, visit us at www.invitrogen.com/napq.

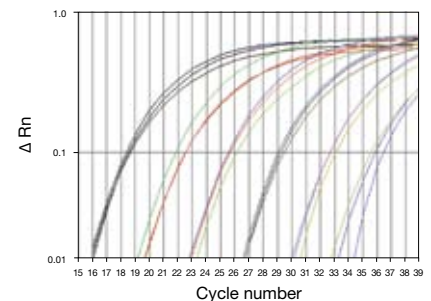
Product	Quantity	Cat. no.
PureLink™ Genomic DNA Mini Kit	10 preps	K1820-00
Enables high-yield, high-purity DNA extractions from a wide variety of sample types. Familiar silica spin-columns. Also available in 96-well plate format.	50 preps 4 × 96 preps	K1820-01 K1821-04
ChargeSwitch® gDNA Mini Bacteria Kit	50 preps	CS11301
A flexible and reliable method of purifying genomic DNA from a wide range of both gram-negative and gram-positive bacteria using magnetic beads. Designed to be used with individual colonies or up to 0.5 ml overnight culture.		

PCR solutions

Invitrogen's Platinum® technology offers antibody-mediated hot-start PCR that reduces nonspecific amplification, providing higher specificity, yield, and sensitivity than other DNA polymerases.

Product	Quantity	Cat. no.
Platinum® Taq PCR SuperMix	100 reactions	1306-016
Qualified reagents for the amplification of nucleic acid templates by polymerase chain reaction (PCR). Includes ready-to-use mixtures of DNA polymerase, salts, magnesium, and dNTPs. Add template and primers. Reduces setup time by half.	5000 reactions	11306-081
Platinum® Tfi DNA Polymerase	500 units	73684-050
Combines Platinum® automated hot-start technology with a non-Taq, surfactant-free PCR enzyme derived from <i>Thermus filiformis</i> . Comparable to Platinum® Taq DNA polymerase in yield, specificity, fidelity, and robustness. Available for OEM.		

Visit our website (www.invitrogen.com/pcr) for other PCR, qPCR, and qRT-PCR products.



Detection of *Bacillus globigii* genomic DNA. A serial dilution of purified genomic DNA obtained from *Bacillus globigii*, (closely related to *Bacillus anthracis*), was amplified using a Platinum® Quantitative PCR SuperMix reagent and FAM-labeled LUX™ primer. The amplification plot obtained is shown here.



Labeling and Detection Technologies

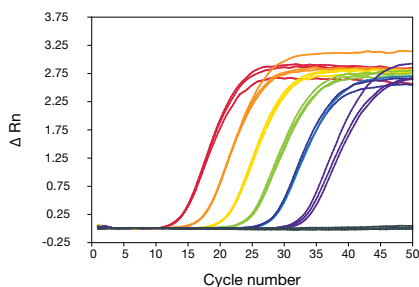
Viral RNA/DNA sample preparation

An important step in RNA-based detection protocols for virus is the preparation of purified RNA from a wide range of samples including serum and plasma. We recommend the following qualified products for viral nucleic acid preparation. For more information on nucleic acid purification and quantitation, visit us at www.invitrogen.com/napq.

Product	Quantity	Cat. no.
PureLink™ Viral RNA/DNA Mini Kit	50 preps	12280-050
PureLink™ 96 Viral RNA/DNA Kit	4 x 96 preps	12280-096

RT-PCR solutions

The RNA UltraSense™ One-Step Quantitative RT-PCR System was specifically developed for the amplification and real-time quantification of ultralow-abundance transcripts and RNA viruses. This system combines SuperScript™ III RT and Platinum® Taq DNA Polymerase and provides greater priming specificity, higher product yields, and detection over a broad dynamic range. The high-concentration formulation of this system provides great flexibility with low-concentration/high-volume RNA samples.



Detection of Newcastle virus RNA. A serial dilution of purified pLenti6V5GFP viral RNA was amplified using the RNA UltraSense™ qRT-PCR System. Clean amplification of RNA with exceptional efficiency is achieved, speeding the analysis and improving the accuracy of pathogen detection.

Product	Quantity	Cat. no.
RNA UltraSense™ One-Step Quantitative RT-PCR System Designed for the analysis of purified RNA from a range of sources including virus.	100 rxns	11732-927

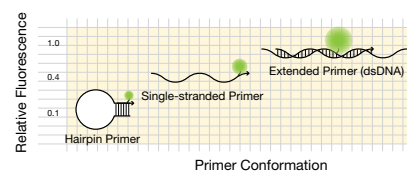
Certified LUX™ primer sets for RT-PCR

Certified LUX™ (Light Upon eXtension) Primer Sets for infectious agents provide highly specific, sensitive detection and quantification of human and animal pathogen domains by real-time PCR (RT-PCR) analysis. LUX™ technology provides a smart alternative to products such as TaqMan® probes or molecular beacons. With these probes, a pair of PCR primers, in addition to a dual-labeled probe that hybridizes to the internal portion of the amplicon,

is required. Using the LUX™ system, one fluorogenic primer (labeled with a single reporter dye) and one corresponding unlabeled primer are employed. In addition, users of LUX™ primers are not restricted to any particular instrument platform. LUX™ primers are compatible with a wide variety of real-time machines.

