INNOVATION WITHIN REACH

InvivoGen

NEW PRODUCT CATALOG

Mammalian Cell Expression & Innate Immunity

NEW PRODUCT CATALOG

& Complete Product Price List

Known for quality and reliability, InvivoGen's products promote the advancement of life sciences by providing cutting-edge tools to the research community. We take pride in our ability to take recent scientific discoveries and quickly turn them into trustworthy products. Each year our library of products matures and evolves.

In 2014, we stayed true to this effort and developed a number of innovative products designed to accelerate discovery. As the leading supplier of products for the study of innate immunity, we continuously expand our collections of PRR ligands, reporter cells, inhibitors, antibodies and vaccine adjuvants.

The **2014 New Product Catalog** introduces you to these new offerings and more:

Normocure™ TLR Reporter Cells **Hygromycin B Gold**
Dectin-1 Ligands **pFUSEN-Fc** STING Reporter Cells **R406**
VX-765 Cyclic dinucleotides **Multi-TLR Array** Antibody Generation
TLR9 Ligand Discovery Kits **Streptavidin-Lucia** Soluble Receptors
2'3'-cGAMP VacciGrade™ IFN Reporter Cells **SB 216763**

In each new product page, you will find tables listing related products already described in the **2012-2013 Catalog 1** (Innate Immunity) or **Catalog 2** (Mammalian Cell Expression).

Use this new catalog as a supplement to the 2012-2013 Catalogs, you already have in your laboratory.

For a more in-depth look at InvivoGen's products, please visit **www.invivogen.com**.

Our website offers detailed information regarding all our current products and services, from product references to technical datasheets and downloadable mini-reviews and newsletters. If there is something you are looking for that you cannot find in this catalog or on our website, please let us know. We are always looking for new ways to bring **innovation within reach**.

Complete 2014 Product Price List

You will find a complete product directory containing all products offered by InvivoGen and a 2014 price list in the Product Information section at the end of the 2014 New Product Catalog.

ORDERING INFORMATION

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9:00 AM to 5:00 PM PST

Order by Fax (24 hours)

(+1) 858 457 5843

Order by E-mail (24 hours)

sales@invivogen.com

To Place an Order

Include the following information:

1. Institution or customer account number
2. Shipping address
3. Billing address
4. Purchase order number
5. Name and telephone number of end user
6. Name and telephone number of purchasing agent
7. Quantity, catalog code, and the description of the product(s)
8. For Visa, MasterCard or American Express orders, please provide card number, expiration date, verification number and name on the card.

*If you are placing an order from a country within the European Community please include your VAT registration number so the proper VAT treatment can be applied.

Shipping Information

All products are shipped via 2-3 day express air, unless specified otherwise. Shipments can be expedited to overnight service for an additional fee. Orders for temperature sensitive products are packaged with 8 lbs of dry ice and are shipped overnight express. Shipping and handling charges are pre-paid by InvivoGen and added to the invoice. Charges will vary by package weight and destination. Orders received after 2:00 p.m. Pacific Time will be processed the next business day. All domestic shipments are shipped via InvivoGen's designated carrier. If another carrier is specified, a customer carrier account number must be provided and InvivoGen cannot guarantee delivery time. All orders shipped via alternate carrier are subject to a handling fee to be added to the invoice. Shipping days are Monday through Friday except for items that must ship on dry ice. Items shipping on dry ice are shipped Monday through Wednesday.

To reduce shipping costs and delivery delays, all European orders are shipped from InvivoGen Europe, in France. European orders must be accompanied by the institution's VAT registration number.

Online Ordering

Orders may be placed online at invivogen.com. Simply register online to set up an account and add the products you wish to purchase to your cart (international customers may need to order through a local distributor). If you already know the catalog codes for the products you wish to order you may enter them directly using our Quick Order option at http://www.invivogen.com/quickorder.php. Orders can also be placed via e-mail to sales@invivogen.com for orders in the US and sales@invivogen.fr for orders in Europe. All orders online will receive e-mail confirmation when orders are shipped.

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MICROBIAL CONTAMINATION

Microbial contamination of cell cultures is easily the most common problem encountered in cell culture laboratories, sometimes with very serious consequences. The use of infected cell lines can lead to unreliable experiments and unsafe biologicals and biopharmaceutical drugs, and is costly in time and materials. Microbial contamination falls into two groups; those that can be easily detected (e.g. bacteria, yeast and fungi) and those that are more difficult to detect (e.g. mycoplasma). While it is impossible to eliminate contamination entirely, it is possible to reduce its frequency and seriousness by gaining a thorough understanding of their sources and by following good aseptic technique.

Mycoplasma Contamination

Mycoplasmas are the smallest and simplest self-replicating organisms. They lack a rigid cell wall and grow mostly associated with the mammalian cell membranes. In most cases, there are no signs of mycoplasma contamination. They cannot be detected by visual inspection and do not cause consistent perceptible changes in a cell culture, such as rapid pH change and medium turbidity. Thus, mycoplasmas commonly remain undetected in the cell cultures for long periods. Mycoplasmas can cause disastrous effects on eukaryotic cells, as they can alter every cellular parameter, from proliferation to virus susceptibility and production, leading to unreliable experimental results and potentially unsafe biological products[1, 2]. This is a serious problem, as 5 to 35% of cell-lines worldwide are infected with mycoplasmas[2-4].

Bacterial Contamination

Although bacterial contamination can be detected using a light microscope, it is easy to mistake it for cellular debris, especially when the baterial contamination is in the early stages of infection. Signs of bacterial contamination include signs of mobility and a sudden decrease in pH with the culture media changing to a yellowish color. Bacteria are a large and ubiquitous group of unicellular microorganisms. They are typically a few micrometers in diameter, and can have a variety of shapes, ranging from spheres to rods and spirals. Because of their ubiquity, size, and fast growth rates, bacteria are the most commonly encountered biological contaminants in cell culture[5, 6].

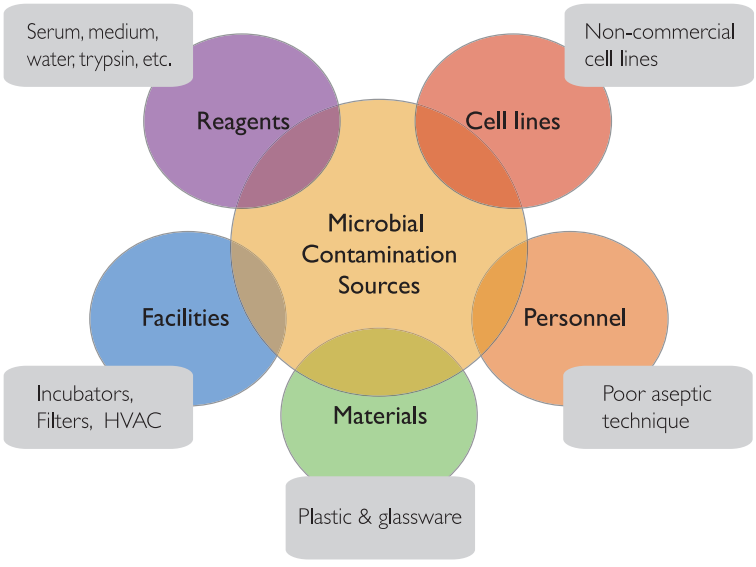
Fungal Contamination

With yeast, molds and fungi, the pH of the culture remains stable in the initial stages of contamination, then rapidly increases as the culture become more heavily infected and becomes turbid. Under microscopy, the fungi usually appears as long thin filaments, while yeast are round or oval bodies that can form chains or clusters[7]. In the advanced stages of contamination, fuzzy patches can be easily seen in the culture[8]. Fungal contamination presents difficulties for eradication, as it can spread via spore mobility in air. Spores of many fungal species can survive extremely harsh and inhospitable environments in their dormant stage, only to become activated when they encounter suitable growth conditions. Cell cultures can often be cured of fungal contamination when detected early and treated with certain antibiotics.

Endotoxin Contamination

Endotoxin, also known as lipopolysaccharide (LPS), is the major cell wall component of Gram-negative bacteria. Endotoxin is a potent stimulator of the humoral and cellular response *in vivo*. *In vitro,* endotoxins can introduce a bias in experiments involving cells sensitive to endotoxins[9, 10]. Thus, monitoring the presence of endotoxins in cell culture reagents is crucial. Sources of endotoxins include media, sera, water, buffers and other cell culture reagents, such as trypsin. Other biologically active organic contaminants, that can induce significant experimental variability, include flagellin and lipoproteins. Care needs to be taken with solutions that are sterile but may still contain bacterial components, such as endotoxins, that could interfere with cell cultures.

1. Drexler H. & Uphoff C., 2002. Mycoplasma contamination of cell cultures: Incidence, sources, effects, detection, elimination, prevention. Cytotechnology. 39:75-90. **2. Rottem S. & Barile M., 1993.** Beware of mycoplasma. Trends in biotechnology. 11:143-50. **3. McGarrity G. *et al.*, 1988.** Annual report to international research program in comparative mycoplasmology. International Organization of mycoplasmology. **4. Young L. *et al.*, 2010.** Detection of Mycoplasma in cell cultures. Nature Protocols 5, 929-934. **5 Ryan J., 2008.** Understanding and managing cell culture contamination. Corning Life Sciences, Technical Literature. **6. Lincoln C. & Gabridge M. 1998.** Cell culture contamination: Sources, consequences, prevention, and elimination. Methods in cell biology. 57:49-65. **7. Mather J. & Roberts E., 1998.** Contamination: How to avoid it, recognize it, and get rid of it. In: Introduction to cell and tissue culture: theory and technique. Chapt. 7. p117-9. **8. Nandi S., 2009.** Animal Cell culture and virology. Chapt. 17 p. 99-9. **9. Gould M. *et al.*, 1984.** Endotoxin in vertebrate cell culture: Its measurement and significance. Uses and standardization of vertebrate cell lines. Tissue Culture Association, Gaithersburg, MD. 125-36. **10. Weber M. *et al.*, 1995.** Effects of lipopolysaccharide on transfection efficiency in eukaryotic cells. BioTechniques 19:930-9.



Mycoplasma Detection - PlasmoTest™ (250 samples)

PlasmoTest™ provides a simple, rapid and reliable assay for the visual detection of mycoplasma contamination in cell cultures. This colorimetric assay is the first to utilize cells to signal the presence of mycoplasmas. PlasmoTest™ is provided as a kit, that contains the Mycoplasma sensor cells and all the reagents needed to perform the assay, including positive and negative controls. PlasmoTest™ allows to test up to 500 samples. PlasmoTest™ (250 samples), a smaller size kit, that allows to test up to 250 samples, is now available.

Description

PlasmoTest™ comprises the HEK-Blue™-2 cells and the PlasmoTest™ Reagent Kit, which includes the HEK-Blue™ Detection medium (see below). The HEK-Blue™-2 cells are the Mycoplasma sensor cells. When grown in HEK-Blue™ Detection medium, the cells detect the presence of mycoplasmas leading to a color change of the medium. The Mycoplasma sensor cells recognize mycoplasmas through Toll-Like Receptor 2 (TLR2), a pathogen recognition receptor. In the presence of mycoplasmas, TLR2 initiates a signaling cascade leading to the activation of NF-κB and AP-1. These transcription factors induce the secretion of SEAP (secreted embryonic alkaline phosphatase) in the supernatant which is readily detected by the purple/blue coloration of the HEK-Blue™ Detection medium.

HEK-Blue™-2 cells

The Mycoplasma sensor cells, are engineered HEK293 cells. These cells stably express TLR2 and multiple genes from the TLR2 pathway and coexpress the SEAP reporter gene, placed under the control of a promoter inducible by the transcription factors NF-κB and AP-1.

PlasmoTest™ Reagent Kit

The PlasmoTest™ Reagent Kit contains enough reagents to test up to 500 samples. These reagents are the positive and negative controls, the HEK-Blue™ water (sterile endotoxin-free water) and the following:

▸ **HEK-Blue™ Detection** is a medium specifically designed for the detection of SEAP. It contains a color substrate that produces a purple/blue color following its hydrolysis by SEAP (see p. 29).

▸ **HEK-Blue™ Selection** is a solution that combines several selective antibiotics. These antibiotics guarantee the persistent expression of the various transgenes introduced in HEK-Blue™-2 cells.

▸ **Normocin™** is included in the kit to protect HEK-Blue™-2 cells from any potential microbial contamination, whether caused by mycoplasmas, bacteria or fungi.

Contents

PlasmoTest™ (250 samples) comprises the HEK-Blue™-2 cells (3-7 x 10^6 cells) and the following components:
- HEK-Blue™ Selection (250X - 2 ml)
- HEK-Blue™ Detection (1 pouch to prepare 50 ml)
- HEK-Blue™ water (60 ml)
- Normocin™ (500X - 1 ml)
- Positive control & negative control (1 tube each)

HEK-Blue™-2 cells are shipped on dry ice. All other products are shipped at room temperature.

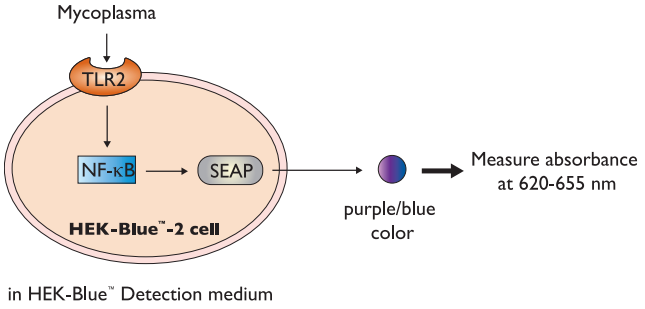
Recent Articles with PLASMOTEST™

Meuris L. *et al.*, 2014. GlycoDelete engineering of mammalian cells simplifies N-glycosylation of recombinant proteins. Nat Biotechnol. [Ahead of print]

Ha H. *et al.*, 2014. A novel phenylcyclohex-1-enecarbothioamide derivative inhibits CXCL8-mediated chemotaxis through selective regulation of CXCR2-mediated signalling. Br J Pharmacol. 171(6):1551-65.

Brizuela L. *et al.*, 2014. Osteoblast-derived sphingosine 1-phosphate to induce proliferation and confer resistance to therapeutics to bone metastasis-derived prostate cancer cells. Mol Oncol. [Ahead of print]

Principle



Principle of PlasmoTest™ - A small volume (20 µl) of the cell culture supernatant is added to the HEK-Blue™-2 cells in HEK-Blue™ Detection medium. Mycoplasmas present in the supernatant are sensed by TLR2 leading to the activation of NF-κB and the production of SEAP in the supernatant. SEAP catalyzes the hydrolysis of a chromogenic substrate contained in HEK-Blue™ Detection medium leading to a purple/blue color, that can be read by a spectrophotometer at 620-655 nm.

PRODUCT	QTY	CAT. CODE
PlasmoTest™ (250 samples)	1 kit	rep-pt1
PlasmoTest™ Reagent Kit	1 kit	rep-ptrk
HEK-Blue™ Detection	5 pouches	hb-det2
HEK-Blue™ Selection	5 x 2 ml	hb-sel
Normocin™	500 mg	ant-nr-1
PlasmoTest™ Controls	200 tests	pt-ctr2

Buy PlasmoTest™ once then reorder only the PlasmoTest Reagent Kit or the reagents separately to perform further assays.

For more information, go to:
www.invivogen.com/plasmotest-kit

Endotoxin Detection - HEK-Blue™ LPS Detection Kit 2

Lipopolysaccharide (LPS), also known as endotoxin, is the major cell wall component of Gram-negative bacteria. LPS is a potent stimulator of the vertebrate innate immune system and can cause fever, septic shock and eventually death. *In vitro*, it can introduce a bias in experiments involving cells sensitive to LPS. Thus, monitoring the presence of LPS in biological reagents is crucial. Current methods for the detection of endotoxins rely on the Limulus Amebocyte Lysate (LAL), an extract of blood cells from an horseshoe crab, that reacts with endotoxin. A major drawback of the LAL test is overcoming assay inhibition. InvivoGen introduces the HEK-Blue™ LPS Detection Kit 2, a simple, rapid and reliable assay to detect the presence of endotoxin in virtually all biological samples, including particulate compounds, such as vaccine adjuvants, and inhibitors of the LAL test. The HEK-Blue™ LPS Detection Kit 2 is a **cell-based colorimetric assay** for the detection of **biologically active endotoxin** that offers a sustainable alternative to the LAL test.

- **Versatile -** Measure endotoxin level in virtually all biological reagents
- **Highly sensitive -** Detect as little as 0.01 EU/ml
- **Economical -** Up to 500 samples can be tested with the kit

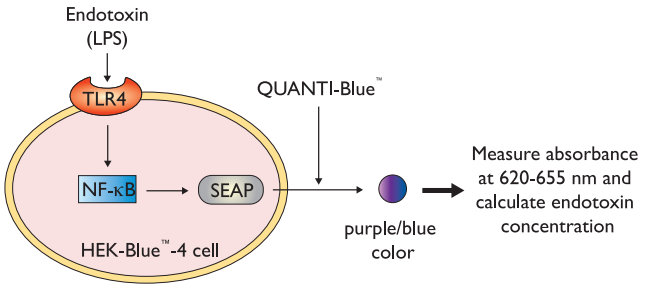
Description

The HEK-Blue™ LPS Detection Kit 2 is a new assay intended for the detection and quantification of biologically active LPS for research purposes. It is based on the activation of Toll-like receptor (TLR) 4, the mammalian endotoxin sensor. TLR4 recognizes structurally different LPS from Gram-negative bacteria. Proprietary cells engineered to become extremely sensitive to LPS, called **HEK-Blue™-4 cells,** are the main feature of this endotoxin detection kit. These cells stably express human TLR4 and an NF-κB-inducible secreted embryonic alkaline phosphatase (SEAP) reporter gene. The presence of minute quantities of LPS, starting as low as 0.01 EU/ml, are detected by the HEK-Blue™-4 cells leading to the activation of NF-κB. Using **QUANTI-Blue™**, a SEAP detection medium that produces a purple/blue color, NF-κB activation can be observed with the naked eye or measured at 620-655 nm. Since the absorbance is in direct proportion to the amount of endotoxin present, the concentration of endotoxin can be calculated from a standard curve obtained using serial dilutions of the **HEK-Blue™ Endotoxin Standard** (a preparation of *E. coli* 055:B5 LPS standardized against FDA approved control standard endotoxin (CSE)).

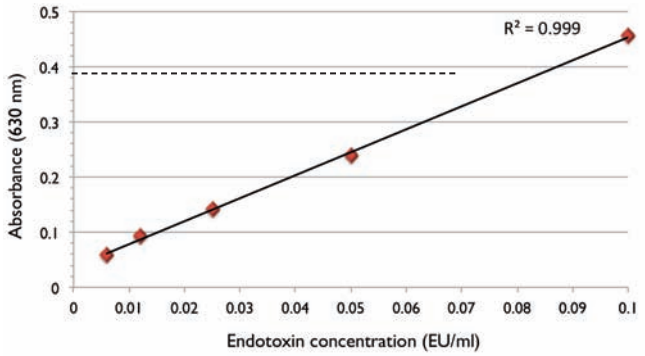
Contents

The HEK-Blue™ LPS Detection Kit 2 is composed of the following components:
- 1 vial of HEK-Blue™-4 cells (3-7 x 10^6 cells)
- 4 tubes of 250X HEK-Blue™ Selection (2 ml each)
- 4 tubes of 500X Normocin™ (1 ml each)
- 1 pouch of QUANTI-Blue™ (100 ml)
- 2 tubes of HEK-Blue™ Endotoxin Standard (50 EU each)
- 1 bottle of endotoxin-free water (50 ml)

Principle



Calculation of Endotoxin Concentration (Graphic Method)



Principle of the HEK-Blue™ LPS Detection Kit 2 - A small volume (20 µl) of the sample or a serial dilution of the HEK-Blue™ Endotoxin Standard is added to the HEK-Blue™-4 cells. Endotoxins present in the sample or standard are sensed by TLR4 leading to the activation of NF-κB and the production of SEAP in the supernatant. When a small volume (20 µl) of the supernatant is combined with QUANTI-Blue™, which contains a SEAP chromogenic substrate, a purple/blue color appears. SEAP is quantitated by measuring the absorbance at 620-655 nm and extrapolating against a standard curve.

PRODUCT	QTY	CAT. CODE
HEK-Blue™ LPS Detection Kit 2	1 kit	rep-lps2
HEK-Blue™ Selection	5 x 2 ml	hb-sel
Normocin™	10 x 1 ml	ant-nr-1
QUANTI-Blue™	5 pouches	rep-qb-1
HEK-Blue™ Endotoxin Standard	10 x 50 EU	rep-hbes-10

Buy the HEK-Blue™ LPS Detection Kit 2 once then reorder only the reagents to perform further assays.

Elimination of bacterial contamination - Normocure™

Bacterial contamination of cell cultures can be devastating when the cell lines used are not commercially available and are often irreplaceable, difficult to obtain, or need rederivation from primary cells. Common antibiotic treatments are not always effective, in particular against nonfermenting Gram-negative bacilli, a heterogenous group of environmental opportunistic bacteria, reported to contaminate cell cultures by laboratories[1]. These bacteria are multidrug resistant and known to be very difficult to eliminate[2]. InvivoGen introduces Normocure™, a novel very potent antibiotic cocktail for the elimination of Gram$^-$ as well as Gram$^+$ bacteria in cell cultures.

Description

Normocure™ is broad-spectrum antibacterial agent highly effective against Gram$^-$ and Gram$^+$ bacteria. Normocure™ contains three bactericidal components belonging to different antibiotic families. They act by inhibiting the protein synthesis or disrupting membrane integrity. Their targets are different and completely absent in eukaryotic cells.

Cell cultures contaminated with bacteria from the environment, such as *Staphylococcus* species[3] and *Achromobacter* species[4], can be efficiently cured by Normocure™ treatment. Unlike most antibiotics used to treat cell cultures, such as Penicillin-Streptomycin, Normocure™ is also active against most multidrug resistant bacteria.

Normocure™ is a sterile solution that can be added directly to the cell culture medium at the recommended concentration of 100 µg/ml. After 3 passages every 3-4 days, the bacterial contamination is totally eliminated. The cytotoxicity of Normocure™ is low, however a slowdown of cell growth may be observed. At the end of the treatment, when Normocure™ is removed from the culture medium, the cells return rapidly to their normal growth rate.

Contents

Normocure™ is provided as a ready-to-use red solution at a concentration of 50 mg/ml. One tube of 1 ml Normocure™ treats 500 ml of cell culture medium. Normocure™ is shipped at room temperature and should be stored at -20°C. Normocure™ is stable 6 months at 4°C and 2 years at -20°C.

PRODUCT	QUANTITY	CAT. CODE
Normocure™	2 x 1 ml (50 mg/ml)	ant-noc

1. Jorgen Fogh, 1973. Contamination in Tissue Culture, published by Academic Press Inc. **2. McGowan JE Jr., 2006.** Resistance in nonfermenting gram-negative bacteria: multidrug resistance to the maximum. Am J Med. 2006 Jun;119(6 Suppl 1):S29-36; discussion S62-70. **3. Mirjalili A, *et al.*, 2005.** Microbial contamination of cell cultures: a 2 years study. Biologicals. 33(2):81–85. **4. Gray JS. *et al.*, 2010.** Got black swimming dots in your cell culture? Identification of Achromobacter as a novel cell culture contaminant. Biologicals. 38(2):273-7.

Also Available

PRODUCT	DESCRIPTION	WORKING CONCENTRATION	QUANTITY	CAT. CODE
Fungin™	Treatment of fungal contaminations	10-50 µg/ml	5 x 1.5 ml (10 mg/ml)	ant-fn-1
Normocin™	Prevention of contamination by mycoplasmas, bacteria, and fungi	100 µg/ml	10 x 1 ml (50 mg/ml) 1 x 20 ml (50 mg/ml)	ant-nr-1 ant-nr-2
Plasmocin™ Prophylactic	Prevention of contamination by mycoplasmas	2.5 µg/ml	10 x 1 ml (2.5 mg/ml)	ant-mpp
Plasmocin™ Treatment	Treatment of mycoplasma contaminations	25 µg/ml	2 x 1 ml (25 mg/ml)	ant-mpt
Plasmocure™	Alternative treatment of mycoplasma contaminations	50 µg/ml	1 x 1 ml (100 mg/ml)	ant-pc
Primocin™	Prevention of contamination by mycoplasmas, bacteria, and fungi in primary cells	100 µg/ml	10 x 1 ml (50 mg/ml) 1 x 20 ml (50 mg/ml)	ant-pm-1 ant-pm-2

For more information, go to www.invivogen.com/cell-culture-contamination

Recent Articles with PLASMOCIN™ & NORMOCIN™

Plasmocin™

Lam AR. *et al.*, 2014. RAE1 Ligands for the NKG2D Receptor Are Regulated by STING-Dependent DNA Sensor Pathways in Lymphoma. Cancer Res. 74(8):2193-203.

Wu SK. *et al.*, 2014. Cortical F-actin stabilization generates apical-lateral patterns of junctional contractility that integrate cells into epithelia. Nat Cell Biol. 16(2):167-78.

Rongvaux A. *et al.*, 2014. Development and function of human innate immune cells in a humanized mouse model. Nat Biotechnol. 32(4):364-72.

Normocin™

Koehler KR & Hashino E., 2014. 3D mouse embryonic stem cell culture for generating inner ear organoids. Nat Protoc. 9(6):1229-44.

Patil HP. *et al.*, 2014. Evaluation of monophosphoryl lipid A as adjuvant for pulmonary delivered influenza vaccine. J Control Release. 174:51-62.

Lee EC. *et al.*, 2014. Complete humanization of the mouse immunoglobulin loci enables efficient therapeutic antibody discovery. Nat Biotechnol. 32(4):356-63.

SELECTIVE ANTIBIOTICS

InvivoGen is a leader in the production of selective antibiotics. We manufacture the largest choice of antibiotics for the selection of stable mammalian cell lines. Our state-of-the-art facilities allow us to produce large quantities of high quality antibiotics at competitive prices. InvivoGen's selective antibiotics are ready-to-use, cell culture-tested solutions, and available from small quantities to bulk.

▸ High Quality
InvivoGen's antibiotics meet rigorous standards to ensure rapid, reliable and reproducible results. They have passed stringent quality control, including verification of potency, purity and stability using microbiological and chromatographic methods.

▸ Ready-to-use Cell Culture Tested Solutions
No weighing needed - Our antibiotics are available as filter-sterilized solutions for customer convenience and validated for cell culture usage.

▸ Endotoxin Tested
InvivoGen's selective antibiotics contain no detectable levels of endotoxin at working concentrations. This eliminates the risk of activating cells that express TLR4 (the receptor for endotoxins), such as immune cells, which can lead to biased results.

▸ Selection in Both Mammalian Cells and *E. coli*
Matches up to the antibiotic resistance genes carried by InvivoGen plasmids, built for selection in both mammalian and bacterial cells.

▸ Antibiotic Resistance Genes
All InvivoGen's antibiotics are paired with resistance genes that are active in both *E. coli* and mammalian cells. They are available in their wild-type form in many plasmids provided by InvivoGen, or as new synthetic alleles devoid of CpGs.

▸ Also Available in Fast-Media®
All our selective antibiotics are available in Fast-Media®, our ready-made *E. coli* selection media, that can be prepared in just 5 minutes without autoclaving. The antibiotics are at the appropriate concentration in pre-mixed LB or TB media for selection of *E. coli* transformants (see p. 18).

Hygromycin B Gold

Description

Hygromycin B is an aminoglycoside antibiotic produced by *Streptomyces hygroscopicus*. It inhibits protein synthesis by interfering with translocation and causing mistranslation at the 70S ribosome. Hygromycin B is effective on most bacteria, fungi and higher eukaryotes. Resistance to hygromycin is conferred by the *hph* gene from *E. coli*. Hygromycin B is normally used at a concentration of 50-200 μg/ml in mammalian cells and 100 μg/ml in bacteria.
Hygromycin B Gold, previously named HygroGold™, is a high purity (>90%) preparation of hygromycin B.

Contents and Storage

Hygromycin B Gold is provided as a 100 mg/ml yellow solution. It is also available as a powder. Hygromycin B Gold products are shipped at room temperature. Store at -20°C. Hygromycin B Gold solution and powder are stable two years when stored at -20°C.

PRODUCT	QUANTITY	CAT. CODE
Hygromycin B Gold	1 g (5 x 2 ml)	ant-hg-1
	5 g (1 x 50 ml)	ant-hg-5
	10 g (powder)	ant-hg-10p

Also Available

SELECTIVE ANTIBIOTIC	SELECTION TARGET	WORKING CONCENTRATION	RESISTANCE GENE	FORMULATION	QUANTITY	CATALOG CODE
Blasticidin	Mammalian cells Bacteria	1 - 10 µg/ml 25 - 100 µg/ml	*Bsr*	Solution	100 mg (10 x 1 ml) 500 mg (50 x 1 ml) 500 mg (1 x 50 ml)	ant-bl-1 ant-bl-5 ant-bl-5b
				Powder	1 g	ant-bl-10p
G418 Sulfate	Mammalian cells	400 - 1000 µg/ml	*Neo*	Solution	1 g (10 x 1 ml) 5 g (1 x 50 ml)	ant-gn-1 ant-gn-5
Phleomycin	Fungi, yeasts	10 - 150 µg/ml	*Sh ble*	Solution	100 mg (5 x 1 ml) 500 mg (25 x 1 ml) 500 mg (1 x 25 ml)	ant-ph-1 ant-ph-5 ant-ph-5b
				Powder	250 mg 500 mg 1 g	ant-ph-2p ant-ph-5p ant-ph-10p
Puromycin	Mammalian cells Bacteria	1 - 10 µg/ml 100 µg/ml	*Pac*	Solution	100 mg (10 x 1 ml) 500 mg (50 x 1 ml) 500 mg (1 x 50 ml)	ant-pr-1 ant-pr-5 ant-pr-5b
Zeocin™	Mammalian cells Bacteria	50 - 300 µg/ml 25 µg/ml	*Sh ble*	Solution	1 g (10 x 1 ml) 5 g (50 x 1 ml) 5 g (1 x 50 ml)	ant-zn-1 ant-zn-5 ant-zn-5b
				Powder	1 g 5 g	ant-zn-1p ant-zn-5p

For more information, go to www.invivogen.com/selective-antibiotics

Recent Articles with InvivoGen's SELECTIVE ANTIBIOTICS

Blasticidin

Liu P. *et al.*, 2014. Cell-cycle-regulated activation of Akt kinase by phosphorylation at its carboxyl terminus. Nature. 508(7497):541-5.

Rajala N. *et al.*, 2014. Replication factors transiently associate with mtDNA at the mitochondrial inner membrane to facilitate replication. Nucleic Acids Res. 42(2):952-67.

Yang X. *et al.*, 2014. Targeting the tumor microenvironment with interferon-β bridges innate and adaptive immune responses. Cancer Cell. 25(1):37-48.

G418 Sulfate

Berger A. *et al.*, 2013. PAK-dependent STAT5 serine phosphorylation is required for BCR-ABL-induced leukemogenesis. Leukemia. 28(3):629-41.

Di K. *et al.*, 2013. TRIM11 is overexpressed in high-grade gliomas and promotes proliferation, invasion, migration and glial tumor growth. Oncogene. 32(42):5038-47.

Deniger DC. *et al.*, 2013. Bispecific T-cells expressing polyclonal repertoire of endogenous γδ T-cell receptors and introduced CD19-specific chimeric antigen receptor. Mol Ther. 21(3):638-47.

HygroGold™

Raschi E. *et al.*, 2014. β2-glycoprotein I, lipopolysaccharide and endothelial TLR4: Three players in the two hit theory for anti-phospholipid-mediated thrombosis. J Autoimmun. [Ahead of print].

Basile KJ. *et al.*, 2013. In vivo MAPK reporting reveals the heterogeneity in tumoral selection of resistance to RAF inhibitors. Cancer Res. 73(23):7101-10.

Ben Haij N. *et al.*, 2013. HIV-1 Tat protein binds to TLR4-MD2 and signals to induce TNF-α and IL-10. Retrovirology. 10:123.

Phleomycin

Jones NG. *et al.*, 2014. Regulators of Trypanosoma brucei cell cycle progression and differentiation identified using a kinome-wide RNAi screen. PLoS Pathog. 10(1):e1003886.

Sizova I. *et al.*, 2013. Nuclear gene targeting in Chlamydomonas using engineered zinc-finger nucleases. Plant J. 73(5):873-82.

Santhanam P. *et al.*, 2013. Evidence for functional diversification within a fungal NEP1-like protein family. Mol Plant Microbe Interact. 26(3):278-86.

Puromycin

Wiel C. *et al.*, 2014. Endoplasmic reticulum calcium release through ITPR2 channels leads to mitochondrial calcium accumulation and senescence. Nat Commun. 5:3792.

Müller K. *et al.*, 2014. Control of gene expression using a red- and far-red light-responsive bi-stable toggle switch. Nat Protoc. 9(3):622-32.

Grzmil M. *et al.*, 2014. MNK1 pathway activity maintains protein synthesis in rapalog-treated gliomas. J Clin Invest. 124(2):742-54.

Zeocin™

Antoniak S. *et al.*, 2013. PAR-1 contributes to the innate immune response during viral infection. J Clin Invest. 123(3):1310-22.

Ivanov SS & Roy CR., 2013. Pathogen signatures activate a ubiquitination pathway that modulates the function of the metabolic checkpoint kinase mTOR. Nat Immunol. 14(12):1219-28.

Rössger K. *et al.*, 2013. Reward-based hypertension control by a synthetic brain-dopamine interface. PNAS. 110(45):18150-5.

2 MAMMALIAN EXPRESSION VECTORS

CLONING VECTORS

InvivoGen offers a large collection of cloning vectors designed for many different applications. These plasmids allow high levels of expression of one or two genes or shRNAs, native or tagged genes, *in vitro* and/or *in vivo*. They are available with a choice of selectable markers that can be used in both *E. coli* and mammalian cells.

PLASMIDS	APPLICATION	SELECTION	FEATURES
pFUSE-Fc & pFUSEN-Fc NEW	**Generation of Fc-Fusion Proteins in C- or N-Terminal**	- Zeocin™	- IgG Fc regions of human, mouse, rabbit or rat origin - Fc regions with or without introns - Native or engineered Fc regions - Untagged or Lucia-tagged Fc regions
pMONO	**Expression of One Gene of Interest**	- Blasticidin - Hygromycin B - Kanamycin / G418 - Zeocin™	- Single transcription unit - Strong and constitutive promoter
pSELECT	**Expression of One Gene of Interest**	- Blasticidin - Hygromycin B - Kanamycin / G418 - Puromycin - Zeocin™ - GFP-Zeocin™	- Two transcription units - Strong and constitutive promoters
pSELECT-Tag	**Expression of a Tagged Gene**	- Blasticidin - Zeocin™	- GFP, HA, His or Lucia luciferase tag - Two transcription units - Strong and constitutive promoters
pVITRO	**Expression of Two Genes of Interest *in vitro***	- Blasticidin - Hygromycin B - Kanamycin / G418	- Two transcription units - Choice of strong and constitutive promoters - With 2 MCS or choice of 2 reporters (GFP/LacZ, GFP/SEAP, Lucia/SEAP)
pVIVO	**Expression of Two Genes of Interest *in vivo***	- Hygromycin B (*E. coli*)	- Two transcription units - Choice of inducible or constitutive promoters - With 2 MCS or choice of 2 reporters (GFP/LacZ, GFP/SEAP, Lucia/SEAP)
pFUSE-CHIg & pFUSE2-CLIg	**Generation of Recombinant Antibodies of All Isotypes**	- Blasticidin (pFUSE2-CLIg) - Zeocin™ (pFUSE-CHIg)	- Constant regions of heavy and light chains - Kappa and lambda light chains - α, δ, ε, γ and μ heavy chains - Two transcription units - Untagged or Lucia-tagged heavy chains
pCpGfree	**Sustained *in vivo* gene or shRNA expression or promoter CpG methylation studies**	- Zeocin™	- CpG-free plasmid backbone - With MCS or reporter (LacZ, mSEAP, Lucia)
psiRNA	**Expression of shRNA(s)**	- Zeocin™	- Human 7SK RNA Pol III promoter - White and blue selection

For more information, go to www.invivogen.com/vectors

Fc-Fusion Proteins (N-Terminal) - pFUSEN-Fc

Fc fusion proteins are molecules consisting of an immunoglobulin Fc domain fused genetically to a protein of interest, such as an extracellular domain of a receptor, ligand, enzyme, or peptide. The Fc domain comprises the CH2 and CH3 regions of the IgG heavy chain and the hinge region. Fusion to an Fc domain endows the hybrid protein with additional biological and biophysical properties:

- **increased serum half-life**, owing to the binding of the Fc domain to the salvage neonatal Fc receptor (FcRn) and the larger size of the molecule which limits renal clearance
- **effector functions** through interaction with Fc receptors (FcgRs), a feature particularly important for oncology and vaccine applications
- **improved solubility and stability** of the partner molecule both *in vitro* and *in vivo*
- **easy, cost-effective purification** by protein G/A affinity chromatography

These beneficial antibody-like properties make Fc fusion proteins an attractive platform for the development of therapeutic drugs.

InvivoGen introduces **pFUSEN-Fc**, a new family of plasmids that allows the fusion of an Fc domain to the **N-terminus** of a protein of interest.

Description

pFUSEN-Fc plasmid features a secretion cassette comprising, in its 5' to 3' direction, the signal sequence of interleukin 2 (IL-2), an immunoglobulin Fc domain and cloning sites to insert the protein of interest.
pFUSEN-Fc plasmids are selectable with Zeocin™ in *E. coli* and mammalian cells. They can be used for transient or stable transfection.

Immunoglobulin Fc domains

- **Human IgG1-Fc** exhibits moderate to high affinity for FcγRs and complement receptors, thus triggering strong ADCC and CDC, respectively. Currently, all Fc-fusions licensed for clinical use contain the IgG1-Fc domain.
- **Human IgG1e2-Fc** contains mutations in the site of interaction of IgG1 with FcRn that enhance the plasma half-life by increasing the affinity of IgG1 for FcRn.
- **Human IgG2-Fc** displays low affinity towards FcγRs and complement receptors. This Fc domain is more suitable for applications for which ADCC and CDC are not desirable.
- **Mouse IgG2a-Fc** is the murine equivalent of human IgG1-Fc. It has moderate to high affinity for FcγRs and complement receptors, inducing strong ADCC and CDC.

Lucia-Tagged Fc-Fusion Proteins

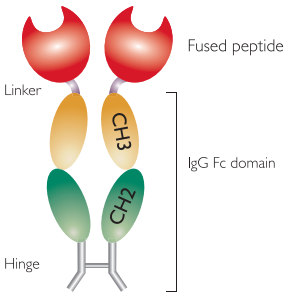
Lucia is a novel secreted luciferase reporter protein with advantageous characteristics when associated with Fc-fusion proteins. It possesses superior carrier ability for excellent secretion of the chimeric protein. It provides a simple means to screen for recombinant clones and it minimally affects the activity of the protein of interest.

Examples of N-terminal Fc fusions

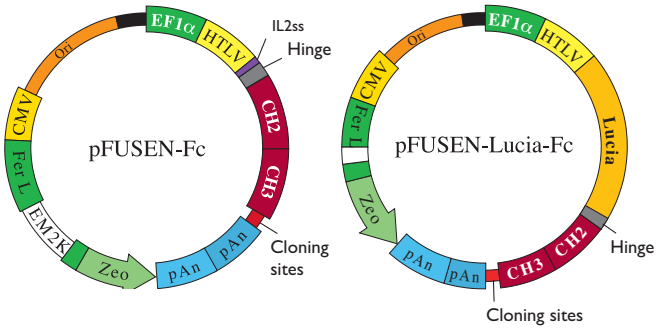
InvivoGen provides Dectin-1 soluble receptors fused to the human IgG1-Fc region (see p. 51). These N-terminal Fc fusions were generated using the pFUSEN-hG1Fc plasmid and purified by protein G affinity chromatography.

Contents and Storage

Each pFUSEN plasmid is provided as 20 µg of lyophilized DNA. Product is shipped at room temperature and should be stored at -20°C for up to one year. Each pFUSEN plasmid is provided with 4 pouches of *E. coli* Fast-Media® Zeo (2 TB and 2 Agar).



Schematic representation of a N-terminal Fc fusion



PRODUCT	QUANTITY	CAT. CODE
pFUSEN-hG1Fc	20 µg	pfcn-hg1
pFUSEN-hG1e2Fc	20 µg	pfcn-hg1e2
pFUSEN-hG2Fc	20 µg	pfcn-hg2
pFUSEN-mG2aFc	20 µg	pfcn-mg2
pFUSEN-Lucia-hG1Fc	20 µg	pfcn-lchg1
pFUSEN-Lucia-hG1e2Fc	20 µg	pfcn-lchg1e2
pFUSEN-Lucia-hG2Fc	20 µg	pfcn-lchg2
pFUSEN-Lucia-mG2aFc	20 µg	pfcn-lcmg2a

Engineered Fc Regions - pFUSE-Fc engineered

Engineering the Fc region of a therapeutic monoclonal antibody or Fc fusion protein allows the generation of molecules that are better suited to the pharmacology activity required of them. Exchanging amino acids in the protein backbone results in increased half-life and altered ADCC and/or CDC activity. InvivoGen provides a series of pFUSE-Fc plasmids featuring engineered Fc regions. Listed below are new additions. For a complete list, go to http://www.invivogen.com/engineered-pfuse-fc.

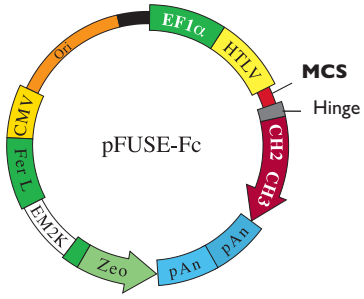
PRODUCT	ISOTYPE	MUTATIONS (ref.)	EFFECTOR FUNCTION	QTY	CAT. CODE (No IL2ss)	CAT. CODE (With IL2ss)
pFUSE-hIgG1e11-Fc	Human IgG1	M252Y/S254T/T256E (1)	Increased binding to FcRn Increased half-life	20 µg	pfc1-hg1e11	pfc2-hg1e11
pFUSE-hIgG1e12-Fc	Human IgG1	M428L/N434A (2)	Increased binding to FcRn Increased half-life	20 µg	pfc1-hg1e12	pfc2-hg1e12
pFUSE-hIgG1e13-Fc	Human IgG1	I253A (3)	Decreased binding to FcRn Enhanced antibody clearance	20 µg	pfc1-hg1e13	pfc2-hg1e13

1. Oganesyan V., *et al.,* 2009. Structural characterization of a human Fc fragment engineered for extended serum half-life. Molec Immunol 46: 1750-1755. 2. Yeung Y.A. *et al.,* 2009. Engineering Human IgG1 Affinity to Human Neonatal Fc Receptor: Impact of Affinity Improvement on Pharmacokinetics in Primates. J. Immunol. 182: 7663-7671. 3. Qiao S-W, *et al.*, 2008. Dependence of antibody-mediated presentation of antigen on FcRn. PNAS 105(27): 9337-9342.

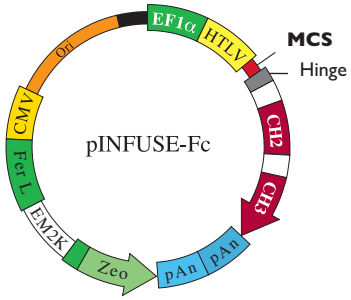
Also Available

InvivoGen provides an extensive collection of **pFUSE-Fc** plasmids designed for the fusion of the Fc domain of an immunoglobulin to the **C-terminus** of a target protein. The Fc regions are available without introns in the pFUSE-Fc plasmid or with introns in the pINFUSE-Fc plasmid.

PLASMID	CLONING SITE/GENE	FC REGION	ISOTYPES AVAILABLE
pFUSE-Fc	MCS	- Native - No introns	- Human IgG1, 2, 3, 4 - Mouse IgG1, 2a, 2b, 3 - Rabbit IgG - Rat IgG2b
pINFUSE-Fc	MCS	- Native - With introns	- Human IgG1, 2, 3, 4 - Mouse IgG2b



For more information, go to www.invivogen.com/fc-fusions



Recent Articles with pFUSE-Fc

Butovsky O. *et al.*, 2014. Identification of a unique TGF-β-dependent molecular and functional signature in microglia. Nat Neurosci. 17(1):131-43.

Koutsokeras A. *et al.,* 2014. Generation of an efficiently secreted, cell penetrating NF-κB inhibitor. FASEB J. 28(1):373-81.

Maglinao M. *et al.,* 2014. A platform to screen for C-type lectin receptor-binding carbohydrates and their potential for cell-specific targeting and immune modulation. J Control Release. 175:36-42.

Neumann K. *et al.*, 2014. Clec12a is an inhibitory receptor for uric acid crystals that regulates inflammation in response to cell death. Immunity. 40(3):389-99.

Tanaka H. *et al.,* 2014. Live-cell imaging of receptors around postsynaptic membranes. Nat Protoc. 9(1):76-89.

Leung LC. *et al.*, 2013. Coupling of NF-protocadherin signaling to axon guidance by cue-induced translation. Nat Neurosci. 16(2):166-73.

Human & Mouse Genes - pUNO1

NEW PRODUCT FORMAT

InvivoGen provides a collection of over 1,600 full-length sequenced genes, mainly from human and mouse but also from other species. These genes, provided as open reading frames (ORFs) from the ATG to the Stop codon, are now all available in the mammalian expression plasmid pUNO1. The ORFs are cloned downstream of a strong and ubiquitous mammalian promoter which makes these clones suitable for stable expression and functional studies in various mammalian cell lines.

Native Genes

Description

Full-length Sequenced Open Reading Frames

InvivoGen provides a large collection of fully sequenced human and murine genes. Genes from other species are also available. These genes are provided as open reading frames (ORFs) from the ATG to the Stop codon, excluding introns and untranslated regions. As the ORFs are amplified from cDNA banks, a variant form is sometimes obtained. Most of the variations have been reported in Genbank.

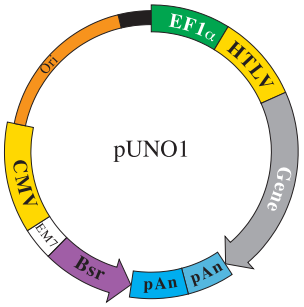
Some of the genes provided encode proteins that are naturally secreted. Their sequences include their native signal sequences, which are generally located at the 5' end of the coding sequence. Other genes, that code for engineered proteins, such as particular fragments of longer proteins (i.e. angiostatic proteins) may include the signal sequence of the human IL-2 gene between the ATG and the second codon to allow their secretion.

