

Services



Guidance Instrument
Results
Access Expertise Streamline
Reagent **Optimize**
Contract



Helping all people
live healthy lives

Keeping your lab in a perpetual state of the art

For more than 30 years, BD Biosciences has delivered flow cytometry systems that are powerful, dependable, and easy to use. From special order products that support advanced research to clinical solutions that streamline care, our systems are designed to make workflow more efficient and results more reliable, today and tomorrow.

To help customers optimize their instrument and application performance, BD Biosciences offers a full complement of instrument, application, and training services delivered by experienced professionals. Seasoned by years of clinical and research lab experience, our service experts will assist you with their in-depth knowledge of flow cytometry and its applications.

BD Biosciences comprehensive customer care—order support, product delivery, installation, warranties, service contracts, instrument support, application support, training, special order product offerings, and custom reagent services—means less downtime for your laboratory and more productive bench time for you. BD service keeps your BD FACSTM brand and other instruments operating within strict parameters, and helps to extend every phase of your product's life cycle, saving cost and time.

Every day, BD service teams are committed to achieving high customer satisfaction. Our aim is to craft quality product and service solutions that support the efforts of researchers and clinicians to advance discovery and provide superior clinical care.

Technical Application and Scientific Support

BD Biosciences Technical Support not only ensures that your BD Biosciences products operate effectively, but also helps you successfully integrate them into your research or clinical applications. Call centers are set up throughout the world to create easy and fast access to the BD support professionals dedicated to each instrument and application platform.

Order support

Support is available even before placing your order. For instrument orders, your BD Biosciences Sales Representative will help you choose the instrument and options that best meet your needs. For reagents and supplies, a Customer Service Representative will help you select products, generate and confirm orders, and direct you to the right BD resource for assistance with technical questions.

Application support

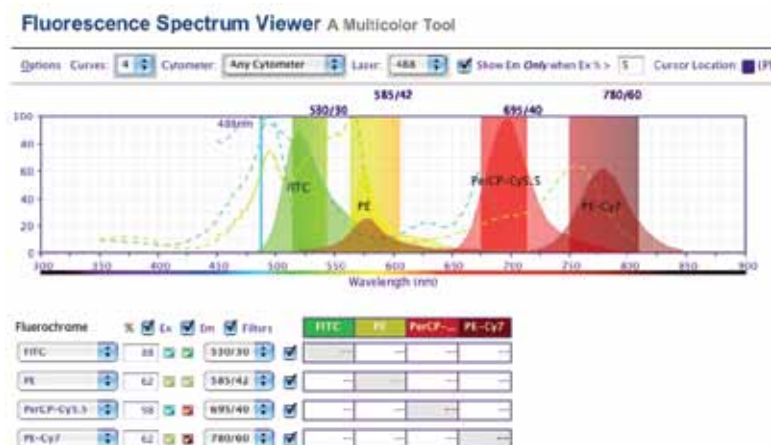
Combining years of collective knowledge with diverse research and clinical laboratory experience, BD Biosciences application support teams provide timely, professional telephone and onsite scientific support. They can address issues related to instruments, software, and reagents across a broad range of applications. These experts can help troubleshoot and resolve both everyday and specialized challenges, either by phone or in the field.

“I just can't explain enough how much your Technical Application Specialist's visit, guidance, and advice are appreciated. Because of your support, we feel very confident now that we can really do the cytokine analysis by flow! It is priceless that BD Biosciences enables such a great service.”

Technical Resources

To ensure that customers have the information they need when they need it, BD Biosciences maintains a comprehensive online reference library. Available at any time, the library includes technical documentation, quick references and guides, protocols, application notes, technical bulletins, product specifications and information sheets, tools and templates, and other information about BD Biosciences products and applications.

You can find technical resources in the Support section of bdbiosciences.com.