In addition to this certified set, custom preparation of additional LUX™ primer sets is available. Please visit our website (www.invitrogen.com/lux).

Product	Quantity	Cat. no.
Certified LUX™ Primer Sets		
SARS Coronavirus, ORF 1b FAM	250 rxns	100P-01
SARS Coronavirus, S Domain FAM	250 rxns	101P-01
SARS Coronavirus, M Domain FAM	250 rxns	102P-01
SARS Coronavirus, E Domain FAM	250 rxns	103P-01
SARS Coronavirus, N Domain FAM	250 rxns	104P-01
SARS Coronavirus, X1 Domain FAM	250 rxns	105P-01
SARS Coronavirus, X2 Domain FAM	250 rxns	106P-01
SARS Coronavirus, X3 Domain FAM	250 rxns	107P-01
SARS Coronavirus, X4 Domain FAM	250 rxns </td <td>108P-01</td>	108P-01
SARS Coronavirus, X5 Domain FAM	250 rxns	109P-01
SARS Coronavirus, S Domain JOE	250 rxns	101P-02
<i>Bacillus anthracis</i> , Pag A domain FAM	250 rxns	120P-01
<i>Bacillus anthracis</i> , Cap B domain FAM	250 rxns	121P-01
<i>Bacillus anthracis</i> , Lef domain FAM	250 rxns	122P-01
<i>Yersinia pestis</i> , Pla domain FAM	250 rxns	140P-01
<i>Yersinia pestis</i> , Pim domain FAM	250 rxns	141P-01
<i>Yersinia pestis</i> , Pst domain FAM	250 rxns	142P-01
<i>Francisella tularensis</i> , Fop A domain FAM	250 rxns	161P-01
<i>Francisella tularensis</i> , Tul4 domain FAM	250 rxns	160P-01
Variola major, HA1 domain FAM	250 rxns	170P-01
<i>Clostridium botulinum</i> , Neurotoxin B FAM	250 rxns	180P-01
Avian influenza A virus, H5 domain FAM	250 rxns	190P-01
Avian influenza A virus, N1 domain FAM	250 rxns	191P-01
Foot and mouth disease, 3D polymerase	250 rxns	200V-01
Lassa virus, N domain	250 rxns	250V-01
West Nile virus, M protein domain	250 rxns	300V-01
West Nile virus, E protein domain	250 rxns	350V-01
Bovine viral diarrhea, NS3 RNA helicase	250 rxns	400V-01



The LUX™ (Light Upon eXtension) effect. LUX™ primers are oligonucleotides labeled with a single fluorophore, close to the 3' end in a hairpin structure. When the primer is incorporated into the double-stranded PCR product, the fluorophore is dequenched, resulting in a significant increase in fluorescent signal.



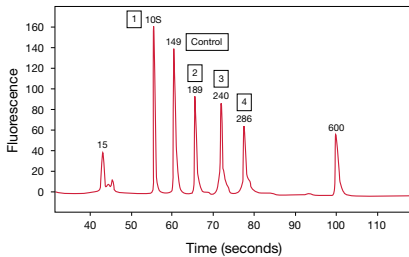
Labeling and Detection Technologies

Cryptosporidium Genotyping Kits

Cryptosporidium genotyping is a critical step in water sample evaluation, providing valuable information regarding public health. Our genotyping kits provide a molecular profile of the organisms isolated with Dynabeads® Anti-*Cryptosporidium* Kit. *Cryptosporidium* Genotyping Kits start with the microscope slide generated at the end of your isolation workflow and are therefore easily incorporated into your current process.

Cryptosporidium Genotyping Kits are available in configurations from basic to complete and include all the consumables you need to perform genotyping experiments.