Suitable for Expression in Mammalian Cells

Each ORF is cloned in a mammalian expression cassette consisting of a potent and ubiquitous composite promoter and the strong SV40 polyadenylation signal. Each ORF is flanked by a unique restriction site at the 5' end and 3' end to facilitate its subcloning into another vector.
All ORFs are now supplied in pUNO1, a plasmid selectable in both bacterial and mammalian cells with blasticidin.

Search the Gene A-List™ online

You can easily find your ORF of interest in the Gene A-List™ at www.invivogen.com/orfs. You can browse the entire list based on HUGO-approved gene symbol (and alias) and function. All sequences are available online or can be emailed upon request.



Contents and Storage

Each pUNO1 plasmid is now provided as 20 µg of lyophilized DNA. Product is shipped at room temperature and should be stored at -20°C for up to one year. Each pUNO1 plasmid is provided with 10 mg blasticidin and 4 pouches of *E. coli* Fast-Media® Blas (2 TB and 2 Agar, p. 18).

PRODUCT	QTY	CAT. CODE
pUNO1-<gene>	20 µg	puno1-<gene>

Gene Family Examples

- Adaptor Genes
- Angiogenic & Angiostatic Genes
- Antiviral Genes
- Apoptotic & Anti-Apoptotic Genes
- Autophagy Genes
- CD Genes
- Cellular Matrix Genes
- Chemokine & Chemokine Receptor Genes
- Chromatin-Remodeling Genes
- Connexin Genes
- Costimulatory Genes
- Cytokine Genes
- Cytokine Signaling Genes
- Cytokine Suppressor Genes
- Cytolytic Genes
- Cytotoxic / Suicide Genes
- DAMPs / Alarmin Genes
- Fc Receptor Genes
- Glycosylation Genes
- Growth Factors
- Hematopoietic Genes
- Inhibitors of Differentiation
- Interferon & Interferon Signaling Genes
- Pattern Recognition Receptors
- Reprogramming Factors (IPSC)
- Signaling Genes
- Signaling Inhibitors
- Transcription Factors
- Tumor Antigens
- Tumor Suppressors

Also Available

➢ HA-Tagged Genes

HA-tagged genes contain at their 3' end the influenza hemaglutinine (HA) tag. This short sequence (YPYDVPDYA) encodes a peptide, which is the epitope of a very efficient and specific monoclonal antibody. This tag allows for efficient and specific detection of these genes by Western blot using the anti-HA tag antibody. HA-tagged genes are provided in the pUNO1 plasmid.

➢ CpG-Free Genes

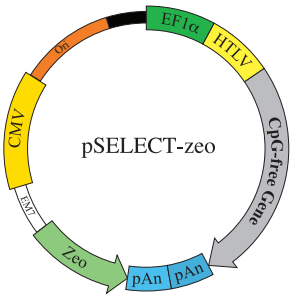
Many non-mammalian genes are widely used as reporter or suicide genes in molecular and cellular studies. However, these genes are recognized as foreign DNA by the vertebrate host leading to a progressive decline of their expression. To circumvent this limitation, InvivoGen has synthesized new alleles of these genes completely devoid of CpG dinucleotides. These synthetic CpG-free genes display higher activity and lower immunogenicity than their wild-type counterparts. CpG-free genes are provided in the pSELECT-Zeo plasmid , which is selectable with Zeocin™ in both *E. coli* and mammalian cells.

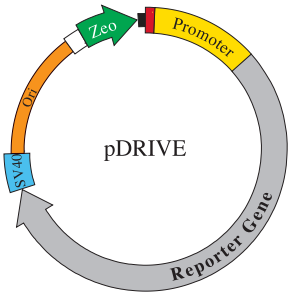
For more information, go to:
www.invivogen.com/cpgfree-genes

➢ Promoters

Promoters are valuable tools to study the expression of a gene of interest both *in vitro* and *in vivo*. InvivoGen offers Prom A-List™, a large choice of promoters for expression in mammalian cells. These promoters are either native or composite for expression at high or low levels, ubiquitous or specific, and in a constitutive or inducible manner. InvivoGen's promoters are provided in the pDRIVE plasmid, which is selectable with Zeocin™ in *E. coli*. They are cloned upstream of a reporter gene for convenient evaluation of their activity and flanked by several unique restriction sites to facilitate their excision. The reporter gene is either LacZ, SEAP or Lucia luciferase. Each promoter is fully sequenced and its expression tested in different cell lines.

For more information, go to:
www.invivogen.com/prom-a-list





PRODUCT	DESCRIPTION	PLASMID	QUANTITY	CAT. CODE
HA-Tagged Genes	Genes fused to the HA tag at their 3' end	pUNO1	20 µg	puno1ha-<gene>
CpG-Free Genes	Synthetic genes devoid of CpG dinucleotides	pSELECT-Zeo	20 µg	psetz-<gene>
Promoters	Collection of promoters for expression in mammalian cells	pDRIVE	20 µg	pdrive-<promoter>

Recent Articles with InvivoGen's GENES & PROMOTERS

pUNO1

Granzow M. *et al.*, 2014. Angiotensin-II type 1 receptor-mediated Janus kinase 2 activation induces liver fibrosis. Hepatology. [Ahead of print]

Kohlway A. *et al.*, 2013. Defining the functional determinants for RNA surveillance by RIG-I. EMBO Rep. 14(9):772-9.

Li G. *et al.*, 2013. Human genetics in rheumatoid arthritis guides a high-throughput drug screen of the CD40 signaling pathway. PLoS Genet. 9(5):e1003487.

Nakamura N. *et al.*, 2014. Endosomes are specialized platforms for bacterial sensing and NOD2 signalling. Nature. 509(7499):240-4.

Takemura N. *et al.*, 2014. Blockade of TLR3 protects mice from lethal radiation-induced gastrointestinal syndrome. Nat Commun. 5:3492.

Uchimura K. *et al.*, 2014. The serine protease prostasin regulates hepatic insulin sensitivity by modulating TLR4 signalling. Nat Commun. 5:3428.

van Gent M. *et al.*, 2014. Epstein-Barr virus large tegument protein BPLF1 contributes to innate immune evasion through interference with toll-like receptor signaling. PLoS Pathog. 10(2):e1003960.

Yang K. *et al.*, 2013. Functional RIG-I-like receptors control the survival of mesenchymal stem cells. Cell Death Dis. 4:e967.

Zhang J. *et al.*, 2014. Inflammasome activation has an important role in the development of spontaneous colitis. Mucosal Immunol. [Ahead of print]

pUNO1-HA

Chaudhry SI. *et al.*, 2013. Autocrine IL-1β-TRAF6 signalling promotes squamous cell carcinoma invasion through paracrine TNFα signalling to carcinoma-associated fibroblasts. Oncogene. 32(6):747-58.

Liu HY. *et al.*, 2013. TLR7 negatively regulates dendrite outgrowth through the Myd88-c-Fos-IL-6 pathway. J Neurosci. 33(28):11479-93.

Resman N. *et al.*, 2014. Tetraacylated lipid A and paclitaxel-selective activation of TLR4/MD-2 conferred through hydrophobic interactions. J Immunol. 192(4):1887-95.

Toscano F. *et al.*, 2013. Cleaved/associated TLR3 represents the primary form of the signaling receptor. J Immunol. 190(2):764-73.

pDRIVE

Cogliati S. *et al.*, 2013. Mitochondrial cristae shape determines respiratory chain supercomplexes assembly and respiratory efficiency. Cell. 155(1):160-71.

Kia A. et al., 2012. Dual systemic tumor targeting with ligand-directed phage and Grp78 promoter induces tumor regression. Mol Cancer Ther. 11(12):2566-77.

Bennett D. *et al.*, 2012. Further reduction in adenovirus vector-mediated liver transduction without largely affecting transgene expression in target organ by exploiting microrna-mediated regulation and the Cre-loxP recombination system. Mol Pharm. 9(12):3452-63.

E. coli Growth & Selection Media - Fast-Media®

All you need to make liquid or solid selective *E. coli* medium are five minutes, a microwave and Fast-Media®. This time-saving product, developed by InvivoGen, comes in individually sealed pouches, each with enough reagents to prepare 200 ml of sterile liquid or agar medium at the appropriate antibiotic concentration. Fast-Media® is extensively tested to guarantee sterility, antibiotic activity and *E. coli* growth. We subject every ready-to-use Fast-Media® pouch to rigorous quality control to ensure consistent results.

Description

Fast-Media® are pre-mixed, pre-sterilized *E. coli* growth media that can be prepared in just five minutes without autoclaving. Fast-Media® contain everything you need to prepare LB medium, TB medium or agar plates. You'll save hours of medium preparation time because there is:

- No weighing or mixing of media components
- No autoclaving
- No waiting for media to cool before adding antibiotics

This time-saving product, developed by InvivoGen, comes in ready-to-use individual pouches. Each pouch contains sufficient reagents for preparing 200 ml of liquid media or 8-10 standard 100 mm^2 agar plates.

For your convenience, Fast-Media® is available with or without antibiotics. Six selective antibiotics can be chosen from: ampicillin, blasticidin, hygromycin B, kanamycin, puromycin and Zeocin™. Further, to allow the detection of blue/white colonies, Fast-Media® is also available with X-Gal/IPTG or X-Gluc.

Performance and Control

Quality Control

Each type of Fast-Media® growth medium is extensively tested to ensure *E. coli* growth, antibiotic activity, and sterility. Fast-Media® containing X-Gal/IPTG or X-Gluc are tested for efficient blue/white colony screening.

Stability and Storage

After preparation, Fast-Media® keeps all its intrinsic properties 48 hours at 37°C or 4 weeks at 4°C.
Sterility is guaranteed when Fast-Media® is properly prepared and stored.

Contents and Storage

Each type of *E. coli* Fast-Media® is provided in a 30- or 500-pouch unit. Store at room temperature. Pouches are stable up to 12 months at room temperature.

Fast-Media® Preparation



1. Empty pouch contents into a clean glass bottle. Mix Fast-Media® with 200 ml of distilled water.
2. Heat in microwave oven on medium power (400 watts) for 3 minutes, mix and reheat for 30 seconds*.
3. Let cool and pour 8-10 plates.

* InvivoGen has developed a process that guarantees the antibiotic activity after microwave heating.

PRODUCT	QUANTITY	CAT. CODE
Fast-Media® Base LB NEW	30 pouches 500 pouches	fas-b fas-b500
Fast-Media® Amp LB	30 pouches 500 pouches	fas-am-b fas-am-b500
Fast-Media® Kan LB	30 pouches 500 pouches	fas-kn-b fas-kn-b500
Fast-Media® Base Agar	30 pouches 500 pouches	fas-s fas-s500
Fast-Media® Amp Agar	30 pouches 500 pouches	fas-am-s fas-am-s500
Fast-Media® Kan Agar	30 pouches 500 pouches	fas-kn-s fas-kn-s500

ALSO AVAILABLE

FAST-Media® TB or Agar with ampicillin, blasticidin, hygromycin, puromycin or Zeocin™, and with or without X-Gal/IPTG or X-Gluc.

For more information, go to:
www.invivogen.com/fast-media

Recent Articles with FAST-MEDIA®

Albers CA. *et al.*, 2012. Compound inheritance of a low-frequency regulatory SNP and a rare null mutation in exon-junction complex subunit RBM8A causes TAR syndrome. Nat Genet. 44(4):435-9, S1-2.

Loyau J. & Rousseau F., 2014. Cloning, reformatting, and small-scale expression of monoclonal antibody isolated from mouse, rat, or hamster hybridoma. Methods Mol Biol. 1131:207-28.

Maszczak-Seneczko D. *et al.*, 2013. UDP-N-acetylglucosamine transporter (SLC35A3) regulates biosynthesis of highly branched N-glycans and keratan sulfate. J Biol Chem. 288(30):21850-60.

3 REPORTER CELL LINES

REPORTER CELL LINES

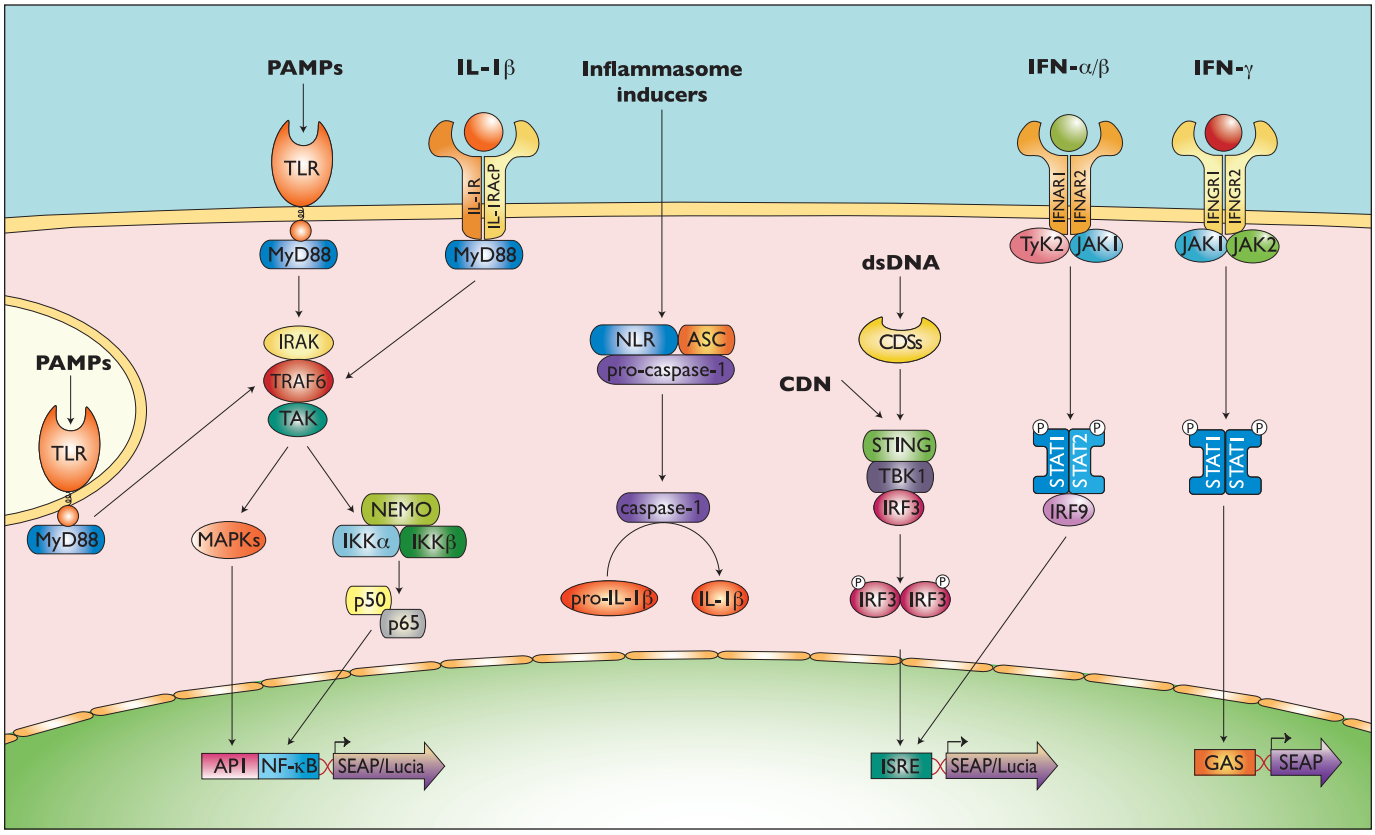
InvivoGen provides Blue™ & Lucia Reporter Cells, a collection of engineered cell lines designed to provide a rapid, sensitive and reliable method to screen and validate ligands of pattern recognition receptors (PRRs), such as Toll-like receptors (TLRs), C-type lectin receptors (CLRs) and cytosolic DNA sensors (CDSs), or detect the presence of a given cytokine in samples. Blue™ Reporter Cells express an inducible SEAP (secreted embryonic alkaline phosphatase) reporter gene, while Lucia Reporter Cells express an inducible Lucia luciferase (a secreted luciferase) reporter gene. SEAP and Lucia luciferase expression can be conveniently monitored using QUANTI-Blue™/HEK-Blue Detection™ or QUANTI-Luc™, respectively. In addition, Dual Reporter Cells, which express both reporter genes, have been developed to allow the simultaneous study of two pathways, such as the NF-κB and IFN pathways. InvivoGen continues to expand its collection of reporter cells:

PRR Reporter Cells

- **TLR reporter cells**
- **CDS/STING reporter cells**
- **Inflammasome reporter cells**

Cytokine Reporter Cells

- **IFN-α/β reporter cells**
- **IFN-γ reporter cells**
- **IL- 1 & TNF reporter cells**



For a complete list, go to www.invivogen.com/reporter-cells

PRR Reporter Cells

Cells that constitutively overexpress a given functional PRR gene are valuable tools for many applications, such as the study of the mechanisms involved in the recognition or signaling of this PRR, and the development of new potential therapeutic drugs. InvivoGen provides HEK293 cells stably transfected with a PRR gene of interest, such as TLR2 or NOD2, and an NF-κB-inducible SEAP reporter gene for convenient monitoring of this PRR activation.

TLR Reporter Cells

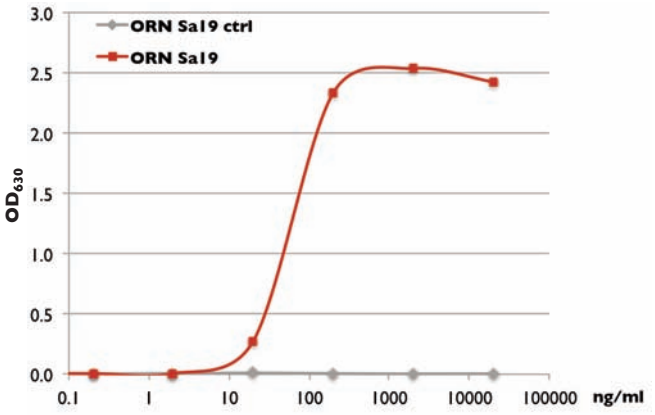
HEK-Blue™ mTLR13 cells

Mouse TLR13 reporter cells

HEK-Blue mTLR13 cells are HEK293-derived cells stably expressing the mouse TLR13 gene and an NF-κB-inducible SEAP (secreted embryonic alkaline phosphatase) reporter construct. Stimulation with a TLR13 ligand, such as ORN Sa19 (see below and figure), activates NF-κB and leads to the production of SEAP. Levels of SEAP can be easily determined with HEK-Blue™ Detection, a growth & detection medium that turns purple/blue in the presence of alkaline phosphatase (see p. 29).

Toll-like receptor 13 (TLR13), an endosomal TLR expressed in mice and not in humans, was recently found to recognize 23S ribosomal RNA (rRNA)[1-3]. This single-stranded rRNA is present in bacteria but not in eukaryotic cells. A conserved sequence of 10 residues within the catalytic center of 23S rRNA, "CGGAAAGACC", was found to be both necessary and sufficient to trigger TLR13 signaling. This sequence, which is the binding site of the macrolide- lincosamide-streptogramin (MLS) group antibiotics[4], is present in ORN Sa19, a 19 mer *S. aureus* 23S rRNA derived oligoribonucleotide. ORN Sa19 is highly stimulatory in TLR13-expressing cells in contrast to ORN Sa19 Control, which carries a G in place of the central A (see p. 37).

1. Oldenburg M. *et al.*, 2012. TLR13 recognizes bacterial 23S rRNA devoid of erythromycin resistance-forming modification. Science. 337(6098). **2. Hidmark A. *et al.*, 2012.** Cutting edge: TLR13 is a receptor for bacterial RNA. J Immunol. 189(6):2717-21. **3. Li XD & Chen ZJ. 2012.** Sequence specific detection of bacterial 23S ribosomal RNA by TLR13. elife. 1:e00102. **4. Hochrein H. & Kirschning CJ., 2013.** Bacteria evade immune recognition via TLR13 and binding of their 23S rRNA by MLS antibiotics by the same mechanisms. Oncoimmunology. 2(3):e23141.



NF-κB response of HEK-Blue™ mTLR13 cells to TLR13 ligands. Cells were incubated in HEK-Blue™ Detection and stimulated with increasing concentrations of ORN Sa19 and ORN Sa19 Control. After 24h incubation, the levels of NF-κB-induced SEAP were determined by reading the OD at 630 nm.

PRODUCT	QUANTITY	CAT. CODE
HEK-Blue™ mTLR13 cells	3-7 x 10^6 cells	hkb-mtlr13

Contents

HEK-Blue™ mTLR13 cells are grown in DMEM medium, 10% FBS, 2mM L-glutamine, and supplemented with 100 µg/ml Zeocin™ and 30 µg/ml blasticidin. Cells are provided frozen in a cryotube containing 3-7 x 10^6 cells and supplied with 100 µl Zeocin™ (100 mg/ml), 100 µl blasticidin (10 mg/ml), 1 ml Normocin™ (50 mg/ml) and 1 pouch of HEK-Blue™ Detection. Cells are shipped on dry ice. They are guaranteed mycoplasma-free.

Also Available

PRODUCT	CAT. CODE (human)	CAT. CODE (mouse)
HEK-Blue™ TLR2 Cells	hkb-htlr2	hkb-mtlr2
HEK-Blue™ TLR3 Cells	hkb-htlr3	hkb-mtlr3
HEK-Blue™ TLR4 Cells	hkb-htlr4	hkb-mtlr4
HEK-Blue™ TLR5 Cells	hkb-htlr5	hkb-mtlr5
HEK-Blue™ TLR7 Cells	hkb-htlr7	hkb-mtlr7
HEK-Blue™ TLR8 Cells	hkb-htlr8	hkb-mtlr8
HEK-Blue™ TLR9 Cells	hkb-htlr9	hkb-mtlr9

For more information, go to:
www.invivogen.com/hek-blue-tlr-cells

Recent Articles with HEK-Blue™ TLR cells

Douillard FP. *et al.*, 2013. Comparative genomic and functional analysis of 100 Lactobacillus rhamnosus strains and their comparison with strain GG. PLoS Genet. 9(8):e1003683.

Kim C. *et al.*, 2013. Neuron-released oligomeric α-synuclein is an endogenous agonist of TLR2 for paracrine activation of microglia. Nat Commun. 4:1562.

Liu H. *et al.*, 2014. Structure-based programming of lymph-node targeting in molecular vaccines. Nature. 507(7493):519-22.

Meseguer V. *et al.*, 2014. TRPA1 channels mediate acute neurogenic inflammation and pain produced by bacterial endotoxins. Nat Commun. 5:3125

Paredes-Juarez GA. *et al.*, 2013. The role of pathogen-associated molecular patterns in inflammatory responses against alginate based microcapsules. J Control Release. 172(3):983-92.

CDS / STING Reporter Cells

Cytosolic DNA sensors (CDSs) comprise an increasing number of receptors, including cGAS, DDX41, AIM2 and DAI, that recognize intracellular double-stranded DNA and induce the production of type I IFNs through the STING-TBK-IRF3 axis. In addition to its role as an adaptor, STING was recently found to be the direct sensor of cyclic dinucleotides (CDNs), such as c-di-GMP, c-di-AMP and cGAMP. Bacteria and metazoans produce distinct cGAMP molecules, bacteria produce cGAMP with canonical linkages (3'3'-cGAMP) while metazoans produce cGAMP with noncanonical limkages (2'3'-cGAMP) (see p. 42). The cellular response to "canonical" and "noncanonical" c-GAMP varies acccording to the STING isoform (see p. 24). InvivoGen provides reporter cells that naturally express various CDSs and different STING isoforms. In addition, these cells were rendered deficient for STING by stable knock-down or knock-out of the STING gene. Reporter cells proficient or deficient for STING are valuable tools to study the STING signaling pathway and screen for molecules that activate or block this pathway.

➢ CDS / STING Reporter Cells

STING reporter cell lines, which express the STING gene endogenously, were stably transfected with a secreted reporter gene construct, either SEAP or Lucia luciferase, under the control of an IRF-inducible promoter. This composite promoter (I-ISG54) is comprised of five IFN-stimulated response elements (ISRE) fused to an ISG54 minimal promoter. IRF induction can be monitored by measuring the levels of SEAP or Lucia luciferase present in the supernatant using QUANTI-Blue™ or QUANTI-Luc™, respectively. STING reporter cell lines are resistant to Zeocin™.

HEK-Blue™ ISG cells

HEK-Blue™ ISG were derived from the PEAKrapid cell line (similar to ATCC® CRL-2828™), which itself was derived from the HEK293 cell line. HEK-Blue™ ISG cells express the wild-type human STING gene. They respond strongly to noncanonical 2'3'-cGAMP but poorly to canonical cyclic CDNs (e.g. 3'3'-cGAMP and c-diGMP) (fig. 1). They do not respond to cytosolic dsDNA (e.g. VACV-70), presumably due to lack of expression of cGAS or perhaps other CDSs[1].

B16-Blue™ ISG cells

B16-Blue™ ISG cells were derived from the B16 F1 murine melanoma cell line. B16-Blue™ ISG cells express the wild-type mouse STING gene and respond to canonical and noncanonical CDNs (fig. 2). They also respond to cytosolic dsDNA suggesting the presence of functional CDSs.

RAW-Lucia™ ISG cells

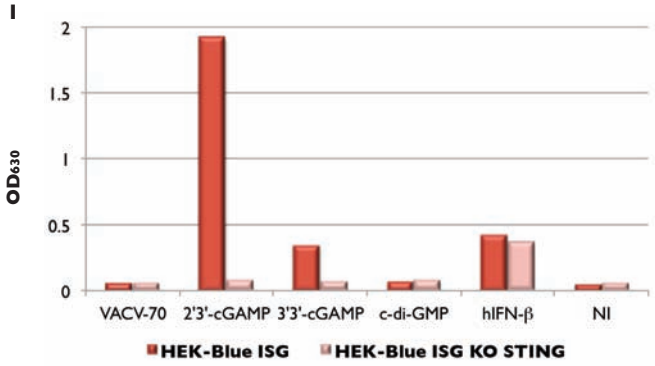
RAW-Lucia™ ISG cell line were derived from the RAW 264.7 murine macrophage cell line, which is a well established immune murine cell model. This cell line has been reported to express several CDSs, including cGAS, and STING[2]. RAW-Blue™ ISG cells express a variant of the mouse STING gene. They respond to cytosolic dsDNA, canonical and noncanonical CDNs (fig. 3).

THP1-Blue™ ISG cells

THP1-Blue™ ISG cells are derived from human THP-1 monocytes, a cell line often used for the study of DNA sensing pathways. They express many cytosolic DNA sensors, including cGAS[1] and IFI16[3], and a common isoform of the human STING gene (STING-HAQ, see p. 24). THP1-Blue™ ISG cells are highly responsive to cytosolic dsDNA and canonical and noncanonical CDNs (fig. 4).

1. Sun L. *et al.*, 2013. Cyclic GMP-AMP synthase is a cytosolic DNA sensor that activates the type I interferon pathway. Science. 339(6121):786-91. **2. Lam E. *et al.*, 2014.** Adenovirus detection by the cGAS/STING/TBK1 DNA sensing cascade. J Virol. 88(2):974-81. **3. Unterholzner L. *et al.*, 2010.** IFI16 is an innate immune sensor for intracellular DNA. Nat Immunol. 11(11):997-1004.

1



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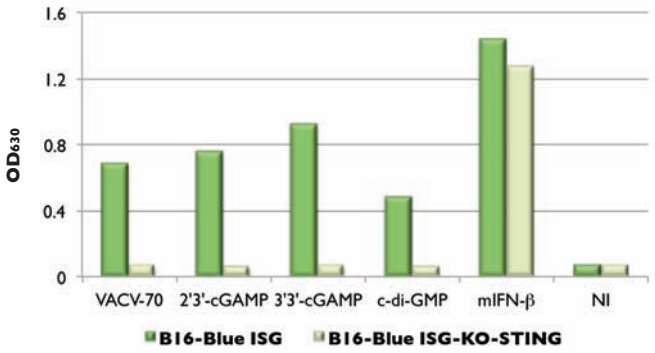

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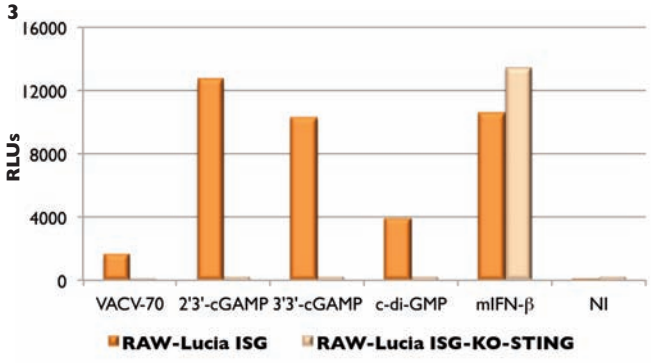


Responses of CDS / STING Reporter Cells to cytosolic DNA, CDNs and IFN-β: Cells were stimulated with 1 µg/ml of transfected VAC-70, 30 µg/ml of cyclic dinucleotides, or 10^3 U/ml of IFN-β. Cells were not permeabilized. After 24h incubation, the levels of IRF-induced SEAP or Lucia luciferase in the supernatant were determined using QUANTI-Blue™ or QUANTI-Luc™, respectively.

➢ KD-STING Reporter Cells

THP1-Blue™ ISG-KD-STING cells

THP1-Blue™ ISG-KD-STING cells were generated from THP1-Blue™ ISG cells through knock-down of the STING gene. As a result, THP1-Blue™ ISG-KD-STING cells display a considerable reduction of STING expression. THP1-Blue™ ISG-KD-STING cells respond poorly to cytosolic DNA and cyclic dinucleotides compared to THP1-Blue™ ISG cells. Both cell lines exhibit comparable IFN responses (Fig. 4).
THP1-Blue™ ISG-KD-STING cells are resistant to Zeocin™.

➢ KO-STING Reporter Cells

KO-STING reporter cell lines were generated through knock-out, close to the START codon, of the *sting* gene expressed endogenously by their STING parental cell line. KO-STING reporter cell lines are resistant to Zeocin™.

HEK-Blue™ ISG-KO-STING cells

HEK-Blue™ ISG-KO-STING cells fail to respond to noncanonical 2'3'-cGAMP. Their response to type I IFNs is comparable to their parental cell line (fig. 1).

B16-Blue™ ISG-KO-STING cells

B16-Blue™ ISG-KO-STING cells have lost the ability to respond to cytosolic DNA, canonical and noncanonical CDNs, while retaining the ability to respond to type I IFNs (fig. 2).

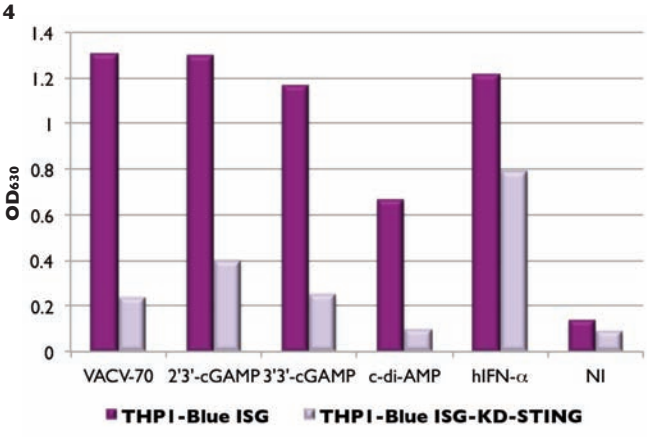
RAW-Lucia™ ISG-KO-STING cells

RAW-Blue™ ISG-KO-STING cells do not respond to cytosolic DNA, canonical and noncanonical CDNs. Both cell lines exhibit comparable IFN responses. (fig. 3)

Contents

HEK-Blue™ and RAW-Lucia™ cells are grown in DMEM medium. B16-Blue™ and THP1-Blue™ cells are grown in RPMI medium. DMEM and RPMI media contain 2mM L-glutamine, 10% FBS with 100 µg/ml Normocin™ and 100 µg/ml Zeocin™. Cells are provided frozen in a cryotube containing 3-7 x 10^6 cells and supplied with 50 mg of Normocin™, 10 mg Zeocin™ and 1 pouch of QUANTI-Blue™ or QUANTI-Luc™. Cells are shipped on dry ice. They are guaranteed mycoplasma-free.

4



Responses of CDS / STING THP1-Blue Reporter Cells to cytosolic DNA, CDNs and IFN-α: Cells were stimulated with 1 µg/ml of transfected VAC-70, 10 µg/ml of cyclic dinucleotides, or 10^3 U/ml of IFN-α. Cells were not permeabilized. After 24h incubation, the levels of IRF-induced SEAP were determined using QUANTI-Blue™.

PRODUCT	QUANTITY	CAT. CODE
B16-Blue™ ISG	3-7 x 10^6 cells	bb-ifnabg
B16-Blue™ ISG-KO-STING	3-7 x 10^6 cells	bb-kostg
HEK-Blue™ ISG	3-7 x 10^6 cells	hkb-isg
HEK-Blue™ ISG-KO-STING	3-7 x 10^6 cells	hkb-kostg
RAW-Lucia™ ISG	3-7 x 10^6 cells	rawl-isg
RAW-Lucia™ ISG-KO-STING	3-7 x 10^6 cells	rawl-kostg
THP1-Blue™ ISG	3-7 x 10^6 cells	thp-isg
THP1-Blue™ ISG-KD-STING	3-7 x 10^6 cells	thp-kdstg

Also Available

PRODUCT	QUANTITY	CAT. CODE
RAW-Blue™	3-7 x 10^6 cells	raw-sp
THP1-XBlue™	3-7 x 10^6 cells	thpx-sp

For more information, go to:
www.invivogen.com/reporter-cells

Recent Articles with RAW-Blue™ & THP1-Xblue™ cells

RAW-Blue™ cells

Lai WY. *et al.*, 2014. Synergistic inhibition of lung cancer cell invasion, tumor growth and angiogenesis using aptamer-siRNA chimeras. Biomaterials. 35(9):2905-14.

Liu H. *et al.*, 2014. Structure-based programming of lymph-node targeting in molecular vaccines. Nature. 507(7493):519-22.

Patil HP. *et al.*, 2014. Evaluation of monophosphoryl lipid A as adjuvant for pulmonary delivered influenza vaccine. J Control Release. 174:51-62.

THP1-XBlue™ cells

Frei R. *et al.*, 2013. Histamine receptor 2 modifies dendritic cell responses to microbial ligands. J Allergy Clin Immunol. 132(1):194-204.

Garbati MR. *et al.*, 2013. FANCA and FANCC modulate TLR and p38 MAPK-dependent expression of IL-1β in macrophages. Blood. 122(18):3197-205.

Paredes-Juarez GA. *et al.*, 2013. The role of pathogen-associated molecular patterns in inflammatory responses against alginate based microcapsules. J Control Release. 172(3):983-92.

➢ STING Variants

Several non-synonymous variants of STING have been described in the human population, as well as various induced mutants of the human and mouse STING genes. Studies have revealed that STING variation can affect cyclic dinucleotide (CDN) recognition and signal transduction. InvivoGen provides most of the STING variants described, cloned and fully-sequenced into the expression plasmid pUNO1 (see p. 16).

Human STING Isoforms

hSTING-WT - The prevalent human STING isoform (~60% of the human population) contains an arginine at position 232 (R232) and is thus considered as wild-type[1, 2]. The hSTING-WT isoform is preferentially activated by noncanonical 2',5'-linkage-containing cGAMP isomers[3](p. 42).

hSTING-H232 (R232H) **-** The H232 isoform of STING occurs in ~14% of the human population[2]. It appears to respond similarly to the WT allele to metazoan CDNs but weakly to bacterial CDNs[2, 4]. Most of the hSTING proteins used for structural studies contained the R232H allele.

hSTING-A230 (G230A) **-** G230 is located in the flexible loop that forms a lid above the c-di-GMP binding pocket. The G230A variant is able to respond to lower concentrations of CDNs due to a different binding to the ligand[2].

hSTING-HAQ (R71H-G230A-R293Q) **-** STING-HAQ is a common haplotype (~20% of the human population and found in THP1 cells) that contains three non-synonymous single nucleotide polymorphisms. It expresses a STING protein that displays reduced intrinsic IFN-β stimulating activity[1, 2] but retains the ability to respond to metazoan and bacterial CDNs[2].

hSTING-A162 (S162A) **-** Human STING fails to bind DMXAA, a potent tumor vascular disrupting agent in mice[5]. A unique point mutation (S162A) placed at the cyclic-dinucleotide-binding site was found to confer DMXAA sensitivity to hSTING[3].

hSTING-N200 (I200N) **-** The hSTING-N200 isoform harbors a missense mutation (I200N) equivalent to I199N mutation of the *Goldenticket (Gt)* mouse strain[6, 7]. The I200N mutation results in a null-phenotype with no detectable STING activity[6].

hSTING-MRP (Alternative splice isoform) **-** hSTING-MRP is an alternatively spliced isoform of hSTING lacking exon 7 that acts as a dominant negative mutant of STING. It was recently reported to block STING-mediated IFN response while retaining the ability to activate NF-κB[7].

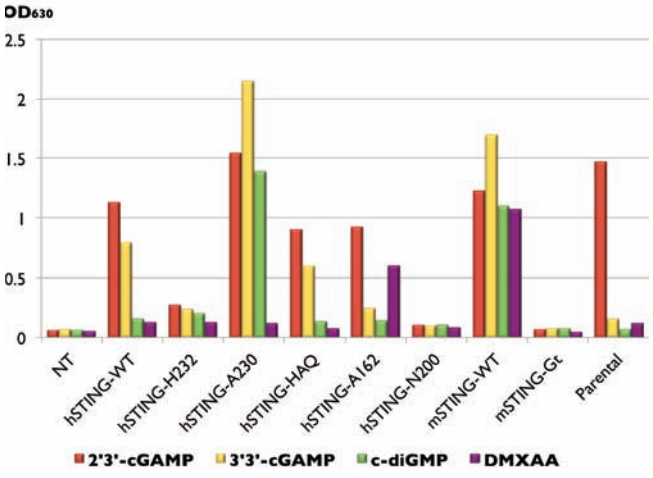
Mouse STING Isoforms

mSTING-WT - Wild-type mouse STING (mSTING-WT) contains an arginine at position 231, similarly to hSTING-WT. Unlike hSTING-WT, mSTING-WT appears to have no preference for the cGAMP isomers[3] and efficiently binds DMXAA to produce type I IFNs[5].

mSTING-Gt (I199N) **-** The *Goldenticket* (*Gt*) mutant mice carries a I199N missense mutation in exon 6 of the mSting gene and fails to display detectable activity[8].

Contents

STING variants are provided in the pUNO1 plasmid as 20 µg of lyophilized DNA. Each plasmid is supplied with 4 pouches of Fast-Media® Blas (see p. 18) and 1 ml blasticidin at 10 mg/ml.



Response to CDNs and DMXAA of STING variants: Pools of HEK-Blue™ ISG KO-STING cells (see p. 23) transfected with WT or mutant STING and HEK-Blue™ ISG cells (parental) were stimulated with 10 µg/ml of 2'3'-cGAMP, 3'3'-cGAMP, c-di-GMP or DMXAA. After 24h incubation, the levels of IRF-induced SEAP were determined using QUANTI-Blue™. NT means not transfected.

ISOFORM	QTY	CAT. CODE
hSTING-WT	20 µg	puno1-hstingwt
hSTING-H232	20 µg	puno1-hsting-h232
hSTING-A230	20 µg	puno1-hsting-a230
hSTING-HAQ	20 µg	puno1-hsting-haq
hSTING-A162	20 µg	puno1-hsting-a162
hSTING-MRP	20 µg	puno1-hsting-mrp
hSTING-N200	20 µg	puno1-hsting-n200
mSTING-WT	20 µg	puno1-mstingwt
mSTING-Gt	20 µg	puno1-msting-gt

1. Jin L. *et al.*, 2011. Identification and characterization of a loss-of-function human MPYS variant. Genes Immun. 12(4):263-9. **2. Yi G. *et al.*, 2013.** Single Nucleotide Polymorphisms of Human STING Can Affect Innate Immune Response to Cyclic Dinucleotides. PLoS One. 8(10):e77846. **3. Gao P. *et al.*, 2013.** Structure-function analysis of STING activation by c[G(2',5')pA(3',5')p] and targeting by antiviral DMXAA. Cell. 154(4):748-62. **4. Diner EJ. *et al.*, 2013.** The innate immune DNA sensor cGAS produces a noncanonical cyclic dinucleotide that activates human STING. Cell Rep. 3(5):1355-61. **5. Conlon J. *et al.*, 2013.** Mouse, but not human STING, binds and signals in response to the vascular disrupting agent 5,6-dimethylxanthenone-4-acetic acid. J Immunol. 190(10):5216-25. **6. Yin Q. *et al.*, 2012.** Cyclic di-GMP sensing via the innate immune signaling protein STING. Mol Cell. 46(6):735-45. **7. Chen H. *et al.*, 2014.** An Alternative Splicing Isoform of MITA Antagonizes MITA-Mediated Induction of Type I IFNs. J Immunol. 192(3):1162-70. **8. Sauer JD. *et al.*, 2011.** The N-ethyl-N-nitrosourea-induced Goldenticket mouse mutant reveals an essential function of Sting in the in vivo interferon response to Listeria monocytogenes and cyclic dinucleotides. Infect Immun. 79(2):688-94.

Inflammasome Reporter Cells

➢ NLRC4 Reporter Assay

InvivoGen has developed a new cell-based assay to monitor the activation of the NLRC4 inflammasome by intracellular flagellin. This assay relies on two cell lines, an NLRC4 inflammasome test cell line, THP1-NLRC4, and a TLR5-deficient IL-1β reporter cell line, HEK-Blue KD-TLR5, which can be used sequentially or co-cultured to save time.

THP1-NLRC4 cells

NLRC4 inflammasome test cell line

THP1-NLRC4 cells are derived from the THP1 human monocytic cell line, which represents the most commonly used model cell line to study inflammasome activation. THP1-NLRC4 cells stably overexpress NLRC4 and naturally express TLR5. Stimulation of these cells with flagellin triggers TLR5 signaling leading to NF-κB activation and the production of pro-IL1β. Once in the cytosol, flagellin induces the formation of the NLRC4 inflammasome resulting in the activation of caspase-1 and the release of IL-1β (fig. 1). Levels of IL-1β secreted in the supernatant of THP-1 cells can be monitored using the HEK-Blue™ KD-TLR5 cell line.

HEK-Blue™ KD-TLR5 cells

TLR5 deficient, IL-1β reporter cells

HEK-Blue™ KD-TLR5 cells are designed to monitor bioactive IL-1β secreted by THP-1 cells upon flagellin-induced NLRC4 activation. HEK-Blue™ KD-TLR5 cells are derived from the HEK293 cell line, which endogenously expresses TLR5 and the IL-1β receptor (IL-1R). This cell line features an NF-κB-inducible SEAP reporter gene and was engineered to knock-down the expression of TLR5 to avoid activation of NF-κB upon flagellin-induced TLR5 stimulation. The knock-down of TLR5 permits the analysis of flagellin specifically for its NLRC4 stimulating activity.
Binding of IL-1β to IL-1R initiates a signaling cascade leading to the activation of NF-κB and the subsequent production of SEAP (fig. 1). Detection of SEAP in the supernatant of HEK-Blue™ KD-TLR5 cells can be readily assessed using the QUANTI-Blue™ assay (fig. 2).

THP1-NLRC4 cells are resistant to blasticidin and HEK-Blue™ KD-TLR5 cells are resistant to Zeocin™ and puromycin.

Contents

THP1-NLRC4 cells are grown in RPMI medium, 10% heat-inactivated FBS, 2mM L-glutamine, supplemented with 10 μg/ml blasticidin. HEK-Blue™ KD-TLR5 cells are grown in DMEM medium, 10% heat-inactivated FBS, 2mM L-glutamine, supplemented with 100 μg/ml Zeocin™ and 1 μg/ml puromycin. THP1-NLRC4 cells are supplied with 100 μl blasticidin (10 mg/ml) and 1 ml Normocin™ (50 mg/ml). HEK-Blue™ KD-TLR5 cells are supplied with 100 μl Zeocin™ (100 mg/ml), 100 μl puromycin (10 mg/ml), 1 ml Normocin™ (50 mg/ml) and 1 pouch of QUANTI-Blue™.
Cells are provided frozen in a cryotube containing 3-7 x 10^6 cells. Cells are shipped on dry ice. They are guaranteed mycoplasma-free.

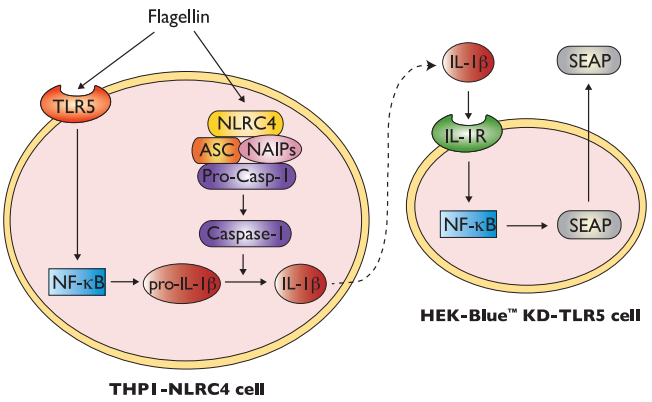


Figure 1: Principle of the NLRC4 reporter assay - Flagellin induces the production of IL-1β following the activation of the NLRC4 inflammasome and caspase-1 in the THP1-NLRC4 cells. IL-1β released in the supernatant binds to the IL-1R receptor on the surface of the HEK-Blue™ KD-TLR5 cells leading to the activation of NF-κB and the production of SEAP in the supernatant. SEAP levels can be determined using QUANTI-Blue™, a SEAP detection reagent.