BD Biosciences
March 2010

Application Note

Human Regulatory T-Cell Isolation and Measurement of Function

Human Regulatory T-Cell Isolation and Measurement of Function

Christopher Boyce, BS,* Cynthia Lane, PhD,*
Ravi Hingorani, PhD,* Catherine McIntyre, PhD,**
Joyce Rutenberg, BS,** Smita Ghanekar, PhD**
*BD Pharmingen, San Diego, **BD Biosciences, San Jose

Application Note

Abstract

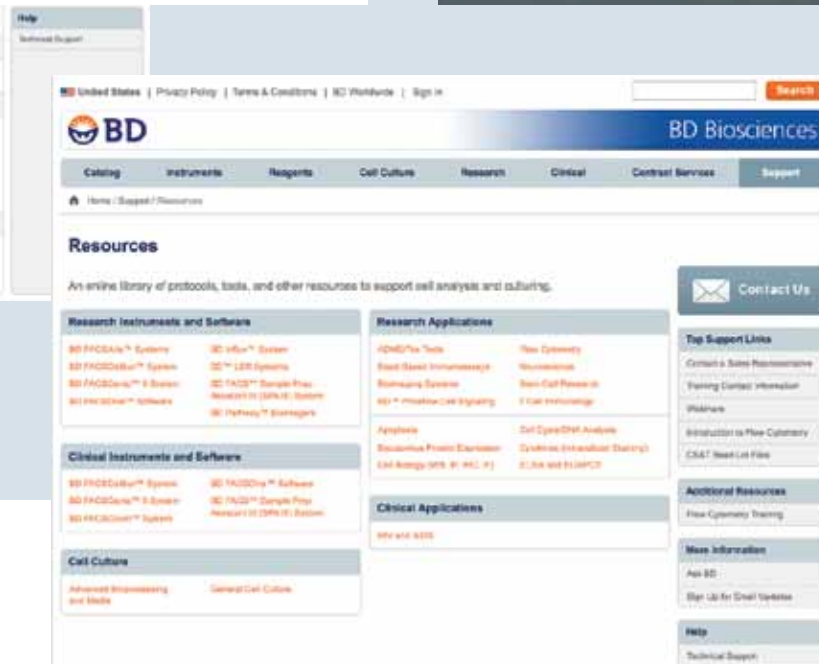
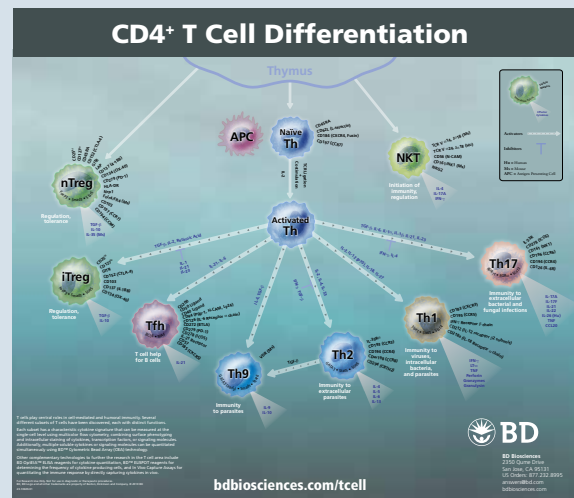
Regulatory T cells (Tregs) play a critical role in maintaining immune modulation and are present in normal peripheral blood in low numbers (5 to 10% of CD4⁺ T cells or 1 to 2% of total lymphocytes). Forkhead box P3 (FoxP3) is considered to be the definitive marker for this rare cell population, but as an intracellular antigen, it is not suitable for sorting viable Tregs that can be used in subsequent studies. Some researchers identify and sort Tregs within a CD4⁺ lymphocyte population based upon high expression levels of CD25. This strategy can result in the isolation of a Treg population with high purity, but the recovery of Tregs can be low using this approach. As an alternative, CD127 can be used to identify Tregs as CD127^{low} events within the CD4⁺CD25⁺ lymphocyte population, and this approach can result in a pure Treg population with higher recoveries. Recent studies investigating CD45RA expression of Treg populations have identified potential subclasses of Tregs and CD45RA expression that can be used to identify and sort CD45RA⁺ and CD45RA⁻ Treg subpopulations.