Product	Quantity	Cat. no.
<i>Cryptosporidium</i> Genotyping Starter Kit Dynabeads® Anti- <i>Cryptosporidium</i> Kit, ChargeSwitch® DNA isolation system, PCR reagents, restriction enzymes, E-Gel® precast agarose gels, and PowerBase™ power supply	1 kit	740-05
<i>Cryptosporidium</i> Genotyping Standard Kit ChargeSwitch® DNA isolation system, PCR reagents, restriction enzymes, E-Gel® precast agarose gels, and PowerBase™ power supply	1 kit	740-06
<i>Cryptosporidium</i> Genotyping Basic Kit ChargeSwitch® DNA isolation system, PCR reagents, restriction enzymes, and E-Gel® precast agarose gels	1 kit	740-07



The PCR PathAlert™ Detection kits use end-point multiplex PCR to detect individual markers in pathogens. In this example, agent-specific kits illustrate the detection of: (1) *Bacillus anthracis* (Anthrax), (2) *Yersinia pestis* (Plague), (3) Orthopox and (4) *Francisella tularensis* (Tularemia)

PathAlert™ detection system

The PathAlert™ Detection System provides accurate and highly sensitive identification of infectious agents. Four multiplex, quantitative PCR kits provide specific detection of pathogens. Standardized kits are available for the detection of *Bacillus anthracis* (anthrax), *Yersinia pestis* (plague), *Francisella tularensis* (tularemia), or Orthopox (smallpox). A complete set of controls provides functional validation of each PCR reaction, ensuring accurate results.

Product	Quantity	Cat. no.
PathAlert™ Detection Kit for <i>Bacillus anthracis</i> (Anthrax)	4 ml (320 rxns)	BD1000
PathAlert™ Detection Kit for <i>Yersinia pestis</i> (Plague)	4 ml (320 rxns)	BD1001
PathAlert™ Detection Kit for <i>Francisella tularensis</i> (Tularemia)	4 ml (320 rxns)	BD1002
PathAlert™ Detection Kit for Orthopox (Smallpox)	4 ml (320 rxns)	BD1003

Customized detection systems directed at additional pathogen targets can be reconfigured to meet your needs. Please contact us (environmental@invitrogen.com) for more information.

Contact us for other queries about products for environmental detection
Invitrogen's environmental detection products are designed for the specific capture, enrichment, and detection of microbial pathogens to address microbial testing objectives in food, water, animal, environmental, and biodefense applications. Please contact us for more information (environmental@invitrogen.com).

Fluorescent dyes for microbial visualization and assessment

We offer a number of fluorescence-based reagents specifically for microbiology research. Fluorescent stains are valuable tools that can improve the contrast of the microbe from the surrounding environment, indicate metabolic activity, assist with the determination of structural composition and integrity, and perform rapid microbe-specific identification. Many of these products are adaptable for various analytical platforms, including flow cytometry, fluorescence microplate and fluorometry, and fluorescence-based microscopy.

In this section you'll find products for:

- Evaluating microbial viability and vitality
- Analyzing biological processes such as microbial generation and phagocytosis
- Examining microbial cell structure

Bacteria

Detection

The *BacLight*[™] Green and Red stains are non-nucleic acid stains for the detection of gram-positive and gram-negative bacteria using flow cytometry; we also offer a variety of SYTO[®] dyes that stain the RNA and DNA of both of these groups of bacteria. For detection based on plasma membrane staining, we suggest the lipophilic dyes FM[®] 1-43 and FM[®] 4-64 that exhibit enhanced fluorescence in a lipid environment. The Cell Culture Contamination Detection Kit supplies three fluorescent dyes for the identification of bacteria and yeast in cultured cells. For mycoplasma screens of eukaryotic cultures, choose our MycoFluor[™] Mycoplasma Detection Kit.

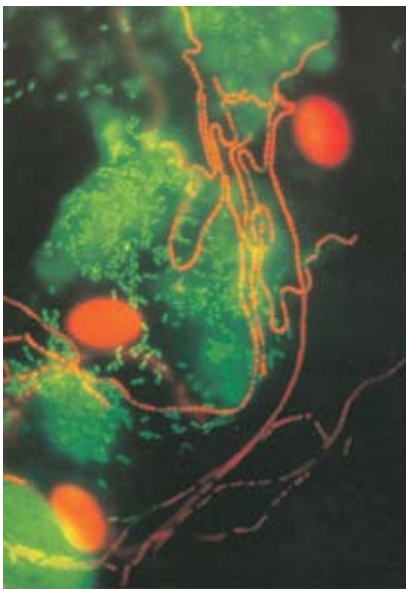
Product	Quantity	Cat. no.
<i>BacLight</i> [™] Green bacterial stain	20 × 50 µg	B35000
<i>BacLight</i> [™] Red bacterial stain	20 × 50 µg	B35001
SYTO [®] 9 green fluorescent nucleic acid stain, 5 mM solution in DMSO	100 µl	S34854
SYTO [®] BC green fluorescent nucleic acid stain, 5 mM solution in DMSO	100 µl	S34855
SYTO [®] RNASelect [™] green fluorescent cell stain, 5 mM solution in DMSO	100 µl	S32703
FM [®] 1-43 (N-(3-triethylammoniumpropyl)-4-(4-(dibutylamino)styryl)pyridinium dibromide)	10 × 100 µg	T35356
FM [®] 4-64 (N-(3-triethylammoniumpropyl)-4-(6-(4-(diethylamino)phenyl)hexatrienyl)pyridinium dibromide)	10 × 100 µg	T13320
Cell Culture Contamination Detection Kit	1 kit	C7028
MycoFluor [™] Mycoplasma Detection Kit	1 kit	M7006