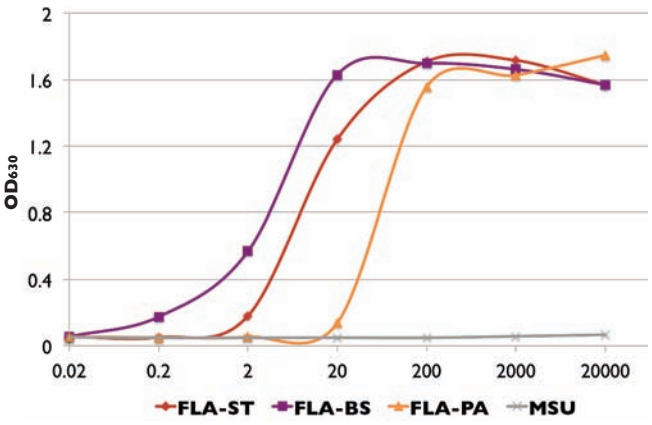


Figure 2: Detection of flagellin-induced IL-1β using HEK-Blue™KD-TLR5 cells. THP1-NLRC4 and HEK-Blue™ KD-TLR5 cells were co-cultured and stimulated with increasing concentrations of ultrapure flagellin from *S. typhimurium* (FLA-ST UP), *B. subtilis* (FLA-BS UP) or *P. aeruginosa* (FLA-PA UP), or monosodium urate (MSU, an NLRP3 inflammasome inducer which requires prior priming of THP-1 cells). After 24h incubation, IL-1β-induced NF-κB activation was assessed by measuring the levels of SEAP using the QUANTI-Blue™ assay. When cultured alone, HEK-Blue™ KD-TLR5 cells do not respond to flagellin.

PRODUCT	QUANTITY	CAT. CODE
THP1-NLRC4 cells	3-7 x 10^6 cells	thp-nlrc4
HEK-Blue™ KD-TLR5 cells	3-7 x 10^6 cells	hkb-kdtlr5

Also Available

PRODUCT	QUANTITY	CAT. CODE
THP1-Null	3-7 x 10^6 cells	thp-null
THP1-defASC	3-7 x 10^6 cells	thp-dasc
THP1-defNLRP3	3-7 x 10^6 cells	thp-dnlp

For more information, go to:
www.invivogen.com/inflammasome

Cytokine Reporter Cells

InvivoGen's cytokine reporter cells comprise an expanding family of engineered cell lines designed to provide a simple, rapid and reliable method to monitor the activation of signaling pathways induced by key cytokines. Cytokine reporter cells allow to detect these biologically active cytokines. The cytokine reporter cells are derived from different cell types, including the human embryonic kidney 293 and murine B16 melanoma cell lines. They express an inducible secreted embryonic alkaline phosphatase (SEAP) reporter that can be quantitatively detected using QUANTI-Blue™, a SEAP colorimetric detection medium. The cytokine reporter cells express the SEAP reporter gene under the control of specific promoters that are induced by signaling pathways selectively triggered by the cytokines of interest. Reporter activity is assessed by measuring the absorbance which is in direct proportion to the amount of cytokine present.

IFN Reporter Cells

B16-Blue™ IFN-α/β cells

Murine type I IFNs sensor cells

B16-Blue™ IFN-α/β cells are designed for the detection of bioactive murine type I IFNs by monitoring the activation of the JAK/STAT/ISGF3 pathway and/or IRF3 pathway. The cells were derived from the murine B16 melanoma cell line of C57BL/6 origin after stable transfection with the SEAP reporter gene under the control of the IFN-α/β-inducible ISG54 promoter enhanced by a multimeric ISRE.
B16-Blue™ IFN-α/β cells do not respond to IFN-γ, due to the inactivation of IFN-γ receptor. B16-Blue™ IFN-α/β cells respond specifically to murine IFN-α/β and do not respond to human IFN-α/β.
Stimulation of B16-Blue™ IFN-α/β cells with murine IFN-α or IFN-β, or type I IFN inducers, such as poly(I:C), poly(dA:dT) or 5'ppp-dsRNA delivered intracelluarly, triggers the production of SEAP by the activation of the IRF-inducible promoter. Levels of SEAP can be easily monitored using the detection medium QUANTI-Blue™.

➢ **Detection range for mIFN-α**: 0.5×10^2 - 10^4 IU/ml
➢ **Detection range for mIFN-β**: 5 - 10^3 IU/ml

B16-Blue™ IFN-γ cells

Murine IFN-γ sensor cells

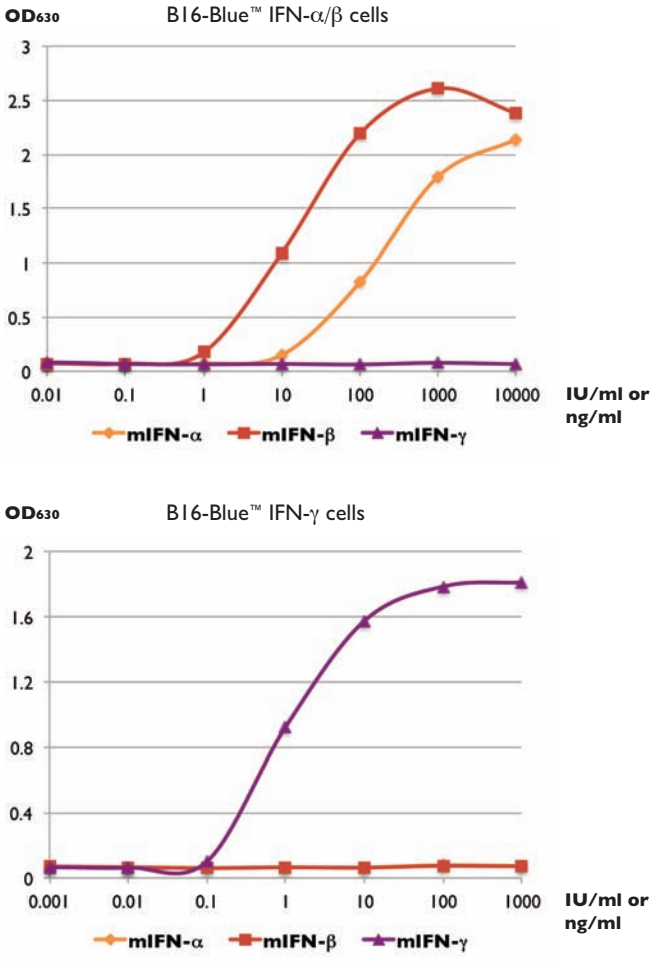
B16-Blue™ IFN-γ cells allow the detection of bioactive murine IFN-γ by monitoring the activation of the JAK/STAT/ISRE pathway. They derive from the murine B16 melanoma cell line after stable transfection with the SEAP reporter gene under the control of the IFN-inducible ISG54 promoter enhanced by a multimeric ISRE.
B16-Blue™ IFN-γ cells do not respond to IFN-α/β due to the inactivation of the type I IFN receptor. B16-Blue™ IFN-γ cells respond specifically to murine IFN-γ and do not respond to human IFN-γ.
Stimulation of B16-Blue™ IFN-γ cells with mIFN-γ triggers the production of SEAP. Levels of SEAP in the supernatant can be readily determined with QUANTI-Blue™.

➢ **Detection range for mIFN-γ**: 0.1 ng - 1 µg/ml

B16-Blue™ IFN-α/β and B16-Blue™ IFN-γ cells are resistant to Zeocin™.

Contents

B16-Blue™ IFN-α/β and B16-Blue™ IFN-γ cells are grown in RPMI medium, 10% FBS, 2mM L-glutamine, supplemented with 100 µg/ml Zeocin™. Cells are provided frozen in a cryotube containing 3-7 x 10^6 cells and supplied with 10 mg Zeocin™, 50 mg Normocin™ and 1 pouch of QUANTI-Blue™. Cells are shipped on dry ice. Cells are guaranteed mycoplasma-free.



IFN responses of B16-Blue™ IFN-α/β cells and B16-Blue™ IFN-γ cells. Cells were stimulated with increasing concentrations of mIFN-α (IU/ml), mIFN-β (IU/ml) or mIFN-γ (ng/ml). After 24h incubation, the levels of IFN-induced SEAP were determined using QUANTI-Blue™.

PRODUCT	QUANTITY	CAT. CODE
B16-Blue™ IFN-α/β cells	3-7 x 10^6 cells	bb-ifnt1
B16-Blue™ IFN-γ cells	3-7 x 10^6 cells	bb-ifng

IL-1 & TNF Reporter Cells

HEK-Blue™ IL-1R cells

Human & murine IL-1β sensor cells

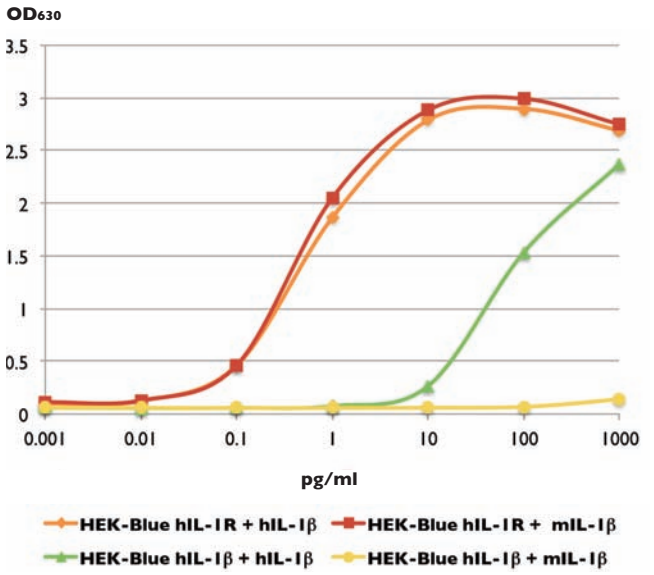
HEK-Blue™ IL-1R cells allow the detection of bioactive human and mouse IL-1β by monitoring the activation of the NF-κB and AP-1 pathways. They derive from HEK-Blue™ IL-1β cells in which the response to human TNF-α is blocked. HEK-Blue™ IL-1R cells respond to low concentrations of human and murine IL-1β. They do not respond to human TNF-α and respond to murine TNF-α at concentrations higher than 10 ng/ml.
HEK-Blue™ IL-1R cells endogenously express the human IL-1 receptor and were stably transfected with the murine IL-1 receptor rendering these cells very sensitive to both human and murine IL-1β. HEK-Blue™ IL-1R cells express the SEAP reporter gene under the control of the IFN-β minimal promoter fused to five NF-κB and five AP-1 binding sites.
Binding of IL-1β to its receptor IL-1R on the surface of HEK-Blue™ IL-1R cells triggers a signaling cascade leading to the activation NF-κB and the subsequent production of SEAP. Detection of SEAP in the supernatant of HEK-Blue™ IL-1R cells can be readily assessed using QUANTI-Blue™, a SEAP detection medium. QUANTI-Blue™ turns blue in the presence of SEAP which can be easily quantified using a spectrophotometer.

- **Detection range for hIL-1β**: 0.1 pg - 1 ng/ml
- **Detection range for mIL-1β**: 0.1 pg - 1 ng/ml

HEK-Blue™ IL-1R cells are resistant to the selective antibiotics Zeocin™ and hygromycin B.

Contents

HEK-Blue™ IL-1R cells are grown in DMEM medium, 10% FBS, 2mM L-glutamine, and supplemented with 100 µg/ml Zeocin™ and 200 µg/ml Hygromycin B Gold. Cells are provided frozen in a cryotube containing 3-7 x 10^6 cells and supplied with 100 µl Zeocin™ (100 mg/ml), 100 µl Hygromycin B Gold (100 mg/ml), 1 ml Normocin™ (50 mg/ml) and 1 pouch of QUANTI-Blue™. Cells are shipped on dry ice. Cells are guaranteed mycoplasma-free.



Response of HEK-Blue™ IL-1R and HEK-Blue™ IL-1β cells to IL-1β. Cells were stimulated with increasing concentrations of hIL-1α or mIL-1β. After 24h incubation, the levels of IFN-induced SEAP were determined using QUANTI-Blue™.

PRODUCT	QUANTITY	CAT. CODE
HEK-Blue™ IL-1R cells	3-7 x 10^6 cells	hkb-il1r

Also Available

PRODUCT	QUANTITY	CAT. CODE
HEK-Blue™ IL-1β cells	3-7 x 10^6 cells	hkb-il1b
HEK-Blue™ IFN-α/β cells	3-7 x 10^6 cells	hkb-ifnab

For more information, go to:
www.invivogen.com/cytokine-sensor-cells

Recent Articles with HEK-Blue™ reporter cells

HEK-Blue IL-1β cells

Álvarez S. & Muñoz-Fernández MÁ., 2013 TNF-A may mediate inflammasome activation in the absence of bacterial infection in more than one way. PLoS One. 8(8):e71477.

Hou J. *et al.*, 2013. Design of a superior cytokine antagonist for topical ophthalmic use. PNAS. 110(10):3913-8.

Schirmer EB. *et al.*, 2013. Reduction of product-related species during the fermentation and purification of a recombinant IL-1 receptor antagonist at the laboratory and pilot scale. Biotechnol J. 8(8):946-56.

HEK-Blue IFN-α/β cells

Dumitru CA. *et al.*, 2014. Stimulation of mesenchymal stromal cells (MSCs) via TLR3 reveals a novel mechanism of autocrine priming. FASEB J. [Ahead of print].

Gatti G. *et al.*, 2013. Direct effect of dsRNA mimetics on cancer cells induces endogenous IFN-β production capable of improving dendritic cell function. Eur J Immunol. 43(7):1849-61.

Huizinga R. *et al.*, 2013. Sialylation of Campylobacter jejuni endotoxin promotes dendritic cell-mediated B cell responses through CD14-dependent production of IFN-β and TNF-α. J Immunol. 191(11):5636-45.

SEAP Detection Reagents

Secreted embryonic alkaline phosphatase (SEAP) is a reporter widely used to study promoter activity or gene expression. It is a truncated form of human placental alkaline phosphatase (PLAP) by deletion of the GPI anchor. Unlike endogenous alkaline phosphatases, PLAP is extremely heat stable and resistant to the inhibitor L-homoarginine. SEAP is secreted into the cell culture supernatant and therefore offers many advantages over intracellular reporters. It allows to determine reporter activity without disturbing the cells, does not require the preparation of cell lysates and can be used for kinetic studies. For the rapid and convenient detection of SEAP in cell supernatants, InvivoGen has developed **QUANTI-Blue™** and **HEK-Blue™ Detection**, a SEAP detection reagent and a SEAP detection culture medium, respectively.

QUANTI-Blue™

QUANTI-Blue™ is a detection reagent developed to determine the levels of SEAP in biological samples, such as cell supernatants and mouse plasma. QUANTI-Blue™ offers many advantages over the conventional SEAP Reporter Assay Kit based on the pNPP substrate, including ease of use, short hands-on-time and visual readout. The same cell cultures can be repeatedly sampled for kinetic studies or further experimentation. SEAP activity can be detected as early as 15 min after incubation of the samples in QUANTI-Blue™.

Applications

- Detection of SEAP in biological samples
- Kinetic studies of SEAP

Readout Method

- Naked eye (purple/blue color)
- Spectrophotometry (620 - 655 nm)

Quality Control

Each lot is extensively tested to ensure lot-to-lot reproducibility using biochemical techniques and HEK-Blue™ TLR cells.

Contents and Storage

QUANTI-Blue™ is provided in a 5- or 10-pouch unit. Each pouch allows the preparation of 100 ml of detection medium. Store at room temperature. Pouches are stable 12 months at room temperature. After preparation, product is stable 2 weeks at 4°C and 2 months at -20°C.

Recent Articles with QUANTI-Blue™

Lai WY. *et al.*, 2014. Synergistic inhibition of lung cancer cell invasion, tumor growth and angiogenesis using aptamer-siRNA chimeras. Biomaterials. 35(9):2905-14.

Meseguer V. *et al.*, 2014. TRPA1 channels mediate acute neurogenic inflammation and pain produced by bacterial endotoxins. Nat Commun. 5:3125.

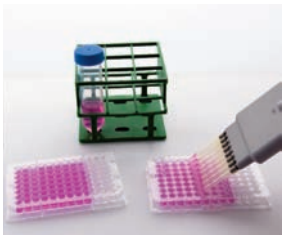
Lee EC. *et al.*, 2014. Complete humanization of the mouse immunoglobulin loci enables efficient therapeutic antibody discovery. Nat Biotechnol. 32(4):356-63.

Patil HP. *et al.*, 2014. Evaluation of monophosphoryl lipid A as adjuvant for pulmonary delivered influenza vaccine. J Control Release. 174:51-62.

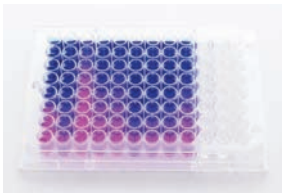
QUANTI-Blue™ Procedure

1. Prepare QUANTI-Blue™ by adding 100 ml water to the contents of one pouch.

2. Aliquote 200 µl QUANTI-Blue™ per well of a multiwell plate.



3. Add 20 µl supernatant of SEAP-expressing cells.



4. After 15 minutes to 24 hours incubation, assess SEAP activity with the naked eye or with a microplate reader at 620-655 nm.

PRODUCT	QUANTITY*	CAT. CODE
QUANTI-Blue™	5 pouches (5 x 100 ml) 10 pouches (10 x 100 ml)	rep-qb1 rep-qb2

*** Bulk quantities readily available**

HEK-Blue™ Detection

HEK-Blue™ Detection is a cell culture medium that detects SEAP as the reporter protein is secreted by the cells. HEK-Blue™ Detection contains all the nutrients necessary for cell growth and a specific SEAP colorimetric substrate. The hydrolysis of the substrate by SEAP produces a purple/blue color that can be easily detected with the naked eye or measured with a spectrophotometer.

Applications

- Real-time detection of SEAP produced by cells
- Applicable to high-throughput screening

Readout Method

- Naked eye (purple/blue color)
- Spectrophotometry (620 - 655 nm)

Quality Control

Each lot is extensively tested to ensure lot-to-lot reproducibility using biochemical techniques and HEK-Blue TLR cells.

Contents and Storage

HEK-Blue™ Detection is provided in a 5- or 10-pouch unit. Each pouch allows the preparation of 50 ml of detection medium. Store at room temperature. Pouches are stable 12 months at room temperature. After preparation, product is stable 2 weeks at 4°C and 2 months at -20°C.

Recent Articles with HEK-Blue™ DETECTION

Cullender TC. *et al.*, 2013. Innate and adaptive immunity interact to quench microbiome flagellar motility in the gut. Cell Host Microbe. 14(5):571-81.

Jiao H. *et al.*, 2013. Caveolin-1 Tyr14 phosphorylation induces interaction with TLR4 in endothelial cells and mediates MyD88-dependent signaling and sepsis-induced lung inflammation. J Immunol. 191(12):6191-9.

Karpurapu M. *et al.*, 2014. Krüppel like factor 4 promoter undergoes active demethylation during monocyte/macrophage differentiation. PLoS One. 9(4):e93362.

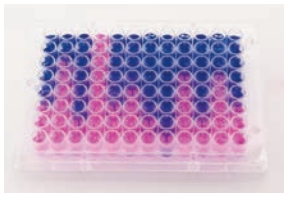
Pavot V. *et al.*, 2013. Encapsulation of Nod1 and Nod2 receptor ligands into poly(lactic acid) nanoparticles potentiates their immune properties. J Control Release. 167(1):60-7.

HEK-Blue™ Detection Procedure

1. Prepare HEK-Blue™ Detection by adding 50 ml water to the contents of one pouch.

2. Prepare a suspension of SEAP-expressing cells using HEK-Blue™ Detection.

3. Combine SEAP inducers and cell suspension in a multiwell plate. Incubate 6 to 24 hours at 37°C, 5% CO_2.



4. Assess SEAP activity with the naked eye or with a microplate reader at 620-655 nm.

PRODUCT	QUANTITY*	CAT. CODE
HEK-Blue™ Detection	5 pouches (5 x 50 ml) 10 pouches (10 x 50 ml)	hb-det2 hb-det3

*** Bulk quantities readily available**

Also Available

PRODUCT	QUANTITY	CAT. CODE
Recombinant SEAP Protein	10 µg	rec-hseap
SEAP Reporter Assay Kit	1 kit	rep-sap

For more information, go to:
www.invivogen.com/seap-reporter-gene-system

Luciferase Detection Reagent - QUANTI-Luc™

InvivoGen's NEW and original lyophilized product, QUANTI-Luc™, is an assay reagent containing all the components required to quantitatively measure the activity of Lucia luciferase and other coelenterazine-utilizing luciferases. QUANTI-Luc™ is optimized for use with Lucia luciferase reporter cell lines for fast and efficient real-time measurements directly from the cell culture media. QUANTI-Luc™ contains the coelenterazine substrate for the luciferase reaction, which produces a light signal that is quantified using a luminometer and expressed as relative light units (RLU). The signal produced correlates to the amount of luciferase protein expressed, indicating promoter activity in the reporter assay.

- **Ready to use -** Just add water
- **Cost effective -** One pouch prepares 5 x 96 well plates
- **Practical -** Working reagent stable for up to a month

Key Features

One step reagent
No additional reagents required! QUANTI-Luc™ contains the coelenterazine substrate with stabilizers and all the necessary components for the luciferase assay. It comes lyophilized and just requires addition of water to prepare the assay reagent.

Substrate stability
When reconstituted the substrate is stable for up to a month in contrast to other commercially available coelenterazine-based assay buffers. Amenable for multiple application use.

Low cost and versatile
Use for low or high throughput applications at lower cost compared to commercially available reagents. Not shipped on dry ice, easy to store and to use. Light emission can be measured using a luminometer without the need for an automated injector.

Applications: Use with Lucia luciferase

Exceptional sensitivity and reproducibility
Optimized for the detection of Lucia, a luciferase producing 1000-fold higher bioluminescent signal compared to the commonly used Firefly and *Renilla* luciferases. Lucia luciferase is one log more sensitive than SEAP. InvivoGen has developed new reporter cell lines providing you with a choice of using SEAP or Lucia as the reporter:
- **single promoter reporter cells,** HEK-Dual™ IFN-γ and HEK-Dual™ TNF-α (www.invivogen.com/cytokine-sensor-cells),
- **double promoter reporter cells**, THP1-Dual™ (NF-κB, ISG) and Jurkat-Dual™ (NF-κB, ISG) (http://www.invivogen.com/reporter-cells).

No cell lysis required
Lucia luciferase is secreted into the cell culture media. Small sample volumes of 20 µl are sufficient.

Rapid acquistion of results
The signal stability of the reaction with Lucia luciferase allows for a single endpoint reading after addition of QUANTI-Luc™ to samples, which shortens time-to-results by half compared to other coelenterazine-utilizing luciferases.

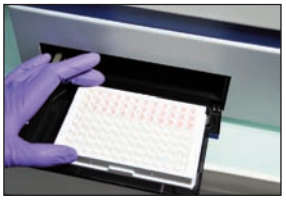
Contents and Storage

QUANTI-Luc™ is provided in a 2- or 5-pouch unit. Each pouch makes 25 ml of reagent allowing the preparation of 500 wells of a 96-well plate. Product is shipped at room temparature. Store at -20°C up to 12 months. After preparation, product is stable 1 week at 4°C and 1 month at -20°C.

QUANTI-Luc™ Procedure

1. Prepare QUANTI-Luc™ by adding 25 ml water to the contents of one pouch.

2. Transfer aliquots of cell culture medium to opaque 96-microwell plate.



3. Set up the luminometer prior to addition of 50 µl QUANTI-Luc™ reagent to each well either manually or by automated injection. Measure luminosity in endpoint mode when using Lucia luciferase or in kinetic mode depending on the coelenterazine-luciferase used.

PRODUCT	QUANTITY*	CAT. CODE
QUANTI-Luc™	2 pouches (2 x 25 ml) 5 pouches (5 x 25 ml)	rep-qlc1 rep-qlc2

*** Bulk quantities readily available**

Also Available

PRODUCT	QUANTITY	CAT. CODE
Recombinant Lucia Protein	1 µg	rec-lucia
Anti-Lucia-IgG	100 µg	mabg-lucia

For more information, go to:
www.invivogen.com/lucia

4 PRR LIGANDS

PAMPS Collection

TLR Agonist Kits

TLR & NOD Response Profiling

PRR Ligand Screening Service

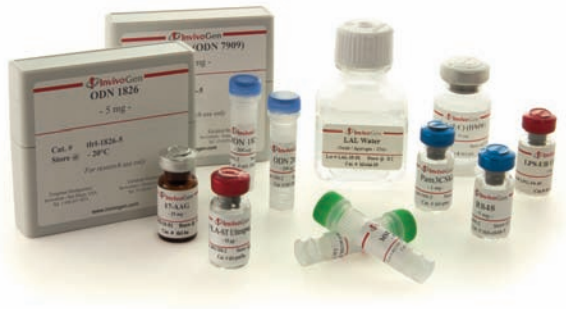
Soluble Receptor:Fc Fusion Proteins

PAMPs Collection

Pattern recognition receptors (PRRs) recognize a wide variety of ligands, called pathogen-associated molecular patterns (PAMPs), discriminating Gram-positive and Gram-negative bacteria from fungi and other pathogens. InvivoGen offers the most comprehensive choice of ligands known to activate specific PRRs, that can serve as controls in genetic and pharmaceutical studies on PRRs. InvivoGen strives to provide PRR ligands of the highest quality. We thoroughly validate our ligands to ensure high quality and lot-to-lot reproducibility.

All of InvivoGen's PAMPs are listed in the following tables.

- **Toll-Like Receptor Ligands**
- **NOD-Like Receptor Ligands**
- **RIG-I-Like Receptor Ligands**
- **Cytosolic DNA Sensor/STING Ligands**
- **C-type Lectin Receptor Ligands**
- **Multi-PRR Ligands**



PRR Activity Validated

The activity of all PAMPs is tested using the appropriate Blue™ reporter cell line, such as HEK-Blue™ TLR, RAW-Blue™ or THP1-Blue™ ISG cells.

TLR2 & TLR4 Contaminant Activities Checked

The major contaminants of PRR ligands are lipoproteins that activate TLR2 and lipopolysaccharide (LPS, also known as endotoxin) that activate TLR4. The presence of these contaminants is determined by assessing the TLR2 and TLR4 activities of all InvivoGen's PAMPs using HEK-Blue™ TLR2 and HEK-Blue™ TLR4 cells, respectively. Endotoxin levels are also determined using a chromogenic LAL assay when possible. **PRR ligands containing undetectable levels of endotoxin are "EndoFit".**

Leading Supplier of PRR Ligands

InvivoGen's PRR ligands are the most cited in the literature. See below references of articles published in high-impact factor journals.

Recent Articles with InvivoGen's PRR LIGANDS

TLR2 Ligands

Meunier E. *et al.*, 2014. Caspase-11 activation requires lysis of pathogen-containing vacuoles by IFN-induced GTPases. Nature. 509(7500):366-70.

Noubade R. *et al.*, 2014. NRROS negatively regulates reactive oxygen species during host defence and autoimmunity. Nature. 509(7499):235-9.

TLR3 Ligands

Beug ST. *et al.*, 2014. Smac mimetics and innate immune stimuli synergize to promote tumor death. Nat Biotechnol. 32(2):182-90.

Rice GI. *et al.*, 2014. Gain-of-function mutations in IFIH1 cause a spectrum of human disease phenotypes associated with upregulated type I interferon signaling. Nat Genet. 46(5):503-9.

TLR4 Ligands

Bald T. *et al.*, 2014. Ultraviolet-radiation-induced inflammation promotes angiotropism and metastasis in melanoma. Nature. 507(7490):109-13.

Tiruppathi C. *et al.*, 2014. The transcription factor DREAM represses the deubiquitinase A20 and mediates inflammation. Nat Immunol. 15(3):239-47.

TLR5 Ligands

Khare S. *et al.*, 2014. The PYRIN domain-only protein POP3 inhibits ALR inflammasomes and regulates responses to infection with DNA viruses. Nat Immunol. 15(4):343-53.

Hedl M. *et al.*, 2014. Pattern Recognition Receptor Signaling in Human Dendritic Cells is Enhanced by ICOS Ligand and Modulated by the Crohn's Disease ICOSLG Risk Allele. Immunity. 40(5):734-46.

TLR7-8 Ligands

Rongvaux A. *et al.*, 2014. Development and function of human innate immune cells in a humanized mouse model. Nat Biotechnol. 32(4):364-72.

Everts B. *et al.*, 2014. TLR-driven early glycolytic reprogramming via the kinases TBK1-IKKε supports the anabolic demands of dendritic cell activation. Nat Immunol. 15(4):323-32.

TLR9 Ligands

Lee EC. *et al.*, 2014. Complete humanization of the mouse immunoglobulin loci enables efficient therapeutic antibody discovery. Nat Biotechnol. 32(4):356-63.

Magri G. *et al.*, 2014. Innate lymphoid cells integrate stromal and immunological signals to enhance antibody production by splenic marginal zone B cells. Nat Immunol. 15(4):354-64.

NOD1-2 Ligands

Nakamura N. *et al.*, 2014. Endosomes are specialized platforms for bacterial sensing and NOD2 signalling. Nature. 509(7499):240-4.

Duffy D. *et al.*, 2014. Functional analysis via standardized whole-blood stimulation systems defines the boundaries of a healthy immune response to complex stimuli. Immunity. 40(3):436-50.

NLRP3 Ligands

Murthy A. *et al.*, 2014. A Crohn's disease variant in Atg16l1 enhances its degradation by caspase 3. Nature. 506(7489):456-62.

Neumann K. *et al.*, 2014. Clec12a is an inhibitory receptor for uric acid crystals that regulates inflammation in response to cell death. Immunity. 40(3):389-99.

CDS & STING Ligands

Roth S. *et al.*, 2014. Rad50-CARD9 interactions link cytosolic DNA sensing to IL-1β production. Nat Immunol. 15(6):538-45.

Zhang L. *et al.*, 2014. NLRC3, a member of the NLR family of proteins, is a negative regulator of innate immune signaling induced by the DNA sensor STING. Immunity. 40(3):329-41.

PRODUCT	ORIGIN/DESCRIPTION	ENDOTOXIN LEVELS	WORKING CONCENTRATION	QTY	CATALOG CODE	INFO
TLR LIGANDS						
TLR2 Agonists						
FSL-1	Synthetic diacylated lipoprotein - TLR2/6	EndoFit™	1 - 100 ng/ml	100 µg	tlrl-fsl	-
HKAL	Heat Killed *Acholeplasma laidlawii*	EndoFit™	10^6 - 10^8 cells/ml	10^9 cells	tlrl-hkal	-
HKEB	Heat Killed *Escherichia coli* 0111:B4	>1 EU/10^9 cells	10^5 - 10^7 cells/ml	10^{10} cells	tlrl-hkeb	-
HKHP	Heat Killed *Helicobacter pylori*	EndoFit™	10^6 - 10^8 cells/ml	10^9 cells	tlrl-hkhp	-
HKLM	Heat Killed *Listeria monocytogenes*	EndoFit™	10^7 - 10^8 cells/ml	10^{10} cells	tlrl-hklm	-
HKLP	Heat Killed *Legionella pneumophila*	EndoFit™	10^7 - 10^8 cells/ml	10^9 cells	tlrl-hklp	-
HKLR	Heat Killed *Lactobacillus rhamnosus*	>1 EU/10^9 cells	10^8 - 10^9 cells/ml	10^{10} cells	tlrl-hklr	-
HKMF	Heat Killed *Mycoplasma fermentans*	EndoFit™	10^6 - 10^8 cells/ml	10^9 cells	tlrl-hkmf	-
HKMT **NEW**	Heat Killed *Mycobacterium tuberculosis*	EndoFit™	100 ng - 10 µg/ml	10 mg 50 mg	tlrl-hkmt-1 tlrl-hkmt-5	p. 40
HKPA	Heat Killed *Pseudomonas aeruginosa*	>1 EU/10^8 cells	10^5 - 10^7 cells/ml	10^{10} cells	tlrl-hkpa	-
HKPG	Heat Killed *Porphyromonas gingivalis*	EndoFit™	10^6 - 10^8 cells/ml	10^{10} cells	tlrl-hkpg	-
HKSA	Heat Killed *Staphylococcus aureus*	>1 EU/10^9 cells	10^6 - 10^8 cells/ml	10^{10} cells	tlrl-hksa	-
HKSE **NEW**	Heat Killed *Staphylococcus epidermidis*	EndoFit™	10^7 - 10^9 cells/ml	10^{10} cells	tlrl-hkse	p. 40
HKSP	Heat Killed *Streptococcus pneumoniae*	EndoFit™	10^7 - 10^9 cells/ml	10^{10} cells	tlrl-hksp	-
HKST **NEW**	Heat Killed *Salmonella typhimurium*	>1 EU/10^8 cells	10^4 - 10^9 cells/ml	10^{10} cells	tlrl-hkst	p. 40
LAM-MS	Lipoarabinomannan from *M. smegmatis*	EndoFit™	100 ng - 10 µg/ml	500 µg	tlrl-lams	-
LM-MS	Lipomannan from *Mycobacterium smegmatis*	<5 EU/mg	1 - 10 ng/ml	250 µg	tlrl-lmms2	-
LPS-PG	Lipopolysaccharide from *P. gingivalis*	>10^4 EU/mg	10 ng - 10 µg/ml	1 mg	tlrl-pglps	-
LTA-BS	Lipoteichoic acid from *Bacillus subtilis*	10 EU/mg	100 ng - 1 µg/ml	5 mg	tlrl-lta	-
LTA-SA	Lipoteichoic acid from *S. aureus*	10 EU/mg	100 ng - 1 µg/ml	5 mg	tlrl-slta	-
LTA-SA Purified	Purified lipoteichoic acid from *S. aureus*	EndoFit™	1 ng - 1 µg/ml	5 mg	tlrl-pslta	-
Pam2CSK4	Synthetic diacylated lipoprotein - TLR2(6)	EndoFit™	1 - 100 ng/ml	1 mg	tlrl-pm2s-1	-
Pam2CSK4 Biotin	Biotinylated Pam2CSK4	EndoFit™	1 - 100 ng/ml	50 µg	tlrl-bpam2	-
Pam2CSK4 Rhodamine	Rhodamine-labeled Pam2CSK4	EndoFit™	1 - 100 ng/ml	50 µg	tlrl-rpam2	-
Pam3CSK4	Synthetic triacylated lipoprotein - TLR1/2	EndoFit™	1 - 300 ng/ml	1 mg	tlrl-pms	-
Pam3CSK4 Biotin	Biotinylated Pam3CSK4	EndoFit™	1 - 100 ng/ml	50 µg	tlrl-bpms	-
Pam3CSK4 Rhodamine	Rhodamine-labeled Pam3CSK4	EndoFit™	1 - 300 ng/ml	50 µg	tlrl-rpms	-
Pam3CSK4 VacciGrade™	Sterile Pam3CSK4	EndoFit™	1 - 300 ng/ml	1 mg	vac-pms	-
PGN-BS	Peptidoglycan from *B. subtilis*	EndoFit™	1 - 10 µg/ml	5 mg	tlrl-pgnbs	-
PGN-EB	Peptidoglycan from *E. coli* 0111:B4	10^2 - 10^3 EU/mg	1 - 10 µg/ml	1 mg	tlrl-pgnec	-
PGN-EK	Peptidoglycan from *E. coli* K12	10^2 - 10^3 EU/mg	1 - 10 µg/ml	1 mg	tlrl-pgnek	-
PGN-SA	Peptidoglycan from *S. aureus*	1 EU/mg	1 - 10 µg/ml	5 mg	tlrl-pgnsa	-
Zymosan	Cell wall preparation of *S. cerevisiae*	EndoFit™	10 µg/ml	100 mg	tlrl-zyn	-
TLR3 Agonists						
Poly(A:U)	Polyadenylic–polyuridylic acid	<0.005 EU/µg	300 ng - 100 µg/ml	10 mg	tlrl-pau	-
Poly(I:C) (HMW)	Polyinosine-polycytidylic acid High molecular weight (1.5-8 kb)	EndoFit™	10 ng - 10 µg/ml	10 mg 50 mg	tlrl-pic tlrl-pic-5	-
Poly(I:C) (LMW)	Polyinosine-polycytidylic acid Low molecular weight (0.2-1 kb)	EndoFit™	30 ng - 10 µg/ml	25 mg 250 mg	tlrl-picw tlrl-picw-250	-
Poly(I:C) (HMW) Biotin	Biotinylated poly(I:C) (HMW)	EndoFit™	10 ng - 10 µg/ml	10 µg	tlrl-picb	-
Poly(I:C) (HMW) Fluorescein	Fluorescein-labeled poly(I:C) (HMW)	EndoFit™	10 ng - 10 µg/ml	10 µg	tlrl-picf	-
Poly(I:C) (HMW) Rhodamine	Rhodamine-labeled poly(I:C) (HMW)	EndoFit™	10 ng - 10 µg/ml	10 µg	tlrl-picr	-
Poly(I:C) (LMW) Rhodamine	Rhodamine-labeled poly(I:C) (LMW)	EndoFit™	10 ng - 10 µg/ml	10 µg	tlrl-piwr	-
Poly(I:C) (HMW) VacciGrade™	Sterile poly(I:C) (HMW)	EndoFit™	10 ng - 10 µg/ml	10 mg	vac-pic	-

PRODUCT	ORIGIN/DESCRIPTION	ENDOTOXIN LEVELS*	WORKING CONCENTRATION	QTY	CATALOG CODE	INFO
TLR LIGANDS						
TLR4 Agonists						
LPS-B5 NEW	Standard lipopolysaccharide from *E. coli 055:B5*	>1 x 10^6 EU/mg	100 pg - 1 µg/ml	5 mg	tlrl-b5lps	p. 40
LPS-B5 Ultrapure NEW	Ultrapure lipopolysaccharide from *E. coli 055:B5*	>1 x 10^6 EU/mg	100 pg - 1 µg/ml	5 mg	tlrl-pb5lps	p. 40
LPS-EB	Standard lipopolysaccharide from *E. coli 0111:B4*	>1 x 10^6 EU/mg	10 ng - 10 µg/ml	5 mg	tlrl-eblps	-
LPS-EB Ultrapure	Ultrapure lipopolysaccharide from *E. coli 0111:B4*	>0.5 x 10^6 EU/mg	10 ng - 10 µg/ml	5x10^6 EU	tlrl-3pelps	-
LPS-EB Biotin	Biotinylated ultrapure LPS from *E. coli 0111:B4*	1 x 10^6 EU/mg	10 ng - 10 µg/ml	500 µg	tlrl-bblps	-
LPS-EK	Standard lipopolysaccharide from *E. coli K12*	>1 x 10^5 EU/mg	1 ng - 10 µg/ml	5 mg	tlrl-eklps	-
LPS-EK Ultrapure	Ultrapure lipopolysaccharide from *E. coli K12*	>0.5 x 10^6 EU/mg	1 ng - 10 µg/ml	1 mg	tlrl-peklps	-
LPS-PG Ultrapure NEW	Ultrapure lipopolysaccharide from *P. gingivalis*	>1 x 10^5 EU/mg	100 ng - 10 µg/ml	1 mg	tlrl-ppglps	p. 40
LPS-SM Ultrapure	Ultrapure lipopolysaccharide from *S. minnesota*	>1 x 10^5 EU/mg	10 ng - 10 µg/ml	5 mg	tlrl-smlps	-
MPLA-SM	Monophosphoryl lipid A from *S. minnesota*	1 x 10^6 EU/mg	100 ng - 1 µg/ml	1 mg	tlrl-mpla	-
MPLA-SM VacciGrade™	Sterile detoxified MPLA	1 x 10^6 EU/mg	2 - 20 µg/mouse	1 mg	vac-mpla	-
MPLAs	Synthetic monophosphoryl lipid A	1 x 10^6 EU/mg	10 ng - 10 µg/ml	1 mg	tlrl-mpls	-
MPLAs VacciGrade™	Sterile synthetic MPLA	1 x 10^6 EU/mg	2 - 20 µg/mouse	1 mg	vac-mpls	-
TLR4 Antagonist						
LPS-RS	Lipopolysaccharide from *Rhodobacter sphaeroides*	>1 x 10^6 EU/mg	10 ng - 10 µg/ml	5 mg	tlrl-rslps	-
LPS-RS Ultrapure	Ultrapure lipopolysaccharide from *R. sphaeroides*	>1 x 10^5 EU/mg	10 ng - 10 µg/ml	1 mg	tlrl-prslps	-
TLR5 Agonists						
FLA-BS	Standard flagellin from *B. subtilis* - 10% pure	<0.1 EU/µg	10 ng - 10 µg/ml	100 µg	tlrl-bsfla	-
FLA-BS Ultrapure NEW	Ultrapure flagellin from *B. subtilis* - >95% pure	<0.05 EU/µg	1 ng - 1 µg/ml	50 µg	tlrl-pbsfla	p. 40
FLA-PA Ultrapure NEW	Ultrapure flagellin from *P. aeruginosa* - >95% pure	<0.05 EU/µg	1 ng - 1 µg/ml	50 µg	tlrl-pafla	p. 40
FLA-ST	Standard flagellin from *S. typhimurium* - 10% pure	<10 EU/µg	10 ng - 10 µg/ml	100 µg	tlrl-stfla	-
FLA-ST Ultrapure	Ultrapure flagellin from *S. typhimurium* - >95% pure	<0.05 EU/µg	10 - 100 ng/ml	10 µg 50 µg	tlrl-epstfla tlrl-epstfla-5	-
RecFLA-ST	Recombinant flagellin from *S. typhimurium*	<0.05 EU/µg	10 - 100 ng/ml	1 µg 10 µg	tlrl-flic tlrl-flic-10	-
RecFLA-ST NQ NEW	Flagellin mutant from *S. typhimurium*	<0.05 EU/µg	10 - 100 ng/ml	10 µg	tlrl-flicnq	p. 40
Flagellin Flic VacciGrade™	Sterile recombinant flagellin from *S. typhimurium*	<0.05 EU/µg	1 - 10 µg/mouse	50 µg	vac-fla	-
TLR7 Agonists						
CL264	Adenine analog	EndoFit™	50 ng - 10 µg/ml	500 µg 5 mg	tlrl-c264e tlrl-c264e-5	-
CL264 Biotin	Biotinylated CL264	EndoFit™	1 - 10 µg/ml	100 µg	tlrl-bc264	-
CL264 FITC	FITC-labeled CL264	EndoFit™	1 - 10 µg/ml	100 µg	tlrl-fc264	-
CL264 Rhodamine	Rhodamine-labeled CL264	EndoFit™	1 - 10 µg/ml	100 µg	tlrl-rc264	-
CL307 NEW	Hydroxyadenine spermine compound	EndoFit™	5 ng - 1 µg/ml	500 µg	tlrl-c307	p. 41
Gardiquimod™	Imidazoquinoline compound	EndoFit™	0.1 - 3 µg/ml	500 µg 5 mg	tlrl-gdqs tlrl-gdq-5	-
Gardiquimod™ VacciGrade™	Sterile Gardiquimod™	EndoFit™	10 - 100 µg/mouse	5 mg	vac-gdq	-
Imiquimod (R837)	Imidazoquinoline compound	EndoFit™	1 - 5 µg/ml	500 µg 5 mg	tlrl-imqs tlrl-imq	-
Imiquimod VacciGrade™	Sterile Imiquimod	EndoFit™	10 - 100 µg/mouse	5 mg	vac-imq	-
Loxoribine	Guanosine analog	EndoFit™	1 mM (300 µg/ml)	50 mg	tlrl-lox	-
TLR8 Agonists						
ORN02/LyoVec	ssRNA with 6 UUAU repeats / LyoVec™	EndoFit™	0.25 - 5 µg/ml	4 x 25 µg	tlrl-orn2	-
ORN06/LyoVec	ssRNA with 6 UUGU repeats / LyoVec™	EndoFit™	0.25 - 5 µg/ml	4 x 25 µg	tlrl-orn6	-
ssPolyU Naked	RNA homopolymer	EndoFit™	1 - 10 µg/ml	10 mg	tlrl-sspu	-

PRODUCT	ORIGIN/DESCRIPTION	ENDOTOXIN LEVELS*	WORKING CONCENTRATION	QTY	CATALOG CODE	INFO
TLR LIGANDS						
TLR8 Agonists						
ssPolyU/LyoVec	RNA homopolymer / LyoVec™	EndoFit™	1 - 10 µg/ml	4 x 25 µg	tlrl-lpu	-
ssRNA40/LyoVec	HIV-1 LTR-derived ssRNA / LyoVec™	EndoFit™	0.25 - 5 µg/ml	4 x 25 µg	tlrl-lrna40	-
ssRNA41/LyoVec	ssRNA40 control / LyoVec™	EndoFit™	0.25 - 5 µg/ml	4 x 25 µg	tlrl-lrna41	-
ssRNA-DR/LyoVec	ssRNA with 2 GUCCUUCAA repeats / LyoVec™	EndoFit™	1 - 10 µg/ml	4 x 25 µg	tlrl-ssdr	-
TLR7/8 Agonists						
CL075	Thiazoquinoline compound	EndoFit™	100 ng - 5 µg/ml	500 µg 5 mg	tlrl-c75 tlrl-c75-5	-
CL097	Imidazoquinoline compound	EndoFit™	50 ng - 5 µg/ml	500 µg 5 mg	tlrl-c97 tlrl-c97-5	-
Poly(dT)	Thymidine homopolymer ODN (17 mer)	EndoFit™	10 µM	100 nmol	tlrl-pt17	-
R848 (resiquimod)	Imidazoquinoline compound	EndoFit™	10 ng - 10 µg/ml	500 µg 5 mg	tlrl-r848 tlrl-r848-5	-
R848 VacciGrade™	Sterile R848	EndoFit™	10 - 100 µg/mouse	5 mg	vac-r848	-
TLR9 Agonists						
***E. coli* ssDNA/LyoVec**	*E. coli* single stranded DNA/LyoVec™ complexes	EndoFit™	1 - 10 µg/ml	200 µg	tlrl-ssec	-
ODN 1585	Stimulatory CpG ODN Type A Mouse specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-1585 tlrl-1585-1 tlrl-1585-5	-
ODN 1585 control	Negative control for ODN 1585	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-1585c tlrl-1585c-1 tlrl-1585c-5	-
ODN 1585 FITC	FITC-labeled CpG ODN - mouse specific, type A	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-1585f	-
ODN 1585 VacciGrade™	Sterile ODN 1585	EndoFit™	20 - 50 µg/mouse	1 mg	vac-1585-1	-
ODN 1668	Stimulatory CpG ODN Type B Mouse specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-1668 tlrl-1668-1 tlrl-1668-5	-
ODN 1668 control	Negative control for ODN 1668	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-1668c tlrl-1668c-1 tlrl-1668-5	-
ODN 1668 FITC	FITC-labeled CpG ODN - mouse specific, type B	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-1668f	-
ODN 1826	Stimulatory CpG ODN Type B Mouse specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-1826 tlrl-1826-1 tlrl-1826-5	-
ODN 1826 control (ODN 2138)	Negative control for ODN 1826	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-1826c tlrl-1826c-1 tlrl-1826c-5	-
ODN 1826 Biotin	Biotinylated CpG ODN - mouse specific, type B	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-1826b	-
ODN 1826 FITC	FITC-labeled CpG ODN - mouse specific, type B	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-1826f	-
ODN 1826 VacciGrade™	Sterile ODN 1826	EndoFit™	20 - 50 µg/mouse	1 mg	vac-1826-1	-
ODN 2006	Stimulatory CpG ODN Type B Human specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2006 tlrl-2006-1 tlrl-2006-5	-
ODN 2006 control (ODN 2137)	Negative control for ODN 2006	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2006c tlrl-2006c-1 tlrl-2006c-5	-
ODN 2006 Biotin	Biotinylated CpG ODN - human specific, type B	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-2006b	-
ODN 2006 FITC	FITC-labeled CpG ODN - human specific, type B	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-2006f	-
ODN 2006-G5	Stimulatory CpG ODN Type B Human specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2006g5 tlrl-2006g5-1 tlrl-2006g5-5	-