In this application note we demonstrate the performance and utility of the BD Pharmingen™ human regulatory T cell sorting kit to sort CD45RA⁺ and CD45RA⁻ Treg populations using a BD FACSAria™ II cell sorter. Using this approach, it is possible to isolate CD45RA⁺ and CD45RA⁻ Treg populations that are 89.4 ± 14.8% and 90.6 ± 14.6% pure (n = 10), 84.4 ± 2.2% and 85.6 ± 1.5% viable (n = 3), and 90.4 ± 2.39% and 90.8 ± 2.67% FoxP3⁺ (n = 10), respectively. Cell population percentage recoveries ranged from 45 to 100%, with 2.17 ± 1.53 × 10⁶ CD45RA⁺ Tregs and 1.2 ± 0.81 × 10⁶ CD45RA⁻ Treg cells recovered from 100 mL of whole blood within a 2 to 4-hour sort time.

CD45RA⁻ Treg post-sort fractions from 4 donors were subsequently cultured for 13 to 14 days, after which the function of the cultured Treg populations was assessed using the BD FastImmune™ human regulatory T cell function kit. Compared to controls, this 7-hour assay demonstrated that these cultured CD45RA⁻ Tregs could suppress the frequency of CD4⁺CD69⁺ and CD4⁺CD154⁺ lymphocytes by 44.33 ± 3.49% and 30.41 ± 5.94%, respectively, at a Treg:PBMC ratio of 0.5:1. Previously cryopreserved autologous PBMCs were used as effector cells.

Taken together, the data presented in this application note demonstrates that when used in combination, these tools offer a simplified and standardized isolation and assay system for Tregs. These pre-optimized methods relieve researchers of optimizing and troubleshooting isolation and suppression assay protocols in their laboratory. General tips for sorting rare cell populations and specific tips for handling Tregs are also provided.

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“ Thank you for sending your Technical Application Specialist to our site. Since the visit, I have been able to accomplish more in a few months than I have in almost two years previously. ”

Instrument Support and Service

Experienced flow cytometry experts from BD Biosciences technical support engineering teams provide timely, professional telephone and onsite support to keep BD FACS™ brand and other instruments running at peak performance.

A full-year warranty ensures that new instruments are effectively installed in your lab environment, and optimal performance is maintained for 12 months. During this time period, operator training for at least one staff member is available at no additional charge. Beyond the initial warranty period, service contracts may be purchased that include periodic onsite preventive maintenance, as well as unlimited phone support and repair visits.

Instrument installation

BD Biosciences works closely with instrument customers from planning to verification. Installation Coordinators and Field Service Engineers carefully orchestrate delivery, unpacking, maneuvering the instrument into your lab, and installation as required. Finally, they verify that the instrument is properly installed and ready to use.

Instrument telephone support

The Instrument Support team is the first point of contact for instrument-related issues and questions. Staff members are available to help triage issues and guide customers through maintenance activities. Remote troubleshooting technology allows staff members to diagnose many issues over the phone, reducing the need for an onsite field visit and maximizing instrument uptime.



Qualification protocols

Installation Qualification (IQ) and Operational Qualification (OQ) certify that an instrument performs according to its specifications in the environment where it is installed. BD Biosciences offers qualification assistance to help customers meet current Good Manufacturing Practice and Good Laboratory Practice (cGMP and cGLP) standards for the manufacture and testing of in vitro diagnostic products. IQ and OQ certification is completed by trained Field Service Engineers.

Qualification services should be quoted and scheduled in advance of installation.

IQ/OQ Checklist for BD FACSCanto II

The following are common parameters BD Field Service Engineers test during a BD FACSCanto™ II instrument Installation Qualification or Operational Qualification.