Labeling and Detection Technologies

Viability and vitality

DiOC₂(3) (supplied in the *BacLight*[™] Bacterial Membrane Potential Kit) and DiBAC₄(3) are excellent bacterial membrane potential indicators. The *BacLight*[™] RedoxSensor[™] Kits indicate vitality using dyes that detect reductase activity; CFDA is a compound used to detect nonspecific esterase activity. The LIVE/DEAD[®] kits in this section provide a viability read-out based on membrane integrity, with live bacteria exhibiting green fluorescence and dead bacteria exhibiting red fluorescence, even when the population contains a mixture of bacterial types. Our LIVE *BacLight*[™] Bacterial Gram Stain Kit provides two nucleic acid stains to differentiate live gram-positive bacteria from live gram-negative bacteria. Our ViaGram[™] Red⁺ Bacterial Gram Stain and Viability Kit also discriminates gram-positive bacteria from gram-negative bacteria and at the same time distinguishes live from dead cells based on membrane integrity. In contrast, the 2-NBDG reagents are fluorescent glucose analogs that indicate viability as judged by glucose uptake. The cationic probe rhodamine 123 has been used to assess viability in gram-positive bacteria.



Live and dead bacteria visualized on freshly isolated human cheek epithelial cells using our LIVE/DEAD[®] *BacLight*[™] Bacterial Viability Kit (L7007, L7012, L13152). When incubated with the SYTO[®] 9 and propidium iodide nucleic acid stains provided in this kit, live bacteria with intact cell membranes fluoresce green and dead bacteria with compromised membranes fluoresce red. This image was photographed in a single exposure through an Omega Optical triple bandpass filter set.

Product	Quantity	Cat. no.
<i>BacLight</i> [™] Bacterial Membrane Potential Kit, for flow cytometry, 100 assays	1 kit	B34950
DiBAC ₄ (3) (bis-(1,3-dibutylbarbituric acid)trimethine oxonol (DiBAC4(3))), FluoroPure [™] grade	5 mg	B24570
<i>BacLight</i> [™] RedoxSensor [™] CTC Vitality Kit, for flow cytometry and microscopy	1 kit	B34956
<i>BacLight</i> [™] RedoxSensor [™] Green Vitality Kit, for flow cytometry	1 kit	B34954
5(6)-CFDA (5-(and-6)-carboxyfluorescein diacetate), mixed isomers	100 mg	C195
LIVE/DEAD [®] <i>BacLight</i> [™] Bacterial Viability Kit, 10 applicator sets, 500 assays	1 kit	L13152
LIVE/DEAD [®] <i>BacLight</i> [™] Bacterial Viability Kit, for microscopy, 1,000 assays	1 kit	L7007
LIVE/DEAD [®] <i>BacLight</i> [™] Bacterial Viability Kit, for microscopy and quantitative assays, 1,000 assays	1 kit	L7012
LIVE <i>BacLight</i> [™] Bacterial Gram Stain Kit, for microscopy and quantitative assays, 1,000 assays	1 kit	L7005
ViaGram [™] Red ⁺ Bacterial Gram Stain and Viability Kit, 200 assays	1 kit	V7023
2-NBDG (2-(N-(7-nitrobenz-2-oxa-1,3-diazol-4-yl)amino)-2-deoxyglucose)	5 mg	N13195
6-NBDG (6-(N-(7-nitrobenz-2-oxa-1,3-diazol-4-yl)amino)-6-deoxyglucose)	5 mg	N23106
Rhodamine 123	25 mg	R302

Enumeration

These kits enable quantitative assessment of bacteria in flow cytometry.

Product	Quantity	Cat. no.
Bacteria Counting Kit, for flow cytometry	1 kit	B7277
LIVE/DEAD® BacLight™ Bacterial Viability and Counting Kit, for flow cytometry, 100 assays	1 kit	L34856

Tracing

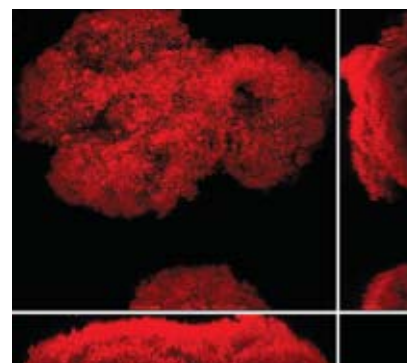
The CFDA SE (in the Vybrant® CFDS SE Cell Tracer Kit) is the most widely used probe for generation analysis of cells and can be detected using a flow cytometer, fluorescence microscope, or fluorescence microplate reader.