PRODUCT	ORIGIN/DESCRIPTION	ENDOTOXIN LEVELS	WORKING CONCENTRATION	QTY	CATALOG CODE	INFO
TLR LIGANDS						
TLR9 Agonists						
ODN 2006-G5 Control	Negative control for ODN 2006-G5	EndoFit™	5 µM (10 µg/ml)	200 µg	tlrl-2006g5c	-
ODN 2006 VacciGrade™	Sterile ODN 2006	EndoFit™	20 - 50 µg/mouse	1 mg	vac-2006-1	-
ODN 2007	Stimulatory CpG ODN Type B Bovine / porcine	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2007 tlrl-2007-1 tlrl-2007-5	-
ODN 2007 control	Negative control for ODN 2007	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2007c tlrl-2007c-1 tlrl-2007c-5	-
ODN 2216	Stimulatory CpG ODN Type A Human specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2216 tlrl-2216-1 tlrl-2216-5	-
ODN 2216 control (ODN 2138)	Negative control for ODN 2216	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2243 tlrl-2243-1 tlrl-2243-5	-
ODN 2216 Biotin	Biotinylated CpG ODN - human specific, type A	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-2216b	-
ODN 2216 FITC	FITC-labeled CpG ODN - human specific, type A	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-2216f	-
ODN 2336	Stimulatory CpG ODN Type A Human specific	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2336 tlrl-2336-1 tlrl-2336-5	-
ODN 2336 control	Negative control for ODN 2336	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2336c tlrl-2336c-1 tlrl-2336c-5	-
ODN 2336 FITC	FITC-labeled CpG ODN - human specific, type A	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-2336f	-
ODN 2395	Stimulatory CpG ODN Type C Human / mouse	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2395 tlrl-2395-1 tlrl-2395-5	-
ODN 2395 control	Negative control for ODN 2395	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-2395c tlrl-2395c-1 tlrl-2395c-5	-
ODN 2395 FITC	FITC-labeled CpG ODN - human specific, type C	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-2395f	-
ODN 2395 VacciGrade™	Sterile ODN 2395	EndoFit™	20 - 50 µg/mouse	1 mg	vac-2395-1	-
ODN BW006 **NEW**	Class B CpG ODN, human & mouse	EndoFit™	300 ng - 30 µg/ml	200 µg	tlrl-bw006	p. 41
ODN BW007 **NEW**	Negative control for ODN BW006	EndoFit™	50 nM - 1 µM	200 µg	tlrl-bw007	p. 41
ODN D-SL01 **NEW**	Class B CpG ODN, multispecies	EndoFit™	50 nM - 1 µM	200 µg	tlrl-dsl01	p. 41
ODN-D-SL03 **NEW**	Class C CpG ODN, multispecies	EndoFit™	50 nM - 1 µM	200 µg	tlrl-dsl03	p. 41
ODN M362	Stimulatory CpG ODN Type C Human / mouse	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-m362 tlrl-m362-1 tlrl-m362-5	-
ODN M362 control	Negative control for ODN M362	EndoFit™	5 µM (10 µg/ml)	200 µg 1 mg 5 mg	tlrl-m362c tlrl-m362c-1 tlrl-m362c-5	-
ODN M362 FITC	FITC-labeled CpG ODN - human specific, type C	EndoFit™	10 ng - 10 µg/ml	50 µg	tlrl-m362f	-
pCpGfree-giant	CpG-free *dcm*- giant plasmid	EndoFit™	5 - 10 µg/ml	200 µg	tlrl-cpgfn	-
Salmon sperm DNA	TLR9 negative control	EndoFit™	5 - 100 µg/ml	50 mg	tlrl-sdef	-
TLR9 Antagonists						
ODN 2088	Inhibitory ODN, mouse preferred	EndoFit™	50 nM - 1 µM	200 µg 1 mg	tlrl-2088 tlrl-2088-1	-
ODN 2088 control	Negative control for ODN 2088	EndoFit™	50 nM - 1 µM	200 µg 1 mg	tlrl-2088c tlrl-2088c-1	-
ODN 4084-F	Class B inhibitory ODN	EndoFit™	50 nM - 1 µM	200 µg	tlrl-4084	-
ODN INH-1	Class R inhibitory ODN	EndoFit™	50 nM - 1 µM	200 µg	tlrl-inh1	-

PRODUCT	ORIGIN/DESCRIPTION	ENDOTOXIN LEVELS	WORKING CONCENTRATION	QTY	CATALOG CODE	INFO
TLR LIGANDS						
TLR9 Antagonists						
ODN INH-18 NEW	Inhibitory ODN, human & mouse	EndoFit™	50 nM - 1 µM	200 µg	tlrl-inh18	p. 41
ODN INH-47	Negative control for ODN INH-1	EndoFit™	50 nM - 1 µM	200 µg	tlrl-inh47	-
ODN TTAGGG	Inhibitory ODN, human preferred	EndoFit™	50 nM - 1 µM	200 µg 1 mg	tlrl-ttag tlrl-ttag-1	-
ODN TTAGGG control	Negative control for ODN TTAGGG	EndoFit™	50 nM - 1 µM	200 µg 1 mg	tlrl-ttagc tlrl-ttagc-1	-
G-ODN	Inhibitory guanosine-rich ODN	EndoFit™	50 nM - 1 µM	200 µg	tlrl-godn	-
G-ODN control	Negative control for G-ODN	EndoFit™	50 nM - 1 µM	200 µg	tlrl-godnc	-
TLR13 Agonists						
ORN Sa19 NEW	*S. aureus* 23S rRNA-derived oligoribonucleotide	EndoFit™	0.02 - 2 µg/ml	200 µg	tlrl-orn19	p. 41
ORN Sa19 Control NEW	Control oligoribonucleotide for ORN Sa19	EndoFit™	0.02 - 2 µg/ml	200 µg	tlrl-orn19c	p. 41
NLR LIGANDS						
NOD1 Agonists						
C12-iE-DAP	Acylated derivative of iE-DAP	EndoFit™	1 ng - 1 µg/ml	1 mg	tlrl-c12dap	-
iE-DAP	D-γ-Glu-mDAP	EndoFit™	1 - 100 µg/ml	5 mg	tlrl-dap	-
iE-Lys	iE-DAP negative control	EndoFit™	1 - 100 µg/ml	5 mg	tlrl-lys	-
Tri-DAP	L-Ala-γ-D-Glu-mDAP	EndoFit™	100 ng - 10 µg/ml	1 mg	tlrl-tdap	-
Tri-Lys	Tri-DAP negative control	EndoFit™	100 ng - 10 µg/ml	1 mg	tlrl-tlys	-
NOD2 Agonists						
L18-MDP	Muramyldipeptide with a C18 fatty acid chain	EndoFit™	1 - 100 ng/ml	1 mg	tlrl-lmdp	-
MDP	Muramyldipeptide (L-D isoform, active)	EndoFit™	10 ng - 10 µg/ml	5 mg	tlrl-mdp	-
MDP control	Muramyldipeptide (D-D isoform, inactive)	EndoFit™	10 ng - 10 µg/ml	5 mg	tlrl-mdpc	-
MDP Biotin	Biotinylated Muramyldipeptide	EndoFit™	100 ng - 10 µg/ml	500 µg	tlrl-bmdp	-
MDP FITC	FITC-labeled Muramyldipeptide	EndoFit™	10 ng - 10 µg/ml	500 µg	tlrl-fmdp	-
MDP Rhodamine	Rhodamine-labeled Muramyldipeptide	EndoFit™	100 ng - 10 µg/ml	500 µg	tlrl-rmdp	-
M-Tri$_{LYS}$	Synthetic muramyl tripeptide	EndoFit™	100 ng - 10 µg/ml	1 mg	tlrl-mtl	-
M-Tri$_{LYS}$-D-ASN	Synthetic muramyl tetrapeptide	EndoFit™	100 ng - 10 µg/ml	1 mg	tlrl-mtn	-
Murabutide	Synthetic derivative of muramyldipeptide	EndoFit™	10 ng - 1 µg/ml	5 mg	tlrl-mbt	-
Murabutide control	Murabutide analog (D isoform, inactive)	EndoFit™	10 ng - 1 µg/ml	5 mg	tlrl-mbtc	-
N-Glycolyl-MDP	N-glycolylated muramyldipeptide	EndoFit™	100 ng - 10 µg/ml	5 mg	tlrl-gmdp	-
N-Glycolyl-MDP VacciGrade™	Sterile N-glycolylated muramyldipeptide	EndoFit™	5 -30 µg/mouse	5 mg	vac-gmdp	-
NOD1/2 Agonists						
M-Tri$_{DAP}$	MurNAc-L-Ala-γ-D-Glu-mDAP	EndoFit™	1 - 100 µg/ml	1 mg	tlrl-mtd	-
PGN-ECndi ultrapure	Insoluble peptidoglycan from *E. coli K12*	EndoFit™	1 - 5 µg/ml	5 mg	tlrl-kipgn	-
PGN-ECndss ultrapure	Soluble sonicated peptidoglycan from *E. coli K12*	EndoFit™	1 - 5 µg/ml	1 mg	tlrl-ksspgn	-
PGN-SAndi ultrapure	Insoluble peptidoglycan from *S. aureus*	EndoFit™	1 - 5 µg/ml	5 mg	tlrl-sipgn	-
NLRP3 Inflammasome Inducers						
Alum Crystals	Aluminium potassium sulfate	EndoFit™	10 - 200 µg/ml	1 g	tlrl-alk	-
ATP	Adenosine 5′-triphosphate disodium salt	EndoFit™	5 mM	1 g	tlrl-atp	-
CPPD Crystals	Calcium pyrophosphate dihydrate	EndoFit™	50 - 200 µg/ml	5 mg	tlrl-cppd	-
Hemozoin	Synthetic heme crystal	EndoFit™	50 - 400 µg/ml	5 mg	tlrl-hz	-
MSU Crystals	Monosodium urate (uric acid)	EndoFit™	50 - 200 µg/ml	5 mg	tlrl-msu	-
Nano-SiO2	Nanoparticles of silica dioxide	EndoFit™	10 - 200 µg/ml	10 mg	tlrl-sio	-
Nigericin	Nigericin, sodium salt	EndoFit™	1 µM	10 mg	tlrl-nig	-

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RLR LIGANDS						
RIG-I Agonists						
5'ppp-dsRNA	5'Triphosphate blunt-end double-stranded RNA	EndoFit™	30 ng - 1 µg/ml	25 µg 100 µg	tlrl-3prna tlrl-3prna-100	-
5'ppp-dsRNA/LyoVec	5'ppp-dsRNA/LyoVec™ complexes	EndoFit™	100 ng - 1 µg/ml	25 µg 100 µg	tlrl-3prnalv tlrl-3prnalv-100	-
5'ppp-dsRNA Control	Blunt-end double-stranded RNA, control	EndoFit™	30 ng - 1 µg/ml	25 µg 100 µg	tlrl-3prnac tlrl-3prnac-100	-
5'ppp-dsRNA Control/LyoVec	5'ppp-dsRNA Control/LyoVec™ complexes	EndoFit™	100 ng - 1 µg/ml	25 µg 100 µg	tlrl-3prnaclv tlrl-3prnadv-100	-
RIG-I/MDA-5 Agonists						
Poly(I:C) (HMW)/LyoVec	Poly(I:C) (HMW)/LyoVec™ complexes	EndoFit™	100 ng - 1 µg/ml	100 µg	tlrl-piclv	-
Poly(I:C) (LMW)/LyoVec	Poly(I:C) (LMW)/LyoVec™ complexes	EndoFit™	100 ng - 1 µg/m	100 µg	tlrl-picwlv	-
CDS & STING LIGANDS						
CDS Agonists						
dsDNA-EC NEW	*E. coli K12* genomic DNA	EndoFit™	30 ng - 1 µg/ml	200 µg	tlrl-ecdna	p. 42
HSV-60 Naked NEW	HSV1-derived 60 bp oligonucleotide	EndoFit™	30 ng - 10 µg/ml	200 µg	tlrl-hsv60n	p. 42
HSV-60 LyoVec NEW	Precomplexed HSV1-derived 60 bp ODN	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-hsv60c	p. 42
HSV-60c Naked NEW	Control for HSV-60 ODN	EndoFit™	30 ng - 10 µg/ml	200 µg	tlrl-hsv60cn	p. 42
HSV-60c/LyoVec NEW	Precomplexed control for HSV-60 ODN	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-hsv60cc	p. 42
ISD Naked NEW	Interferon stimulatory DNA	EndoFit™	100 ng - 10 µg/ml	200 µg	tlrl-isdn	p. 42
ISD/LyoVec NEW	Precomplexed interferon stimulatory DNA	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-isdc	p. 42
ISD Control Naked NEW	Non-immunostimulatory ODN	EndoFit™	100 ng - 10 µg/ml	200 µg	tlrl-isdcn	p. 42
ISD Control/LyoVec NEW	Precomplexed non-immunostimulatory ODN	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-isdcc	p. 42
pCpGfree-giant NEW	CpG-free high molecular weight plasmid	EndoFit™	30 ng - 10 µg/ml	200 µg	tlrl-cpgfn	p. 42
pCpGfree-giant/LyoVec NEW	Precomplexed CpG-free plasmid	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-cpgfc	p. 42
Poly(dA) NEW	Polydeoxyadenylic acid	EndoFit™	30 ng - 10 µg/ml	200 µg	tlrl-pan	p. 42
Poly(dA)/LyoVec NEW	Precomplexed polydeoxyadenylic acid	EndoFit™	100 ng - 10 µg/ml	100 µg	tlrl-pac	p. 42
Poly(dA:dT) Naked	Poly(dA-dT)•poly(dT-dA)	EndoFit™	1 - 5 µg/ml	200 µg 1 mg	tlrl-patn tlrl-patn-1	-
Poly(dA:dT)/LyoVec	Poly(dA-dT)•poly(dT-dA)/LyoVec™ complexes	EndoFit™	1 - 5 µg/ml	100 µg	tlrl-patc	-
Poly(dG:dC) Naked	Poly(dG-dC)•poly(dG-dC)	EndoFit™	1 - 5 µg/ml	200 µg	tlrl-pgcn	-
Poly(dG:dC)/LyoVec	Poly(dG-dC)•poly(dG-dC)/LyoVec™ complexes	EndoFit™	1 - 5 µg/ml	100 µg	tlrl-pgcc	-
VACV-70 Naked NEW	Vaccinia virus-derived 70 bp oligonucleotide	EndoFit™	30 ng - 10 µg/ml	200 µg	tlrl-vav70n	p. 42
VACV-70/LyoVec NEW	Precomplexed vaccinia virus-derived 70 bp ODN	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-vav70c	p. 42
VACV-70c Naked NEW	Control for VACV-70 ODN	EndoFit™	30 ng - 10 µg/ml	200 µg	tlrl-vav70cn	p. 42
VACV-70c/LyoVec NEW	Precomplexed control for VACV-70 ODN	EndoFit™	300 ng - 10 µg/ml	100 µg	tlrl-vav70cc	p. 42
STING Agonists						
2'2'-cGAMP NEW	2'5'-2'5' Cyclic GMP-AMP	EndoFit™	100 ng - 100 µg/ml	500 µg 1 mg	tlrl-cga22-s tlrl-cga22	p. 42
2'2'-cGAMP VacciGrade™ NEW	Sterile 2'5'-2'5' cyclic GMP-AMP	EndoFit™	5 - 50 µg/mouse	1 mg	vac-cga22	p. 42
2'3'-cGAMP NEW	2'5'-3'5' Cyclic GMP-AMP	EndoFit™	100 ng - 100 µg/ml	500 µg 1 mg	tlrl-cga23-s tlrl-cga23	p. 42
2'3'-cGAMP VacciGrade™ NEW	Sterile 2'5'-3'5' cyclic GMP-AMP	EndoFit™	5 - 50 µg/mouse	1 mg	vac-cga23	p. 42
3'3'-cGAMP NEW	3'5'-3'5' Cyclic GMP-AMP	EndoFit™	100 ng - 100 µg/ml	500 µg 1 mg	tlrl-cga-s tlrl-cga	p. 42
3'3'-cGAMP VacciGrade™ NEW	Sterile 3'5'-3'5' cyclic GMP-AMP	EndoFit™	5 - 50 µg/mouse	1 mg	vac-cga	p. 42

PRODUCT	ORIGIN/DESCRIPTION	ENDOTOXIN LEVELS*	WORKING CONCENTRATION	QTY	CATALOG CODE	INFO
CDS & STING LIGANDS						
STING Agonists						
c-di-AMP	3'5' Cyclic di-AMP	EndoFit™	1 - 100 µg/ml	1 mg	tlrl-cda	p. 42
c-di-AMP VacciGrade™	Sterile 3'5' cyclic di-AMP	EndoFit™	5 - 50 µg/mouse	1 mg	vac-cda	p. 42
c-di-GMP	3'5' Cyclic di-GMP	EndoFit™	10 - 100 µg/ml	1 mg	tlrl-cdg	p. 42
c-di-GMP VacciGrade™	Sterile 3'5' cyclic di-GMP	EndoFit™	5 - 50 µg/mouse	1 mg	vac-cdg	p. 42
c-di-IMP NEW	3'5' Cyclic di-IMP	EndoFit™	10 - 100 µg/ml	1 mg	tlrl-cdi	p. 42
c-di-UMP NEW	3'5' Cyclic di-UMP	EndoFit™	1 - 100 µg/ml	1 mg	tlrl-cdu	p. 42
DMXAA NEW	5,6-dimethylxanthenone-4-acetic acid	EndoFit™	10 - 100 µg/ml	5 mg	tlrl-dmx	p. 42
CLR LIGANDS						
Dectin-1 Agonists						
Beta-Glucan Peptide NEW	Beta-glucan from *Trametes versicolor*	EndoFit™	10 - 100 µg/ml	50 mg	tlrl-bgp	p. 43
Curdlan AL	Beta-1,3-glucan from *Alcaligenes faecalis*	*100 ng/ml	100 µg/ml	100 mg	tlrl-cura	-
HKCA	Heat-killed *Candida albicans*	EndoFit™	10^8 cells/ml	10^9 cells	tlrl-hkca	-
HKSC	Heat-killed *Saccharomyces cerevisiae*	EndoFit™	10^8 cells/ml	10^9 cells	tlrl-hksc	-
Laminarin NEW	Soluble beta-glucan from *Laminaria digitata*	*10 µg/ml	1 - 100 µg/ml	100 mg	tlrl-lam	p.43
Lichenan NEW	Beta-glucan from *Cetriana islandica*	*10 µg/ml	10 - 100 µg/ml	100 mg	tlrl-lich	p. 43
Pustulan NEW	Beta-glucan from *Lasallia pustulata*	*1 µg/ml	1 - 100 µg/ml	100 mg	tlrl-pst	p. 43
Schizophyllan NEW	Beta-glucan from *Schizophyllum commune*	*1 µg/ml	1 - 100 µg/ml	100 mg	tlrl-spg	p. 43
Scleroglucan NEW	Beta-glucan from *Sclerotium rolfsii*	*100 ng/ml	1 - 100 µg/ml	100 mg	tlrl-scg	p. 43
WGP Dispersible	Whole Glucan Particles, insoluble	*100 µg/ml	1 - 200 µg/ml	50 mg	tlrl-wgp	-
WGP Soluble	Whole Glucan Particles, soluble	EndoFit™	1 µg - 1 mg/ml	50 mg	tlrl-wgps	-
Zymosan	Cell wall preparation from *S. cerevisiae*	*10 ng/ml	1 - 100 µg/ml	100 mg	tlrl-zyn	-
Zymosan Depleted	Hot alkali treated zymosan	EndoFit™	100 µg/ml	10 mg	tlrl-dzn	-
Mincle Agonists						
HKMT NEW	Heat Killed *Mycobacterium tuberculosis*	EndoFit™	10 - 100 µg/ml	10 mg 50 mg	tlrl-hkmt-1 tlrl-hkmt-5	p. 43
TDB	Synthetic analog of the cord factor	*50 µg/ml	1 - 100 µg/ml	2 mg	tlrl-tdb	-
TDB VacciGrade™	Sterile synthetic analog of the cord factor	*50 µg/ml	50 µg/mouse	2 mg	vac-tdb	-
TDB HS-15 NEW	Formulated TDB	*50 µg/ml	1 - 100 µg/ml	2 mg	tlrl-stdb	p. 43
TDB HS-15 VacciGrade™ NEW	Sterile formulated TDB	*50 µg/ml	50 µg/mouse	2 mg	vac-stdb	-
Multi PRR LIGANDS						
TLR2/TLR7 Agonists						
AdiFectin™ (CL347) NEW	TLR7 agonist & nucleic acid carrier	EndoFit™	300 ng - 3 µg/ml	500 µg	tlrl-c347	p. 46
CL401 NEW	TLR2/TLR7 agonist	EndoFit™	1 ng - 10 µg/ml	500 µg	tlrl-c401	p. 45
Adilipoline™ (CL413) NEW	TLR2/TLR7 agonist	EndoFit™	50 pg - 10 µg/ml	500 µg	tlrl-c413	p. 45
CL419 NEW	TLR2 agonist & nucleic acid carrier	EndoFit™	1 ng - 100 µg/ml	500 µg	tlrl-c419	p. 45
CL531 NEW	TLR2/TLR7 agonist	EndoFit™	5 pg - 10 µg/ml	500 µg	tlrl-c531	p. 45
PamadiFectin™ (CL553) NEW	TLR2/TLR7 agonist & nucleic acid carrier	EndoFit™	100 ng - 1 µg/ml	500 µg	tlrl-c553	p. 46
CL572 NEW	TLR2/TLR7 agonist	EndoFit™	0.5 ng - 1 µg/ml	500 µg	tlrl-c572	p. 45

* The levels of endotoxin in certain PAMPs, such as cristals and β-glucans, cannot been determined using the chromogenic LAL assay. For these products, the value listed in the table corresponds to the highest concentration tested that does not activate the HEK-Blue™ TLR4 cell line.

TLR Ligands

For detailed information on all InvivoGen's PRR Ligands, go to http://www.invivogen.com/innate-immunity-pamps

➢ TLR2 Agonists

HKMT (*Mycobacterium tuberculosis*)

HKMT is a heat-killed preparation of the avirulent strain of *Mycobacterium tuberculosis* H37 Ra. HKMT is sensed by Mincle, which recognizes the mycobacterial cell wall glycolipid TDM[1]. HKMT also possesses a large repertoire of TLR2 ligands, such as lipoproteins and lipomannan[2]. Upon HKMT sensing, both Mincle and TLR2 receptors lead to the activation of NF-κB.

HKSE (*Staphylococcus aureus*)

HKSE is a heat killed preparation of *Staphylococcus epidermidis*, a Gram positive bacterium. *S. epidermidis* is a ubiquitous skin commensal and a major cause of nosocomial bacteremia. The recognition and clearance of *S. epidermidis* bacteremia is mediated by TLR2[3]. *In vitro* studies demonstrate that cell wall components from this bacterium, such as peptidoglycan (PGN), are recognized by TLR2[4].

HKST (*Salmonella typhimurium*)

HKST is a heat killed preparation of the flagellated Gram negative bacterium, *S. typhimurium*. Recognition of HKST is largely mediated by TLR2, TLR4 and TLR5[5-7]. TLR2 and TLR4 recognize cell wall components from HKST, such as peptidoglycan (PGN) and lipopolysaccharide (LPS), resulting in the production of pro-inflammatory cytokines, such as IL-6 and TNF-α[5]. TLR5 recognizes extracellular flagellin present on HKST resulting in NF-κB activation[6].

1. Ishikawa E. *et al.*, 2009. Direct recognition of the mycobacterial glycolipid, trehalose dimycolate, by C-type lectin Mincle. J Exp Med. 206(13):2879-88. **2. Bhatt K & Salgame P., 2007.** Host innate immune response to *Mycobacterium tuberculosis*. J Clin Immunol 27(4): 347–362. **3 Strunk T. *et al.*, 2010.** TLR2 mediates recognition of live Staphylococcus epidermidis and clearance of bacteremia. PLoS One. 5(4):e10111. **4 Natsuka M. *et al.*, 2008.** A polymer-type water-soluble peptidoglycan exhibited both Toll-like receptor 2- and NOD2-agonistic activities, resulting in synergistic activation of human monocytic cells. Innate Immun 14: 298–308. **5. Lembo A. *et al.*, 2003.** Differential Contribution of Toll-Like Receptors 4 and 2 to the Cytokine Response to Salmonella enterica Serovar Typhimurium and Staphylococcus aureus in Mice. Infect Immun. 71(10):6058-62. **6.Arpaia N. *et al.*, 2011.** TLR signaling is required for virulence of an intracellular pathogen Cell, 144(5):675-688.

➢ TLR4 Agonists

LPS-B5 Standard & Ultrapure (*E. coli 055:B5*)

LPS-B5 is a smooth (S)-form lipopolysaccharide (LPS) extracted from *E. coli* 055:B5, often used as an endotoxin standard in Limulus amebocyte lysate (LAL) assays. LPS-B5 is highly pyrogenic and a potent activator of TLR4 with the subsequent induction of NF-κB and the production of pro-inflammatory cytokines. LPS-B5 is extracted by successive enzymatic hydrolysis steps and purified by the phenol-TEA-DOC extraction protocol described by Hirschfeld M. *et al.*[1] and provided as two grades of purity. The standard grade of LPS-B5 contains other bacterial components, such as lipopeptides, and therefore stimulates both TLR4 and TLR2. The ultrapure grade of LPS-B5 underwent enzymatic treatment to remove lipoproteins and hence only activates TLR4.

LPS-PG Standard & Ultrapure (*Porphyromonas gingivalis*)

LPS from *P. gingivalis* (LPS-PG), an important virulence factor in the mechanisms of periodontal diseases, presents a unique and heterogenous chemical structure, which differs from traditionally recognized enteric bacterium-derived LPS. The fact that LPS-PG exhibits activity in C3H/HeJ mice, which are deficient for TLR4, led to the common belief that this LPS is a TLR2 ligand[2, 3]. However, structural and functional studies of LPS-PG have revealed that it activates cells through TLR4. The TLR2 activity of this LPS has been ascribed to a contaminant lipoprotein[4]. InvivoGen provides LPS-PG with two grades of purity. LPS-PG Standard contains the lipoprotein and thus activates both TLR4 and TLR2, while LPS-PG Ultrapure, which underwent an enzymatic treatment, contains no detectable lipoprotein and activates only TLR4.

1. Hirschfeld M. *et al.*, 2000. Cutting edge: repurification of lipopolysaccharide eliminates signaling through both human and murine toll-like receptor 2. J Immunol. ;165(2):618-22. **2. Kirikae T. *et al.*, 1999.** Lipopolysaccharides (LPS) of oral black-pigmented bacteria induce tumor necrosis factor production by LPS-refractory C3H/HeJ macrophages in a way different from that of Salmonella LPS. Infect Immun. 67(4):1736-42. **3. Hirschfeld M. *et al.*, 2001.** Signaling by toll-like receptor 2 and 4 agonists results in differential gene expression in murine macrophages. Infect Immun. 69(3):1477-82. **4. Ogawa T. *et al.*, 2007.** Chemical structure and immunobiological activity of Porphyromonas gingivalis lipid A. Front Biosci. 12:3795-812.

➢ TLR5 Agonists

FLA-BS Ultrapure (*B. subtilis*)

FLA-BS Ultrapure is a high purity grade of flagellin isolated from the Gram$^+$ bacterium *Bacillus subtilis*. FLA-BS Ultrapure is extracted by violent agitation and purified by several different separation techniques resulting in the depolymerized protein. This flagellin is >95% pure and migrates on SDS-PAGE at ~30 kDa. FLA-BS Ultrapure is a more potent activator of TLR5 than standard FLA-BS.

FLA-PA Ultrapure (*P. aeruginosa*)

Pseudomonas aeruginosa is a virulent Gram$^-$ bacterial pathogen that infects the respiratory tracts. FLA-PA Ultrapure is a flagellin isolated from *P. aeruginosa* by acid hydrolysis and purified by ultrafiltration and chromatography with a purity of >95%. FLA-PA Ultrapure migrates on SDS-PAGE at ~52 kDa and strongly activates TLR5.

Rec-FLA-ST NQ (*S. typhimurium*)

RecFLA-ST NQ is a N-glycosylation mutant of the *Salmonella typhimurium* flagellin (FliC gene) where potential asparagine (N) glycosylation sites are substituted by glutamine (Q) residues (see below). RecFLA-ST NQ migrates on SDS-PAGE at ~52 kDa, a similar molecular weight as the extracted FLA-ST Ultrapure. This flagellin mutant is a potent activator of TLR5.

Glycosylation of recombinant flagellins

Production of recombinant flagellins in mammalian cells highly reduces the risk of endotoxin and other bacterial contaminations. These flagellins are altered by N-glycosylation, a post-translational modification rarely observed in bacteria, that may affect their immunostimulatory activity. To avoid this modification, mutations to generate N-Q substitutions were incorporated in the flagellin gene, resulting in recombinant flagellins with a similar molecular weight as their counterparts extracted from bacteria.

➢ TLR7 Agonists

CL307

CL307 (N1-glycinyl[4-((6-amino-2-(butylamino)-8-hydroxy-9H-purin-9-yl)methyl)benzoyl] spermine) was generated by covalently linking a spermine to the hydroxyadenine compound CL264[1]. CL307 is a very potent TLR7 agonist. Titration experiments have showed that CL307 induces robust NF-κB activation even at concentrations as low as 20 nM (10 ng/ml).

1. **Guiducci C. *et al.*,** 2013. RNA recognition by human TLR8 can lead to autoimmune inflammation. J Exp Med. 210(13):2903-19.

➢ TLR9 Agonists & Antagonist

ODN BW006 (Stimulatory CpG ODN)

ODN BW006 (also known as ODN 684) is a class B ODN containing twice the optimal motif in human, GTCGTT[1]. ODN BW006 is capable of inducing the proliferation of human PBMC and mouse splenocytes as vigorously as ODN 2006, a class B prototype ODN. It was found to improve the rabies vaccine by inducing an earlier and more vigorous protective response. ODN BW006 promotes strong Th1 responses[2, 3].
ODN BW007 is a control ODN that contains GpC dinucleotides instead of CpGs and can be used as a negative control together with ODN BW006.

ODN D-SL01 & ODN D-SL03 (Stimulatory CpG ODN)

ODN D-SL01 and ODN D-SL03 are double stem loop ODNs belonging to the B class and C class CpG ODNs, respectively[4]. Both of them have been shown to potently activate human B cells, NK cells and mononuclear cells as well as PBMC/splenocytes obtained from diverse vertebrate species (mouse, rat, rabbit, guinea pig, swine and dog).

ODN INH-18 (Inhibitory ODN)

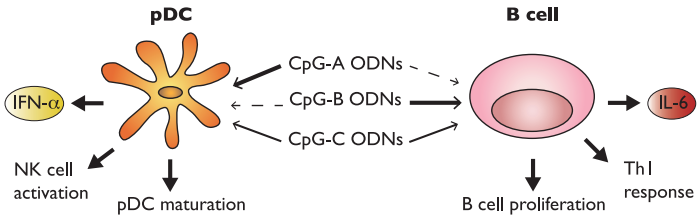
ODN INH-18 is a linear and class R ('restricted') inhibitory ODN. It contains an inhibitory DNA motif consisting of two nucleotide triplets, a proximal CCT and a more distal GGG, spaced from each other by four nucleotides. ODN INH-18 is a potent inhibitor of TLR9-induced B cells and macrophages[5]. ODN INH-18 strongly blocks TLR9 activation in both human and mouse TLR9-expressing cells.

1. **Wang X. *et al.*, 2008.** A CpG oligodeoxynucleotide acts as a potent adjuvant for inactivated rabies virus vaccine.Vaccine. 26(15):1893-901. **2. Yan Y. *et al.*, 2012.** A CpG oligodeoxynucleotide potentiates the anti-tumor effect of HSP65-Her2 fusion protein against Her2 positive B16 melanoma in mice. Int Immunopharmacol. 12(2):402-7. **3. Zhang X. *et al.*, 2011.** Enhanced specific immune responses by CpG DNA in mice immunized with recombinant hepatitis B surface antigen and HB vaccine. Virol J. 8:78. **4. Yang L. *et al.*, 2013.** CpG oligodeoxynucleotides with double stem-loops show strong immunostimulatory activity. Int Immunopharmacol. 15(1):89-96. **5. Lenert P. *et al.*, 2009.** DNA-like class R inhibitory oligonucleotides (INH-ODNs) preferentially block autoantigen-induced B-cell and dendritic cell activation in vitro and autoantibody production in lupus-prone MRL-Fas(lpr/lpr) mice in vivo. Arthritis Res Ther. 11(3):R79.

CpG ODN Classes

Bacterial DNA contains unmethylated "CpG motifs" that are recognized by the pattern recognition receptor Toll-like receptor (TLR) 9 and induce strong immunostimulatory effects in mammals. Synthetic oligodeoxynuclotides containing such CpG motifs (CpG ODNs) stimulate B cells, natural killer (NK) cells and professional antigen-presenting cells to proliferate and/or secrete a variety of cytokines, chemokines and immunoglobulins. Three major classes of stimulatory CpG ODNs have been identified based on structural characteristics and activity on human peripheral blood mononuclear cells (PBMCs), in particular B cells and plasmacytoid dendritic cells (pDCs). These three classes are Class A (Type D), Class B (Type K) and Class C.

- **Class A** CpG ODNs are characterized by a PO central CpG-containing palindromic motif and a PS-modified 3' poly-G string. They induce high IFN-α production from pDCs but are weak stimulators of TLR9-dependent NF-κB signaling and pro-inflammatory cytokine production.
- **Class B** CpG ODNs contain a full PS backbone with one or more CpG dinucleotides. They strongly activate B cells and TLR9-dependent NF-κB signaling but weakly stimulate IFN-α secretion.
- **Class C** CpG ODNs combine features of both classes A and B. They contain a complete PS backbone and a CpG-containing palindromic motif. C-Class CpG ODNs induce strong IFN-α production from pDC as well as B cell stimulation.



➢ TLR13 Agonists

ORN Sa19 & ORN Sa19 Control

ORN Sa19 is a 19 mer *S. aureus* 23S rRNA derived oligoribonucleotide[1]. This ORN, which contains an A in its center to mirror *S. aureus* A2085, is highly stimulatory in TLR13-expressing cells in contrast to ORN Sa19 Control, which carries a G in place of the central A. ORN Sa19 and ORN Sa19 Control are stabilized by phosphorothioate modification.

ORN Sa19 5'-GGACGG**A**AAGACCCCGUGG-3'
ORN Sa19 Control 5'-GGACGG**G**AAGACCCCGUGG

1. **Oldenburg M. *et al.*, 2012.** TLR13 recognizes bacterial 23S rRNA devoid of erythromycin resistance-forming modification. Science. 337(6098).

CDS / STING Ligands

➢ CDS Agonists

dsDNA-EC

dsDNA-EC is an ultrapure, endotoxin-free preparation of *E. coli* K12 double-stranded DNA. Intracellular dsDNA-EC is recognized by the endosomal receptor, TLR9 and mutliple cytosolic DNA sensors (CDSs), leading to the production of type I IFNs[1]. In HEK293 cells transfected with TLR9, dsDNA-EC induces the activation of NF-κB.

HSV60

HSV-60 is a 60 bp oligonucleotide containing viral DNA motifs[2]. HSV-60 derives from the herpes simplex virus 1 genome. Transfected HSV-60 was shown to potently induce IFN-β in a TLR-, DAI- and RNA Pol III-independent, but STING-, TBK1- and IRF3-dependent manner. HSV-60 is recognized by the CDSs, DDX41[3] and IFI16[2].
HSV-60c (control) is a single-stranded oligonucleotide which, unlike its double-stranded counterpart does not induce type I IFNs[2].
HSV-60 and HSV-60c are also available complexed with the cationic lipid transfection reagent LyoVec™ to facilitate their uptake.

ISD - Interferon stimulatory DNA

ISD is a 45-bp non-CpG oligomer from the *Listeria monocytogenes* genome. When transfected into various cell types, including plasmacytoid and conventional DCs, macrophages and murine embryonic fibroblasts, ISD strongly enhances the expression of IFN-β[4]. This ISD-induced response is mediated by the STING-TBK1-IRF3 signaling axis[4, 5].
ISD Control is a non-immunostimulatory single-stranded oligonucleotide with the same sequence as ISD, its double-stranded counterpart.
ISD and ISD Control are also available complexed with the cationic lipid transfection reagent LyoVec™ to facilitate their uptake.

pCpGfree-giant

pCpGfree-giant is a high molecular weight plasmid (~15 kb) entirely devoid of CpG dinucleotides and containing AT-rich regions. This plasmid DNA also features no detectable amounts of endotoxin, as determined by the LAL assay and the HEK-Blue™ LPS Detection Kit 2 (see p. 8) and no detectable TLR2 activity. In addition, pCpGfree-giant displays no Dcm methylation and a reduced level of Dam methylation. pCpGfree-giant can be used as a control in studies on CpG methylations. Moreover, when transfected in ISG-reporter cells, pCpGfree-giant induces strong reporter activity. This activity requires STING as cells deficient for STING fail to respond to transfected pCpGfree-giant.
pCpGfree-giant is also available complexed with the cationic lipid transfection reagent LyoVec™ to facilitate its uptake.

Poly(dA)

Poly(dA) is a repetitive synthetic single-stranded DNA sequence of polydeoxyadenylic acid with no IFN stimulatory property. Poly(dA) is a control for poly(dA:dT).

VACV-70

VACV-70 is a 70 bp oligonucleotide containing a sequence conserved in various poxviral genomes including the vaccinia virus (VACV)[2]. Transfection of VACV-70 was shown to induce a strong IFN-β response dependent on STING, TBK1 and IRF3, but independent of TLR, DAI and RNA Pol III. The cytosolic DNA sensor IFI16 is involved in the recognition of VACV-70[2].
VACV-70c (control), the single-stranded form of VACV-70, is not inducer of the IFN-β response[2].
VACV-70 is also available complexed with the cationic lipid transfection reagent LyoVec™ to facilitate its uptake.

1. Wu J. & Chen ZJ., 2014. Innate immune sensing and signaling of cytosolic nucleic acids. Annu Rev Immunol. 32:461-88. **2. Unterholzner L. *et al.*, 2010.** IFI16 is an innate immune sensor for intracellular DNA. Nat Immunol. 11(11):997-1004. **3. Zhang Z. *et al.*, 2011.** The helicase DDX41 senses intracellular DNA mediated by the adaptor STING in dendritic cells. Nat Immunol. 12(10):959-65. **4. Stetson DB & Medzhitov R.** 2006. Recognition of cytosolic DNA activates an IRF3-dependent innate immune response. Immunity. 24(1):93-103. **5. Ishikawa H. *et al.*, 2009.** STING regulates intracellular DNA-mediated, type I interferondependent innate immunity. Nature. 461(7265):788-92.

➢ STING Agonists

2'3'-cGAMP - Mammalian cGAMP

2'3'-cGAMP (cyclic [G(2',5')pA(3',5')p]) is the only isomer of cGAMP produced by the mammalian DNA sensor cGAMP synthase (cGAS) in response to cytosolic DNA[1]. This isomer contains two distinct phosphodiester linkages, a noncanonical (2',5') linkage at the GpA step and a canonical (3',5') linkage at the ApG step[1-3]. Mammalian 2'3'-cGAMP binds to STING with high affinity and is a potent inducer of IFN-β[3].

3'3'-cGAMP - Bacterial cGAMP

3'3'-cGAMP (cyclic [G(3',5')pA(3',5')p]) is the initially proposed isomer of cGAMP produced by cGAS[4]. This cyclic dinucleotide is not produced in mammals but only in bacteria, thus is a pathogen associated molecular pattern. Bacterial 3'3'-cGAMP contains two conventional (3',5') phosphodiester linkages. It is differentially recognized by STING variants and induces mainly the type I IFN pathway.

2'2'-cGAMP - Non-natural cGAMP

2'2' cGAMP (cyclic [G(2',5')pA(2',5')p]) is a synthetic cyclic dinucleotide not found in nature. It contains two noncanonical (2',5') phosphodiester linkages. Compared to 2'3'-cGAMP, it binds with lower affinity to STING[3] but induces similar IFN-β response in cell-based assays[3, 5].

DMXAA - Xanthenone Analog

DMXAA (5,6-dimethylxanthenone-4-acetic acid, also known as Vadimezan or ASA404) was initially identified as a potent tumor vascular disrupting agent in mice through the induction of cytokines, notably IFN-β. Recent studies have demonstrated that DMXAA targets the STING pathway[6], and this in a mouse-specific manner; DMXAA has no effect on human STING[7,8].

1. Gao P. *et al.*, 2013. Cyclic [G(2',5')pA(3',5')p] is the metazoan second messenger produced by DNA-activated cyclic GMP-AMP synthase. Cell. 153(5):1094-107. **2. Ablasser A. *et al.*, 2013.** cGAS produces a 2'-5'-linked cyclic dinucleotide second messenger that activates STING. Nature. 498(7454):380-4. **3. Zhang X. *et al.*, 2013.** Cyclic GMP-AMP containing mixed phosphodiester linkages is an endogenous high-affinity ligand for STING. Mol Cell. 2013 Jul 25;51(2):226-35. **4. Wu J. *et al.*, 2012.** Cyclic GMP-AMP Is an Endogenous Second Messenger in Innate Immune Signaling by Cytosolic DNA. Science. 339(6121):826-30. **5. Gao P. *et al.*, 2013.** Structure-function analysis of STING activation by c[G(2',5')pA(3',5')p] and targeting by antiviral DMXAA. Cell. 154(4):748-62. **6. Prantner D. *et al.*, 2012.** 5,6-Dimethylxanthenone-4-acetic acid (DMXAA) activates stimulator of interferon gene (STING)-dependent innate immune pathways and is regulated by mitochondrial membrane potential. J Biol Chem. 287(47):39776-88. **7. Conlon J. *et al.*, 2013.** Mouse, but not human STING, binds and signals in response to the vascular disrupting agent 5,6-dimethylxanthenone-4-acetic acid. J Immunol. 190(10):5216-25. **8. Kim S. *et al.*, 2013.** Anticancer Flavonoids Are Mouse-Selective STING Agonists. ACS Chem Biol. 8(7):1396-1401.

CLR Ligands

➢ Dectin-1 Agonists

Dectin-1 is a major receptor for β-glucans, a diverse class of glucose polymers found in fungi, plants and some bacteria. InvivoGen provides an extensive collection of β-1,3 and/or β-1,6 glucans validated for their ability to activate Dectin-1 in RAW-Blue™ cells, a murine macrophage-derived reporter cell line, and in HEK-Blue™ Dectin-1 reporter cells, which stably express different isoforms of the Dectin-1 gene.

Beta-glucan peptide (BGP) - β(1→4,1→3, 1→6)-glucan

Beta-glucan peptide (BGP) is a high molecular weight (~100 kDa) polysaccharide extracted from the fungus *Trametes versicolor*. BGP consists of a highly ramified glucan portion, comprising a beta 1-4 main chain and beta 1-3 side chain, with beta 1-6 side chains covalently linked to a polypeptide portion rich in aspartic, glutamic and other amino acids. BGP activates murine macrophages and HEK-Blue™ Dectin-1 cells.

Laminarin - β(1→3, 1→6)-glucan

Laminarin from the brown seaweed *Laminaria digitata* is a linear β(1-3)-glucan with β(1-6)-linkages. Laminarin is a low molecular weight (6 kDa), water-soluble β-glucan. It can bind to Dectin-1 without stimulating downstream signaling[1] and is able to block binding to Dectin-1 of particulate β(1-3)-glucans, such as zymosan[2].

Lichenan - β(1→3, 1→4)-glucan

Lichenan (or lichenin) is a median molecular weight (22 kDa), linear glucan of (1-3, 1-4)-β-glycosidic bonds that originates from the lichen *Cetraria islandica*. The proportion of 1-4 to 1-3 linkage is approximately 2:1. Lichenan binds to Dectin-1[3] and initiates downstream signaling leading to NF-κB activation.

Pustulan - β(1→6)-glucan

Pustulan is a median molecular weight (20 kDa), linear (1-6) linked β-D-glucan from lichen *Lasallia pustulata*. Pustulan is recognized by Dectin-1[4] and activates HEK-Blue™ Dectin-1 and RAW-Blue™ cells.

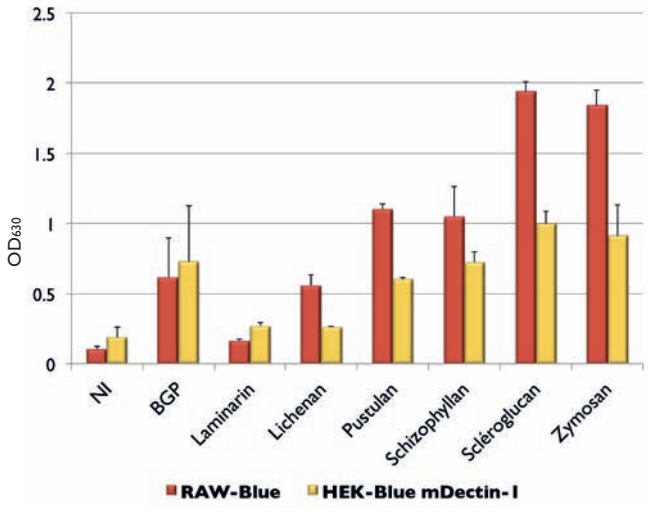
Schizophyllan - β(1→3, 1→6)-glucan

Schizophyllan (SPG) is a gel-forming β-glucan from the fungus *Schizophyllum commune*. SPG is a high molecular weight (450 kDa) (1-3)-β-D-glucan that has a 1,6-β-monoglucosyl branch in every three 1,3-β-glucosyl residues on the main chain. SPG binds to Dectin-1[5] and triggers a signaling cascade leading to NF-κB activation.