Fluidics

- Verify fluidics startup
- Verify fluidics air pressure and sample flow rate operation
- Verify fluidics shutdown

Optical Systems

- Verify laser operational characteristics
- Measure PMT voltage response
- Verify optical precision using BD FACS™ Loader (if applicable)

“ I cannot sing my service engineer’s praises loudly enough... I am impressed with his clean, logical approach to problem solving, his personable interactions with his clientele, and his willingness to go out on a limb to provide the best customer service possible. ”

Onsite field support

When needed, a Field Service Engineer can be dispatched to your site to further diagnose and repair your BD instrument. Repairs are usually completed onsite. Every effort is made to minimize downtime.

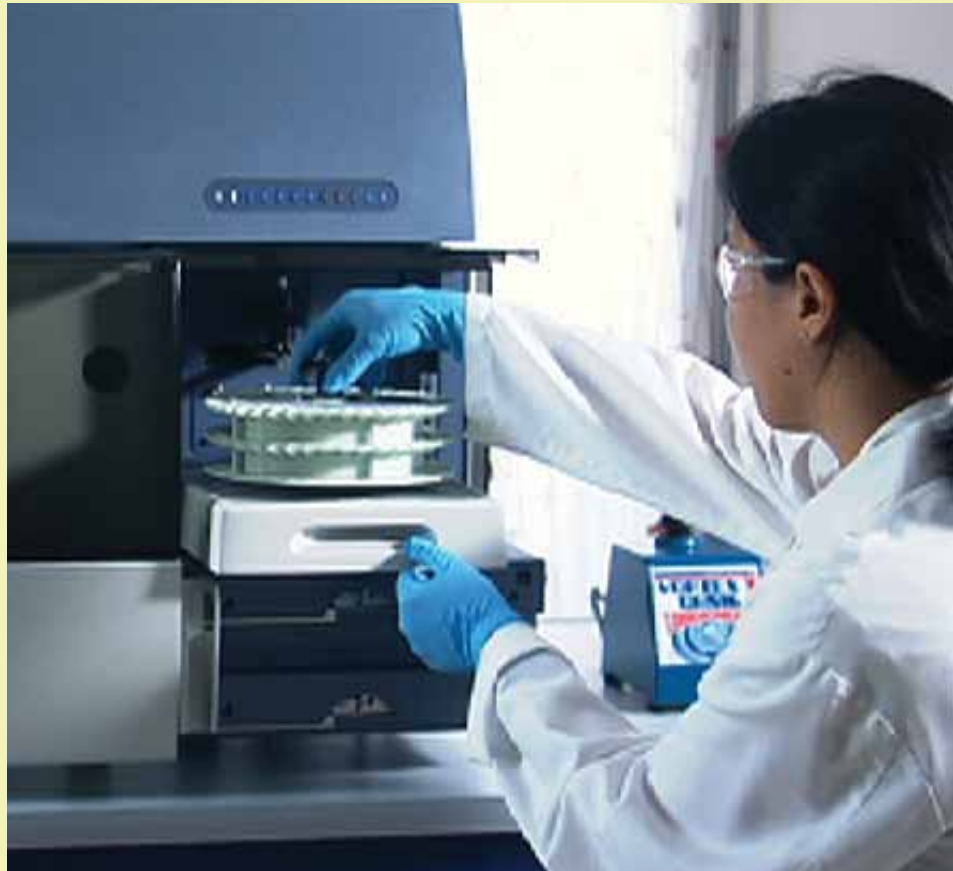
An instrument covered by a warranty or service contract will receive periodic preventive maintenance onsite. Routine maintenance includes replacement of accessories such as filters and tubing, and follows a prescribed schedule designed to keep the instrument working optimally.

Warranty and service contracts

New BD Biosciences instruments include a one-year warranty to ensure consistent performance. For support beyond the warranty period, a variety of service agreements is available. Instrument service contracts cover all system components and include unlimited telephone consultations during phone support hours, unlimited onsite service repairs, replacement parts (except consumables), preventive maintenance, and selected software updates.