Product	Quantity	Cat. no.
Vybrant® CFDA SE Cell Tracer Kit	1 kit	V12883

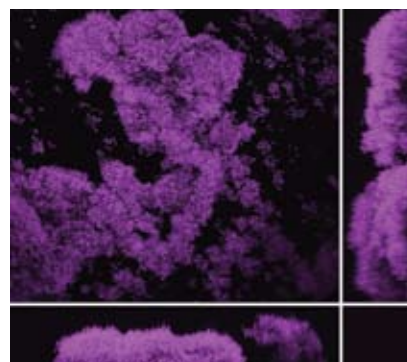
Fluorescent antibiotics

The penicillin-binding proteins on the cytoplasmic membranes of eubacteria can be detected with our BOCILLIN™ FL penicillin products, and the lipopolysaccharide component of the outer membrane of gram-negative bacteria can be labeled using polymyxin B conjugate. The BODIPY® FL-labeled vancomycin is useful for detecting vancomycin binding sites and transport in gram-positive bacteria.

Product	Quantity	Cat. no.
BOCILLIN™ FL penicillin, sodium salt	1 mg	B13233
BOCILLIN™ 650/665 penicillin, sodium salt	1 mg	B13234
Polymyxin B, BODIPY® FL conjugate, trifluoroacetic acid salt, mixed species	100 µg	P13235
Polymyxin B, dansyl conjugate, trifluoroacetic acid salt, mixed species	100 µg	P13238
Vancomycin, BODIPY® FL conjugate, (BODIPY® FL vancomycin)	100 µg	V34850



CellTrace™ calcein red-orange AM applied to a *Staphylococcus epidermidis* biofilm. The esterase substrate CellTrace™ calcein red-orange AM appears to stain all of the bacteria in the biofilm, suggesting that the bacteria are all actively producing esterase. The image was obtained using a Leica TCS-SP2 AOBS confocal microscope and a 63x/0.9 NA water immersion objective. Image contributed by Betsey Pitts, Microscopy Center for Biofilm Engineering, Bozeman, Montana.



CellTrace™ calcein violet AM applied to a *Staphylococcus epidermidis* biofilm. The esterase substrate CellTrace™ calcein violet AM appears to stain all of the bacteria in the biofilm, suggesting that the bacteria are all actively producing esterase. The image was obtained using a Leica TCS-SP2 AOBS confocal microscope with a 63x/0.9 NA water immersion objective, and a Spectra-Physics Mai Tai® two-photon confocal microscope. Image contributed by Betsey Pitts, Microscopy Center for Biofilm Engineering, Bozeman, Montana.



Labeling and Detection Technologies

Lectins

Concanavalin A and wheat germ agglutinins are the most commonly used lectins for the detection of carbohydrates or glycosylation. The products listed here are just a few of the lectin conjugates we have available; find more at probes.invitrogen.com.



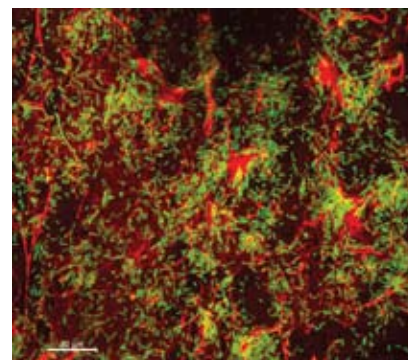
FM[®] 1-43 applied to a *Pseudomonas aeruginosa* biofilm. FM[®] 1-43 appears to bind to the cell membrane, and has been shown to work equally well on *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, and *Escherichia coli*, exhibiting exceptional cell specificity in each case. The image was obtained using a Leica TCS-SP2 AOBS confocal microscope and a 63x/0.9 NA water immersion objective. Image contributed by Betsey Pitts, Microscopy Center for Biofilm Engineering, Bozeman, Montana.