Scleroglucan - β(1→3, 1→6)-glucan

Scleroglucan is a high molecular weight (>1000 kDa) polysaccharide produced by fermentation of the filamentous fungus *Sclerotium rolfsii*. Scleroglucan consists of a linear β(1-3) D-glucose backbone with one β(1-6) D-glucose side chain every three main residues. Scleroglucan is recognized by Dectin-1[6] and strongly activates HEK-Blue™ Dectin-1 and RAW-Blue™ cells.

1. Gantner BN. *et al.*, 2005. Dectin-1 mediates macrophage recognition of *Candida albicans* yeast but not filaments. EMBO J. 24(6):1277-86. **2. Brown GD. *et al.*, 2002.** Dectin-1 is a major beta-glucan receptor on macrophages. J Exp Med. 196(3):407-12. **3. Ujita M. *et al.*, 2009.** Carbohydrate binding specificity of recombinant human macrophage beta-glucan receptor dectin-1. Biosci Biotechnol Biochem. 73(1):237-40. **4. Willment JA. *et al.*, 2001.** Characterization of the human beta -glucan receptor and its alternatively spliced isoforms. J Biol Chem. 276(47):43818-23. **5. Adachi Y. *et al.*, 2004.** Characterization of beta-glucan recognition site on C-type lectin, dectin 1. Infect Immun. 72(7):4159-71. **6. Adams EL. *et al.*, 2008.** Differential high-affinity interaction of dectin-1 with natural or synthetic glucans is dependent upon primary structure and is influenced by polymer chain length and side-chain branching. J Pharmacol Exp Ther. 325(1):115-23.



RAW-Blue™ cells and HEK-Blue™ mDectin-1 cells, which express the murin Dectin-1a gene, were stimulated with 100 µg/ml of various β-glucans. After 24h incubation, NF-κB activation was assessed by measuring the levels of SEAP using QUANTI-Blue™.

➢ Mincle Agonists

The C-type lectin receptor Mincle is involved in the recognition of mycobacteria, including *Mycobacterium tuberculosis*. Mincle recognizes trehalose-6'6'-dimycolate (TDM), also known as 'cord factor', the major virulence factor of *Mycobacterium tuberculosis* and signals through the Syk-Card9 pathway leading to the activation of NF-κB. Activation of Mincle is assayed in the Mincle reporter cells, RAW-Blue™ cells and HEK-Blue™ Mincle cells.

HKMT - Heat-killed *Mycobacterium tuberculosis*

HKMT is a heat-killed preparation of the avirulent strain of *Mycobacterium tuberculosis* H37 Ra. HKMT is sensed by Mincle which recognizes the mycobacterial cell wall glycolipid TDM[1]. HKMT also possesses a large repertoire of TLR2 ligands, such as lipoproteins and lipomannan[2]. Upon HKMT sensing, both Mincle and TLR2 lead to the activation of NF-κB.

TDB-HS15 - Synthetic cord factor analog

Trehalose-6,6-dibehenate (TDB) is a non-toxic synthetic analogue of TDM and an effective adjuvant for Th1/Th17 vaccination. TDB was found to rely on Mincle, Syk and Card9 for its adjuvant activity[3]. TDB is a poorly soluble compound and thus was formulated with Kolliphor® HS 15, a potent low-toxicity non-ionic solubilizer, to generate TDB-HS15, which is particularly suitable for *in vivo* studies. TDB-HS15 is available in a standard grade and VacciGrade™ (sterility and absence of endotoxin guaranteed).

1. Ishikawa E. *et al.*, 2009. Direct recognition of the mycobacterial glycolipid, trehalose dimycolate, by C-type lectin Mincle. J Exp Med. 206(13):2879-88. **2. Bhatt K & Salgame P., 2007.** Host innate immune response to *Mycobacterium tuberculosis*. J Clin Immunol 27(4): 347–362. **3. Schoenen H, *et al.*, 2010.** Cutting edge: Mincle is essential for recognition and adjuvanticity of the mycobacterial cord factor and its synthetic analog trehalose-dibehenate. J Immunol. 184(6):2756-60.

Multi-PRR Ligands

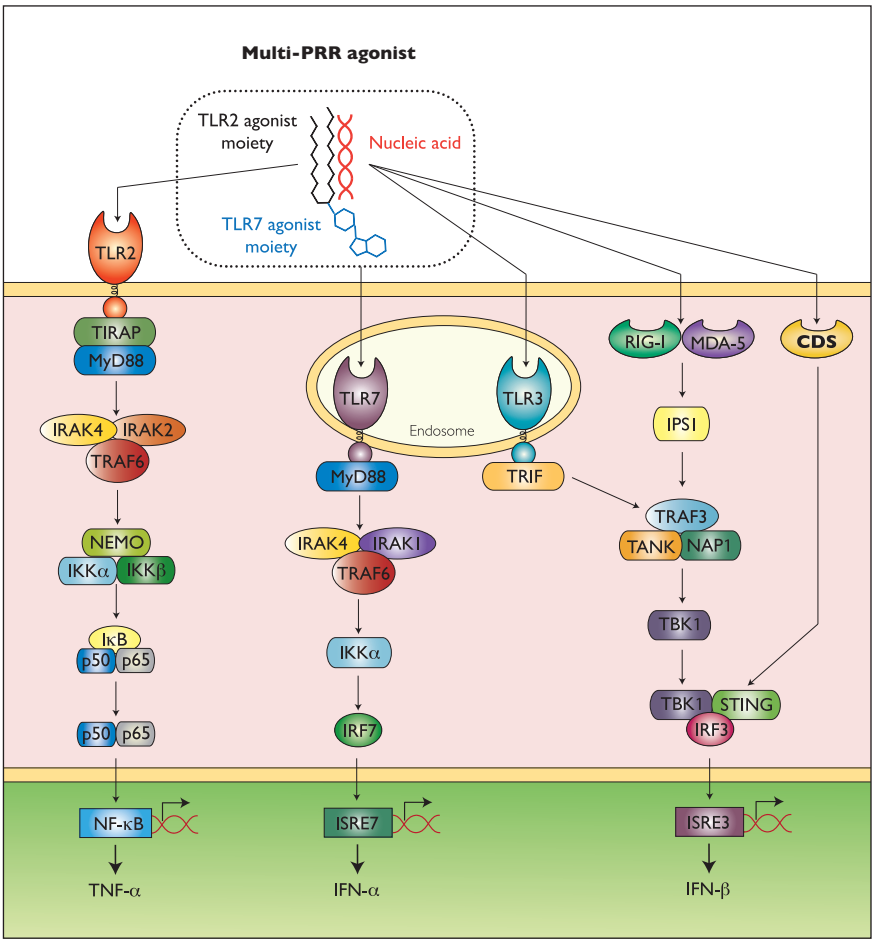
InvivoGen has developed a series of novel molecules designed to induce potent immune responses through the combined activation of several pattern recognition receptors (PRRs) that trigger different innate immune signaling pathways. These molecules are agonists for TLR2, TLR7 or both. In addition, some of these ligands have the ability to form complexes with nucleic acids (for example, double-stranded DNA, such as short oligonucleotides or plasmid DNA, or single-stranded RNA) and facilitate their penetration into the cell resulting in their recognition by additional PRRs that sense nucleic acids (e.g. the cytosolic DNA sensors DDX41 and IFI16 and the dsRNA receptors TLR3 and RIG-I/MDA-5).

➢ **Dual TLR Agonists**

- TLR2 & TLR7 Ligands

➢ **TLR Agonists & Nucleic Acid Carriers**

- TLR2 Ligand
- TLR7 Ligand
- TLR2 & TLR7 Ligand



Schematic representation of innate immune signaling pathways activated by PamadiFectin™ (CL553), a multi-PRR agonist that activates TLR2, TLR7 and nucleic acid sensors when complexed with dsDNA, for example.

Description

Agonists that activate TLR2 are derived from the well-established TLR2 ligand, Pam2CSK4, and those recognized by TLR7 are derived from the 8-hydroxyadenine derivative, CL264, a TLR7 agonist recently developed by InvivoGen. The ability to complex nucleic acids is conferred by the addition of a cationic lipid. TLR2 and TLR7 are two PRRs with distinct characteristics. TLR2 is a cell surface receptor expressed by many cell types, while TLR7 is an endosomal receptor expressed predominantly in plasmacytoid dendritic cells (pDC) and to a lesser extent in B cells. TLR2 signaling triggers the NF-κB pathway and the production of pro-inflammatory cytokines, such as TNF-α, whereas TLR7 signaling induces mainly the IRF pathway and the production of IFN-α. Sensors of nucleic acids are numerous and their signaling pathways, although not fully understood, lead mainly to the production of type I IFNs. Combined activation of these different pathways results in robust immune responses with potential therapeutic effects. InvivoGen's multi-PRR agonists are promising candidates for antitumor and vaccine applications.

In vitro Evaluation

All InvivoGen's multi-PRR agonists have been evaluated *in vitro*. TLR2- or TLR7-induced NF-κB activation has been determined using HEK-Blue™ TLR reporter cells which express TLR2 or TLR7 and an NF-κB-inducible SEAP (secreted embryonic alkaline phosphatase) reporter gene, as well as the murine macrophage-derived RAW-Blue™ reporter cell line. Activation of the IRF pathway has been monitored in the RAW-Lucia™ ISG cell line, a mouse macrophage cell line expressing an IRF-inducible secreted luciferase (Lucia) reporter gene.

In vivo Testing

A selection of InvivoGen's multi-PRR agonists has been tested *in vivo* using the B16 melanoma model in syngeneic C57/BL6 mice. The antitumor activity of these molecules has been studied after intratumoral administration by following tumor growth and mice survival. B16 melanoma cells express TLR2 but not TLR7.

➢ Dual TLR Agonists

CL401 - TLR2 & TLR7 Ligand

CL401 (S-(2,3-bis(palmitoyloxy)-(2RS)propyl)-(R)-cysteinyl 4-((6-amino-2(butyl amino)-8-hydroxy-9H-purin-9-yl)methyl) aniline) is a small lipophilic molecule comprising an 8-hydroxyadenine compound conjugated with a Pam2C group.This bipartite structure confers to CL401 the ability to efficiently stimulate both TLR7 and TLR2, respectively (fig. 1, 2, 3). Intratumoral injection of CL401 leads to a significant antitumor activity (fig. 6, p. 46).

Adilipoline™ (CL413) - TLR2 & TLR7 Ligand

Adilipoline™ (S-(2,3-bis(palmitoyloxy)-(2RS)propyl)-(R)-cysteinyl-(S)-seryl-(S)-lysyl-(S)-lysyl-(S)-lysyl-(S)-lysyl 4-((6-amino-2-(butylamino)-8-hydroxy-9H-purin-9-yl)methyl) aniline) was generated by conjugation of an 8-hydroxyadenine moiety to the terminal acid function of Pam2CSK4. Adilipoline™ is a good ligand for both TLR2 and TLR7 (fig. 1, 2, 3). *In vivo* tumor studies have demonstrated that Adilipoline™ is a potent antitumor agent (fig. 6, p. 46). Intratumoral injection of Adilipoline™ in established B16 tumors resulted in tumor regression. However, in contrast to AdiFectin™ (CL347), no protection after tumor rechallenge was observed.

CL531 - TLR2 & TLR7 Ligand

CL531 (S-(2,3-bis(palmitoyloxy)-(2RS)propyl)-(R)-cysteinyl-(S)-seryl-(S)-lysyl-Ne-(4-((6-amino-2-(butylamino)-8-hydroxy-9H-purin-9-yl)methyl) benzylamido)(S)-lysyl-(S)-lysyl-(S)-lysine) is an 8-hydroxyadenine derivative conjugated to the lateral chain of the second lysine of Pam2CSK4. CL531 is a very potent TLR2 agonist and a good TLR7 agonist (fig. 1 & 2). TLR2-mediated activation of NF-κB is achieved with concentrations as low as 5 pM (0.01 ng/ml).

CL572 - TLR2 (human) & TLR7 Ligand

CL572 (S-(2-myristoyloxy ethyl)-(R)-cysteinyl 4-((6-amino-2-(butylamino)-8-hydroxy-9H-purin-9-yl)methyl) aniline) is a 8-hydroxy-adenine compound conjugated to a monoacyl-ethyl-cystein group via a glutamic acid derivative. Monoacy-ethyl-cystein-containing dipeptides have been recently shown to specifically activate human TLR2 (Agnihotri G. *et al.,* 2011). Indeed, CL572 is a robust inducer of human TLR2 (fig. 1) but is unable to stimulate mouse TLR2 (data not shown). CL572 is also a potent inducer of TLR7 (fig. 2).

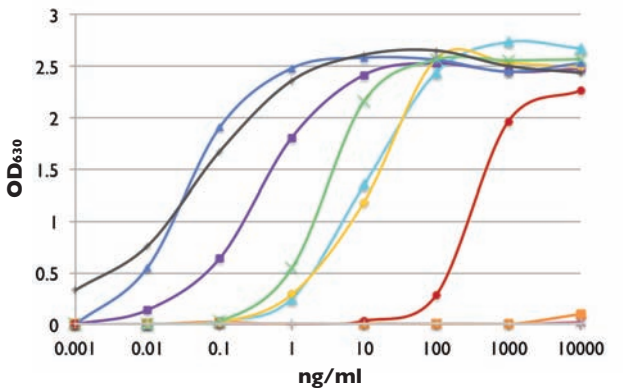
Agnihotri G. *et al.*, 2011. Structure-activity relationships in toll-like receptor 2-agonists leading to simplified monoacyl lipopeptides. J Med Chem. 54(23):8148-60.

➢ TLR Agonists & Nucleic Acid Carriers

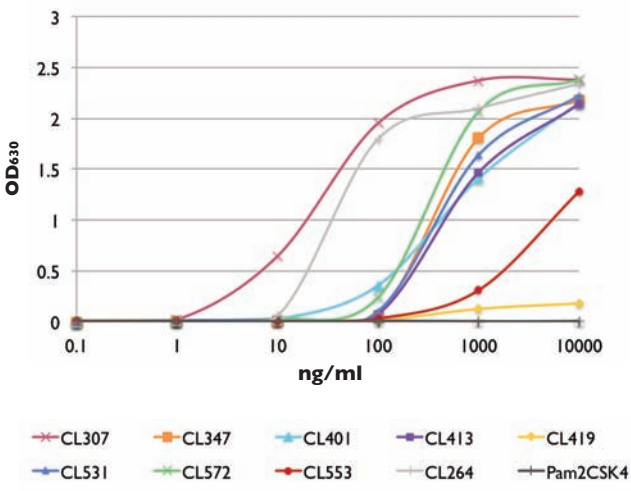
CL419 - TLR2 Ligand

CL419 (S-(2,3-bis(palmitoyloxy)-(2RS)propyl)-(R)-cysteinyl spermine) is a polyamine TLR2 agonist derived from Pam2CSK4 by replacement of Ser-(Lys)4 by a cationic sperminyl group. CL419 forms positively charged liposomes which allows it to complex nucleic acids and transport them into the cytosol and the nucleus. CL419/nucleic acid complexes are recognized by TLR2 and nucleic acid sensors leading to the significant activation of the NF-κB and IRF pathways (fig. 1, 3, 4). *In vivo*, CL419 complexed with a plasmid DNA (pDNA) and injected intratumorally induces a modest reduction of the tumor growth (fig. 7, p.46).

1- TLR2 response



2- TLR7 response



Figures 1 & 2. HEK-Blue™ hTLR2 cells (1) and HEK-Blue™ hTLR7 cells (2), which stably express an NF-κB-inducible SEAP reporter gene and human TLR2 or TLR7, respectively, were incubated in HEK-Blue™ Detection (a SEAP detection growth medium) and stimulated with increasing concentrations of the agonists indicated in the graph. After 24h incubation, the levels of NF-κB-induced SEAP were determined by reading the OD at 630 nm.

3- NF-κB response

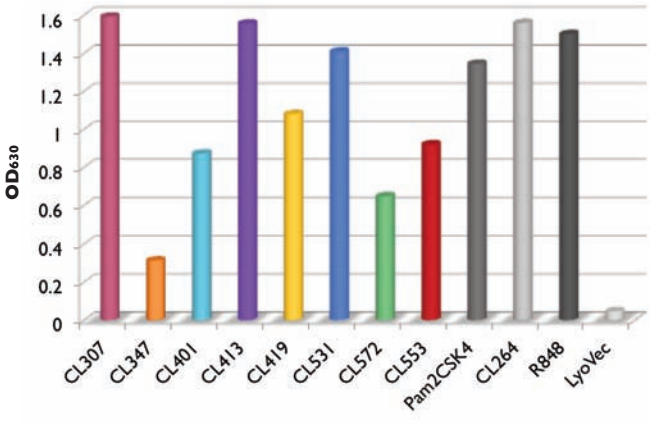


Figure 3. RAW-Blue™ cells, which stably express an NF-κB-inducible SEAP reporter gene, were stimulated with 0.6 μg/ml of InvivoGen's multi-PRR ligands complexed with 0.1 μg/ml HSV-60 (synthetic dsDNA). After 24h incubation, the levels of NF-κB-induced SEAP were determined using QUANTI-Blue™.

➢ Dual TLR Agonists

AdiFectin™ (CL347) - TLR7 Ligand

AdiFectin™ (bis(phytanyl) N4-{N1-[(4-((6-amino-2-(butylamino)-8-hydroxy-9H-purin-9-yl)methyl)benzoyl)glycinyl]sperminyl}propyl phosphonate) is derived from CL307 by conjugation with a bis(phytanyl) phosphonate group. Addition of this lipid confers to the molecule the ability to form positively charged liposomes, which can encapsulate DNA (or RNA). AdiFectin™ is a weaker TLR7 agonist than CL307 (fig. 2 & 3, p.45), but in contrast to CL307, is able to efficiently complex nucleic acids resulting in a strong IFN response (fig. 4) and transgene expression when the nucleic acid is a plasmid DNA carrying an expression cassette (fig. 5). Repeated *in vivo* studies have showed that pDNA/AdiFectin™ complexes display robust anti-tumor activity (fig. 7). Tumor growth was markedly reduced resulting in a 50% survival rate. Notably, mice that achieved long-term clearance of tumor following AdiFectin™ treatment were protected from subsequent tumor rechallenge suggesting the generation of a tumor-specific memory immune response (data not shown).

PamadiFectin™ (CL553) - TLR2 & TLR7 Ligand

PamadiFectin™ (N4-(S-((2,3-bis(palmitoyloxy))-(2RS)propyl)-(R)-cysteinyl) N1-(4-(((6-amino-2-(butylamino)-8-hydroxy-9H-purin-9-yl)methyl)benzoyl) glycinyl) spermine) was generated by conjugation of CL307 to a Pam2C group. PamadiFectin™ induces NF-κB activation through stimulation of both TLR2 and TLR7 (fig. 1, 2 & 3, p.45). In addition, at physiological pH, PamadiFectin™ is able to form complexes with nucleic acids and carry them in the cytosol and nucleus leading to a strong induction of the IRF pathway (fig. 4). Intratumoral administration of pDNA/PamadiFectin™ complexes leads to spectacular reduction of tumor growth and improved long-term survival in B16-F1 tumor-bearing mice (fig. 7). Tumor rechallenge experiments have not yet been performed.

4- IRF response

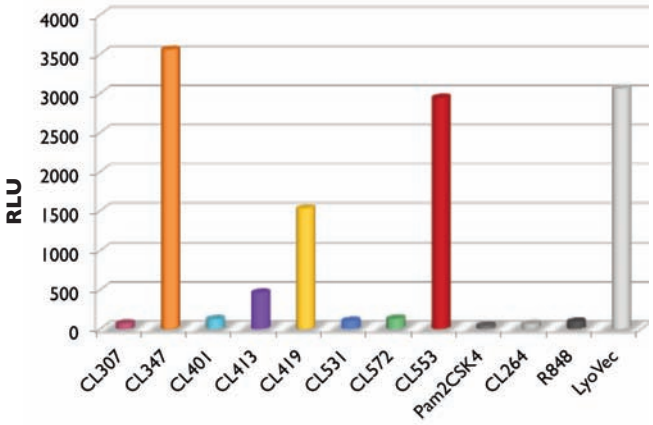


Figure 4. RAW-Lucia™ cells, which stably express an IRF-inducible Lucia luciferase reporter gene, were stimulated with 6 µg/ml of InvivoGen's multi-PRR ligands complexed with 1 µg/ml HSV-60 (synthetic dsDNA). After 24h incubation, the levels of IRF-induced Lucia™ were determined using QUANTI-Luc™, a Lucia luciferase detection reagent.

5- Transfection efficiency of AdiFectin™

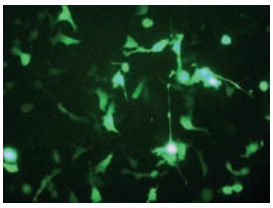


Figure 5. B16-F1 cells were incubated with pDNA-GFP/CL347 complexes at a 1/6 ratio (w/w). After 48h incubation, GFP expression was detected using fluorescence microscopy. Similar results were obtained with pDNA-GFP complexed with CL419 or CL553. No fluorescence was observed with pDNA-GFP mixed with other multi-PRR ligands, such as CL307 or CL531.

6- Antitumor effect of CL401 & CL413

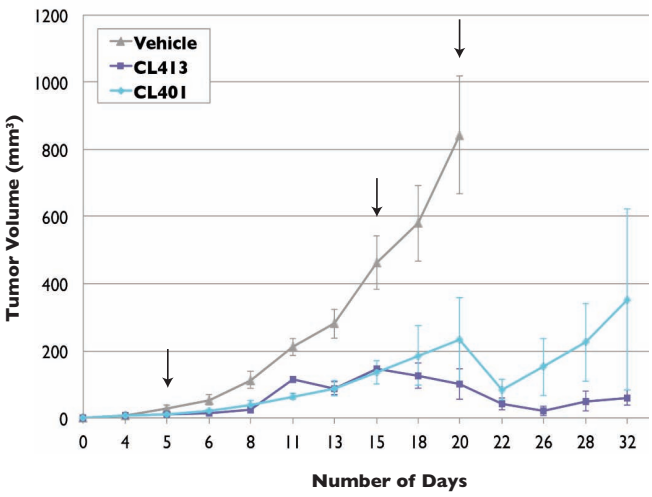


Figure 6: Tumor growth after CL413 or CL401 treatment. C57BL/6 mice were inoculated subcutaneously with $5x10^5$ B16-F1 mouse melanoma cells. CL413, CL401 or vehicle were injected intratumorally (50 µg/mouse/50 µl) on days 5, 15 and 20. Each group contained 8 mice.

7- Antitumor effect of CL419, CL347 & CL413 complexed to pDNA

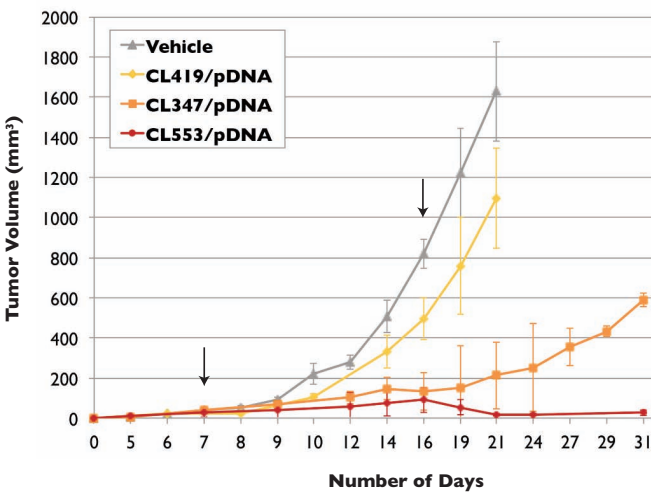


Figure 7: Tumor growth after treatment with CL419, CL347 or CL553 complexed with plasmid DNA (pDNA). C57BL/6 mice were inoculated subcutaneously with 5.10^5 B16-F1 cells. Complexes of pDNA/CL419, pDNA/CL347 or pDNA/CL553 were injected intratumorally at a 10:40 (w:w) ratio (10 µg:40 µg/mouse/100 µl) on days 7 and 16. A fourth group received intratumoral injections of the vehicle. Each group contained 8 mice.

Black arrows represent the days of injection. Tumor growth was monitored and measured with calipers after day 5 of grafting tumor cells into mice and then every 2 days thereafter. Tumor volume in mm^3 was determined according to the formula $V = W^2 \times L/2$, where L = length (mm) and W = width (mm).

TLR Agonist Kits - TLR9 Ligand Discovery Kits

Synthetic oligodeoxynucleotides containing CpG motifs (CpG ODNs) are widely used to induce TLR9-dependent immune responses that vary according to their class. InvivoGen provides a wide collection of A, B, or C class CpG ODNs (see p. 41) that activate TLR9 in various species and inhibitory ODNs known to block TLR9 activation. To compare the activities of stimulatory or inhibitory ODNs, InvivoGen introduces a choice of TLR9 Ligand Discovery Kits. Each kit contains six ODNs that are either stimulatory, control or inhibitory of the TLR9 response.

Human TLR9 Agonist Kit

This kit features prototype CpG ODNs of the A, B or C class that function best in human. These CpG ODNs are often cited in the literature. This kit will help you choose the most appropriate class of CpG ODNs for studies in human cells.

- **ODN 2006 and ODN 2006 control** - B class
- **ODN 2216 and ODN 2216 control** - A class
- **ODN 2395 and ODN 2395 control** - C class

Mouse TLR9 Agonist Kit

This kit contains prototype CpG ODNs of the A, B or C class described to work well in mice studies. This kit allows to compare their effectiveness and select the most suitable one for a given application in murine cells or mice.

- **ODN 1585 and ODN 1585 control** - A class
- **ODN 1826 and ODN 1826 control** - B class
- **ODN 2395 and ODN 2395 control** - C class

B-Class TLR9 Agonist Kit - Multispecies

CpG ODNs of this kit belong exclusively to the B class and are active in human and/or mouse and other species. The kit contains prototype CpG ODNs as well as less popular but worth testing CpG ODNs.

- **ODN 1668 and ODN 1826** - B class, mouse preferred
- **ODN 2006** - B class, human preferred
- **ODN 2007** - B class, bovine/porcine
- **ODN BW006** - B class, human/mouse
- **ODN D-SL01** - B class, multispecies

A&C-Classes TLR9 Agonist Kit - Multispecies

This kit contains CpG ODNs that belong to the A or C class. They are active in several species.

- **ODN 1585** - A class, mouse preferred
- **ODN 2216 and ODN 2336** - A class, human preferred
- **ODN 2395 and ODN M362** - C class, human/mouse
- **ODN D-SL03** - C class multispecies

TLR9 Antagonist Kit - Multispecies

This kit contains inhibitory ODNs, that are active in human and/or mouse, and a control ODN, that can be used with each inhibitory ODN.

- **ODN 2088** - Mouse preferred
- **ODN 4084-F** - Human/mouse
- **ODN INH-1** - Human/mouse
- **ODN INH-18** - Human/mouse
- **ODN TTAGGG** - Human preferred
- **Neutral ODN** - Control ODN

Contents

ODNs are provided lyophilized, 100 µg each, with 1.5 ml endotoxin-free water. Products are shipped at room temperature and should be stored at -20°C. ODN sequences are available online.

PRODUCT	QUANTITY	CAT. CODE
Human TLR9 Agonist Kit		
- ODN 2006	100 µg	
- ODN 2006 control (ODN 2137)	100 µg	
- ODN 2216	100 µg	tlrl-kit9h
- ODN 2216 control (ODN 2243)	100 µg	
- ODN 2395	100 µg	
- ODN 2395 control	100 µg	
Mouse TLR9 Agonist Kit		
- ODN 1585	100 µg	
- ODN 1585 control	100 µg	
- ODN 1826	100 µg	tlrl-kit9m
- ODN 1826 control (ODN 2138)	100 µg	
- ODN 2395	100 µg	
- ODN 2395 control	100 µg	
B-Class TLR9 Agonist Kit		
- ODN 1668	100 µg	
- ODN 1826	100 µg	
- ODN 2006	100 µg	tlrl-kit9b
- ODN 2007	100 µg	
- ODN BW006	100 µg	
- ODN D-SL01	100 µg	
A&C-Class TLR9 Agonist Kit		
- ODN 1585	100 µg	
- ODN 2216	100 µg	
- ODN 2336	100 µg	tlrl-kit9ac
- ODN 2395	100 µg	
- ODN D-SL03	100 µg	
- ODN M362	100 µg	
TLR9 Antagonist Kit		
- ODN 2088	100 µg	
- ODN 4084-F	100 µg	
- ODN INH-1	100 µg	tlrl-kit9i
- ODN INH-18	100 µg	
- ODN TTAGGG (ODN A151)	100 µg	
- Neutral ODN	100 µg	

Also Available

PRODUCT	QUANTITY	CAT. CODE
TLR1-9 Agonist Kit - Human	10 ligands	tlrl-kit1hw
TLR1-9 Agonist Kit - Mouse	9 ligands	tlrl-kit1mw
TLR2 Agonist Kit - Human/Mouse	7 ligands	tlrl-kit2hm
TLR3/7/8/9 Agonist Kit - Human	14 ligands	tlrl-kit3hw3

For more information, go to:
www.invivogen.com/tlr-agonist-kit

TLR & NOD Response Profiling - Multi-TLR Array™

Multi-TLR Array™ is a convenient tool to study the activation of multiple mammalian toll-like receptors (TLRs) and the cytosolic nucleotide-binding oligomerization domain receptors (NODs). Multi-TLR Array™ provides a rapid and simple means to determine the TLR repertoire of a given cell or a biological sample, such as whole blood, peripheral blood mononuclear cells (PBMC), primary cells and cell lines.

- **Save Time -** No more tedious preparation of TLR/NOD agonists dilutions, just add cell suspension
- **Save Money -** No need to buy multiple TLR/NOD agonists, each array contains 10 TLR agonists and 2 NOD agonists
- **Standardized -** This product is prepared under aseptic conditions and each batch is tested for biological potency

Description

Multi-TLR Array™ is a 96-well plate pre-coated with ten-fold serial dilutions of 12 different lyophilized TLR or NOD agonists. These TLR/NOD agonists were chosen as they are the "gold standard" agonists for these receptors.

• FSL-1	TLR2/6 agonist	1 pg to 100 ng/ml
• PAM3CSK4	TLR1/2 agonist	1 pg to 100 ng/ml
• HKLM	TLR2 agonist	10^2 to 10^8 cells/ml
• Poly(I:C) HMW	TLR3 agonist	10 pg to 10 µg/ml
• LPS-EB Ultrapure	TLR4 agonist	1 pg to 1 µg/ml
• FLA-ST Ultrapure	TLR5 agonist	0.1 pg to 100 ng/ml
• Imiquimod	TLR7 agonist	10 pg to 10 µg/ml
• R848	TLR7/8 agonist	10 pg to 10 µg/ml
• ODN 2006	TLR9 agonist	10 pg to 10 µg/ml
• ODN 2216	TLR9 agonist	10 pg to 10 µg/ml
• C12-iE-DAP	NOD1 agonist	10 pg to 10 µg/ml
• L18-MDP	NOD2 agonist	1 pg to 1 µg/ml

Applications

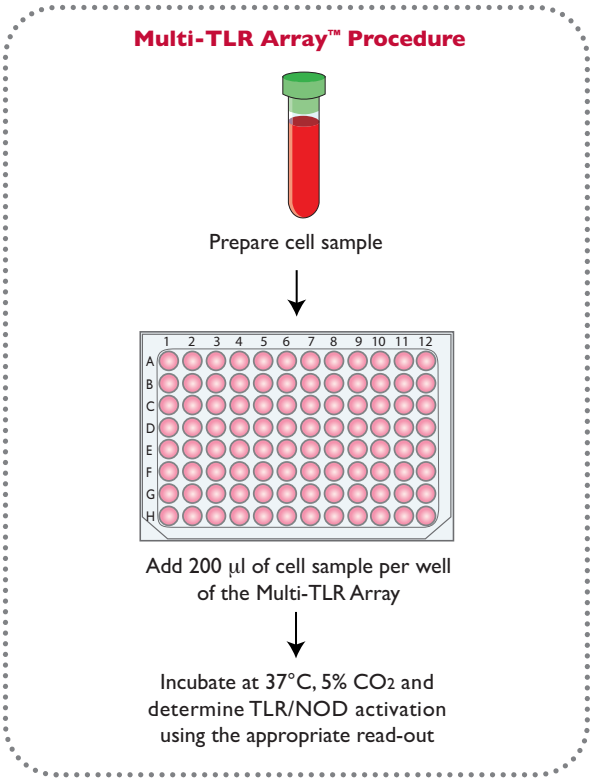
Multi-TLR Array™ is designed to test the functional activity of TLR or NOD receptors. Multi-TLR Array™ can be used:
- to define the TLR & NOD profile of a given cell type (primary cells or immortalized cells) prior to use in an experimental model,
- to monitor the TLR & NOD response of a biological sample, such as whole blood, following treatment or in an experimental model of inflammatory disease, autoimmunity or cancer,
- to distinguish between differentiated and undifferentiated cells based on cellular responses to TLR & NOD agonists.

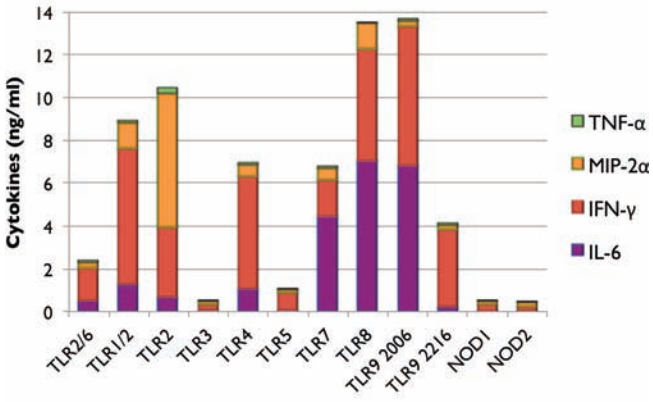
Read-out

The response to the stimulation of TLRs and NODs can be monitored by assessing the expression of cytokines,(e.g. IFN-γ, IL-6 and TNF-α) chemokines (e.g. MCP-1, MIP-1α and MIP-2), cell surface proteins (e.g. B cell receptor, CD11c and CD56), signaling proteins (e.g. caspase-1 and TRIF) or transcription factors (AP-1 and NF-κB).

Quality Control

The functionality of the Multi-TLR Array™ is validated for the biological potency of each agonist using the RAW-Blue™, HEK-Blue™ TLR and HEK-Blue™ NOD cell lines. Rigorous quality control tests are performed to ensure lot-to-lot reproducibility and performance.





Multiple cytokine profiling of mouse splenocytes in the Multi-TLR Array™. Secretion of cytokines was measured by ELISA following a 24h incubation at 37°C, 5% CO_2. The cytokines interferon-gamma (IFN-γ), interleukin-6 (IL-6), macrophage inflammatory protein 2-alpha (MIP-2α) and tumor necrosis factor-alpha (TNF-α) were measured.

Multi-TLR Array™ Plate Layout

Receptor	TLR2/6	TLR1/2	TLR2	TLR3	TLR4	TLR5	TLR7	TLR7/8	TLR9	TLR9	NOD1	NOD2
Ligand	**FSL-1**	**Pam3CSK4**	**HKLM**	**Poly(I:C)**	**LPS-EB Ultrapure**	**FLA-ST Ultrapure**	**Imiquimod**	**R848**	**ODN 2006**	**ODN 2216**	**C12-iE-DAP**	**L18-MDP**
Conc	**ng/ml**	**ng/ml**	**cells/ml**	**ng/ml**	**ng/ml**	**ng/ml**	**ng/ml**	**ng/ml**	**ng/ml**	**ng/ml**	**ng/ml**	**ng/ml**
	1	2	3	4	5	6	7	8	9	10	11	12
A	100	100	10^8	10^4	10^3	100	10^4	10^4	10^4	10^4	10^4	10^3
B	10	10	10^7	10^3	10^2	10	10^3	10^3	10^3	10^3	10^3	10^2
C	1	1	10^6	10^2	10	1	10^2	10^2	10^2	10^2	10^2	10
D	0.1	0.1	10^5	10	1	0.1	10	10	10	10	10	1
E	0.01	0.01	10^4	1	0.1	0.01	1	1	1	1	1	0.1
F	0.001	0.001	10^3	0.1	0.01	0.001	0.1	0.1	0.1	0.1	0.1	0.01
G	0.0001	0.0001	10^2	0.01	0.001	0.0001	0.01	0.01	0.01	0.01	0.01	0.001
H	0	0	0	0	0	0	0	0	0	0	0	0

Contents and Storage

Multi-TLR Array™ is provided as a 96-well flat-bottomed plate with a transparent lid. Multi-TLR Array™ is shipped at room temperature. Store at 4°C. Product is stable one year when properly stored.

PRODUCT	QUANTITY	CAT. CODE
Multi-TLR Array™	1 plate 5 plates	tlrl-arr tlrl-arr-5

TLR & NOD Test Strips

Description

TLR & NOD Test Strips are designed to determine the activation profile of a TLR or NOD of interest. Each Test Strip is pre-coated with a "gold standard" agonist for the corresponding receptor, such as imiquimod for TLR7 (see list p. 33-35). The response to the agonist stimulation can be monitored by assessing the expression of cytokines, chemokines, cell surface proteins, signaling proteins or transcription factors.

Applications

TLR & NOD Test Strips can be used to generate dose-response curves and to define the detection limit of the TLR or NOD of interest for one or several different cell types. The Test Strips can be used with biological samples, such as whole blood, peripheral blood mononuclear cells, primary cells and established cell lines.

Quality Control

The functionality of the TLR & NOD Test Strips is validated for the biological potency of each agonist using the corresponding HEK-Blue™ TLR or NOD cell line. Rigorous quality control tests are performed to ensure lot-to-lot reproducibility and performance.

Contents and Storage

TLR & NOD Test Strips are provided as a 8-well strips pre-coated with a lyophilized TLR or NOD agonist. Products are shipped at room temperature. Store at 4°C. Product is stable one year when properly stored.

PRODUCT	QUANTITY	CAT. CODE
TLR1/2 Test Strip (Pam3CSK4)	2 x 6 strips	tlrs-tlr12
TLR2/6 Test Strip (FSL-1)	2 x 6 strips	tlrs-tlr26
TLR2 Test Strip (HKLM)	2 x 6 strips	tlrs-tlr2
TLR3 Test Strip (Poly(I:C) HMW)	2 x 6 strips	tlrs-tlr3
TLR4 Test Strip (LPS-EB ultrapure)	2 x 6 strips	tlrs-tlr4
TLR5 Test Strip (FLA-ST ultrapure)	2 x 6 strips	tlrs-tlr5
TLR7 Test Strip (Imiquimod)	2 x 6 strips	tlrs-tlr7
TLR7/8 Test Strip (R848)	2 x 6 strips	tlrs-tlr78
TLR9 Test Strip 2006 (Type B ODN)	2 x 6 strips	tlrs-2006
TLR9 Test Strip 2216 (Type A ODN)	2 x 6 strips	tlrs-2216
NOD1 Test Strip (C12-iE-DAP)	2 x 6 strips	tlrs-nod1
NOD2 Test Strip (L18-MDP)	2 x 6 strips	tlrs-l18

PRR Ligand Screening Service

InvivoGen has developed novel cellular assays to detect compounds that activate or block the C-type lectins, Dectin-1 and Mincle. These sensitive assays feature engineered HEK293 cells, which utilize an NF-κB-inducible SEAP (secreted embryonic alkaline phosphatase) reporter gene as the read-out. Dectin-1- or Mincle-triggered NF-κB activation is monitored using proprietary detection assays designed to provide rapid and reliable results.

Dectin-1 Ligand Screening

➢ Screening for Dectin-1 agonists

The Dectin-1 ligand screening service can be performed on three different HEK-Blue™ Dectin-1 cells, which express different isoforms of the dectin-1 gene: **HEK-Blue™ mDectin-1a, HEK-Blue™ hDectin-1a and HEK-Blue™ hDectin-1b.**

HEK-Blue™ Dectin-1 cell lines express the murine dectin-1a, human dectin-1a or human dectin-1b gene, respectively. They also express genes of the Dectin-1-NF-κB signaling pathway, in addition to an NF-κB-inducible SEAP reporter gene. These reporter cell lines are activated specifically by Dectin-1 ligands. They do not respond to other CLR ligands. The Dectin-1 activity of a test compound is determined by incubating HEK-Blue™ Dectin-1 cells with increasing concentrations of this compound and controls (positive and negative). After 24h incubation, activation of Dectin-1 is assessed by measuring the levels of NF-κB-induced SEAP in the supernatant using the QUANTI-Blue™ assay.

The three Dectin-1 reporter cell lines respond specifically to β(1-3) and/or (1-6)-glucans, but display differences in their response profile. In particular, HEK-Blue™ hDectin-1b cells do not respond to soluble β-glucans, such as laminarin and WGP soluble, in accordance with the literature, whereas HEK-Blue™ hDectin-1a cells are highly responsive to these ligands (fig. 1).

➢ Screening for Dectin-1 antagonists

Some β-glucans, due to their biophysical properties, bind to Dectin-1 but are unable to induce Dectin-1 signaling of certain isoforms (fig. 1A). In addition, these β-glucans can act as antagonists, such as laminarin and WGP soluble (fig. 1B).

Screening for Dectin-1 antagonists can be performed using the HEK-Blue™ Dectin-1 cell lines. Increasing concentrations of a test compound are pre-incubated with HEK-Blue™ Dectin-1 cells prior to the addition of Dectin-1 agonists. After 24h incubation, inhibition of Dectin-1 activation is determined by measuring the levels of NF-κB-induced SEAP using the QUANTI-Blue™ assay.

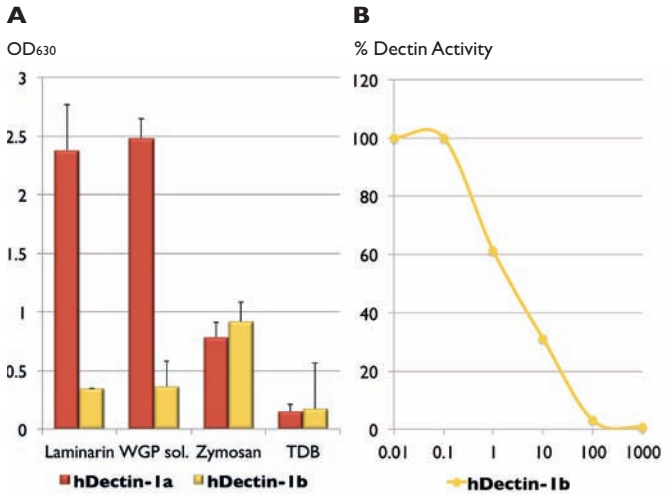


Figure 1. Stimulatory and inhibitory activities of Dectin-1 ligands: A) HEK-Blue™ hDectin-1a and HEK-Blue™ hDectin-1b cells were stimulated with 1 μg/ml or 10 μg/ml of Dectin-1 ligands, respectively, and 10 μg/ml TDB. **B)** HEK-Blue™ hDectin-1b cells were incubated with 100 μg/ml zymosan and increasing concentrations of WGP soluble. After 24h incubation, Dectin-1 activity was determined by measuring the levels of NF-κB-induced SEAP using the QUANTI-Blue™ assay.

Mincle Ligand Screening

➢ Screening for Mincle agonists

The Mincle ligand screening service utilizes the **HEK-Blue™ hMincle** reporter cell line, which co-expresses the human mincle gene, genes of the Mincle-NF-κB signaling pathway and an NF-κB-inducible SEAP reporter gene. This cell line responds specifically to Mincle ligands, such as trehalose-6,6-dibehenate (TDB) and heat-killed *M. tuberculosis* (HKMT) (fig. 2).

Screening for Mincle agonists is performed similarly to the screening for Dectin-1 agonists. Screening for Mincle antagonists can also be performed, although, as of today, no ligand with inhibitory activity on Mincle has been identified.

PRODUCT	CAT. CODE
CLR Ligand Screening Service	tlrl-test2

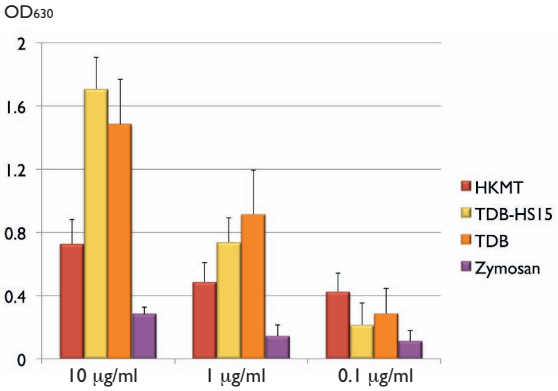


Figure 2. Stimulatory activity of Mincle ligands: HEK-Blue™ hMincle cells were stimulated with 0.1, 1 or 10 μg/ml Mincle ligands or zymosan. After 24h incubation, Mincle-induced NF-κB activation was assessed by measuring the levels of SEAP using the QUANTI-Blue™ assay.

Also Available

PRODUCT	CAT. CODE
TLR Ligand Screening Service	tlrl-test2

For more information, go to:
www.invivogen.com/custom-tlr-screening

Soluble Receptor:Fc Fusion Proteins

InvivoGen provides soluble forms of the pattern recognition receptors, Dectin-1 and TLR5, that consist of the extracellular domain (ECD) of each receptor fused to an IgG1 Fc domain, engineered to reduce ADCC and enhance half-life. Dectin-1, which is a type-II transmembrane receptor, is fused to the C-terminus of the Fc domain while TLR5, which is a type-I transmembrane receptor is fused to the N-terminus of the Fc domain. The Fc fusion proteins are expressed in CHO cells and purified by protein G affinity chromatography. The soluble Dectin-1 and TLR5 receptors can be used for receptor binding assays or neutralization studies.

Soluble Dectin-1 Receptors

InvivoGen provides soluble forms of the human and mouse Dectin-1 receptors, Fc-hDectin-1a and Fc-mDectin-1a, respectively. Human and murine Dectin-1 share 60% sequence identity, which may lead to differences in protein folding and β-glucans recognition of the Fc-Dectin-1 fusion proteins.