Updates

Instruments covered by a warranty or service contract will receive selected hardware and software updates; software and hardware updates are usually installed by BD Field Service Engineers. These updates are typically associated with optimizing instrument performance and are generally performed free of charge.



Workstation and Software

- Verify software operation

Space and Environment

- Verify space guidelines for instrument and fluidics cart
- Verify environmental conditions (temperature and relative humidity)

Electrical Requirements

- Verify power supply and circuit protection
- Perform electrical safety tests applicable to site region

Options

- Verify operation of Loader (if applicable)
- Verify operation of HTS (if applicable)
- Verify operation of Barcode Reader (if applicable)



Training Services

To help customers take full and immediate advantage of their BD products' capabilities, BD Biosciences offers training for instruments, software, and applications. The wide range of product courses includes hands-on, instructor-led training in BD training centers, as well as e-learning in instructor-led virtual classrooms, self-paced study, and periodic online webinars.

Professional BD instructors have extensive flow cytometry experience gained in research and clinical labs, and have faced the same issues as customers. Courses combine theory with hands-on practice to provide participants with knowledge, skills, and operational experience.



Course Highlights

Here are a few examples of some of the courses offered by BD Biosciences.

Classroom-based Courses:

- BD FACSAria III Operator Course
- BD FACSArray Operator Course
- BD FACSCanto II Operator Course
- BD LSRFortessa Operator Course
- BD Influx Operator Course

For additional information regarding course descriptions and schedules please visit bdbiosciences.com/training.



“It felt as though [my trainers] were my lab mates, offering great advice in a non-arrogant manner. It truly was a joy learning from you all.”

Classroom-based training

Intensive flow cytometry operator training courses are offered at BD training centers in Billerica, MA and San Jose, CA. Hands-on classroom training is included with new instrument purchases.

Additional classroom training, held at BD training centers worldwide, covers the full complement of BD Biosciences instruments as well as numerous applications and software programs.

The virtual classroom

In virtual classroom training, an instructor delivers course information through a web conferencing application, and students perform hands-on exercises in an online lab. The virtual classroom allows you to take a course from anywhere, without the time and expense of travel. The only equipment you need is a computer with an Internet connection, and a phone.

Virtual classroom training includes interactive discussions and quizzes, creating a fun and collaborative learning experience without having to leave your home or office.

e-Learning

Self-paced e-Learning courses are dynamic supplements to operator training courses. They can be used for basic learning or to reinforce or refresh what you learned in class. Sample self-paced online courses include Introduction to Flow Cytometry, along with software and system overviews.

Topical webinars and news

BD Biosciences hosts a robust webinar series and distributes monthly newsletters that keep you informed about new products and tools. You can sign up for both online at bdbiosciences.com.

The webinar program features senior scientists, from BD Biosciences and customer organizations, who present “how to” seminars or topical discussions in areas of interest to our scientific community. You can attend the webinars live, view past webinars on demand, or simply download the materials.

Virtual Training Courses:

- BD FACSDiva Software Workshop: Using CS&T
- BD FACSDiva Software Workshop: Compensation
- BD FACSDiva Software Workshop: Templates

e-Learning Courses:

- Introduction to Flow Cytometry
- DNA Cell Cycle Analysis on the BD FACSCanto II
- HTS Option for the BD FACSCalibur

Special Order Products for Leading-Edge Research

The BD Biosciences Special Order Program offers rapid configuration of BD flow cytometers and cell sorters to fit customers' precise research and assay requirements. This innovative program is tailored to the special needs of leading edge biomedical research, and offers a wide range of choices to help researchers create the ultimate customized instrument for their requirements. Our newest technology places us at the forefront of choice in flow cytometry.

“Our special order research instruments have kept our users at the latest state of technology—even before they know they need it. I consider my sales and support people from BD to be an extension of our team here. They have gone above and beyond on numerous occasions to help us with the challenges we face.”