Product	Quantity	Cat. no.
Concanavalin A, Alexa Fluor [®] 488 conjugate	5 mg	C11252
Concanavalin A, Alexa Fluor [®] 594 conjugate	5 mg	C11253
Concanavalin A, Alexa Fluor [®] 647 conjugate	5 mg	C21421
Isolectin GS-IB4 from <i>Griffonia simplicifolia</i> , Alexa Fluor [®] 488 conjugate	500 µg	I21411
Isolectin GS-IB4 from <i>Griffonia simplicifolia</i> , Alexa Fluor [®] 594 conjugate	500 µg	I21413
Isolectin GS-IB4 from <i>Griffonia simplicifolia</i> , Alexa Fluor [®] 647 conjugate	500 µg	I32450
Lectin PHA-L from <i>Phaseolus vulgaris</i> (red kidney bean), Alexa Fluor [®] 488 conjugate	1 mg	L11270
Lectin PHA-L from <i>Phaseolus vulgaris</i> (red kidney bean), Alexa Fluor [®] 594 conjugate	1 mg	L32456
Lectin PHA-L from <i>Phaseolus vulgaris</i> (red kidney bean), Alexa Fluor [®] 647 conjugate	1 mg	L32457
Lectin PNA from <i>Arachis hypogaea</i> (peanut), Alexa Fluor [®] 488 conjugate	1 mg	L21409
Lectin PNA from <i>Arachis hypogaea</i> (peanut), Alexa Fluor [®] 594 conjugate	1 mg	L32459
Lectin PNA from <i>Arachis hypogaea</i> (peanut), Alexa Fluor [®] 647 conjugate	1 mg	L32460
Lectin SBA from <i>Glycine max</i> (soybean), Alexa Fluor [®] 488 conjugate	1 mg	L11272
Lectin SBA from <i>Glycine max</i> (soybean), Alexa Fluor [®] 594 conjugate	1 mg	L32462
Lectin SBA from <i>Glycine max</i> (soybean), Alexa Fluor [®] 647 conjugate	1 mg	L32463
Wheat germ agglutinin, Alexa Fluor [®] 488 conjugate	5 mg	W11261
Wheat germ agglutinin, Alexa Fluor [®] 594 conjugate	5 mg	W11262
Wheat germ agglutinin, Alexa Fluor [®] 633 conjugate	5 mg	W21404

Biofilms

Most of our stains have been developed using planktonic organisms (free-living cultures). The products listed here are useful for detecting biofilms (organisms attached to surfaces), which are composed of microbial cells and extracellular polymeric matrix.

Product	Quantity	Cat. no.
pHrodo™, succinimidyl ester (SE)	1 mg	P36600
SYTO® 9 green fluorescent nucleic acid stain, 5 mM solution in DMSO	100 µl	S34854
SYTO® 59 red fluorescent nucleic acid stain, 5 mM solution in DMSO	100 µl	S11341
BacLight™ RedoxSensor™ CTC Vitality Kit, for flow cytometry and microscopy	1 kit	B34956
FM® 1-43 (N-(3-triethylammoniumpropyl) -4-(4-(dibutylamino)styryl) pyridinium dibromide)	1 mg	T3163
FM® 4-64 (N-(3-triethylammoniumpropyl) -4-(6-(4-(diethylamino) phenyl)hexatrienyl)pyridinium dibromide)	1 mg	T3166
LIVE/DEAD® Yeast Viability Kit, 1000 assays	1 kit	L7009
Calcein, AM	20 × 50 µg	C3100MP
CellTrace™ calcein red-orange, AM	20 × 50 µg	C34851
CellTrace™ calcein violet, AM, for 405 nm excitation	20 × 25 µg	C34858
BODIPY® 630/650-X, SE	5 mg	D10000
DAPI (4',6-diamidino-2-phenylindole, dihydrochloride)	10 mg	D1306
BrdU (5-bromo-2'-deoxyuridine)	100 mg	B23151
Anti-BrdU, Alexa Fluor® 488 conjugate	350 µl	A21303
Propidium iodide, solution	10 ml	P3566
Propidium iodide, solid	100 mg	P1304MP
LIVE/DEAD® BacLight™ Bacterial Viability Kit, 10 applicator sets, 500 assays	1 kit	L13152
LIVE/DEAD® BacLight™ Bacterial Viability Kit, for microscopy and quantitative assays, 1,000 assays	1 kit	L7012
LIVE/DEAD® BacLight™ Bacterial Viability Kit, for microscopy, 1,000 assays	1 kit	L7007



BODIPY® 630/650-X SE applied to a *Pseudomonas aeruginosa* biofilm. BODIPY® 630/650-X SE binds to a *Pseudomonas aeruginosa* PAO1 pMF230 matrix (red). The bacteria are engineered to produce Green Fluorescent Protein (GFP, green). The image was obtained using a Leica TCS-SP2 AOB5 confocal microscope and a 63×/0.9 NA water immersion objective. Image contributed by Betsey Pitts, Microscopy Center for Biofilm Engineering, Bozeman, Montana.



Labeling and Detection Technologies

BioParticles® labeled bacteria

These dead, fluorescently labeled bacteria or zymosan particles can be used for phagocytosis and other feeding studies.