Fc-hDectin-1a

Fc-hDectin-1a is a soluble human Dectin-1 receptor constructed by fusing the C-terminal extracellular domain of human Dectin-1a (aa 67-247) to the C-terminus of an engineered human IgG1 Fc domain with a 10 amino acid linker. Fc-hDectin-1a has an apparent molecular weight of ~55 kDa on SDS-PAGE.
Applications: Receptor binding assays, neutralization

Fc-mDectin-1a

Fc-mDectin-1a is a soluble murine Dectin-1 receptor constructed by fusing the C-terminal extracellular domain of mouse Dectin-1a (aa 67-244) to the C-terminus of an engineered human IgG1 Fc domain with a 10 amino acid linker. Fc-mDectin-1a has an apparent molecular weight of ~55 kDa on SDS-PAGE.
Applications: Receptor binding assays, neutralization

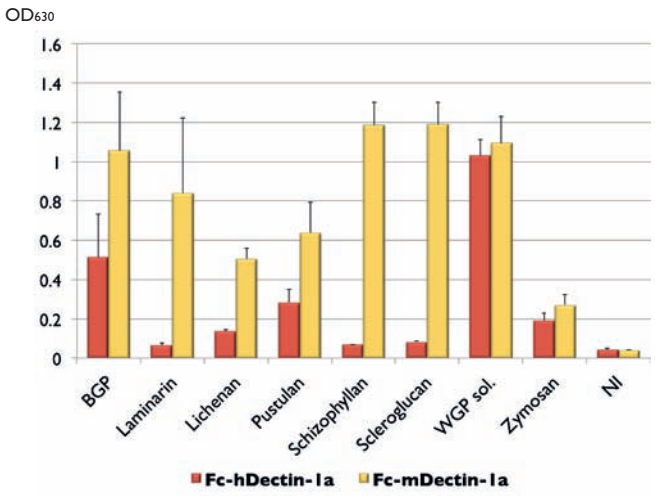


Figure 1: β-Glucan receptor binding assay - 96-well plates were coated with 0.5 µg of various β-glucans and incubated with 1 µg/ml Fc-hDectin-1a or Fc-mDectin-1a. After 2 hours, an anti-IgG secondary antibody conjugated to alkaline phosphatase was added. β-Glucan/Dectin-1 binding was assessed using the QUANTI-Blue™ assay.

Soluble TLR5 Receptor

Toll-like receptor 5 (TLR5) is a type-I transmembrane receptor comprising an N-terminal extracellular leucine rich repeat domain and a C-terminal intracellular TIR signaling domain.

hTLR5-Fc - Soluble ectodomain of TLR5

The soluble TLR5 receptor, hTLR5-Fc, was generated by fusing the N-terminal extracellular domain of human TLR5 (aa 21-639) to the N- terminus of an engineered Fc region of human IgG1 with a 2 amino acid linker. The hTLR5-hFc fusion has an apparent molecular weight of 110 kDa on SDS-PAGE.
Applications: Neutralization, receptor binding assays

Contents

Soluble Dectin-1 and TLR5 receptors are provided lyophilized. Products are shipped at room temperature and should be stored at -20°C.

PRODUCT	QUANTITY	CAT. CODE
Fc-hDectin-1a	50 µg	fc-hdec1a
Fc-mDectin-1a	50 µg	fc-mdec1a
hTLR5-Fc	50 µg	fc-htlr5

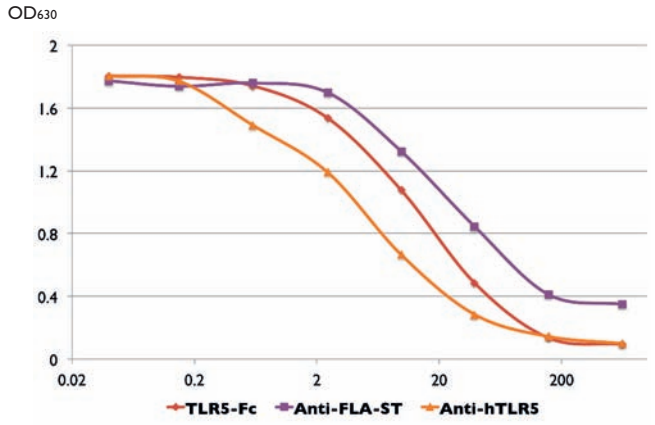


Figure 2: Neutralization activity of hTLR5-Fc - Increasing concentrations of hTLR5-Fc, anti-FLA-ST (antibody against *S. typhimurium* flagellin) or anti-hTLR5 (antibody against human TLR5) were pre-incubated with 5 µg FLA-ST (*S. typhimurium* flagellin) prior to the addition of HEK-Blue™ hTLR5 cells, which express the human TLR5 gene and an NF-κB-inducible SEAP gene. After 24h incubation, TLR5-induced NF-κB activation was assessed by measuring the levels of SEAP using the QUANTI-Blue™ assay.

5 INHIBITORS

Inhibitors

shRNA-Expressing Plasmids

Inhibitors

InvivoGen offers an expanding collection of inhibitors that block key cellular processes, such as replication and transcription, or key signaling pathways such as those leading to the activation of the transcription factors NF-κB or STAT. Many of these inhibitors are small molecules that are being tested or are currently used in the treatment of a variety of human diseases, including cancer, diabetes, malaria and rheumatoid arthritis. InvivoGen is continuously expanding its collection of inhibitors. New additions include:

- **Inhibitors of Hsp90**
- **Inhibitors of innate immunity**
- **Inhibitors of NF-κB and MAPK activation**
- **Inhibitors of mTOR and calcineurin signaling**

The inhibitors provided by InvivoGen are high quality products:

- Purity tested by HPLC,
- Inhibitory activity validated, when a reporter cell assay is available,
- Absence of TLR2 and TLR4 contaminant activities confirmed using HEK-Blue™ TLR cells.

PRODUCT	DESCRIPTION	TARGET	WORKING CONCENTRATION	QUANTITY	CATALOG CODE
A-769662	AMPK activator / mTOR inhibitor	mTOR / Calcineurin	100 - 300 µM	10 mg	inh-a769
FITC-Geldanamycin	FITC-labeled Hsp90 inhibitor	Hsp90	1 nM - 10 µM	1 mg 5 mg	ant-fgl-1 ant-fgl-5
OSU-03012 (AR-12)	PDK1 inhibitor	mTOR / Calcineurin	1 - 5 µM	10 mg	inh-os03
R406	Syk inhibitor	Innate immunity	10 nM - 100 µM	2 mg	inh-r406
SB 216763	GSK3 inhibitor	mTOR / Calcineurin	5 - 20 µM	5 mg	inh-sb21
VX-765	Caspase-1 inhibitor	Innate immunity	10 - 100 µM	10 mg 50 mg	inh-vx765-1 inh-vx765-5
YM201636	PYKfyve inhibitor	Innate immunity	0.5 - 5 µM	5 mg	inh-ym20
ZM336372	Raf-1 inhibitor	NF-κB / MAPK	0.5 - 30 µM	10 mg	inh-zm33

A-769662 - AMPK Activator (mTOR Inhibitor)

A-769662 is a potent and reversible activator of AMPK (AMP-activated protein kinase), an energy sensing serine/threonine protein kinase important in cellular metabolism[1]. Through the activation of AMPK, A-769662 inhibits mammalian target of rapamycin (mTOR), an enzyme in the PI3K/AKT/mTOR intracellular signalling pathway that plays a central role in cell proliferation, growth, and survival[2]. A-769662 has been shown to inhibit the cell proliferation of various cell types[3,4]. A-769662 is also considered as an anti-inflammatory agent as it reduces the activation of JNK, a member of the mitogen-activated protein kinase (MAPK) family, that plays an essential role in inflammatory responses[5,6].

FITC-Geldanamycin - FITC-labeled Hsp90 inhibitor

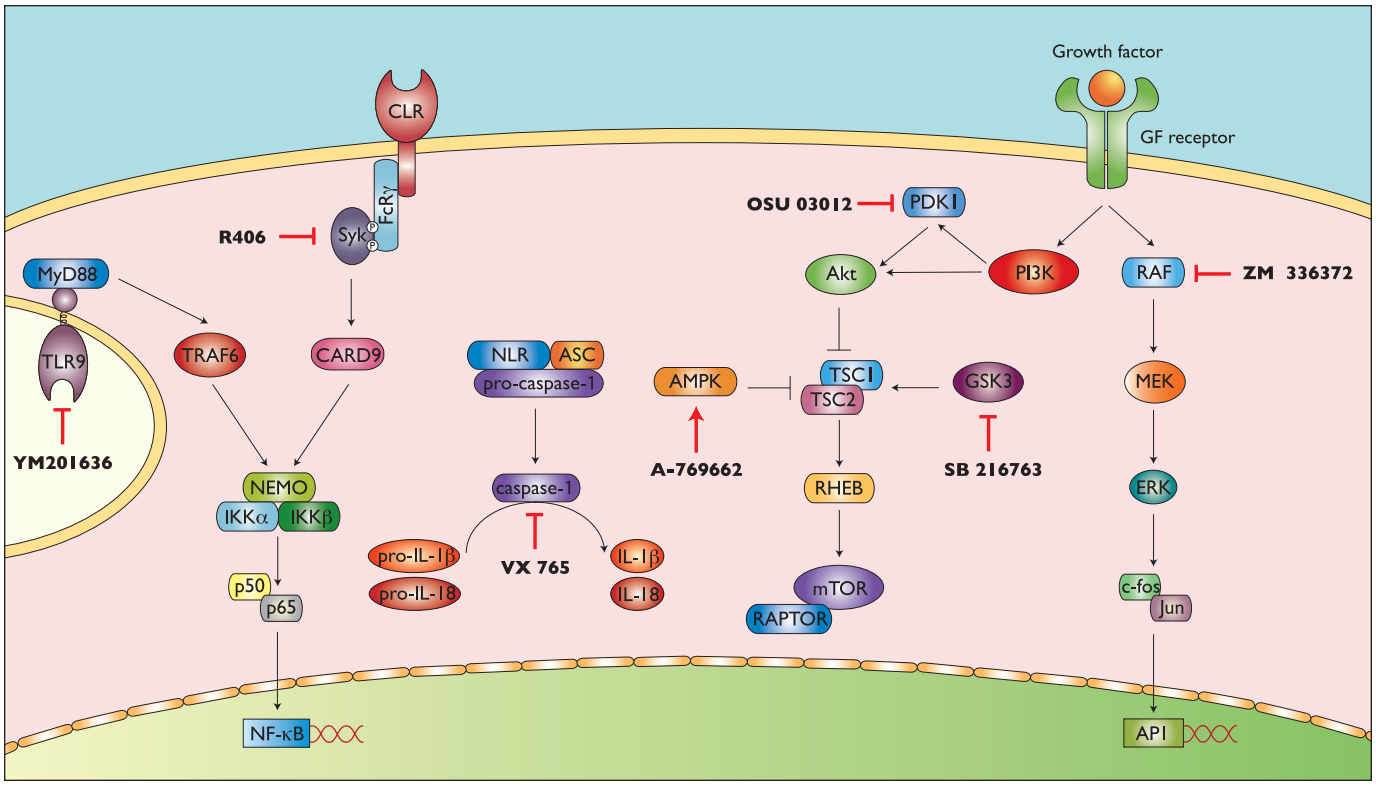
FITC-geldanamycin is a fluorescent derivative of geldanamycin. The fluorescein-5-isothiocyanate dye was linked to geldanamycin at the C17 position[7]. FITC-geldanamycin binds tightly to Hsp90. This interaction can compete wirh other Hsp90 inhibitors, such as 17-AAG or 17-DMAG. Therefore, FITC-geldanamycin can be used to screen for new Hsp90 inhibitors by measuring its binding to Hsp90 through a fluorescent polarization assay.

OSU-03012 - PDK1 Inhibitor

OSU-03012, a derivative of the cyclooxygenase-2 (COX2) inhibitor celecoxib but lacking COX2 inhibitory activity, is a potent inhibitor of PDK1 (phosphoinositide-dependent kinase-1), a protein in the PI3K/Akt pathway that is involved in the growth and proliferation of cells[8]. OSU-03012 has been shown to induce cell death in various types of cancer cells through the inhibition of PDK1, although other mechanisms of action of this agent may be involved[9, 10]. OSU-03012-induced cell killing is dependent on protein kinase RNA-like endoplasmic reticulum kinase (PERK)[11].

R406 - Syk Inhibitor

R406 is a specific, ATP-competitive inhibitor of spleen tyrosine kinase (Syk), which plays a key role in the signaling of activating Fc receptors and the B-cell receptor. R406 was shown to potently inhibit IgE- and IgG-mediated activation of Fc receptor signaling and to reduce inflammation in animal models of arthritis[12]. In cancers characterized by over-expression of Syk, R406 treatment induces the activation of caspase leading to significant apoptosis[13, 14]. Syk also activates the NLRP3 inflammasome[15]. Inhibition of Syk with R406 selectively abrogates inflammasome activation by *C. albicans* but not by inflammasome activators such as the bacterial toxin nigericin[15].



SB 216763 - GSK3 Inhibitor

SB 216763 is a potent and selective inhibitor of the α and β isozymes of GSK-3 (Glycogen synthase kinase-3), a serine/threonine kinase involved in regulating cell death and differentiation. Dysregulation of GSK3 is linked to several prevalent pathological conditions, such as diabetes and/or insulin resistance, and Alzheimer's disease. SB 216763 acts as a neuroprotectant by preventing apoptotic neuronal cell death induced by PI3-kinase pathway[16] and suppresses neuroinflammation by activating autophagy[17]. In a mouse model, SB 216763 reduces pulmonary inflammation and fibrosis by blocking inflammatory cytokine production in macrophages and inhibiting epithelial cell damage[18]. Interestingly, SB 216763 is able to maintain mouse embryonic stem cells in a pluripotent state in the absence of exogenous leukemia inhibitory factor (LIF)[19].

VX-765 - Caspase-1 Inhibitor

VX-765 is an orally absorbed prodrug of VRT-043198, a potent and selective inhibitor of caspases belonging to the ICE/caspase-1 subfamily[20]. VX-765 is converted to VRT-043198 under the action of plasma and liver esterases. The active metabolite of VX-765 exhibits potent inhibition of caspase-1 and caspase-4 and at least 100-fold lower potency against other non-ICE subfamily caspases. VX-765 was shown to reduce the production of IL-1β and IL-18 both *in vitro* and *in vivo* in correlation with tissue-protective effects in animal models of inflammatory disease[20]. VX-765 was found in a phase II a trial to be safe and well tolerated. Recent data demonstrate that VX-765 prevents CD4 T-cell death in a dose-dependent manner in HIV-infected lymphoid tissues[21].

YM201636 - PYKfyve Inhibitor

YM201636 is a potent inhibitor of mammalian phosphatidylinositol phosphate kinase PIP5KIII (PIKfyve)[22]. PIKfyve is the sole enzyme for PtdIns(3,5)P2 biosynthesis that regulates a number of intracellular membrane trafficking pathways[22]. Inhibition of PIKfyve with YM201636 disrupts endomembrane transport and inhibits retroviral release from infected cells[22,23]. YM201636 can also disrupt glucose homeostasis by halting glucose entry by insulin and inhibiting activation of PI3-kinase[23]. In neurons, YM201636 promotes cell death via a caspase-independent mechanism, and is associated with alterations in autophagy[24]. YM201636 blocks TLR9-signaling by preventing endosomal translocation of CpG-containing oligodeoxynucleotides (CpG ODNs), thus preventing co-localization of agonist and receptor[25]. YM201636 also inhibits TBK-1/IRF3-mediated type I IFN production without affecting NF-κB dependent cytokine production[26].

ZM 336372 - Raf-1 Inhibitor

ZM 336372 is a potent and specific inhibitor of Raf-1 (also known as c-Raf), a cytosolic serine/threonine kinase[27]. Activated Raf-1 phosphorylates MAPK-kinase (MEK), which in turn activates downstream extracellular signal-regulated kinase 1 and 2 (ERK1/2). ZM 336373 blocks cell proliferation through the complete inhibition of ERK-1/2 activity[28]. ZM 336373 inhibits macrophage activation by impairing c-jun gene expression[29], a critical component of the heterodimeric AP-1 transcription factor, which is downstream of Raf-1. In certain cell-based experiments, ZM-336372 can paradoxically induce Raf-1 activation leading to growth inhibition and suppression of hormone secretion[30,31].

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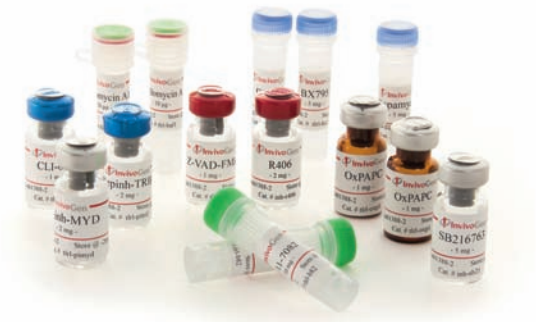
Also Available

PRODUCT	QTY	CAT. CODE
BX795	5 mg	tlrl-bx7
Chloroquine	250 mg	tlrl-chq
CLI-095	1 mg	tlrl-cli95
Ganciclovir	250 mg	sud-gcv
Geldanamycin	5 mg	ant-gl-5
OxPAPC	1 mg	tlrl-oxp1
Pepinh-MyD88	2 mg	tlrl-pimyd
Rapamycin	5 mg	tlrl-rap



For a complete list of InvivoGen's inhibitors, go to: www.invivogen.com/immunomodulators

Recent Articles with InvivoGen's INHIBITORS

BX795

Antoniak S. *et al.*, 2013. PAR-1 contributes to the innate immune response during viral infection. J Clin Invest. 123(3):1310-22.

Miyabe H. et al., 2014. A new adjuvant delivery system 'cyclic di-GMP/YSK05 liposome' for cancer immunotherapy. J Control Release. 184:20-7.

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CLI-095

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Ganciclovir

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Geldanamycin

Keestra AM. *et al.*, 2013. Manipulation of small Rho GTPases is a pathogen-induced process detected by NOD1. Nature. 496(7444):233-7.

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OxPAPC

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Wen Z. *et al.*, 2013. Autoantibody induction by DNA-containing immune complexes requires HMGB1 with the TLR2/microRNA-155 pathway. J Immunol. ;190(11):5411-22.

Pepinh-MyD & Pepinh-TRIF

McEwan WA. *et al.*, 2013. Intracellular antibody-bound pathogens stimulate immune signaling via the Fc receptor TRIM21. Nat Immunol. 14(4):327-36.

Kücüksezer UC. *et al.*, 2013. Triggering of specific Toll-like receptors and proinflammatory cytokines breaks allergen-specific T-cell tolerance in human tonsils and peripheral blood. J Allergy Clin Immunol. 131(3):875-85.

Rapamycin

Guzman J. *et al.*, 2014. Podocyte-specific GLUT4-deficient mice have fewer and larger podocytes and are protected from diabetic nephropathy. Diabetes. 63(2):701-14.

Peng YF. *et al.*, 2013. Autophagy inhibition suppresses pulmonary metastasis of HCC in mice via impairing anoikis resistance and colonization of HCC cells. Autophagy. 9(12):2056-68.

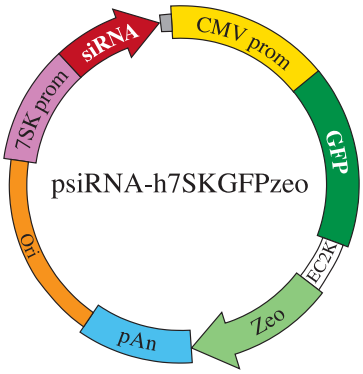
shRNA-Expressing Plasmids - Ready-Made psiRNA™

Ready-made psiRNA is a family of plasmids expressing a growing list of short hairpin RNAs (shRNAs), which functionality has been described in the literature or validated in house. Ready-made psiRNA plasmids eliminate the need to design and clone several shRNA sequences before identifying an effective one. They express shRNAs that silence the expression of a target gene by >70%.

Description

Ready-made psiRNAs are psiRNA-h7SKGFPzeo-derived plasmids. They feature the human 7SK RNA Pol III promoter that generates high amounts of short hairpin RNAs. They also feature the GFP::Zeo fusion gene which confers both reporter and antibiotic resistance activities making these plasmids very useful for the following applications:

- Monitor transfection efficiency
- Standardize gene silencing efficiency
- Select clones that stably express a validated shRNA



Quality Control

The silencing efficiency of each Ready-made psiRNA plasmid has been tested using the psiTEST system (www.invivogen.com/psitest-system). The genes or fragments of the genes targeted by the Ready-made psiRNA have been fused to the secreted embryonic alkaline phosphatase (SEAP) reporter gene within the psiTEST plasmid. Silencing efficiencies have been confirmed by the absence of SEAP activity after cotransfecting HEK293 cells with each recombinant psiTEST and corresponding Ready-made psiRNA.

GENE NAME/ALIASES	SPECIES	CAT. CODE (plasmid)*
ATG7	Human	psirna42-hatg7
BINCARD	Human	psirna42-hbincard
DDX21	Mouse	psirna42-mddx21
DDX60	Human	psirna42-hddx60
GBP5	Human, mouse	psirna42-(h/m)gbp5
GEF-H1 / ARHGEF2	Human	psirna42-hgefh1
IFIT3	Human, mouse	psirna42-(h/m)ifit3
IFIT5	Human	psirna42-hifit5
MRE11A	Human	psirna42-hmre11a
Smad2	Human	psirna42-hsmad2
Smad6	Human	psirna42-hsmad6
Smad7	Human	psirna42-hsmad7
TRAF2	Human	psirna42-htraf2
TRIM21	Human	psirna42-htrim21
TRIM25	Mouse	psirna42-mtrim25
TRIM28	Human	psirna42-htrim28
ZAPS / PARP13	Human	psirna42-hzaps

**For the catalog code of the kit, replace psirna42 by ksirna42

Contents and Storage

Ready-made psiRNA plasmids are available alone or in a kit.
Ready-made psiRNA plasmids are provided as 20 µg of lyophilized DNA.
Ready-made psiRNA kits contain the following components:

- 20 µg of a Ready-made psiRNA plasmid
- 20 µg of a control psiRNA plasmid (psiRNA-Luc)
- 1 vial of LyoComp GT116
- 4 pouches of Fast-Media® Zeo

Products are shipped at room temperature. Store at -20°C.

5

Also Available

GENE NAME/ALIASES	SPECIES	CAT. CODE
MDA-5 / IFIH1	Human, mouse	psirna42-(h/m)mda5
NOD2 / CARD15	Human, mouse	psirna42-(h/m)nod2
p53	Human, mouse	psirna42-(h/m)p53
RIG-I / DDX58	Human, mouse	psirna42-(h/m)rigi
TLR3 / CD283	Human, mouse	psirna42-(h/m)tlr3
TLR4 / CD284	Human, mouse	psirna42-(h/m)tlr4
VEGF	Human, mouse	psirna42-(h/m)vegf

Recent Articles with READY-MADE psiRNAs

Dang I. *et al.*, 2013. Inhibitory signalling to the Arp2/3 complex steers cell migration. Nature. 503(7475):281-4.

Guo X. *et al.*, 2013. Inhibition of mitochondrial fragmentation diminishes Huntington's disease-associated neurodegeneration. J Clin Invest. 123(12):5371-88.

McEwan WA. *et al.*, 2013. Intracellular antibody-bound pathogens stimulate immune signaling via the Fc receptor TRIM21. Nat Immunol. 14(4):327-36.

Thuringer D. *et al.*, 2013. Extracellular HSP27 mediates angiogenesis through Toll-like receptor 3. FASEB J. 27(10):4169-83.

For a complete list of Ready-Made psiRNA, go to:
www.invivogen.com/readymade-psirna

6 ANTIBODIES & VACCINATION

Antibody Generation - pFUSE-CHIg & pFUSE2-CLIg

pFUSE-CHIg and pFUSE2-CLIg plasmids are designed to change a monoclonal antibody from one immunoglobulin subclass to another, such as IgG1 to IgG4 or IgG1 to IgA2, therefore enabling the generation of antibodies with the same antigen affinity but with different effector functions. They can also be used to produce entire IgG antibodies from fragment antigen-binding (Fab) or single-chain variable fragment (scFv) fragments that are either chimeric, humanized, or fully human depending on the nature of the variable region. Lastly, pFUSE-CHIg and pFUSE2-CLIg plasmids can be used to generate recombinant antibodies from different species: human, mouse, rabbit and now rat or rhesus monkey.

Description

pFUSE-CHIg - Heavy chain constant region

pFUSE-CHIg plasmids express the three constant domains CH1, CH2, CH3 (and hinge region) of the heavy chain of the five primary classes of immunoglobulins, IgG, IgM, IgA, IgD and IgE. They contain a multiple cloning site (MCS) to facilitate the cloning of a variable region (VH) upstream of the CH1 domain.

pFUSEss-CHIg plasmids derive from the corresponding pFUSE-CHIg plasmids by addition of the IL-2 signal sequence (IL2ss) upstream of the MCS. It allows the secretion of the recombinant heavy chains generated using Fab or scFv fragments selected from phage display libraries that lack a signal sequence.

pFUSE-CHIg and pFUSEss-CHIg plasmids are selectable in *E. coli* and mammalian cells with Zeocin™.

pFUSE2-CLIg - Light chain constant region

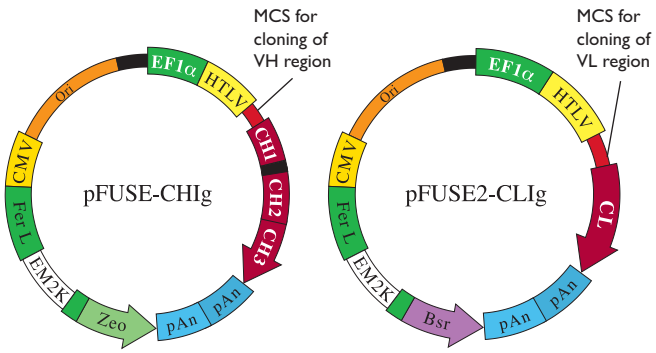
pFUSE2-CLIg plasmids express the constant domain CL of the two main types of light chains, kappa and lambda, from different species. They contain a multiple cloning site (MCS) to facilitate the cloning of a variable region (VL) upstream of the CL domain.

pFUSE2ss-CLIg: Similarly to pFUSEss-CHIg plasmids, pFUSE2ss-CLIg plasmids contain the IL-2ss upstream of the MCS for proper secretion of light chains missing a signal sequence.

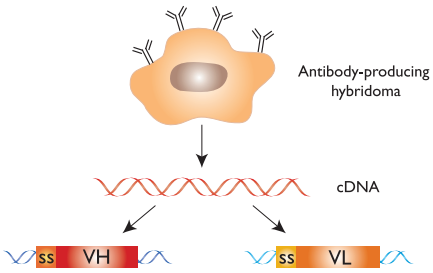
pFUSE2-CLIg and pFUSE2ss-CLIg plasmids are selectable in *E. coli* and mammalian cells with blasticidin.

Contents and Storage

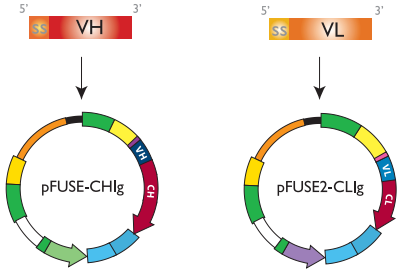
pFUSE-CHIg and pFUSE2-CLIg plasmids are provided as 20 µg of lyophilized DNA. Products are shipped at room temperature and should be stored at -20°C. Each plasmid is provided with 4 pouches of *E. coli* Fast-Media® Blas or Fast-Media® Zeo (2 TB and 2 Agar, see p. 18).



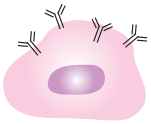
Antibody generation using pFUSE-CHIg/pFUSE2-CLIg



1- Obtaining VH and VL sequences: To obtain the cDNA sequence of the VH and VL regions from an antibody producing hybridoma, total RNA or mRNA is extracted and reverse transcribed to cDNA. PCR is performed with 5' degenerate primers to anneal to the unknown VH and VL regions and the 3' primers designed to anneal to the 'known' CH and CL regions. Alternatively 5' RACE can be used. The resulting amplicons are sequenced.

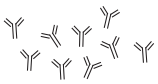


2- Cloning into pFUSE-CHIg and pFUSE2-CLIg: Once the VH and VL sequences are known, inserts that will be cloned into the pFUSE-CHIg and pFUSE2-CLIg plasmids, respectively, can be generated. When generating the insert for VH, a Nhe I site must be introduced at the 3' end to maintain the integrity of the constant region. Similarly, when generating the insert for VL, a Bsi WI (human VL) or Bst API (mouse VL) site must be introduced at the 3' end. There is a choice of restriction sites at the 5' end.



Mammalian cell line co-transfected with recombinant pFUSE-CHIg and pFUSE2-CLIg plasmids

3- Antibody production: Antibody production depends greatly on the ratio of heavy chain (HC) to light chain (LC) expression. Typically, a pFUSE-CHIg (HC):pFUSE2-CLIg (LC) ratio of 2:3 is used to cotransfect mammalian cells, such as HEK293 or CHO cells. Production of antibodies in cell supernatants can be analyzed using different methods including ELISA, flow cytometry or bioactivity assays.



4- Antibody purification: Many antibody purification methods are available, among them isotype-specific affinity chromatography using Protein A, Protein G, Protein L or Peptide M.

SPECIES	PRODUCT	ISOTYPE	QUANTITY	CAT. CODE (No IL2ss)	CAT. CODE (With IL2ss)
Rat					
Heavy chain	**pFUSE-CHIg-ratG1**	IgG1 heavy chain	20 µg	pfuse-rtchg1	pfusess-rtchg1
	pFUSE-CHIg-ratG2a	IgG2a heavy chain	20 µg	pfuse-rtchg2a	pfusess-rtchg2a
	pFUSE-CHIg-ratG2b	IgG2b heavy chain	20 µg	pfuse-rtchg2b	pfusess-rtchg2b
	pFUSE-CHIg-ratG2c	IgG2c heavy chain	20 µg	pfuse-rtchg2c	pfusess-rtchg2c
Light chain	**pFUSE2-CLIg-ratK**	Kappa light chain	20 µg	pfuse2-rtclk	pfuse2ss-rtclk
	pFUSE2-CLIg-ratL1	Lambda 1 light chain	20 µg	pfuse2-rtcll1	pfuse2ss-rtcll1
Rhesus Monkey					
Heavy chain	**pFUSE-CHIg-rhG1**	IgG1 heavy chain	20 µg	pfuse-rhchg1	pfusess-rhchg1
	pFUSE-CHIg-rhG2	IgG2 heavy chain	20 µg	pfuse-rhchg2	pfusess-rhchg2
	pFUSE-CHIg-rhG3	IgG3 heavy chain	20 µg	pfuse-rhchg3	pfusess-rhchg3
	pFUSE-CHIg-rhG4	IgG4 heavy chain	20 µg	pfuse-rhchg4	pfusess-rhchg4
Light chain	**pFUSE2-CLIg-rhK**	Kappa light chain	20 µg	pfuse2-rhclk	pfuse2ss-rhclk

Also Available

SPECIES	ISOTYPE	PLASMID
Human		
Heavy chain	IgA1	pFUSE-CHIg-hA1
	IgA2 (allele m1)	pFUSE-CHIg-hA2m1
	IgD (allele 2)	pFUSE-CHIg-hD
	IgE	pFUSE-CHIg-hE
	IgG1	pFUSE-CHIg-hG1
	IgG2	pFUSE-CHIg-hG2
	IgG3 (allelle 1)	pFUSE-CHIg-hG3
	IgG4	pFUSE-CHIg-hG4
	IgM (allele 3)	pFUSE-CHIg-hM
Light chain	Kappa	pFUSE2-CLIg-hK
	Lambda 2	pFUSE2-CLIg-hL2
Mouse		
Heavy chain	IgA	pFUSE-CHIg-mA
	IgD	pFUSE-CHIg-mD
	IgE (allele 1)	pFUSE-CHIg-mE
	IgG1	pFUSE-CHIg-mG1
	IgG2a	pFUSE-CHIg-mG2a
	IgG2b	pFUSE-CHIg-mG2b
	IgG3	pFUSE-CHIg-mG3
	IgM (allele 1)	pFUSE-CHIg-mM
Light chain	Kappa	pFUSE2-CLIg-mK
	Lambda 2	pFUSE2-CLIg-mL1
	Lambda 2	pFUSE2-CLIg-mL2
Rabbit		
Heavy chain	IgG	pFUSE-CHIg-rG
Light chain	Kappa 1	pFUSE2-CLIg-rK1
	Kappa 2	pFUSE2-CLIg-rK2

Recent Articles with pFUSE-CHIg & pFUSE2-CLIg

Congy-Jolivet N. *et al.*, 2013. Production and characterization of chimeric anti-HLA monoclonal antibodies targeting public epitopes as tools for standardizations of the anti-HLA antibody detection. J Immunol Methods. 390(1-2):41-51.

Gao W. *et al.*, 2014. Inactivation of Wnt signaling by a human antibody that recognizes the heparan sulfate chains of glypican-3 for liver cancer therapy. Hepatology. [Ahead of print]

Hardy IR. *et al.*, 2014. Anti-CD79 antibody induces B cell anergy that protects against autoimmunity. J Immunol. 192(4):1641-50.

Murphy MK. *et al.*, 2013. Viral escape from neutralizing antibodies in early subtype A HIV-1 infection drives an increase in autologous neutralization breadth. PLoS Pathog. 9(2):e1003173.

Wang F. *et al.*, 2013. Somatic hypermutation maintains antibody thermodynamic stability during affinity maturation. PNAS. 110(11):4261-6.

Zhao Z. *et al.*, 2014. A neutralization epitope in the hepatitis C virus E2 glycoprotein interacts with host entry factor CD81. PLoS One. 9(1):e84346.

For more information, go to:
www.invivogen.com/antibody-generation

Antibody Collection

InvivoGen offers a selection of monoclonal and polyclonal antibodies, that mainly target pattern recognition receptors and cytokines. These antibodies have been generated by immunization of mice or rats with DNA or recombinant proteins or peptides. These antibodies can be used for different applications. They have been tested in our laboratories for neutralization and/or flow cytometry.

Primary Antibodies

TARGET	ANTIBODY	SPECIFICITY	DESCRIPTION	APPLICATIONS*	QTY	CAT. CODE
Dectin-1	Anti-hDectin-1-Biotin	Human Dectin-1	Monoclonal mouse IgG1	Neutralization, FC	100 µg	bmab-hdect
Dectin-1	Anti-mDectin-1a-IgG	Mouse Dectin-1a	Monoclonal rat IgG2b	Neutralization, FC	100 µg	mabg-mdecta
Dectin-1	Anti-mDectin-1a-Biotin	Mouse Dectin-1a	Monoclonal rat IgG2b	Neutralization, FC	100 µg	bmab-mdecta
Dectin-1	Anti-mDectin-1-IgG	Mouse Dectin-1	Monoclonal rat IgG2a	Neutralization, FC	100 µg	mabg-mdect
Dectin-1	Anti-mDectin-1-Biotin	Mouse Dectin-1	Monoclonal rat IgG2a	Neutralization, FC	100 µg	bmab-mdect
Dectin-2	Anti-hDectin-2-IgG	Human Dectin-2	Monoclonal mouse IgG1	Neutralization, FC	100 µg	mabg-hdect2
Dectin-2	Anti-hDectin-2-Biotin	Human Dectin-2	Monoclonal mouse IgG1	Neutralization, FC	100 µg	bmab-hdect2
Dectin-3	Anti-hDectin-3-IgG	Human Dectin-3	Monoclonal mouse IgG2a	Neutralization, FC	100 µg	mabg-hdect3
Dectin-3	Anti-hDectin-3-Biotin	Human Dectin-3	Monoclonal mouse IgG2a	Neutralization, FC	100 µg	bmab-hdect3
FLA-BS	Anti-FLA-BS	*B. subtilis* Flagellin	Monoclonal mouse IgG1	Neutralization, ELISA	100 µg	mabg-flabs
FLA-PA	Anti-FLA-PA	*P. aeruginosa* Flagellin	Monoclonal mouse IgG1	ELISA, WB	100 µg	mabg-flapa
FLA-ST	Anti-FLA-ST	*S. typhimurium* Flagellin	Monoclonal mouse IgG1	Neutralization, ELISA	100 µg	mabg-flast
HLA Class I	Anti-HLA Class I Ctrl	HLA Class I	Monoclonal human IgG1	ELISA, Multiplex bead assay	100 µg	hla-c1
HLA Class II	Anti-HLA Class II Ctrl	HLA-DRB & HLA-DQ2	Monoclonal human IgG1	ELISA, Multiplex bead assay	100 µg	hla-c2
Mincle	Anti-hMincle-Biotin	Human Mincle	Monoclonal mouse IgG2b	Neutralization, FC	100 µg	bmab-hmcl
Mincle	Anti-mMincle-Biotin	Mouse Mincle	Monoclonal rat IgG2b	Neutralization, FC	100 µg	bmab-mmcl

Isotype Controls

TARGET	ANTIBODY	DESCRIPTION	APPLICATIONS	QTY	CAT. CODE
Control	Rat IgG1 Control	Monoclonal rat IgG1, (*E. coli* β-Gal)	Isotype control	100 µg	mabg1-ctlrt
Control	Rat IgG2a Control	Monoclonal rat IgG2a, (*E. coli* β-Gal)	Isotype control	100 µg	mabg2a-ctlrt
Control	Rat IgG2b Control	Monoclonal rat IgG2b, (*E. coli* β-Gal)	Isotype control	100 µg	mabg2b-ctlrt

Also Available

ANTIBODY	SPECIFICITY	QTY	CAT. CODE
Anti-hCD20-hIgG1	Human CD20	100 µg	hcd20-mab1
Anti-mMincle-IgG	Mouse Mincle	100 µg	mabg-mmcl
Anti-hTLR2-IgA	Human TLR2	100 µg	maba2-htlr2
MAb-mTLR2	Human/mouse TLR2	100 µg	mab-mtlr2
Anti-hTLR4-IgG	Human TLR4	100 µg	mabg-htlr4
PAb-hTLR4	Human TLR4	100 µg	pab-hstlr4
Human IgA2 Control	Human IgA2	100 µg	maba2-ctrl
Mouse IgG1 Control	Mouse IgG1	100 µg	mabg1-ctrlm

Recent Articles with InvivoGen's ANTIBODIES

Atif SM. *et al.*, 2014. CD103-CD11b+ dendritic cells regulate the sensitivity of CD4 T-cell responses to bacterial flagellin. Mucosal Immunol. 7(1):68-77.

Brandt KJ. *et al.*, 2014. NF-κB is Activated from Endosomal Compartments in Antiphospholipid Antibodies-treated Human Monocytes. J Thromb Haemost. [Ahead of print]

Marchetti T. *et al.*, 2014. Hydroxychloroquine restores trophoblast fusion affected by antiphospholipid antibodies. J Thromb Haemost. [Ahead of print]

Uchimura K. *et al.*, 2014. The serine protease prostasin regulates hepatic insulin sensitivity by modulating TLR4 signalling. Nat Commun. 5:3428.

For a complete list of InvivoGen's antibodies, go to: www.invivogen.com/antibodies

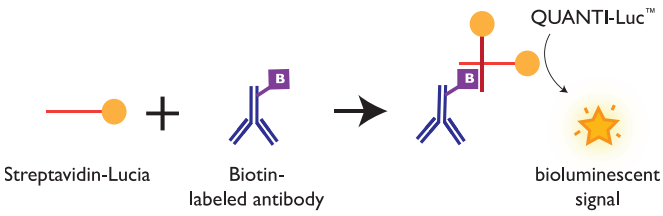
Streptavidin-Luciferase Conjugate - Streptavidin-Lucia

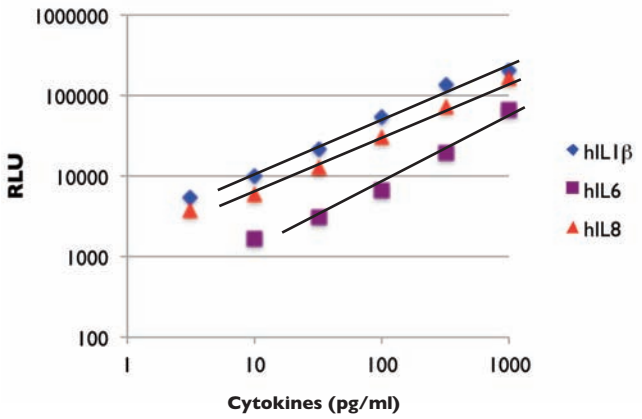
The common techniques of ELISA and Western Blot analysis widely use the Streptavidin-Biotin system for signal amplification. InvivoGen introduces Streptavidin-Lucia, a new bioluminescent streptavidin-conjugate featuring the Lucia luciferase. Streptavidin-Lucia has been optimized for ELISA and can be adapted for use in a variety of assays requiring the detection of biotin and biotinylated proteins.

- **Highly sensitive -** Detect low levels of target with low background
- **Accurate -** Tight linear correlation over several logs
- **Convenient -** Reveal using one-step QUANTI-Luc™ detection reagent
- **Rapid -** Measure 96 samples in a microplate in less than a minute

Description

Streptavidin-Lucia consists of a streptavidin peptide fused to the Lucia luciferase, a small secreted coelenterazine-utilizing luciferase with strong and stable bioluminescence properties. Streptavidin-Lucia uses the advantages of two systems, streptavidin for strength of binding to biotin labeled proteins, together with an optimized luciferase with a strong and stable bioluminescence for high sensitive detection with low background. Thus, this product is used for the detection of streptavidin-biotin interactions with high sensitivity and accuracy.
The unique long-lasting bioluminescence property of Lucia luciferase allows for ease in reading measurements. After addition of the QUANTI-Luc™ assay reagent to each well of a 96-well plate, results can be obtained in less than a minute using a luminometer without injectors.





Typical data obtained using Strepavidin-Lucia for the detection of cytokines with commercially available ELISA. Graph shows detection of hIL1β, hIL8 and hIL6. Streptavidin-Lucia was detected using QUANTI-Luc™. Linear regression indicates detection range over at least 3 logs.

Contents

Streptavidin-Lucia is provided lyophilized in 2 vials, allowing to prepare 100x 96-well plates. Once reconstituted, each vial contains 500 µl each.

PRODUCT	QUANTITY	CAT. CODE
Streptavidin-Lucia	2 x 500 µl	rep-strlc

Vaccine Adjuvants

InvivoGen provides different classes of vaccine adjuvants, that are either already approved for use in human vaccination, such as alum, or under investigation, such as the TLR agonists Gardiquimod™ and CpG oligonucleotides. InvivoGen adjuvants are VacciGrade™, a specific grade for preclinical studies. They are prepared under strict aseptic conditions. They are guaranteed sterile and thoroughly tested for the presence of endotoxins.

PRODUCT	DESCRIPTION	Th RESPONSE	RATIO / WORKING CONCENTRATION	QTY	CATALOG CODE
Emulsions					
CFA	Complete Freund's adjuvant - Water-in-oil	Th1	1:1 (CFA : antigen)	6 x 10 ml	vac-cfa-60
VacciGrade™ PRR Ligands					
2'2'-cGAMP VacciGrade™	2'5'-2'5' Cyclic GMP-AMP - STING agonist	Th1	5 - 50 µg/mouse	1 mg	vac-cga22
2'3'-cGAMP VacciGrade™	2'5'-3'5' Cyclic GMP-AMP - STING agonist	Th1	5 - 50 µg/mouse	1 mg	vac-cga23
3'3'-cGAMP VacciGrade™	3'5'-3'5' Cyclic GMP-AMP - STING agonist	Th1	5 - 50 µg/mouse	1mg	vac-cga
LPS-EB VacciGrade™	LPS from E. coli 0111:B4 strain - TLR4 agonist	Th1	0.1 - 25 µg/mouse	5 x 10^6 EU	vac-3pelps
TDB-HS15 VacciGrade™	Formulated TDB - Mincle agonist	Th1	50 µg/mouse	2 mg	vac-stdb

CFA - Complete Freund's Adjuvant

Complete Freund's adjuvant (CFA) consists of heat-killed *Mycobacterium tuberculosis* in a water-in-oil emulsion. CFA contains ligands for Mincle, TLR2, TLR4, and TLR9[1]. Injection of antigen in CFA induces a Th1-dominated response, while injection in Incomplete Freund's Adjuvant (IFA), which lacks mycobacterial components, induces a Th2-dominated response[2].

cGAMPs VacciGrade™

2'3'-cGAMP, 3'3'-cGAMP and 2'2'-cGAMP are cyclic dinucleotides (CDNs) produced in mammalian cells, in bacteria or synthetic, respectively. CDNs represent a recent class of adjuvants that have been shown to increase vaccine potency[3]. CDNs activate innate immunity by directly binding the endoplasmic reticulum-resident receptor STING (stimulator of interferon genes), activating a signaling pathway that induces the expression of IFN-β and also NF-κB-dependent inflammatory cytokines[3]. Recently, 2'3'-cGAMP was reported to function as an effective adjuvant that boosts the production of antigen-specific antibodies and T cell responses in mice[4].

LPS-EB VacciGrade™

Lipopolysaccharide (LPS) is a natural adjuvant synthesized by Gram-negative bacteria. LPS a potent activator of the immune system through Toll-like receptor (TLR4)[5]. Similar to other TLR-based adjuvants, LPS drives Th1 immunity[6, 7], although in certain circumstances, low-dose inhaled LPS can promote Th2 responses[8]. While LPS is a potent adjuvant, its pyrogenic activity has prevented clinical use of LPS in vaccines. Large quantities of LPS induce the overproduction of cytokines causing septic shock[5]. Most LPS preparations on the market are contaminated by other bacterial components, such as lipoproteins, thus activating TLR2 signaling as well as TLR4 signaling. LPS-EB VacciGrade™ only activates the TLR4 pathway.

TDB-HS15 VacciGrade™

Trehalose-6,6-dibehenate (TDB), a non-toxic synthetic analogue of the mycobacterial cell wall component trehalose 6,6' dimycolate (TDM, also known as cord factor), is a potent inducer of antigen-specific Th1/Th17 immunity after subunit *Mycobacterium tuberculosis* vaccination[9]. TDB was recently shown to rely on the C-type lectin Mincle and the signaling molecules Syk and Card9 to trigger innate immunity and adjuvancy[10,11]. TDB is a poorly soluble compound and thus was formulated with Kolliphor® HS 15, a potent low-toxicity non-ionic solubilizer, to generate TDB-HS15, which is particularly suitable for *in vivo* studies.