Special order sorters and analyzers

BD special order sorters and analyzers offer the most advanced and flexible features available for multicolor research. To support advanced assay development, BD special order analyzers deliver the latest in laser technology to researchers with an unrivaled range of color, wavelength, and power choices.

Special order BD FACSria sorter

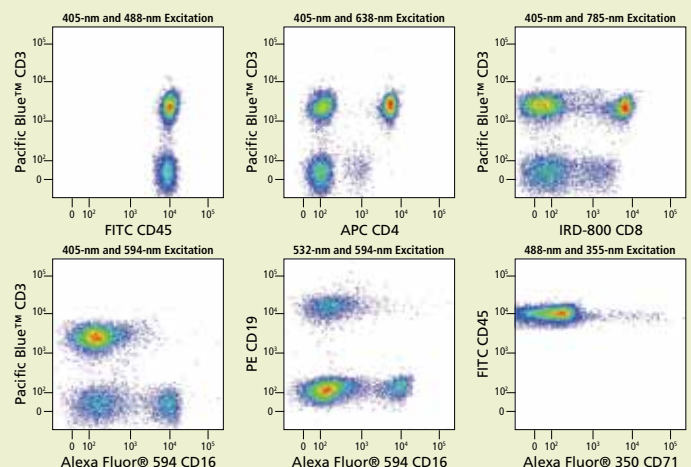
The special order BD FACSria™ sorter can support up to 7 variable power lasers. Any combination of the 7 spatially separated beams can be used simultaneously. Customers can choose from a selection of 12 variable power lasers. The special order system can support up to 56 colors and 58 parameters including FSC and SSC. A wide selection of detectors and filter sets is available to meet strict assay requirements.

Special order BD Influx sorter

The modular design of the BD Influx™ system makes it highly flexible, and as a result, it offers a range of standard choices and options. An open design makes it possible to quickly accommodate application challenges as they arise. Choose from a range of innovative laser options that include diode and solid state lasers across a spectrum of wavelengths and powers.

The dot plots show 7-laser excitation of 7 fluorochromes, demonstrating the usefulness of a 7-laser special order BD LSR II analyzer. Each spatially separated beam provides discrete fluorochrome excitation so that virtually no computer compensation is required for complete cell population separation. The experiment was run on a BD LSR II configured with the following lasers: 20-mW 355-nm UV, 50-mW 405-nm violet, 20–100 mW 488-nm blue (variable power), 150-mW 532-nm green (variable power), 50-mW 594-nm yellow, 40-mW 638-nm red, and 25-mW 785-nm IR.

Data courtesy of Frederic Preffer (Harvard Medical School, Boston MA). Reference: Preffer F, Dombkowski D. Advances in complex multiparameter flow cytometry: Applications in stem cell research. *Cytometry*. 2009;76B:295-314.



PRECISE REQUIREMENTS



Special order BD LSRFortessa analyzer

The special order BD LSRFortessa™ cell analyzer has the capacity to support up to 5 lasers and has 30 positional choices for the selection of detectors. The lasers may be chosen from more than 11 laser wavelengths and multiple power options for maximum flexibility. The special order BD LSRFortessa analyzer can detect up to 18 colors simultaneously and can be upgraded later with additional or new lasers from BD as future requirements dictate.

Special order BD LSR II analyzer

The special order BD™ LSR II analyzer has the capacity to support up to 9 lasers and has 56 positional choices for selection of the detectors. It can be designed to meet the multicolor analysis needs of high-end research entailing demanding assay requirements, for which complex experiments may require a specific combination of unique lasers, detectors, and filters. The lasers for the special order BD LSR II analyzer may be chosen from more than 11 laser wavelengths and multiple power options for maximum flexibility of configuration.

Laser and detector options for special order analyzers are supported by a choice of filters that can be configured to almost any dye across the spectrum. This allows researchers to designate reagents based on maximal signal strength and minimal crosstalk, to increase resolution of dim populations by reducing spectral spillover and compensation challenges.