Product	Quantity	Cat. no.
pHrodo™ <i>E. coli</i> BioParticles® conjugate for phagocytosis	5 × 2 mg	P35361
<i>Escherichia coli</i> BioParticles®, Alexa Fluor® 488 conjugate	2 mg	E13231
<i>Escherichia coli</i> BioParticles®, Alexa Fluor® 594 conjugate	2 mg	E23370
<i>Escherichia coli</i> BioParticles®, fluorescein conjugate	10 mg	E2861
<i>Escherichia coli</i> BioParticles®, tetramethylrhodamine conjugate	10 mg	E2862
<i>Escherichia coli</i> BioParticles®, Texas Red® conjugate	10 mg	E2863
<i>Escherichia coli</i> BioParticles®, BODIPY® FL conjugate	10 mg	E2864
<i>Escherichia coli</i> BioParticles®, opsonizing reagent	1 U	E2870
<i>Staphylococcus aureus</i> BioParticles®, Alexa Fluor® 488 conjugate	2 mg	S23371
<i>Staphylococcus aureus</i> BioParticles®, Alexa Fluor® 594 conjugate	2 mg	S23372
<i>Staphylococcus aureus</i> BioParticles®, fluorescein conjugate	10 mg	S2851
<i>Staphylococcus aureus</i> BioParticles®, BODIPY® FL conjugate	10 mg	S2854
<i>Staphylococcus aureus</i> BioParticles®, unlabeled conjugate	100 mg	S2859
<i>Staphylococcus aureus</i> BioParticles®, opsonizing reagent	1 U	S2860
Zymosan A BioParticles®, Alexa Fluor® 488 conjugate	2 mg	Z23373
Zymosan A BioParticles®, Alexa Fluor® 594 conjugate	2 mg	Z23374
Zymosan A BioParticles®, fluorescein conjugate	10 mg	Z2841
Zymosan A BioParticles®, Texas Red® conjugate	10 mg	Z2843
Zymosan A BioParticles®, unlabeled	100 mg	Z2849
Zymosan A opsonizing reagent	1 U	Z2850

Cholera toxins

Cholera toxins are useful in the labeling of surface molecules for some bacteria, most notably *Campylobacter jejuni*.

Product	Quantity	Cat. no.
Cholera toxin subunit B (recombinant), Alexa Fluor® 488 conjugate	500 µg	C22841
Cholera toxin subunit B (recombinant), Alexa Fluor® 594 conjugate	500 µg	C22842
Cholera toxin subunit B (recombinant), Alexa Fluor® 555 conjugate	500 µg	C22843
Cholera toxin subunit B (recombinant), Alexa Fluor® 488 conjugate	100 µg	C34775
Cholera toxin subunit B (recombinant), Alexa Fluor® 555 conjugate	100 µg	C34776
Cholera toxin subunit B (recombinant), Alexa Fluor® 594 conjugate	100 µg	C34777
Cholera toxin subunit B (recombinant), Alexa Fluor® 647 conjugate	100 µg	C34778
Cholera toxin subunit B (recombinant), biotin-XX conjugate	100 µg	C34779
Cholera toxin subunit B (recombinant), horseradish peroxidase conjugate	100 µg	C34780

Yeast

Viability and vitality

The FUN®-1 yeast viability indicator is available with Calcofluor White M2R (a fungal cell wall stain) in the LIVE/DEAD® Yeast Viability Kit or as a stand-alone reagent. For viability determinations based on two nucleic acid stains, we offer the LIVE/DEAD® *FungaLight*™ Yeast Viability Kit—live yeast are green fluorescent and dead yeast are red fluorescent. Additionally, we offer a *FungaLight*™ CFDA, AM/Propidium Iodide Yeast Vitality Kit that uses a nucleic acid stain to mark dead cells and an esterase substrate, CFDA AM, as an indicator of vitality. CFDA AM is also available separately.

Product	Quantity	Cat. no.
LIVE/DEAD® Yeast Viability Kit, 1000 assays	1 kit	L7009
FUN® 1 cell stain, 10 mM solution in DMSO	100 µl	F7030
LIVE/DEAD® <i>FungaLight</i> ™ Yeast Viability Kit, for flow cytometry	1 kit	L34952
<i>FungaLight</i> ™ CFDA, AM/Propidium Iodide Yeast Vitality Kit, for flow cytometry	1 kit	F34953
5-CFDA, AM (5-carboxyfluorescein diacetate, acetoxymethyl ester)	5 mg	C1354

Vacuole and organelle markers

FM® 4-64 has been reported to selectively stain yeast vacuolar membranes with red fluorescence (excitation/emission maxima ~515/640 nm). This lipophilic styryl dye is an important tool for visualizing vacuolar organelle morphology and dynamics, for studying the endocytic pathway, and for screening and characterizing yeast endocytosis mutants. We also have a collection of antibodies targeted to vacuolar markers and to mitochondrial membranes.