1. Coffman RL. *et al.*, 2010. Vaccine adjuvants: putting innate immunity to work. Immunity. 33(4):492-503. **2. Petrovsky N. & Aguilar JC., 2004.** Vaccine adjuvants: Current state and future trends. Immunol Cell Biol. 82(5): 488-96. **3. Dubensky TW. *et al.*, 2013.** Rationale, progress and development of vaccines utilizing STING-activating cyclic dinucleotide adjuvants. Therapeutic Advances in Vaccines 1(4): 131-143. **4. Li XD. *et al.*, 2013.** Pivotal roles of cGAS-cGAMP signaling in antiviral defense and immune adjuvant effects. Science. 341(6152):1390-4. **5. Poltorak A. *et al.*, 1998.** Defective LPS signaling in C3H/HeJ and C57BL/10ScCr mice: mutations in Tlr4 gene. Science, 282(5396): 2085-8. **6. Jamalan M. *et al.*, 2011.** Effectiveness of Brucella abortus lipopolysaccharide as an adjuvant for tuberculin PPD. Biologicals: journal of the International Association of Biological Standardization. 39(1); 23-28. **7. Barton G.M. & Medzhitov R., 2002.** Control of adaptive immune responses by Toll-like receptors. Curr: Opin. Immunol. 14:380. **8. Iwasaki A. & Medzhitov R., 2004.** Toll-like receptor control of the adaptive immune responses. Nat Immunol. 5(10):987-95. **9. Werninghaus K. *et al.*, 2009.** Adjuvanticity of a synthetic cord factor analogue for subunit Mycobacterium tuberculosis vaccination requires FcRgamma-Syk-Card9-dependent innate immune activation. J Exp Med. 206(1):89-97. **10. Ishikawa E. *et al.*, 2009.** Direct recognition of the mycobacterial glycolipid, trehalose dimycolate, by C-type lectin mincle. J Exp Med. 206: 2879–2888. **11. Schoenen H. *et al.*, 2010.** Cutting edge: Mincle is essential for recognition and adjuvanticity of the mycobacterial cord factor and its synthetic analog trehalose-dibehenate. J Immunol 184: 2756–2760.

Contents and Storage

CFA is provided as a ready-to-use, sterile solution. cGAMPs, LPS-EB and TDB-HS15 VacciGrade™ are provided lyophilized with endotoxin-free water. Products are shipped at room temperature. CFA should be stored at 4°C and VacciGrade™ products at -20°C.

Also Available

PRODUCT	QTY	CAT. CODE
Vaccine Aduvants		
AddaVax™	10 ml	vac-adx-10
Alhydrogel® 2%	250 ml	vac-alu-250
c-di-AMP VacciGrade™	1 mg	vac-cda
c-di-GMP VacciGrade™	1 mg	vac-cdg
Flagellin FliC VacciGrade™	50 µg	vac-fla
Gardiquimod VacciGrade™	5 mg	vac-gdq
IFA	6 x 10 ml	vac-ifa-60
Imiquimod VacciGrade™	5 mg	vac-imq
MPLA-SM VacciGrade™	1 mg	vac-mpl
MPLAs VacciGrade™	1 mg	vac-mpls
N-glycolyl-MDP VacciGrade™	5 mg	vac-gmdp
ODN 1585 VacciGrade™	1 mg	vac-1585-1
ODN 1826 VacciGrade™	1 mg	vac-1826-1
ODN 2006 VacciGrade™	1 mg	vac-2006-1
ODN 2395 VacciGrade™	1 mg	vac-2395-1
Pam3CSK4 VacciGrade™	1 mg	vac-pms
Poly(I:C) (HMW) VacciGrade™	10 mg	vac-pic
R848 VacciGrade™	5 mg	vac-r848
TDB VacciGrade™	2 mg	vac-tdb
OVA Antigens		
EndoFit™ Ovalbumin	10 mg	vac-efova
Ovalbumin	1 g	vac-ova
OVA 257-264	1 mg	vac-sin
OVA 323-339	1 mg	vac-isq

Recent Articles with InvivoGen's ADJUVANTS

AddaVax™

Beaumont E. *et al.*, 2013. Chimeric hepatitis B virus/hepatitis C virus envelope proteins elicit broadly neutralizing antibodies and constitute a potential bivalent prophylactic vaccine. Hepatology. 57(4):1303-13.

Cayatte C. *et al.*, 2013. Cytomegalovirus vaccine strain towne-derived dense bodies induce broad cellular immune responses and neutralizing antibodies that prevent infection of fibroblasts and epithelial cells. J Virol. 87(20):11107-20.

Dubensky TW Jr. *et al.*, 2013. Rationale, progress and development of vaccines utilizing STING-activating cyclic dinucleotide adjuvants. Ther Adv Vaccines. 1(4):131-143.

Alhydrogel®

Johswich KO. *et al.*, 2013. In vivo adaptation and persistence of Neisseria meningitidis within the nasopharyngeal mucosa. PLoS Pathog. 9(7):e1003509.

Lee EC. *et al.*, 2014. Complete humanization of the mouse immunoglobulin loci enables efficient therapeutic antibody discovery. Nat Biotechnol. 32(4):356-63.

VacciGrade™ Adjuvants

Goraczniak R. *et al.*, 2013. U1 Adaptor Oligonucleotides Targeting BCL2 and GRM1 Suppress Growth of Human Melanoma Xenografts In Vivo. Mol Ther Nucleic Acids. 2:e92.

Huang LR. *et al.*, 2013. Intrahepatic myeloid-cell aggregates enable local proliferation of CD8(+) T cells and successful immunotherapy against chronic viral liver infection. Nat Immunol. 14(6):574-83.

Pradhan P. *et al.*, 2014. The effect of combined IL10 siRNA and CpG ODN as pathogen-mimicking microparticles on Th1/Th2 cytokine balance in dendritic cells and protective immunity against B cell lymphoma. Biomaterials. 35(21):5491-504.

Tao W. *et al.*, 2014. Gold nanoparticle-M2e conjugate coformulated with CpG induces protective immunity against influenza A virus. Nanomedicine 9(2):237-51.

OVA Antigens

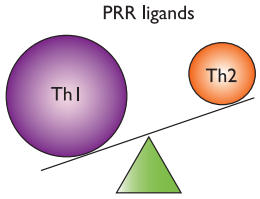
Mazzini E. *et al.*, 2014. Oral tolerance can be established via gap junction transfer of fed antigens from $CX3CR1^+$ macrophages to $CD103^+$ dendritic cells. Immunity. 40(2):248-61.

Robertson SJ. *et al.*, 2014. Tick-borne flaviviruses antagonize both IRF-1 and type I IFN signaling to inhibit dendritic cell function. J Immunol. 192(6):2744-55.

Roser-Page S. *et al.*, 2014. CTLA-4Ig-induced T cell anergy promotes Wnt-10b production and bone formation in a mouse model. Arthritis Rheumatol. 66(4):990-9.

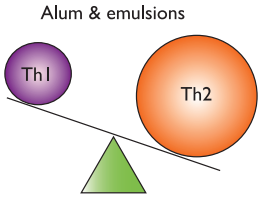
Adjuvant-dependent modulation of Th1 and Th2 responses to immunization

Most vaccines currently available contain one or more antigens targeted against the disease of interest and an adjuvant. An antigen is a foreign or toxic substance that induces protective immunity. However, not all antigens are able to effectively activate the immune system. Hence, the need for adjuvants to boost the immune response. Depending on the disease of interest, the required immune response differs. Illnesses caused by intracellular pathogens (e.g. invasive bacteria, protozoa and viruses) and cancers require a cytotoxic T-cell mediated (also known as cellular or Th1) response. Diseases caused by extracellular pathogens (e.g. helminthes, extracellular bacteria and toxins) require an antibody-mediated (also known as humoral or Th2) response. The use of adjuvants can greatly modulate the Th1-Th2 balance. Currently, the only adjuvants approved for use in human vaccines are alum (aluminum salts), emulsions (e.g. MF59), and the new generation adjuvant AS04 (MPL® formulated with alum). Alum and emulsions induce a strong Th2 response with little or no Th1 response. In contrast, AS04 triggers a Th1-biased response, primarily due to the presence of MPL®, a modified MPLA derived from bacterial LPS.



Cellular Immunity

Anti-tumor activity
Defense against intracellular pathogens (e.g. HIV, malaria)



Humoral Immunity

Defense against extracellular bacteria (e.g. pneumococci), toxins (e.g. tentanus, diphtheria), & certain viruses (e.g. rabies)

The successful development of this novel Th1-polarizing adjuvant containing an immunostimulatory compound based on a natural ligand was a breakthrough. However, additional Th1-biased adjuvants are needed to protect against challenging diseases, such as HIV and cancer. New adjuvants are being developed that are natural ligands or synthetic agonists for pattern recognition receptors (PRRs), to be used either alone or with various formulations. Better understanding of the mechanisms of "immunogenicity" and "adjuvancy" will foster the development of more effective and safer vaccine adjuvants.

PRODUCT INFORMATION

TERMS AND CONDITIONS

Prices

Written price quotes are firm for purchase orders received within 30 days. Prices are subject to change without notice.

Payment Terms

Payment terms are net 30 days from the invoice date. Pre-payments may be required for initial orders with completion of credit application. InvivoGen does not require a minimum order quantity.

Shipping

Product is shipped F.O.B. from InvivoGen, San Diego, CA. Domestic orders are shipped 2-3 day express by our designated carrier. Orders can be expedited to overnight service for an additional fee. European orders are shipped from InvivoGen Europe in France. Please include Value Added Tax (VAT) registration number when placing the order. For non-U.S. orders, other charges such as import duties and value added taxes may apply. Shipping days are Monday through Friday.

Warranty

InvivoGen warrants that the products sold will meet our specifications at the time of delivery. InvivoGen's sole liability shall be limited to, at our option, replacement of material(s) that does not meet our specification or refund of the purchase price. By acceptance of the product, Buyer indemnifies and holds InvivoGen harmless against, and assumes all liability for any direct, incidental, special or consequential loss, damage or expense directly or indirectly arising from the use of the product, even if InvivoGen knew of the possibility of such loss, damage or expense.

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The buyer agrees that any activity undertaken with the product and replicates or derivatives will be conducted in compliance with all applicable guidelines, laws and regulations.
Commercial Purposes means any activity by a party for consideration and may include, but is not limited to: (1) use of the product or its components in manufacturing; (2) use of the product or its components to provide a service, information, or data; (3) use of the product or its components for therapeutic, diagnostic or prophylactic purposes; or (4) resale of the product or its components, whether or not such product or its components are resold for use in research. "Replicate" means any biological or chemical material that represents a substantially unmodified copy of the Material such as, but not limited to, material produced by growth of cells. "Derivative" means material created from the Material that is substantially modified to have new properties such as, but not limited to, recombinant DNA modified clones.
If the purchaser is not willing to accept the limitations of this limited use statement, InvivoGen is willing to accept return of the product with a full refund. For information on purchasing a license to this product for purposes other than research, contact InvivoGen, 3950 Sorrento Valley Blvd. Suite 100, San Diego California 92121. Tel:858-457-5873. Fax: 858-457-5843.

Returns

All product returns must have prior authorization and approval. Contact our customer service or technical service department for a return authorization number. Return authorization numbers are valid for 30 days from issuance. Items that are authorized for return must arrive at InvivoGen Corporation in resalable condition to be eligible for a product credit. A restocking charge of 20% will be charged on returns that are through no error or fault of InvivoGen Corporation and shipping charges will not be credited. Products may not be returned for credit after 20 days of receipt of material.

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PRODUCT INFORMATION

Alphabetical List by Product Name

PRODUCT (QUANTITY)	CAT. CODE	PAGE
17-AAG (5 mg)	ant-agl-5	-
17-AAG (25 mg)	ant-agl-25	-
17-AEP-GA (1 mg)	ant-egl-1	-
17-AEP-GA (5 mg)	ant-egl-5	-
17-DMAG (5 mg)	ant-dgl-5	-
17-DMAG (25 mg)	ant-dgl-25	-
17-DMAP-GA (1 mg)	ant-mgl-1	-
17-DMAP-GA (5 mg)	ant-mgl-5	-
17-GMB-APA-GA (1 mg)	gmbapa-ga	-
17-NHS-ALA-GA (1 mg)	ant-nhgl-1	-
2-Aminopurine (250 mg)	tlrl-apr	-
2'2' cGAMP (500 µg)	tlrl-cga22-s	38
2'2' cGAMP (1 mg)	tlrl-cga22	38
2'2' cGAMP VacciGrade (1 mg)	vac-cga22	62
2'3' cGAMP (500 µg)	tlrl-cga23-s	38
2'3' cGAMP (1 mg)	tlrl-cga23	38
2'3' cGAMP VacciGrade (1 mg)	vac-cga23	62
293/hMD2-CD14 (3-7 x 10^6 cells)	293-hmd2cd14	-
293/hNOD1 (3-7 x 10^6 cells)	293-hnod1	-
293/hNOD2 (3-7 x 10^6 cells)	293-hnod2	-
293/hTLR1-HA (3-7 x 10^6 cells)	293-htlr1ha	-
293/hTLR2 (3-7 x 10^6 cells)	293-htlr2	-
293/hTLR2-CD14 (3-7 x 10^6 cells)	293-htlr2cd14	-
293/hTLR2-HA (3-7 x 10^6 cells)	293-htlr2ha	-
293/hTLR2/6 (3-7 x 10^6 cells)	293-htlr2/6	-
293/hTLR3 (3-7 x 10^6 cells)	293-htlr3	-
293/hTLR3-HA (3-7 x 10^6 cells)	293-htlr3ha	-
293/hTLR4A (3-7 x 10^6 cells)	293-htlr4a	-
293/hTLR4A-MD2-CD14 (3-7 x 10^6 cells)	293-htlr4md2cd14	-
293/hTLR4-HA (3-7 x 10^6 cells)	293-htlr4ha	-
293/hTLR5 (3-7 x 10^6 cells)	293-htlr5	-
293/hTLR5-CD14 (3-7 x 10^6 cells)	293-htlr5cd14	-
293/hTLR5-HA (3-7 x 10^6 cells)	293-htlr5ha	-
293/hTLR6-HA (3-7 x 10^6 cells)	293-htlr6ha	-
293/hTLR10-HA (3-7 x 10^6 cells)	293-htlr10ha	-
293/LacZ (3-7 x 10^6 cells)	293-lacz	-
293/mNOD1 (3-7 x 10^6 cells)	293-mnod1	-
293/mNOD2 (3-7 x 10^6 cells)	293-mnod2	-
293/mTLR1 (3-7 x 10^6 cells)	293-mtlr1	-
293/mTLR1/2 (3-7 x 10^6 cells)	293-mtlr1/2	-
293/mTLR2 (3-7 x 10^6 cells)	293-mtlr2	-
293/mTLR2/6 (3-7 x 10^6 cells)	293-mtlr2/6	-
293/mTLR3 (3-7 x 10^6 cells)	293-mtlr3	-
293/mTLR4 (3-7 x 10^6 cells)	293-mtlr4	-
293/mTLR4-MD2-CD14 (3-7 x 10^6 cells)	293-mtlr4md2cd14	-
293/mTLR5 (3-7 x 10^6 cells)	293-mtlr5	-
293/mTLR6 (3-7 x 10^6 cells)	293-mtlr6	-

PRODUCT (QUANTITY)	CAT. CODE	PAGE
293/mTLR9 (3-7 x 10^6 cells)	293-mtlr9	-
293/null (3-7 x 10^6 cells)	293-null	-
293XL/hTLR7 (3-7 x 10^6 cells)	293xl-htlr7	-
293XL/hTLR7-HA (3-7 x 10^6 cells)	293xl-htlr7ha	-
293XL/hTLR8 (3-7 x 10^6 cells)	293xl-htlr8	-
293XL/hTLR8-HA (3-7 x 10^6 cells)	293xl-htlr8ha	-
293XL/hTLR9 (3-7 x 10^6 cells)	293xl-htlr9	-
293XL/hTLR9-HA (5-7 x 10^6 cells)	293xl-htlr9ha	-
293XL/mTLR7 (5-7 x 10^6 cells)	293xl-mtlr7	-
293XL/null (5-7 x 10^6 cells)	293xl-null	-
3-Methyladenine (50 mg)	tlrl-3ma	-
3'3' cGAMP (500 µg)	tlrl-cga-s	38
3'3' cGAMP (1 mg)	tlrl-cga	38
3'3' cGAMP VacciGrade (1 mg)	vac-cga	62
5-Aza-2'-deoxycytidine (10 mg)	met-adc-1	-
5-Aza-2'-deoxycytidine (50 mg)	met-adc-5	-
5-Aza-cytidine (100 mg)	inh-aza	-
5-Fluorocytosine (250 mg)	sud-5fc	-
5-Fluorouracil (250 mg)	sud-5fu	-
5'ppp-dsRNA (25 µg)	tlrl-3prna	38
5'ppp-dsRNA (100 µg)	tlrl-3prna-100	38
5'ppp-dsRNA / LyoVec (25 µg)	tlrl-3prnalv	38
5'ppp-dsRNA / LyoVec (100 µg)	tlrl-3prnalv-100	38
5'ppp-dsRNA Control (25 µg)	tlrl-3prnac	38
5'ppp-dsRNA Control (100 µg)	tlrl-3prnac-100	38
5'ppp-dsRNA Control / LyoVec (25 µg)	tlrl-3prnaclv	38
5'ppp-dsRNA Control / LyoVec (100 µg)	tlrl-3prnaclv-100	38
A & C-Classes TLR9 Agonist Kit (6 ligands)	tlrl-kit9ac	47
A-769662 (10 mg)	inh-a769	53
AddaVax™ (10 ml)	vac-adx-10	-
AdiFectin™ (CL347) (500 µg)	tlrl-c347	39
Adilipoline™ (CL413) (500 µg)	tlrl-c413	39
AG490 (10 mg)	tlrl-ag4	-
Alhydrogel 2% (250 ml)	vac-alu-250	-
Alum Crystals (1 g)	tlrl-alk	37
Anti-[anti-hTNF-α] (100 µg)	mab-idtnf	-
Anti-FLA-BS (100 µg)	mabg-flabs	60
Anti-FLA-PA (100 µg)	mabg-flapa	60
Anti-FLA-ST (100 µg)	mabg-flast	60
Anti-Flagellin FliC (100 µg)	mabg-flic	-
Anti-HA Tag (250 µl)	ab-hatag	-
Anti-hCD14-IgA (100 µg)	maba-hcd14	-
Anti-hCD20-hIgA1 (100 µg)	hcd20-mab6	-
Anti-hCD20-hIgA2 (100 µg)	hcd20-mab7	-
Anti-hCD20-hIgE (100 µg)	hcd20-mab8	-
Anti-hCD20-hIgG1 (100 µg)	hcd20-mab1	-
Anti-hCD20-hIgG2 (100 µg)	hcd20-mab2	-

PRODUCT INFORMATION

Alphabetical List by Product Name

PRODUCT (QUANTITY)	CAT. CODE	PAGE
Anti-hCD20-hIgG3 (100 µg)	hcd20-mab3	-
Anti-hCD20-hIgG4 (100 µg)	hcd20-mab4	-
Anti-hCD20-hIgM (100 µg)	hcd20-mab5	-
Anti-hCD20-mIgA (100 µg)	hcd20-mab11	-
Anti-hCD20-mIgG1 (100 µg)	hcd20-mab9	-
Anti-hCD20-mIgG2a (100 µg)	hcd20-mab10	-
Anti-hCD40L-IgA2 (100 µg)	maba-h40l	-
Anti-hDectin-1-Biotin (100 µg)	bmab-hdect	60
Anti-hDectin-1-IgG (100 µg)	mabg-hdect	60
Anti-hDectin-2-Biotin (100 µg)	bmab-hdect2	60
Anti-hDectin-2-IgG (100 µg)	mabg-hdect2	60
Anti-hDectin-3-Biotin (100 µg)	bmab-hdect3	60
Anti-hDectin-3-IgG (100 µg)	mabg-hdect3	60
Anti-hIFN-α-IgA (100 µg)	maba-hifna	-
Anti-hIFN-γ-IgA (100 µg)	maba-hifng	-
Anti-hIL-1β-IgA (100 µg)	maba-hil1b	-
Anti-hIL-4-IgA (100 µg)	maba-hil4	-
Anti-hIL-6-IgA (100 µg)	maba-hil6	-
Anti-hIL-13-IgA (100 µg)	maba-hil13	-
Anti-hIL-18-IgA (100 µg)	maba-hil18	-
Anti-hIL-28-IgG (100 µg)	mabg-hil28	-
Anti-HLA Class I Ctrl (100 µg)	hla-c1	60
Anti-HLA Class II Ctrl (100 µg)	hla-c2	60
Anti-hMincle-Biotin (100 µg)	bmab-hmcl	60
Anti-hMincle-IgG (100 µg)	mabg-hmcl	60
Anti-hTGFβ-IgA2 (100 µg)	maba-htgfb	-
Anti-hTLR1-IgG (100 µg)	mabg-htlr1	-
Anti-hTLR2-IgA (100 µg)	maba2-htlr2	-
Anti-hTLR3-IgA (100 µg)	maba-htlr3	-
Anti-hTLR4-IgG (100 µg)	mabg-htlr4	-
Anti-hTLR5-IgA (100 µg)	maba2-htlr5	-
Anti-hTLR6-IgG (100 µg)	mabg-htlr6	-
Anti-hTNF-α-hIgA1 (100 µg)	htnfa-mab6	-
Anti-hTNF-α-hIgA2 (100 µg)	htnfa-mab7	-
Anti-hTNF-α-hIgE (100 µg)	htnfa-mab8	-
Anti-hTNF-α-hIgG1 (100 µg)	htnfa-mab1	-
Anti-hTNF-α-hIgG2 (100 µg)	htnfa-mab2	-
Anti-hTNF-α-hIgG3 (100 µg)	htnfa-mab3	-
Anti-hTNF-α-hIgG4 (100 µg)	htnfa-mab4	-
Anti-hTNF-α-hIgM (100 µg)	htnfa-mab5	-
Anti-hTNF-α-mIgA (100 µg)	htnfa-mab11	-
Anti-hTNF-α-mIgG1 (100 µg)	htnfa-mab9	-
Anti-hTNF-α-mIgG2a (100 µg)	htnfa-mab10	-
Anti-Lucia-IgG (100 µg)	mabg-lucia	-
Anti-mDectin-1a-Biotin (100 µg)	bmab-mdecta	60
Anti-mDectin-1a-IgG (100 µg)	mabg-mdecta	60
Anti-mDectin-1-Biotin (100 µg)	bmab-mdect	60

PRODUCT (QUANTITY)	CAT. CODE	PAGE
Anti-mDectin-1-IgG (100 µg)	mabg-mdect	60
Anti-mMincle-Biotin (100 µg)	bmab-mmcl	60
Anti-mMincle-IgG (100 µg)	mabg-mmcl	60
Anti-mTLR2-IgG (100 µg)	mabg-mtlr2	-
Anti-mTLR5-IgG (100 µg)	mabg-mtlr5	-
ATP (1 g)	tlrl-atp	37
B-Classes TLR9 Agonist Kit (6 ligands)	tlrl-kit9b	47
B16-Blue™ IFNγ Cells (3-7 x 10^6 cells)	bb-ifng	26
B16-Blue™ IFNα/β Cells (3-7 x 10^6 cells)	bb-ifnt1	26
B16-Blue™ ISG Cells (3-7 x 10^6 cells)	bb-ifnabg	22
B16-Blue™ ISG-KO-STING Cells (3-7 x 10^6 cells)	bb-kostg	23
Bafilomycin A1 (10 µg)	tlrl-baf1	-
Bay11-7082 (10 mg)	tlrl-b82	-
Beta-glucan peptide (50 mg)	tlrl-bgp	39
Biotin-GA (1 mg)	ant-bgl-1	-
Biotin-GA (5 mg)	ant-bgl-5	-
Bix-01294 (2 mg)	inh-bix	-
Blasticidin (100 mg)	ant-bl-1	11
Blasticidin (500 mg)	ant-bl-5	11
Blasticidin (500 mg, bottle)	ant-bl-5b	11
Blasticidin (1 g powder)	ant-bl-10p	11
BX795 (5 mg)	tlrl-bx7	-
c-di-AMP (1 mg)	tlrl-cda	39
c-di-AMP VacciGrade (1 mg)	vac-cda	39
c-di-GMP (1 mg)	tlrl-cdg	39
c-di-GMP VacciGrade (1 mg)	vac-cdg	39
c-di-IMP (1 mg)	tlrl-cdi	39
c-di-UMP (1 mg)	tlrl-cdu	39
C12-iE-DAP (1 mg)	tlrl-c12dap	37
C3H/TLR4mut MEFs (3-7 x 10^6 cells)	mef-c3h4m	-
C3H/WT MEFs (3-7 x 10^6 cells)	mef-c3hwt	-
C57/WT MEFs (3-7 x 10^6 cells)	mef-c57wt	-
Celastrol (1 mg)	ant-cls	-
CFA (10 ml)	vac-cfa-10	62
CFA (6 x 10 ml)	vac-cfa-60	62
ChemiComp GT115 (5 x 0.1 ml)	gt115-11	-
ChemiComp GT115 (5 x 0.2 ml)	gt115-21	-
ChemiComp GT116 (5 x 0.1 ml)	gt116-11	-
ChemiComp GT116 (5 x 0.2 ml)	gt116-21	-
Chloroquine (250 mg)	tlrl-chq	-
CI-994 (10 mg)	inh-ci99	-
CL075 (500 µg)	tlrl-c75	35
CL075 (5 mg)	tlrl-c75-5	35
CL097 (500 µg)	tlrl-c97	35
CL097 (5 mg)	tlrl-c97-5	35
CL264 (500 µg)	tlrl-c264e	34
CL264 (5 mg)	tlrl-c264e-5	34

PRODUCT INFORMATION

Alphabetical List by Product Name

PRODUCT (QUANTITY)	CAT. CODE	PAGE
CL264 Biotin (100 µg)	tlrl-bc264	34
CL264 FITC (100 µg)	tlrl-fc264	34
CL264 Rhodamine (100 µg)	tlrl-rc264	34
CL307 (500 µg)	tlrl-c307	34
CL401 (500 µg)	tlrl-c401	39
CL419 (500 µg)	tlrl-c419	39
CL531 (500 µg)	tlrl-c531	39
CL572 (500 µg)	tlrl-c572	39
CLI-095 (1 mg)	tlrl-cli95	-
CLR Ligand Screening Service	tlrl-test-2	50
Compound Profiling	tlrl-test-1	-
Control IgG1 (100 µg)	mabg1-ctrlm	-
Control IgG2a (100 µg)	mabg2a-ctrlm	-
Control IgG2b (100 µg)	mabg2b-ctrlm	-
CP-690550 (5 mg)	tlrl-cp69	-
CPPD crystals (5 mg)	tlrl-cppd	37
Curdlan AL (1 g)	tlrl-cura	39
Custom-made CpG-free Gene (20 µg)	p-custom	-
Custom-made pDRIVE (20 µg)	p-custom	-
Custom-made psiRNA (20 µg)	p-custom	-
Custom-made psiRNA kit	k-custom	-
Custom-made pSELECT (20 µg)	p-custom	-
Cyclosporin A (100 mg)	tlrl-cyca	-
Dexamethasone (100 mg)	tlrl-dex	-
DNA Standard Research Grade	p-custom	-
DNA Pre-Clinical Grade	p-custom	-
DMXAA (5 mg)	tlrl-dmx	39
dsDNA-EC (200 µg)	tlrl-ecdna	38
***E. coli* ssDNA / LyoVec** (200 µg)	tlrl-ssec	35
EndoFit™ Ovalbumin (10 mg)	vac-efova	-
Everolimus (5 mg)	tlrl-eve	-
Fast-Media® Amp Agar (30 pouches)	fas-am-s	18
Fast-Media® Amp Agar (500 pouches)	fas-am-s500	18
Fast-Media® Amp LB (30 pouches)	fas-am-b	18
Fast-Media® Amp LB (500 pouches)	fas-am-b500	18
Fast-Media® Amp TB (30 pouches)	fas-am-l	18
Fast-Media® Amp TB (500 pouches)	fas-am-l500	18
Fast-Media® Amp XGal (20 pouches)	fas-am-x	18
Fast-Media® Base Agar (30 pouches)	fas-s	18
Fast-Media® Base Agar (500 pouches)	fas-s500	18
Fast-Media® Base LB (30 pouches)	fas-b	18
Fast-Media® Base LB (500 pouches)	fas-b500	18
Fast-Media® Blas Agar (20 pouches)	fas-bl-s	18
Fast-Media® Blas TB (20 pouches)	fas-bl-l	18
Fast-Media® Blas XGal (20 pouches)	fas-bl-x	18
Fast-Media® Hygro Agar (20 pouches)	fas-hg-s	18
Fast-Media® Hygro TB (20 pouches)	fas-hg-l	18

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Fast-Media® Hygro XGal (20 pouches)	fas-hg-x	18
Fast-Media® Kan Agar (30 pouches)	fas-kn-s	18
Fast-Media® Kan Agar (500 pouches)	fas-kn-s500	18
Fast-Media® Kan LB (30 pouches)	fas-kn-b	18
Fast-Media® Kan LB (500 pouches)	fas-kn-b500	18
Fast-Media® Kan TB (30 pouches)	fas-kn-l	18
Fast-Media® Kan TB (500 pouches)	fas-kn-l500	18
Fast-Media® Kan XGal (20 pouches)	fas-kn-x	18
Fast-Media® Puro Agar (20 pouches)	fas-pr-s	18
Fast-Media® Puro TB (20 pouches)	fas-pr-l	18
Fast-Media® Zeo Agar (20 pouches)	fas-zn-s	18
Fast-Media® Zeo TB (20 pouches)	fas-zn-l	18
Fast-Media® Zeo XGal (20 pouches)	fas-zn-x	18
Fast-Media® Zeo X-Gluc (10 pouches)	fas-zn-g	18
Fc-hDectin-1a (50 µg)	fc-hdec1a	51
Fc-mDectin-1a (50 µg)	fc-mdec1a	51
FITC-Geldanamycin (1 mg)	ant-fgl-1	-
FITC-Geldanamycin (5 mg)	ant-fgl-5	-
FK506 (10 mg)	tlrl-fk5	-
FLA-BS (100 µg)	tlrl-bsfla	34
FLA-BS Ultrapure (50 µg)	tlrl-pbsfla	34
FLA-PA Ultrapure (50 µg)	tlrl-pafla	34
Flagellin FliC VacciGrade (50 µg)	vac-fla	34
FLA-ST (100 µg)	tlrl-stfla	34
FLA-ST Ultrapure (10 µg)	tlrl-epstfla	34
FLA-ST Ultrapure (50 µg)	tlrl-epstfla5	34
FLA-ST recombinant (1 µg)	tlrl-flic	34
FLA-ST recombinant (10 µg)	tlrl-flic-10	34
FLA-ST NQ recombinant (10 µg)	tlrl-flicnq	34
FSL-1 (100 µg)	tlrl-fsl	33
Fungin™ (75 mg)	ant-fn-1	9
Fungin™ (200 mg)	ant-fn-2	9
G-ODN (200 µg)	tlrl-godn	37
G-ODN Control (200 µg)	tlrl-godnc	37
G418 Sulfate (1 g)	ant-gn-1	11
G418 Sulfate (5 g)	ant-gn-5	11
Ganciclovir (250 mg)	sud-gcv	-
Gardiquimod (500 µg)	tlrl-gdqs	34
Gardiquimod (5 mg)	tlrl-gdq-5	34
Gardiquimod VacciGrade (5 mg)	vac-gdq	34
Gefitinib (10 mg)	tlrl-gef	-
Geldanamycin (5 mg)	ant-gl-5	-
Geldanamycin (25 mg)	ant-gl-25	-
Glybenclamide (1 g)	tlrl-gly	-
Goat anti-human IgA - HRP (1 ml)	hrp-iga	-
Goat anti-human kappa - HRP (1 ml)	hrp-igak	-
Goat F(ab')2 anti-human IgA (0.5 mg)	fab-iga	-

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PRODUCT (QUANTITY)	CAT. CODE	PAGE
Goat F(ab')2 anti-human IgA - Biotin (0.5 mg)	chiga-biot	-
Goat F(ab')2 anti-human IgA - FITC (0.5 mg)	chiga-fitc	-
Goat F(ab')2 anti-human kappa (0.5 mg)	fab-igak	-
Goat F(ab')2 IgG isotype control - FITC (100 tests)	cgig-fitc	-
H-89 (5 mg)	tlrl-h89	-
HEK-Blue™ CD40L Cells (3-7 x 10^6 cells)	hkb-cd40	-
HEK-Blue™ CD40L Kit	hkb-cd40-kit	-
HEK-Blue™ Detection (5 pouches)	hb-det2	29
HEK-Blue™ Detection (10 pouches)	hb-det3	29
HEK-Blue™ Endotoxin Standard (10 x 50 EU)	rep-hbes-10	8
HEK-Blue™ hMD2-CD14 Cells (3-7 x 10^6 cells)	hkb-hmdcd	-
HEK-Blue™ hNOD1 Cells (3-7 x 10^6 cells)	hkb-hnod1	-
HEK-Blue™ hNOD2 Cells (3-7 x 10^6 cells)	hkb-hnod2	-
HEK-Blue™ hTLR2 Cells (3-7 x 10^6 cells)	hkb-htlr2	21
HEK-Blue™ hTLR3 Cells (3-7 x 10^6 cells)	hkb-htlr3	21
HEK-Blue™ hTLR4 Cells (3-7 x 10^6 cells)	hkb-htlr4	21
HEK-Blue™ hTLR5 Cells (3-7 x 10^6 cells)	hkb-htlr5	21
HEK-Blue™ hTLR7 Cells (3-7 x 10^6 cells)	hkb-htlr7	21
HEK-Blue™ hTLR8 Cells (3-7 x 10^6 cells)	hkb-htlr8	21
HEK-Blue™ hTLR9 Cells (3-7 x 10^6 cells)	hkb-htlr9	21
HEK-Blue™ IFN-α/β Cells (3-7 x 10^6 cells)	hkb-ifnab	-
HEK-Blue™ IFN-γ Cells (3-7 x 10^6 cells)	hkb-ifng	-
HEK-Blue™ IL-1β Cells (3-7 x 10^6 cells)	hkb-il1b	-
HEK-Blue™ IL-1β Kit	hkb-il1b-kit	-
HEK-Blue™ IL-1R Cells (3-7 x 10^6 cells)	hkb-il1r	27
HEK-Blue™ IL-4/IL-13 Cells (3-7 x 10^6 cells)	hkb-stat6	-
HEK-Blue™ IL-4/IL-13 Kit	hkb-stat6-kit	-
HEK-Blue™ IL-6 Cells (3-7 x 10^6 cells)	hkb-il6	-
HEK-Blue™ IL-6 Kit	hkb-il6-kit	-
HEK-Blue™ IL-18/IL-1β Cells (3-7 x 10^6 cells)	hkb-il18	-
HEK-Blue™ IL-18/IL-1β Kit	hkb-il18-kit	-
HEK-Blue™ IL-33/IL-1β Cells (3-7 x 10^6 cells)	hkb-il33	-
HEK-Blue™ ISG Cells (3-7 x 10^6 cells)	hkb-isg	22
HEK-Blue™ ISG-KO-STING Cells (3-7 x 10^6 cells)	hkb-kostg	23
HEK-Blue™ KD-TLR5 Cells (3-7 x 10^6 cells)	hkb-kdtlr5	25
HEK-Blue™ LPS Detection Kit 2	rep-lps2	8
HEK-Blue™ mNOD1 Cells (3-7 x 10^6 cells)	hkb-mnod1	-
HEK-Blue™ mNOD2 Cells (3-7 x 10^6 cells)	hkb-mnod2	-
HEK-Blue™ mTLR2 Cells (3-7 x 10^6 cells)	hkb-mtlr2	21
HEK-Blue™ mTLR3 Cells (3-7 x 10^6 cells)	hkb-mtlr3	21
HEK-Blue™ mTLR4 Cells (3-7 x 10^6 cells)	hkb-mtlr4	21
HEK-Blue™ mTLR5 Cells (3-7 x 10^6 cells)	hkb-mtlr5	21
HEK-Blue™ mTLR7 Cells (3-7 x 10^6 cells)	hkb-mtlr7	21
HEK-Blue™ mTLR8 Cells (3-7 x 10^6 cells)	hkb-mtlr8	21
HEK-Blue™ mTLR9 Cells (3-7 x 10^6 cells)	hkb-mtlr9	21
HEK-Blue™ mTLR13 Cells (3-7 x 10^6 cells)	hkb-mtlr13	21
HEK-Blue™ Null1 Cells (3-7 x 10^6 cells)	hkb-null1	-
HEK-Blue™ Null1-k Cells (3-7 x 10^6 cells)	hkb-null1k	-
HEK-Blue™ Null1-v Cells (3-7 x 10^6 cells)	hkb-null1v	-
HEK-Blue™ Null2 Cells (3-7 x 10^6 cells)	hkb-null2	-
HEK-Blue™ Null2-k Cells (3-7 x 10^6 cells)	hkb-null2k	-
HEK-Blue™ Selection (5 x 2 ml)	hb-sel	7
HEK-Blue™ TGF-β Cells (3-7 x 10^6 cells)	hkb-tgfb	-
HEK-Blue™ TGF-β Kit	hkb-tgfb-kit	-
HEK-Blue™ TNF-α Cells (3-7 x 10^6 cells)	hkb-tnfdmyd	-
HEK-Blue™ TNF-α Kit	hkb-tnfdmyd-kit	-
HEK-Dual™ IFN-γ Cells (5-7 x 10^6 cells)	hkd-ifng	-
HEK-Dual™ TNF-α Cells (5-7 x 10^6 cells)	hkd-tnfa	-
Hemozoin (5 mg)	tlrl-hz	37
HKAL (10^9 cells)	tlrl-hkal	33
HKCA (10^9 cells)	tlrl-hkca	39
HKEB (10^{10} cells)	tlrl-hkeb2	33
HKHP (10^9 cells)	tlrl-hkhp	33
HKLM (10^{10} cells)	tlrl-hklm	33
HKLP (10^9 cells)	tlrl-hklp	33
HKLR (10^{10} cells)	tlrl-hklr	33
HKMF (10^9 cells)	tlrl-hkmf	33
HKMT (10 mg)	tlrl-hkmt-1	39
HKMT (50 mg)	tlrl-hkmt-5	39
HKPA (10^{10} cells)	tlrl-hkpa	33
HKPG (10^{10} cells)	tlrl-hkpg	33
HKSA (10^{10} cells)	tlrl-hksa	33
HKSC (10^9 cells)	tlrl-hksc	33
HKSE (10^{10} cells)	tlrl-hkse	33
HKSP (10^{10} cells)	tlrl-hksp	33
HKST (10^{10} cells)	tlrl-hkst	33
HSV-60 Naked (200 µg)	tlrl-hsv60n	38
HSV-60 / LyoVec (100 µg)	tlrl-hsv60c	38
HSV-60c Naked (control) (200 µg)	tlrl-hsv60cn	38
HSV-60c / LyoVec (control) (100 µg)	tlrl-hsv60cc	38
hTLR5-Fc (50 µg)	fc-htlr5	51
Human IgA (0.5 mg)	ctrl-iga	-
Human IgA kappa (0.5 mg)	ctrl-igak	-
Human IgA2 Isotype Control (100 µg)	maba2-ctrl	-
Human MDA-5 RT-Primer Pair (2 x 2.5 nmol)	rtp-hmda5	-
Human NOD1 RT-Primer Pair (2 x 2.5 nmol)	rtp-hnod1	-
Human NOD2 RT-Primer Pair (2 x 2.5 nmol)	rtp-hnod2	-
Human RIG-I RT-Primer Pair (2 x 2.5 nmol)	rtp-hrigi	-
Human TLR1 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr1	-
Human TLR2 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr2	-
Human TLR3 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr3	-
Human TLR4 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr4	-
Human TLR5 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr5	-
Human TLR6 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr6	-

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Human TLR7 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr7	-
Human TLR8 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr8	-
Human TLR9 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr9	-
Human TLR10 RT-Primer Pair (2 x 2.5 nmol)	rtp-htlr10	-
Human TLR1-10 RT-Primer Set (20 x 2.5 nmol)	rts-htlrs	-
Human TLR3/7/8/9 Agonist Kit (14 ligands)	tlrl-kit3hw3	47
Human TLR9 Agonist Kit (6 ligands)	tlrl-kit9h	47
Hygromycin B Gold (1 g)	ant-hg-1	10
Hygromycin B Gold (5 g)	ant-hg-5	10
Hygromycin B Gold (10 g powder)	ant-hg-10p	10
iE-DAP (5 mg)	tlrl-dap	37
iE-Lys (5 mg)	tlrl-lys	37
IFA (10 ml)	vac-ifa-10	-
IFA (6 x 10 ml)	vac-ifa-60	-
IFNr qRT-Primers (kit)	rts-hifnr	-
Imiquimod (500 μg)	tlrl-imqs	34
Imiquimod (5 mg)	tlrl-imq	34
Imiquimod VacciGrade (5 mg)	vac-imq	34
ISD Naked (200 μg)	tlrl-isdn	-
ISD / LyoVec (100 μg)	tlrl-isdc	-
ISD Control Naked (200 μg)	tlrl-isdcn	-
ISD Control / LyoVec (100 μg)	tlrl-isdcc	-
J Chain Antiserum (100 μg)	pab-jc	-
Jacalin / Agarose (2 ml)	gel-jac-2	-
Jacalin / Agarose (5 ml)	gel-jac-5	-
Jurkat-Dual™ Cells (3-7 x 10^6 cells)	jktd-isnf	-
L18-MDP (1 mg)	tlrl-lmdp	37
LacZ Cell Staining Kit	rep-lz-c	-
LacZ Tissue Staining Kit	rep-lz-t	-
LAM-MS (500 μg)	tlrl-lams	33
Laminarin (100 mg)	tlrl-lam	39
LENTI-Smart™ (INT) (5 vials)	ltsint-5	-
LENTI-Smart™ (INT) (10 vials)	ltsint-10	-
LENTI-Smart™ NIL (5 vials)	ltsnil-5	-
LENTI-Smart™ NIL (10 vials)	ltsnil-10	-
LENTI-Smart™ Starter Kit (10 vials)	lts-str	-
Leptomycin B (5 μg)	tlrl-lep	-
Lichenan (100 mg)	tlrl-lich	39
LL-37 (1 mg)	tlrl-l37	-
LM-MS (250 μg)	tlrl-lmms2	33
Loxoribine (50 mg)	tlrl-lox	34
LPS-B5 (5 mg)	tlrl-b5lps	34
LPS-B5 Ultrapure (5 mg)	tlrl-pb5lps	34
LPS-EB (5 mg)	tlrl-eblps	34
LPS-EB Biotin (500 μg)	tlrl-bblps	34
LPS-EB Ultrapure (5 x 10^6 EU)	tlrl-3pelps	34
LPS-EB VacciGrade (5 x 10^6 EU)	vac-3pelps	62

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LPS-EK (5 mg)	tlrl-eklps	34
LPS-EK Ultrapure (1 mg)	tlrl-peklps	34
LPS-PG (1 mg)	tlrl-pglps	33
LPS-PG Ultrapure (1 mg)	tlrl-ppglps	34
LPS-RS (5 mg)	tlrl-rslps	34
LPS-RS Ultrapure (1 mg)	tlrl-prslps	34
LPS-SM Ultrapure (5 mg)	tlrl-smlps	34
LTA-BS (5 mg)	tlrl-lta	33
LTA-SA (5 mg)	tlrl-slta	33
LTA-SA Purified (5 mg)	tlrl-pslta	33
LY294002 (5 mg)	tlrl-ly29	-
LyoComp GT115 (5 x 0.1 ml)	lyo-115-11	-
LyoComp GT115 (5 x 0.2 ml)	lyo-115-21	-
LyoComp GT116 (4 x 0.5 ml)	lyo-116-11	-
LyoComp GT116 (4 x 1 ml)	lyo-116-21	-
LyoVec™ (10 ml, 200 reactions)	lyec-1	-
LyoVec™ (20 ml, 400 reactions)	lyec-2	-
LyoVec™ (8 ml, 160 reactions)	lyec-12	-
LyoVec™ (18 ml, 360 reactions)	lyec-22	-
M-TriDAP (1 mg)	tlrl-mtd	37
M-TriLYS (1 mg)	tlrl-mtl	37
M-TriLYS-D-ASN (1 mg)	tlrl-mtn	37
MAb-hDC-SIGN (100 μg)	mab-hdcsg	-
MAb-hMD2 (100 μg)	mab-hmd2	-
MAb-hMR (100 μg)	mab-hmr	-
MAb-hTLR1 (100 μg)	mab-htlr1	-
MAb-hTLR1-FITC (100 μg)	mab-htlr1f	-
MAb-hTLR2 (100 μg)	mab-htlr2	-
MAb-hTLR2-FITC (100 μg)	mab-htlr2f	-
MAb-hTLR3 (100 μg)	mab-htlr3	-
MAb-hTLR3-FITC (100 μg)	mab-htlr3f	-
MAb2-hTLR4 (100 μg)	mab2-htlr4	-
MAb-hTLR4 (100 μg)	mab-htlr4	-
MAb-hTLR4-FITC (100 μg)	mab-htlr4f	-
MAb-hTLR4/MD2 (100 μg)	mab-htlr4md2	-
MAb-hTNF-R1 (100 μg)	mab-htnfr1	-
MAb-mDectin-1 (100 μg)	mab-mdect	-
MAb-mTLR2 (100 μg)	mab-mtlr2	-
MAb-mTLR2-FITC (100 μg)	mab-mtlr2f	-
MAb-mTLR4/MD2 (100 μg)	mab-mtlr4md2	-
MAb-mTLR4/MD2-FITC (100 μg)	mab-mtlr4md2f	-
MAb-mTLR9 (100 μg)	mab-mtlr9	-
MAb-mTLR9-FITC (100 μg)	mab-mtlr9f	-
MDP (5 mg)	tlrl-mdp	-
MDP Biotin (500 μg)	tlrl-bmdp	37
MDP control (5 mg)	tlrl-mdpc	37
MDP FITC (500 μg)	tlrl-fmdp	37