Product	Quantity	Cat. no.
FM® 4-64 (N-(3-triethylammoniumpropyl)-4-(6-(4-(diethylamino)phenyl)hexatrienyl)pyridinium dibromide)	1 mg	T3166
Anti-alkaline phosphatase (yeast vacuolar), mouse IgG1, monoclonal 1D3, in conditioned culture medium	2.5 ml	A6458
Anti-carboxypeptidase Y (yeast vacuolar), mouse IgG1, monoclonal 10A5 (anti-CPY)	250 µg	A6428
Anti-H+-ATPase 69 kDa subunit (yeast vacuolar), mouse IgG2a, monoclonal 8B1	250 µg	A6422
Anti-H+-ATPase 100 kDa subunit (yeast vacuolar), mouse IgG2a, monoclonal 10D7	250 µg	A6426
Anti-H+-ATPase 60 kDa subunit (yeast vacuolar), mouse IgG1, monoclonal 13D11	250 µg	A6427
Anti-OxPhos Complex IV subunit II (yeast), mouse IgG2a, monoclonal 4B12 (anti-cytochrome oxidase subunit II (yeast))	250 µg	A6407
Anti-OxPhos Complex IV subunit III (yeast), mouse IgG2a, monoclonal DA5 (anti-cytochrome oxidase subunit III (yeast))	250 µg	A6408
Anti-porin (yeast mitochondrial), mouse IgG1, monoclonal 16G9	250 µg	A6449
Yeast Mitochondrial Stain Sampler Kit	1 kit	Y7530
Yeast Vacuole Marker Sampler Kit	1 kit	Y7531
Yeast vacuole membrane marker MDY-64	1 mg	Y7536



Labeling and Detection Technologies

Other antibodies

These antibodies are specific for the detection of late-Golgi compartment of yeast, yeast endosomal compartment, the detection of yeast cytosol, and the yeast endoplasmic reticulum.

Product	Quantity	Cat. no.
Anti-dolichol phosphate mannose synthase (yeast), mouse IgG1, monoclonal 5C5	250 µg	A6429
Anti-Pep12p (yeast), mouse IgG1, monoclonal 2C3, 0.5 mg/ml	100 µl	A21273
Anti-3-phosphoglycerate kinase (yeast), mouse IgG1, monoclonal 22C5 (anti-PGK)	250 µg	A6457
Anti-Vps10p (yeast), mouse IgG2a, monoclonal 18C8, 0.5 mg/ml	500 µl	A21274

Viruses

One of the detectable features of a virion is its nucleic acid. These SYBR® nucleic acid stains exhibit >1000 fold fluorescence enhancement upon nucleic acid binding with high quantum yield. These stains have been used to detect and enumerate viruses.

Product	Quantity	Cat. no.
SYBR® Gold nucleic acid gel stain, 10,000X concentrate in DMSO	500 µl	S11494
SYBR® Green I nucleic acid gel stain, 10,000X concentrate in DMSO	20 × 50 µl	S7585

Related products for fluorescence-based applications

Antifade reagents

Product	Quantity	Cat. no.
ProLong® Gold antifade reagent	10 ml	P36930
SlowFade® Gold antifade reagent	10 ml	S36936

Molecular biology products

Product	Quantity	Cat. no.
SYBR® Green I nucleic acid gel stain, 10,000X concentrate in DMSO	20 × 50 µl	S7585
SYBR® Safe DNA gel stain, 10,000X concentrate in DMSO	400 µl	S33102

Antibody labeling kits

Alexa Fluor® Monoclonal Antibody Labeling Kits—Please visit our website at www.invitrogen.com/alexaproteinlabeling.

Zenon® Antibody Labeling Kits—Please visit our website at probes.invitrogen.com/zenon.

Secondary detection and signal amplification—Please visit our website at probes.invitrogen.com/signalamp.

Alexa Fluor® Secondary Antibodies
Tyramide Signal Amplification Kits

Fluorescence *in situ* hybridization—Please visit our website at www.invitrogen.com/nalabeling.

ARES™ DNA Labeling Kits
Nucleic Acid Labeling

Custom oligos— Please visit our website at www.invitrogen.com/oligos.

RT-PCR and qPCR

Easy, convenient qPCR detection with SYBR® GreenER™ qPCR Reagent—Please visit our website at www.invitrogen.com/sybrgreener.

Nucleic acid and protein quantitation—Please visit our website at probes.invitrogen.com/qubit.

The Qubit™ fluorometer delivers:

- Selective quantitation—more accurate than UV absorbance readings
- High sensitivity—use as little as 1 µl of sample for quantitation
- An intuitive integrated system—sophisticated quantitation in 5 minutes or less

Cloning—Please visit our website at www.invitrogen.com/cloning.



The Qubit™ fluorometer



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