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MDP Rhodamine (500 µg)	tlrl-rmdp	37
Metformin (1 mg)	tlrl-metf	-
MG-132 (5 mg)	tlrl-mg132	-
Mouse IgG1 Isotype Control (100 µg)	mabg1-ctrlm	-
Mouse IgG2a Isotype Control (100 µg)	mabg2a-ctrlm	-
Mouse IgG2b Isotype Control (100 µg)	mabg2b-ctrlm	-
Mouse MDA-5 RT-Primer Pair (2 x 2.5 nmol)	rtp-mmda5	-
Mouse NOD1 RT-Primer Pair (2 x 2.5 nmol)	rtp-mnod1	-
Mouse NOD2 RT-Primer Pair (2 x 2.5 nmol)	rtp-mnod2	-
Mouse RIG-I RT-Primer Pair (2 x 2.5 nmol)	rtp-mrigi	-
Mouse TLR1 RT-Primer Pair (2x2.5 nmol)	rtp-mtlr1	-
Mouse TLR1-9 RT-Primer Set (20 x 2.5 nmol)	rts-mtlrs	-
Mouse TLR1-9 Agonist Kit (9 ligands)	tlrl-kit1mw	-
Mouse TLR2 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr2	-
Mouse TLR3 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr3	-
Mouse TLR4 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr4	-
Mouse TLR5 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr5	-
Mouse TLR6 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr6	-
Mouse TLR7 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr7	-
Mouse TLR8 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr8	-
Mouse TLR9 RT-Primer Pair (2 x 2.5 nmol)	rtp-mtlr9	-
Mouse TLR9 Agonist Kit (6 ligands)	tlrl-kit9m	47
MPLA-SM (1 mg)	tlrl-mpla	34
MPLA-SM VacciGrade (1 mg)	vac-mpla	34
MPLAs (1 mg)	tlrl-mpls	34
MPLAs VacciGrade (1 mg)	vac-mpls	34
MSU Crystals (5 mg)	tlrl-msu	37
Multi-TLR Array(1 plate)	tlrl-arr	48
Multi-TLR Array(5 plates)	tlrl-arr-5	48
Murabutide (5 mg)	tlrl-mbt	37
Murabutide control (5 mg)	tlrl-mbtc	37
N-Glycolyl-MDP (5 mg)	tlrl-gmdp	37
N-Glycolyl-MDP VacciGrade (5 mg)	vac-gmdp	37
Nano-SiO2 (10 mg)	tlrl-sio	37
Nigericin (10 mg)	tlrl-nig	37
Nigericin (50 mg)	tlrl-nig-5	37
NOD1 Test Strip (2 x 6 strips)	tlrs-nod1	49
NOD1 Test Strip (10 x 6 strips)	tlrs-nod1-5	49
NOD1/2 Agonist Kit (10 ligands)	tlrl-nodkit2	-
NOD2 Test Strip (2 x 6 strips)	tlrs-nod2	49
NOD2 Test Strip (10 x 6 strips)	tlrs-nod2-5	49
Normocin™ (500 mg)	ant-nr-1	9
Normocin™ (1 g)	ant-nr-2	9
Normocure™ (50 mg)	ant-noc	9
ODN 1585 (200 µg)	tlrl-1585	35
ODN 1585 (1 mg)	tlrl-1585-1	35
ODN 1585 (5 mg)	tlrl-1585-5	35

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ODN 1585 control (200 µg)	tlrl-1585c	35
ODN 1585 control (1 mg)	tlrl-1585c-1	35
ODN 1585 control (5 mg)	tlrl-1585c-5	35
ODN 1585 FITC (50 µg)	tlrl-1585f	35
ODN 1585 VacciGrade (1 mg)	vac-1585-1	35
ODN 1668 (200 µg)	tlrl-1668	35
ODN 1668 (1 mg)	tlrl-1668-1	35
ODN 1668 (5 mg)	tlrl-1668-5	35
ODN 1668 control (200 µg)	tlrl-1668c	35
ODN 1668 control (1 mg)	tlrl-1668c-1	35
ODN 1668 control 5 mg)	tlrl-1668c-5	35
ODN 1668 FITC (50 µg)	tlrl-1668f	35
ODN 1826 (200 µg)	tlrl-1826	35
ODN 1826 (1 mg)	tlrl-1826-1	35
ODN 1826 (5 mg)	tlrl-1826-5	35
ODN 1826 Biotin (50 µg)	tlrl-1826b	35
ODN 1826 control (ODN 2138) (200 µg)	tlrl-1826c	35
ODN 1826 control (ODN 2138) (1 mg)	tlrl-1826c-1	35
ODN 1826 control (ODN 2138) (5 mg)	tlrl-1826c-5	35
ODN 1826 FITC (50 µg)	tlrl-1826f	35
ODN 1826 VacciGrade (1 mg)	vac-1826-1	35
ODN 2006 (ODN 7909) (200 µg)	tlrl-2006	35
ODN 2006 (ODN 7909) (1 mg)	tlrl-2006-1	35
ODN 2006 (ODN 7909) (5 mg)	tlrl-2006-5	35
ODN 2006 Biotin (50 µg)	tlrl-2006b	35
ODN 2006 control (ODN 2137) (200 µg)	tlrl-2006c	35
ODN 2006 control (ODN 2137) (1 mg)	tlrl-2006c-1	35
ODN 2006 control (ODN 2137) (5 mg)	tlrl-2006c-5	35
ODN 2006 FITC (50 µg)	tlrl-2006f	35
ODN 2006-G5 (200 µg)	tlrl-2006g5	35
ODN 2006-G5 (1 mg)	tlrl-2006g5-1	35
ODN 2006-G5 (5 mg)	tlrl-2006g5-5	35
ODN 2006-G5 control (200 µg)	tlrl-2006g5c	36
ODN 2006 VacciGrade (1 mg)	vac-2006-1	36
ODN 2007 (200 µg)	tlrl-2007	36
ODN 2007 (1 mg)	tlrl-2007-1	36
ODN 2007 (5 mg)	tlrl-2007-5	36
ODN 2007 Control (200 µg)	tlrl-2007c	36
ODN 2007 Control (1 mg)	tlrl-2007c-1	36
ODN 2007 Control (5 mg)	tlrl-2007c-5	36
ODN 2088 (200 µg)	tlrl-2088	36
ODN 2088 (1 mg)	tlrl-2088-1	36
ODN 2088 (5 mg)	tlrl-2088-5	36
ODN 2088 control (200 µg)	tlrl-2088c	36
ODN 2088 control (1 mg)	tlrl-2088c-1	36
ODN 2088 control (5 mg)	tlrl-2088c-5	36
ODN 2216 (200 µg)	tlrl-2216	36

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ODN 2216 (1 mg)	tlrl-2216-1	36
ODN 2216 (5 mg)	tlrl-2216-5	36
ODN 2216 Biotin (50 µg)	tlrl-2216b	36
ODN 2216 control (ODN 2243) (200 µg)	tlrl-2243	36
ODN 2216 control (ODN 2243) (1 mg)	tlrl-2243-1	36
ODN 2216 control (ODN 2243) (5 mg)	tlrl-2243-5	36
ODN 2216 FITC (50 µg)	tlrl-2216f	36
ODN 2336 (200 µg)	tlrl-2336	36
ODN 2336 (1 mg)	tlrl-2336-1	36
ODN 2336 (5 mg)	tlrl-2336-5	36
ODN 2336 control (200 µg)	tlrl-2336c	36
ODN 2336 control (1 mg)	tlrl-2336c-1	36
ODN 2336 control (5 mg)	tlrl-2336c-5	36
ODN 2336 FITC (50 µg)	tlrl-2336f	36
ODN 2395 (200 µg)	tlrl-2395	36
ODN 2395 (1 mg)	tlrl-2395-1	36
ODN 2395 (5 mg)	tlrl-2395-5	36
ODN 2395 control (200 µg)	tlrl-2395c	36
ODN 2395 control (1 mg)	tlrl-2395c-1	36
ODN 2395 control (5 mg)	tlrl-2395c-5	36
ODN 2395 FITC (50 µg)	tlrl-2395f	36
ODN 2395 VacciGrade (1 mg)	vac-2395-1	36
ODN 4084-F (200 µg)	tlrl-4084	36
ODN BW006 (ODN 684) (200 µg)	tlrl-bw006	36
ODN BW007 (200 µg)	tlrl-bw007	36
ODN D-SL01 (200 µg)	tlrl-dsl01	36
ODN D-SL03 (200 µg)	tlrl-dsl03	36
ODN INH-1 (200 µg)	tlrl-inh1	36
ODN INH-18 (200 µg)	tlrl-inh18	36
ODN INH-47 (200 µg)	tlrl-inh47	37
ODN M362 (200 µg)	tlrl-m362	36
ODN M362 (1 mg)	tlrl-m362-1	36
ODN M362 (5 mg)	tlrl-m362-5	36
ODN M362 control (200 µg)	tlrl-m362c	36
ODN M362 control (1 mg)	tlrl-m362c-1	36
ODN M362 control (5 mg)	tlrl-m362c-5	36
ODN M362 FITC (50 µg)	tlrl-m362f	36
ODN TTAGGG (ODN A151) (200 µg)	tlrl-ttag	37
ODN TTAGGG (ODN A151) (1 mg)	tlrl-ttag-1	37
ODN TTAGGG control (200 µg)	tlrl-ttagc	37
ODN TTAGGG control (1 mg)	tlrl-ttagc-1	37
ORN02 / LyoVec (4 x 25 µg)	tlrl-orn2	34
ORN06 / LyoVec (4 x 25 µg)	tlrl-orn6	34
ORN Sa19 (200 µg)	tlrl-orn19	37
ORN Sa19 control (200 µg)	tlrl-orn19c	37
OSU 03012 (10 mg)	inh-os03	53
OVA 257-264 (1 mg)	vac-sin	-

PRODUCT (QUANTITY)	CAT. CODE	PAGE
OVA 323-339 (1 mg)	vac-isq	-
Ovalbumin (1 g)	vac-ova	-
Ovalbumin EndoFit™ (10 mg)	vac-efova	-
OxPAPC (1 mg)	tlrl-oxp1	-
PAb Control (200 µg)	pab-sctr	-
PAb-hTLR1 (200 µg)	pab-hstlr1	-
PAb-hTLR2 (200 µg)	pab-hstlr2	-
PAb-hTLR4 (200 µg)	pab-hstlr4	-
PAb-hTLR5 (200 µg)	pab-hstlr5	-
PAb-hTLR6 (200 µg)	pab-hstlr6	-
Pam2CSK4 (1 mg)	tlrl-pm2s-1	33
Pam2CSK4 Biotin (50 µg)	tlrl-bpam2	33
Pam2CSK4 Rhodamine (50 µg)	tlrl-rpam2	33
Pam3CSK4 (1 mg)	tlrl-pms	33
Pam3CSK4 Biotin (50 µg)	tlrl-bpms	33
Pam3CSK4 Rhodamine (50 µg)	tlrl-rpms	33
Pam3CSK4 VacciGrade (1 mg)	vac-pms	33
PamadiFectin (CL553) (500 µg)	tlrl-c553	39
pBOOST2-mcs (20 µg)	pbst2-mcs	-
pBOOST2-samIRF3 (20 µg)	pbst2-samirf3	-
pBOOST2-samIRF7/3 (20 µg)	pbst2-samirf73	-
pBOOST2-wtmIRF1 (20 µg)	pbst2-wtmirf1	-
pBOOST3-mcs (20 µg)	pbst3-mcs	-
pBOOST3-mTBK1 (20 µg)	pbst3-mtbk1	-
pCpGfree-basic (mSEAP) (20 µg)	pcpgf-bas	-
pCpGfree-basic-Lucia (20 µg)	pcpgf-baslc	-
pCpGfree-giant Naked (200 µg)	tlrl-cpgfn	-
pCpGfree-giant / LyoVec (100 µg)	tlrl-cpgfc	-
pCpGfree-LacZ (20 µg)	pcpgf-lacz	-
pCpGfree-Lucia (20 µg)	pcpgf-lucia	-
pCpGfree-mcs (20 µg)	pcpgf-mcs	-
pCpGfree-mSEAP (20 µg)	pcpgf-mseap	-
pCpGfree-promoter (mSEAP) (20 µg)	pcpgf-prom	-
pCpGfree-promoter-Lucia (20 µg)	pcpgf-promlc	-
pCpGfree-siRNA (kit)	kcpgf-sirna	-
pCpGfree-siRNADUO (kit)	kcpg-sirna2	-
pCpGfree-vitroBLacZ (20 µg)	pcpgvtb-lz	-
pCpGfree-vitroBmcs (20 µg)	pcpgvtb-mcsg2	-
pCpGfree-vitroHLacZ (20 µg)	pcpgvth-lz	-
pCpGfree-vitroHmcs (20 µg)	pcpgvth-mcsg2	-
pCpGfree-vitroNLacZ (20 µg)	pcpgvtn-lz	-
pCpGfree-vitro-Nmcs (20 µg)	pcpgvtn-mcsg2	-
pCpGrich-mcs (20 µg)	pcpgr-mcs	-
PD0325901 (2 mg)	inh-pd32	-
PD98059 (10 mg)	tlrl-pd98	-
pDeNy-<Gene> (20 µg)	pdn-<gene>	-
pDRIVE(LacZ)-<Native Prom> (20 µg)	pdrive-<prom>	-

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PRODUCT (QUANTITY)	CAT. CODE	PAGE
pDRIVE(LacZ)-<Composite Prom> (20 µg)	pdrive-<prom>	-
pDRIVE-custom (20 µg)	p-custom	-
pDRIVE5-GFP-n (20 µg)	pdv5-gfp-n	-
pDRIVE5-Lucia-<Native Prom> (20 µg)	pdrive5lc-<prom>	-
pDRIVE5-Lucia-<Composite Prom> (20 µg)	pdrive5lc-<prom>	-
pDRIVE5-SEAP-<Native Prom> (20 µg)	pdrive5s-<prom>	-
pDRIVE5-SEAP-<Composite Prom> (20 µg)	pdrive5s-<prom>	-
pDUO-<Genes> (20 µg)	pduo-<genes>	-
pDUO2-<Genes> (20 µg)	pduo2-<genes>	-
Pepinh-Control (2 mg)	tlrl-pictrl	-
Pepinh-MYD (2 mg)	tlrl-pimyd	-
Pepinh-TRIF (2 mg)	tlrl-pitrif	-
Peptide M / Agarose (2 ml)	gel-pdm-2	-
Peptide M / Agarose (5 ml)	gel-pdm-5	-
Perifosine (5 mg)	tlrl-peri	-
pFUSE(ss)-CHIg-hA1 (20 µg)	pfuse(ss)-hcha1	58
pFUSE(ss)-CHIg-hA2m1 (20 µg)	pfuse(ss)-hcha2m1	58
pFUSE(ss)-CHIg-hD (20 µg)	pfuse(ss)-hchd	58
pFUSE(ss)-CHIg-hE (20 µg)	pfuse(ss)-hche	58
pFUSE(ss)-CHIg-hG1 (20 µg)	pfuse(ss)-hchg1	58
pFUSE(ss)-CHIg-hG2 (20 µg)	pfuse(ss)-hchg2	58
pFUSE(ss)-CHIg-hG3 (20 µg)	pfuse(ss)-hchg301	58
pFUSE(ss)-CHIg-hG4 (20 µg)	pfuse(ss)-hchg4	58
pFUSE(ss)-CHIg-hM (20 µg)	pfuse(ss)-hchm	58
pFUSE(ss)-CHIg-mA (20 µg)	pfuse(ss)-mcha	58
pFUSE(ss)-CHIg-mD (20 µg)	pfuse(ss)-mchd	58
pFUSE(ss)-CHIg-mE (20 µg)	pfuse(ss)-mche	58
pFUSE(ss)-CHIg-mG1 (20 µg)	pfuse(ss)-mchg1	58
pFUSE(ss)-CHIg-mG2a (20 µg)	pfuse(ss)-mchg2a	58
pFUSE(ss)-CHIg-mG2b (20 µg)	pfuse(ss)-mchg2b	58
pFUSE(ss)-CHIg-mG3 (20 µg)	pfuse(ss)-mchg3	58
pFUSE(ss)-CHIg-mM (20 µg)	pfuse(ss)-mchm	58
pFUSE(ss)-CHIg-ratG1 (20 µg)	pfuse(ss)-rtchg1	58
pFUSE(ss)-CHIg-ratG2a (20 µg)	pfuse(ss)-rtchg2a	58
pFUSE(ss)-CHIg-ratG2b (20 µg)	pfuse(ss)-rtchg2b	58
pFUSE(ss)-CHIg-ratG2c (20 µg)	pfuse(ss)-rtchg2c	58
pFUSE(ss)-CHIg-rG (20 µg)	pfuse(ss)-rchg	58
pFUSE(ss)-CHIg-rhG1 (20 µg)	pfuse(ss)-rhchg1	58
pFUSE(ss)-CHIg-rhG2 (20 µg)	pfuse(ss)-rhchg2	58
pFUSE(ss)-CHIg-rhG3 (20 µg)	pfuse(ss)-rhchg3	58
pFUSE(ss)-CHIg-rhG4 (20 µg)	pfuse(ss)-rhchg4	58
pFUSE2(ss)-CLIg-hk (20 µg)	pfuse2(ss)-hclk	58
pFUSE2(ss)-CLIg-hl2 (20 µg)	pfuse2(ss)-hcll2	58
pFUSE2(ss)-CLIg-mk (20 µg)	pfuse2(ss)-mclk	58
pFUSE2(ss)-CLIg-ml1 (20 µg)	pfuse2(ss)-mcll1	58
pFUSE2(ss)-CLIg-ml2 (20 µg)	pfuse2(ss)-mcll2	58
pFUSE2(ss)-CLIg-ratK (20 µg)	pfuse2(ss)-rtclk	58

PRODUCT (QUANTITY)	CAT. CODE	PAGE
pFUSE2(ss)-CLIg-ratL1 (20 µg)	pfuse2(ss)-rtcll1	58
pFUSE2(ss)-CLIg-rhK (20 µg)	pfuse2(ss)-rhclk	58
pFUSE2(ss)-CLIg-rk1 (20 µg)	pfuse2(ss)-rclk1	58
pFUSE2(ss)-CLIg-rk2 (20 µg)	pfuse2(ss)-rclk2	58
pFUSE-Lucia-CHIg-hG1 (20 µg)	pfuselc-hchg1	-
pFUSE-Lucia-CHIg-hG2 (20 µg)	pfuselc-hchg2	-
pFUSE-Lucia-CHIg-hG3 (20 µg)	pfuselc-hchg3	-
pFUSE-Lucia-CHIg-hG4 (20 µg)	pfuselc-hchg4	-
pFUSE-Lucia-CHIg-mG1 (20 µg)	pfuselc-mchg1	-
pFUSE-Lucia-CHIg-mG2a (20 µg)	pfuselc-mchg2a	-
pFUSE-Lucia-CHIg-mG2b (20 µg)	pfuselc-mchg2b	-
pFUSE-Lucia-CHIg-mG3 (20 µg)	pfuselc-mchg3	-
pFUSE-hIgG1-Fc(1/2) (20 µg)	pfuse-hg1fc(1/2)	-
pFUSE-hIgG2-Fc(1/2) (20 µg)	pfuse-hfc(1/2)	-
pFUSE-hIgG3-Fc(1/2) (20 µg)	pfuse-hg3fc(1/2)	-
pFUSE-hIgG4-Fc(1/2) (20 µg)	pfuse-hg4fc(1/2)	-
pFUSE-mIgG1-Fc(1/2) (20 µg)	pfuse-mg1fc(1/2)	-
pFUSE-mIgG2a-Fc(1/2) (20 µg)	pfuse-mg2afc(1/2)	-
pFUSE-mIgG2b-Fc(1/2) (20 µg)	pfuse-mg2bfc(1/2)	-
pFUSE-mIgG3-Fc(1/2) (20 µg)	pfuse-mg3fc(1/2)	-
pFUSE-rIgG-Fc(1/2) (20 µg)	pfuse-rfc(1/2)	-
pFUSE-rtIgG2b-Fc(1/2) (20 µg)	pfuse-rtg2bfc(1/2)	-
pFUSE-hIgG1e1-Fc(1/2) (20 µg)	pfc(1/2)-hg1e1	-
pFUSE-hIgG1e2-Fc(1/2) (20 µg)	pfc(1/2)-hg1e2	-
pFUSE-hIgG1e3-Fc(1/2) (20 µg)	pfc(1/2)-hg1e3	-
pFUSE-hIgG1e4-Fc(1/2) (20 µg)	pfc(1/2)-hg1e4	-
pFUSE-hIgG1e5-Fc(1/2) (20 µg)	pfc(1/2)-hg1e5	-
pFUSE-hIgG1e6-Fc(1/2) (20 µg)	pfc(1/2)-hg1e6	-
pFUSE-hIgG1e7-Fc(1/2) (20 µg)	pfc(1/2)-hg1e7	-
pFUSE-hIgG1e9-Fc(1/2) (20 µg)	pfc(1/2)-hg1e9	-
pFUSE-hIgG1e11-Fc(1/2) (20 µg)	pfc(1/2)-hg1e11	15
pFUSE-hIgG1e12-Fc(1/2) (20 µg)	pfc(1/2)-hg1e12	15
pFUSE-hIgG1e13-Fc(1/2) (20 µg)	pfc(1/2)-hg1e13	15
pFUSE-hIgG2e1-Fc(1/2) (20 µg)	pfc(1/2)-hg2e1	-
pFUSE-hIgG4e1-Fc(1/2) (20 µg)	pfc(1/2)-hg4e1	-
pFUSE-mIgG2ae1-Fc(1/2) (20 µg)	pfc(1/2)-mg2ae1	-
pFUSE-Lucia-hG1Fc (20 µg)	pfuse-hg1lc	-
pFUSE-Lucia-mG2aFc (20 µg)	pfuse-mg2alc	-
pFUSE-SEAP-hG1Fc (20 µg)	pfuse-hg1sp	-
pFUSE-SEAP-hG2Fc (20 µg)	pfuse-hg2sp	-
pFUSE-SEAP-hG3Fc (20 µg)	pfuse-hg3sp	-
pFUSE-SEAP-hG4Fc (20 µg)	pfuse-hg4sp	-
pFUSE-SEAP-mG1Fc (20 µg)	pfuse-mg1sp	-
pFUSE-SEAP-mG2aFc (20 µg)	pfuse-mg2asp	-
pFUSE-SEAP-mG2bFc (20 µg)	pfuse-mg2bsp	-
pFUSE-SEAP-mG3Fc (20 µg)	pfuse-mg3sp	-
pFUSE-SEAP-rFc (20 µg)	pfuse-rsp	-

PRODUCT INFORMATION

Alphabetical List by Product Name

PRODUCT (QUANTITY)	CAT. CODE	PAGE
pFUSE-SEAP-rtFc (20 µg)	pfuse-rtsp	-
pFUSEN-hG1e2Fc (20 µg)	pfcn-hg1e2	14
pFUSEN-hG1Fc (20 µg)	pfcn-hg1	14
pFUSEN-hG2Fc (20 µg)	pfcn-hg2	14
pFUSEN-Lucia-hG1e2Fc (20 µg)	pfcn-lchg1e2	14
pFUSEN-Lucia-hG1Fc (20 µg)	pfcn-lchg1	14
pFUSEN-Lucia-hG2Fc (20 µg)	pfcn-lchg2	14
pFUSEN-Lucia-mG2aFc (20 µg)	pfcn-lcmg2a	14
pFUSEN-mG2aFc (20 µg)	pfcn-mg2	14
PGN-BS (5 mg)	tlrl-pgnb3	33
PGN-EB (1 mg)	tlrl-pgnec	33
PGN-ECndi ultrapure, insoluble (5 mg)	tlrl-kipgn	37
PGN-ECndss ultrapure, soluble (1 mg)	tlrl-kspgn	37
PGN-EK (1 mg)	tlrl-pgnek	33
PGN-SA (5 mg)	tlrl-pgnsa	33
PGN-SAndi ultrapure, insoluble (5 mg)	tlrl-sipgn	37
Phleomycin (100 mg; 5 x 1 ml)	ant-ph-1	11
Phleomycin (500 mg; 25 x 1 ml)	ant-ph-5	11
Phleomycin (500 mg; 1 x 25 ml)	ant-ph-5b	11
Phleomycin (250 mg powder)	ant-ph-2p	11
Phleomycin (500 mg powder)	ant-ph-5p	11
Phleomycin (1 g powder)	ant-ph-10p	11
Piceatannol (5 mg)	tlrl-pct	-
pINFUSE-hIgG1-Fc(1/2) (20 µg)	pfc(1/2)-hgin1	15
pINFUSE-hIgG2-Fc(1/2) (20 µg)	pfc(1/2)-hgin2	15
pINFUSE-hIgG3-Fc(1/2) (20 µg)	pfc(1/2)-hgin3	15
pINFUSE-hIgG4-Fc(1/2) (20 µg)	pfc(1/2)-hgin4	15
pINFUSE-mIgG2b-Fc(1/2) (20 µg)	pfc(1/2)-mgin2	15
Plasmocin™ prophylactic (25 mg)	ant-mpp	9
Plasmocin™ treatment (50 mg)	ant-mpt	9
Plasmocure™ (100 mg)	ant-pc	9
PlasmoTest™ (kit; test up to 250 samples)	rep-pt1	7
PlasmoTest™ (kit; test up to 500 samples)	rep-pt2	7
PlasmoTest™ Controls (200 tests)	pt-ctr2	7
PlasmoTest™ Reagent Kit (500 samples)	rep-ptrk	7
PMA (5 mg)	tlrl-pma	-
pMONO-blasti/GFP (20 µg)	pmonob-gfp	-
pMONO-blasti/mcs (20 µg)	pmonob-mcs	-
pMONO-hygro/GFP (20 µg)	pmonoh-gfp	-
pMONO-hygro/mcs (20 µg)	pmonoh-mcs	-
pMONO-neo/GFP (20 µg)	pmonon-gfp	-
pMONO-neo/mcs (20 µg)	pmonon-mcs	-
pMONO-zeo/GFP (20 µg)	pmonoz-gfp	-
pMONO-zeo/mcs (20 µg)	pmonoz-mcs	-
pNiFty-Luc (20 µg)	pnifty-luc	-
pNiFty-SEAP (20 µg)	pnifty-seap	-
pNiFty2-56K-SEAP (20 µg)	pnf2-56ksp	-

PRODUCT (QUANTITY)	CAT. CODE	PAGE
pNiFty2-Luc (20 µg)	pnifty2-luc	-
pNiFty2-SEAP (20 µg)	pnifty2-seap	-
pNiFty3-Lucia (20 µg)	pnf3-lc1	-
pNiFty3-SEAP (20 µg)	pnf3-sp1	-
pNiFty3-A-Lucia (20 µg)	pnf3-lc3	-
pNiFty3-A-SEAP (20 µg)	pnf3-sp3	-
pNiFty3-AN-Lucia (20 µg)	pnf3-lc6	-
pNiFty3-AN-SEAP (20 µg)	pnf3-sp6	-
pNiFty3-I-Lucia (20 µg)	pnf3-lc4	-
pNiFty3-I-SEAP (20 µg)	pnf3-sp4	-
pNiFty3-IAN-Lucia (20 µg)	pnf3-lc7	-
pNiFty3-IAN-SEAP (20 µg)	pnf3-sp7	-
pNiFty3-N-Lucia (20 µg)	pnf3-lc2	-
pNiFty3-N-SEAP (20 µg)	pnf3-sp2	-
pNiFty3-T-Lucia (20 µg)	pnf3-lc5	-
pNiFty3-T-SEAP (20 µg)	pnf3-sp5	-
pNiFty3-TAN-Lucia (20 µg)	pnf3-lc8	-
pNiFty3-TAN-SEAP (20 µg)	pnf3-sp8	-
Poly(A:U) (10 mg)	tlrl-pau	33
Poly(dA) Naked (200 µg)	tlrl-pan	38
Poly(dA) / LyoVec (100 µg)	tlrl-pac	38
Poly(dA:dT) / LyoVec (100 µg)	tlrl-patc	38
Poly(dA:dT) Naked (200 µg)	tlrl-patn	38
Poly(dA:dT) Naked (1 mg)	tlrl-patn-1	38
Poly(dA:dT) Rhodamine (10 µg)	tlrl-patr	-
Poly(dG:dC) / LyoVec (100 µg)	tlrl-pgcc	38
Poly(dG:dC) Naked (200 µg)	tlrl-pgcn	38
Poly(dT) (100 nmol)	tlrl-pt17	35
Poly(I:C) (HMW) (10 mg)	tlrl-pic	33
Poly(I:C) (HMW) (50 mg)	tlrl-pic-5	33
Poly(I:C) (HMW) / LyoVec (100 µg)	tlrl-piclv	38
Poly(I:C) (HMW) Biotin (10 µg)	tlrl-picb	-
Poly(I:C) (HMW) Fluorescein (10 µg)	tlrl-picf	33
Poly(I:C) (HMW) Rhodamine (10 µg)	tlrl-picr	33
Poly(I:C) (HMW) VacciGrade (10 mg)	vac-pic	33
Poly(I:C) (LMW) (25 mg)	tlrl-picw	33
Poly(I:C) (LMW) (250 mg)	tlrl-picw-250	33
Poly(I:C) (LMW) / LyoVec (100 µg)	tlrl-picwlv	38
Poly(I:C) (LMW) Rhodamine (10 µg)	tlrl-piwr	33
Polymyxin B (100 mg)	tlrl-pmb	-
Primocin™ (500 mg)	ant-pm-1	9
Primocin™ (1 g)	ant-pm-2	9
PromTest (10 x 5 µg)	prom-test	-
Protein G / Agarose (2 ml)	gel-agg-2	-
Protein G / Agarose (5 ml)	gel-agg-5	-
Protein L / Agarose (2 ml)	gel-protl-2	-
Protein L / Agarose (10 ml)	gel-protl-10	-

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PRODUCT (QUANTITY)	CAT. CODE	PAGE
pSELECT-blasti/LacZ (20 µg)	psetb-lacz	-
pSELECT-blasti/mcs (20 µg)	psetb-mcs	-
pSELECT-CGFP-blasti (20 µg)	psetb-cgfp	-
pSELECT-CGFP-zeo (20 µg)	psetz-cgfp	-
pSELECT-CHA-blasti (20 µg)	psetb-cha	-
pSELECT-CHA-zeo (20 µg)	psetz-cha	-
pSELECT-CHis-blasti (20 µg)	psetb-chis	-
pSELECT-CHis-zeo (20 µg)	psetz-chis	-
pSELECT-GFP-hLC3 (20 µg)	psetz-gfplc3	-
pSELECT-GFP-mLC3 (20 µg)	psetz-gfpmlc3	-
pSELECT-GFPzeo-LacZ (20 µg)	psetgz-lacz	-
pSELECT-GFPzeo-mcs (20 µg)	psetgz-mcs	-
pSELECT-hygro-LacZ (20 µg)	pseth-lacz	-
pSELECT-hygro-mcs (20 µg)	pseth-mcs	-
pSELECT-neo-LacZ (20 µg)	psetn-lacz	-
pSELECT-neo-mcs (20 µg)	psetn-mcs	-
pSELECT-NGFP-blasti (20 µg)	psetb-ngfp	-
pSELECT-NGFP-zeo (20 µg)	psetz-ngfp	-
pSELECT-NHA-blasti (20 µg)	psetb-nha	-
pSELECT-NHA-zeo (20 µg)	psetz-nha	-
pSELECT-NHis-blasti (20 µg)	psetb-nhis	-
pSELECT-NHis-zeo (20 µg)	psetz-nhis	-
pSELECT-NLucia-blasti (20 µg)	psetb-nlucia	-
pSELECT-NLucia-zeo (20 µg)	psetz-nlucia	-
pSELECT-puro-LacZ (20 µg)	psetp-lacz	-
pSELECT-puro-mcs (20 µg)	psetp-mcs	-
pSELECT-zeo-<Gene> (20 µg)	psetz-<gene>	-
pSELECT-zeo-LacZ (20 µg)	psetz-lacz	-
pSELECT-zeo-Lucia (20 µg)	psetz-lucia	-
pSELECT-zeo-mcs (20 µg)	psetz-mcs	-
pSELECT-zeo-seap (20 µg)	psetz-seap	-
psiRNA-DUO Kit	ksirna4-gz3	-
psiRNA-h7SKblasti Kit	ksirna3-b21	-
psiRNA-h7SKGFPzeo Kit	ksirna4-gz21	-
psiRNA-h7SKhygro Kit	ksirna3-h21	-
psiRNA-h7SKneo Kit	ksirna3-n21	-
psiRNA-h7SKzeo Kit	ksirna3-z21	-
psiTEST System	ksitest	-
pUNO1-<Gene> (20 µg)	puno1-<gene>	16
pUNO1-mcs (20 µg)	puno1-mcs	16
pUNO1-hSTING-A162 (20 µg)	puno1-hsting-a162	24
pUNO1-hSTING-A230 (20 µg)	puno1-hsting-a230	24
pUNO1-hSTING-H232 (20 µg)	puno1-hsting-h232	24
pUNO1-hSTING-HAQ (20 µg)	puno1-hsting-haq	24
pUNO1-hSTING-MRP (20 µg)	puno1-hsting-mrp	24
pUNO1-hSTING-N200 (20 µg)	puno1-hsting-n200	24
pUNO1-hSTING-WT (20 µg)	puno1-hstingwt	24

PRODUCT (QUANTITY)	CAT. CODE	PAGE
pUNO1-<TLR Gene>-HA (20 µg)	puno1ha-<gene>	17
pUNO1-hTLR1-GFP (20 µg)	phtlr1-gfp	-
pUNO1-hTLR2-GFP (20 µg)	phtlr2-gfp	-
pUNO1-hTLR3-GFP (20 µg)	phtlr3-gfp	-
pUNO1-hTLR4-GFP (20 µg)	phtlr4-gfp	-
pUNO1-hTLR5-GFP (20 µg)	phtlr5-gfp	-
pUNO1-hTLR6-GFP (20 µg)	phtlr6-gfp	-
pUNO2-<Gene> (20 µg)	puno2-<gene>	-
pUNO2-mcs (20 µg)	puno2-mcs	-
pUNO3-<Gene> (20 µg)	puno3-<gene>	-
pUNO3-mcs (20 µg)	puno3-mcs	-
pUNO1-mSTING-Gt (20 µg)	puno1-msting-gt	24
pUNO1-mSTING-WT (20 µg)	puno1-mstingwt	24
Puromycin (100 mg; 10 x 1 ml)	ant-pr-1	11
Puromycin (500 mg; 50 x 1 ml))	ant-pr-5	11
Puromycin (500 mg; 1 x 50 ml)	ant-pr-5b	11
Pustulan (100 mg)	tlrl-pst	39
pVAC1-mcs (20 µg)	pvac1	-
pVAC2-mcs (20 µg)	pvac2	-
pVITRO1-blasti-GFP/LacZ (20 µg)	pvitro1-bgfplacz	-
pVITRO1-blasti-GFP/SEAP (20 µg)	pvitro1-bgfpsp	-
pVITRO1-blasti-Lucia/SEAP (20 µg)	pvitro1-blucsp	-
pVITRO1-blasti-mcs (20 µg)	pvitro1-bmcs	-
pVITRO1-hygro-GFP/LacZ (20 µg)	pvitro1-gfplacz	-
pVITRO1-hygro-GFP/SEAP (20 µg)	pvitro1-gfpsp	-
pVITRO1-hygro-Lucia/SEAP (20 µg)	pvitro1-lucsp	-
pVITRO1-hygro-mcs (20 µg)	pvitro1-mcs	-
pVITRO1-neo-GFP/LacZ (20 µg)	pvitro1-ngfplacz	-
pVITRO1-neo-GFP/SEAP (20 µg)	pvitro1-ngfpsp	-
pVITRO1-neo-Lucia/SEAP (20 µg)	pvitro1-nlucsp	-
pVITRO1-neo-mcs (20 µg)	pvitro1-nmcs	-
pVITRO2-blasti-GFP/LacZ (20 µg)	pvitro2-bgfplacz	-
pVITRO2-blasti-GFP/SEAP (20 µg)	pvitro2-bgfpsp	-
pVITRO2-blasti-Lucia/SEAP (20 µg)	pvitro2-blucsp	-
pVITRO2-blasti-mcs (20 µg)	pvitro2-bmcs	-
pVITRO2-hygro-GFP/LacZ (20 µg)	pvitro2-gfplacz	-
pVITRO2-hygro-GFP/SEAP (20 µg)	pvitro2-gfpsp	-
pVITRO2-hygro-Lucia/SEAP (20 µg)	pvitro2-lucsp	-
pVITRO2-hygro-mcs (20 µg)	pvitro2-mcs	-
pVITRO2-neo-GFP/LacZ (20 µg)	pvitro2-ngfplacz	-
pVITRO2-neo-GFP/SEAP (20 µg)	pvitro2-ngfpsp	-
pVITRO2-neo-Lucia/SEAP (20 µg)	pvitro2-nlucsp	-
pVITRO2-neo-mcs (20 µg)	pvitro2-nmcs	-
pVIVO1-GFP/LacZ (20 µg)	pvivo1-gfplacz	-
pVIVO1-GFP/SEAP (20 µg)	pvivo1-gfpsp	-
pVIVO1-Lucia/SEAP (20 µg)	pvivo1-lucsp	-
pVIVO1-mcs (20 µg)	pvivo1-mcs	-

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pVIVO2-Lucia/SEAP (20 μg)	pvivo2-lucsp	-
pVIVO2-mcs (20 μg)	pvivo2-mcs	-
pZERO-<TLR Gene> (20 μg)	pzero-<gene>	-
pZERO-<TLR Gene>-HA (20 μg)	pzero-<gene>-ha	-
QUANTI-Blue™ (5 pouches)	rep-qb1	28
QUANTI-Blue™ (10 pouches)	rep-qb2	28
QUANTI-Luc™ (2 pouches)	rep-qlc1	30
QUANTI-Luc™ (5 pouches)	rep-qlc2	30
R406 (5 mg)	inh-r406	53
R848 (500 μg)	tlrl-r848	35
R848 (5 mg)	tlrl-r848-5	35
R848 VacciGrade (5 mg)	vac-r848	35
Ramos-Blue™ Cells (3-7 x 10^6 cells)	rms-sp	-
Ramos-Blue™ KD-MyDCells (3-7 x 10^6 cells)	rms-kdmyd	-
Rapamycin (5 mg)	tlrl-rap	-
Rat IgG1 Control (100 μg)	mabg1-ctlrt	60
Rat IgG2a Control (100 μg)	mabg2a-ctlrt	60
Rat IgG2b Control (100 μg)	mabg2b-ctlrt	60
RAW-Blue™ Cells (3-7 x 10^6 cells)	raw-sp	-
RAW-Blue™ ISG Cells (3-7 x 10^6 cells)	raw-isg	-
RAW-Lucia™ ISG Cells (3-7 x 10^6 cells)	rawl-isg	22
RAW-Lucia™ ISG-KO-STING Cells (3-7 x 10^6 cells)	rawl-kostg	23
Ready-Made psiRNA plasmid (20 μg)	psirna42-<gene>	56
Ready-Made psiRNA kit	ksirna42-<gene>	56
RecFLA-ST (1 μg)	tlrl-flic	34
RecFLA-ST (10 μg)	tlrl-flic-10	34
RecFLA-ST NQ (10 μg)	tlrl-flicnq	34
Recombinant human CD40L (10 μg)	rhcd-40l	-
Recombinant human IFN-γ (20 μg)	rhifn-g	-
Recombinant human IL-1β (10 μg)	rhil-1b	-
Recombinant human IL-4 (10 μg)	rhil-4	-
Recombinant human IL-6 (10 μg)	rhil-6	-
Recombinant human IL-13 (10 μg)	rhil-13	-
Recombinant human IL-18 (10 μg)	rhil-18	-
Recombinant human IL-33 (10 μg)	rhil-33	-
Recombinant human TNF-α (20 μg)	rhtnf-a	-
Recombinant Lucia Protein (1 μg)	rec-lucia	-
Recombinant SEAP Protein (10 μg)	rec-hseap	-
Resveratrol (100 mg)	tlrl-resv	-
Ruxolitinib (5 mg)	tlrl-rux	-
SAHA (25 mg)	inh-saha	-
Salmon sperm DNA (50 mg)	tlrl-sdef	-
SB202190 (5 mg)	tlrl-sb90	-
SB203580 (5 mg)	tlrl-sb20	-
SB216763 (5 mg)	tlrl-sb21	54

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SB431542 (5 mg)	inh-sb43	-
Schizophyllan (100 mg)	tlrl-spg	39
Scleroglucan (100 mg)	tlrl-scg	39
SEAP Reporter Assay Kit	rep-sap	-
SP600125 (10 mg)	tlrl-sp60	-
SSL7 / Agarose (2 ml)	gel-ssl-2	-
SSL7 / Agarose (10 ml)	gel-ssl-10	-
ssPolyU / LyoVec (100 μg)	tlrl-lpu	35
ssPolyU Naked (10 mg)	tlrl-sspu	34
ssPolyU Naked (100 mg)	tlrl-sspu-100	34
ssRNA40 / LyoVec (100 μg)	tlrl-lrna40	35
ssRNA41 / LyoVec (100 μg)	tlrl-lrna41	35
ssRNA-DR / LyoVec (100 μg)	tlrl-ssdr	35
Streptavidin-Lucia (2 x 500 μl)	rep-strlc	61
Tamoxifen (200 mg)	tlrl-txf	-
TDB (2 x 1 mg)	tlrl-tdb	39
TDB VacciGrade (2 mg)	vac-tdb	39
TDB-HS15 (2 mg)	tlrl-stdb	39
TDB-HS15 VacciGrade (2 mg)	vac-stdb	62
THP1-Blue™ ISG Cells (3-7 x 10^6 cells)	thp-isg	22
THP1-Blue™ ISG-KD-STING Cells (3-7 x 10^6 cells)	thp-kdstg	22
THP1-Blue™ NF-κB Cells (3-7 x 10^6 cells)	thp-nfkb	-
THP1-defASC Cells (3-7 x 10^6 cells)	thp-dasc	-
THP1-defNLRP3 Cells (3-7 x 10^6 cells)	thp-dnlp	-
THP1-Dual™ (NF-κB, ISG) Cells (3-7 x 10^6 cells)	thpd-nfis	-
THP1-Lucia™ ISG Cells (3-7 x 10^6 cells)	thpl-isg	-
THP1-Lucia™ NF-κB Cells (3-7 x 10^6 cells)	thpl-nfkb	-
THP1-NLRC4 Cells (3-7 x 10^6 cells)	thp-nlrc4	25
THP1-Null Cells (3-7 x 10^6 cells)	thp-null	-
THP1-XBlue™ Cells (3-7 x 10^6 cells)	thpx-sp	-
THP1-XBlue™-defMyD Cells (3-7 x 10^6 cells)	thpx-dmyd	-
THP1-XBlue™-CD14 Cells (3-7 x 10^6 cells)	thpx-cd14sp	-
THP1-XBlue™-MD2-CD14 Cells (3-7 x 10^6 cells)	thpx-mdcdsp	-
TLR1/2 Test Strip (2 x 6 strips)	tlrs-tlr12	49
TLR1/2 Test Strip (10 x 6 strips)	tlrs-tlr12-5	49
TLR1-9 Agonist Kit-Human (10 ligands)	tlrl-kit1hw	-
TLR1-9 Agonist Kit-Mouse (9 ligands)	tlrl-kit1mw	-
TLR2 Agonist Kit (7 ligands)	tlrl-kit2hm	-
TLR2 Test Strip (2 x 6 strips)	tlrs-tlr2	49
TLR2 Test Strip (10 x 6 strips)	tlrs-tlr2-5	49
TLR2/6 Test Strip (2 x 6 strips)	tlrs-tlr26	49
TLR2/6 Test Strip (10 x 6 strips)	tlrs-tlr26-5	49
TLR3/7/8/9 Agonist Kit (14 ligands)	tlrl-kit3hw3	-
TLR3 Test Strip (2 x 6 strips)	tlrs-tlr3	49
TLR3 Test Strip (10 x 6 strips)	tlrs-tlr3-5	49
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TLR7 Test Strip (2 x 6 strips)	tlrs-tlr7	49
TLR7 Test Strip (10 x 6 strips)	tlrs-tlr7-5	49
TLR7/8 Test Strip (2 x 6 strips)	tlrs-tlr78	49
TLR7/8 Test Strip (10 x 6 strips)	tlrs-tlr78-5	49
TLR9 Antagonist Kit (6 ODNs)	tlrl-kit9i	47
TLR9 Test Strip 2006 (2 x 6 strips)	tlrs-2006	49
TLR9 Test Strip 2006 (10 x 6 strips)	tlrs-2006-5	49
TLR9 Test Strip 2216 (2 x 6 strips)	tlrs-2216	49
TLR9 Test Strip 2216 (10 x 6 strips)	tlrs-2216-5	49
Trichostatin A (1 mg)	met-tsa-1	-
Trichostatin A (5 mg)	met-tsa-5	-
Tri-DAP (1 mg)	tlrl-tdap	37
Tri-Lys (1 mg)	tlrl-tlys	37
Triptolide (1 mg)	ant-tpl	-
U0126 (5 mg)	tlrl-u0126	-
VACV-70 / LyoVec (100 µg)	tlrl-vav70c	38
VACV-70 Naked (200 µg)	tlrl-vav70n	38
VACV-70c / LyoVec (control) (100 µg)	tlrl-vav70cc	38
VACV-70c Naked (control) (200 µg)	tlrl-vav70cn	38
Valproic Acid (5 g)	inh-vpa	-
VX-765 (10 mg)	inh-vx765-1	54
VX-765 (0 mg)	inh-vx765-5	54
WGP Dispersible (50 mg)	tlrl-wgp	39
WGP Soluble (50 mg)	tlrl-wgps	39
Wortmannin (5 mg)	tlrl-wtm	-
YM201636 (5 mg)	inh-ym20	54
Z-VAD-FMK (1 mg)	tlrl-vad	-
Zeocin™ (1 g)	ant-zn-1	11
Zeocin™ (1 g powder)	ant-zn-1p	11
Zeocin™ (5 g)	ant-zn-5	11
Zeocin™ (5 g, bottle)	ant-zn-5b	11
Zeocin™ (5 g powder)	ant-zn-5p	11
ZM 336372 (10 mg)	inh-zm33	54
Zymosan (100 mg)	tlrl-zyn	33
Zymosan Depleted (10 mg)	tlrl-dzn	33

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