Taking advantage of continuous innovation

New technologies are regularly incorporated into the special order product line and offered to customers as soon as they become available. This makes a BD Biosciences special order product a solid, long-term investment.



The BD LSRFortessa FSC (data shown in Figure 1) is optimized for a wide range of biological particles. For applications requiring a smaller resolution, an FSC PMT Option is available through the special order program (data shown in Figure 2).

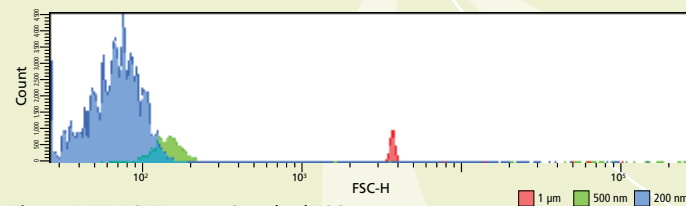


Figure 1: BD LSRFortessa Standard FSC

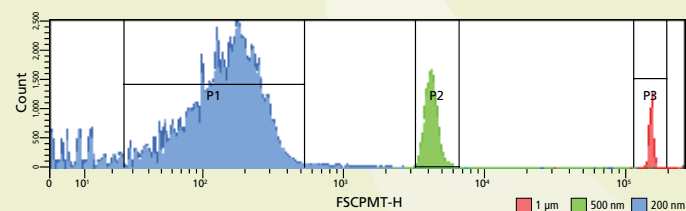


Figure 2: BD LSRFortessa Special Order FSC PMT Option

Reagent Services Increase Your Options

BD Biosciences has several contract reagent programs to help customers respond to the rapidly changing research landscape. Custom products utilize our deep knowledge of advanced methodologies for immunophenotyping, immunogenicity testing of biological and immune function testing, as well as our manufacturing experience and standards that have led us to produce consistently high quality products over the years.

From comprehensive contract research services to test-ready GMP antibody conjugates and express antibody conjugation services, BD Biosciences has reagent solutions that expand choice and complement our extensive portfolio of assay products to meet research needs at the leading edge of biological discovery.

Express Conjugation Service

With fast turnaround times and small minimum orders, the Express Conjugation Service delivers affordable custom antibody conjugates that help researchers quickly build unique multicolor flow cytometry panels to expand their research. The wide selection includes 16 fluorochromes across 250 of the most popular BD Pharmingen™ antibody clones.

For researchers requiring custom conjugates of antibody specificities not offered by the Express Conjugation Service, full access to the BD Pharmingen portfolio of antibodies is available through a standard service with quantities and lead times that vary by format. Additionally, BD offers a test-ready conjugation service using our portfolio of RUO-GMP reagents to provide research and clinical labs with custom antibody conjugates that can be quickly and reliably incorporated into laboratory protocols.



“Over time we’ve received excellent service on multiple projects from BD’s Custom Technology Team. We’ve found that they carefully consider project goals and provide valuable and knowledgeable input into the study’s design. Once the work is complete, the follow-up teleconferences ensure that the data is correctly interpreted by our team to provide insight into the results.”



Test-Ready GMP Service

Offering made-to-order formulations and specialized quality assurance, the Test-Ready GMP Service provides researchers with custom antibody conjugates that can be quickly and reliably incorporated into laboratory protocols. GMP manufacturing under the highest QC standards testing ensures antibody conjugate quality and reliability of results. Pre-titrated antibodies in test sizes formulated to customer specifications offer standardization and help increase lab productivity.

Special Order Cell Processing (SOCP) Reagent Service

The SOCP Service can conjugate, formulate, and lyophilize fluorochrome-conjugated and purified antibodies to strict cGMP manufacturing standards for cell processing. Optional services are available for these Special Order cGMP antibodies and are performed to customer-defined requirements. Optional services include:

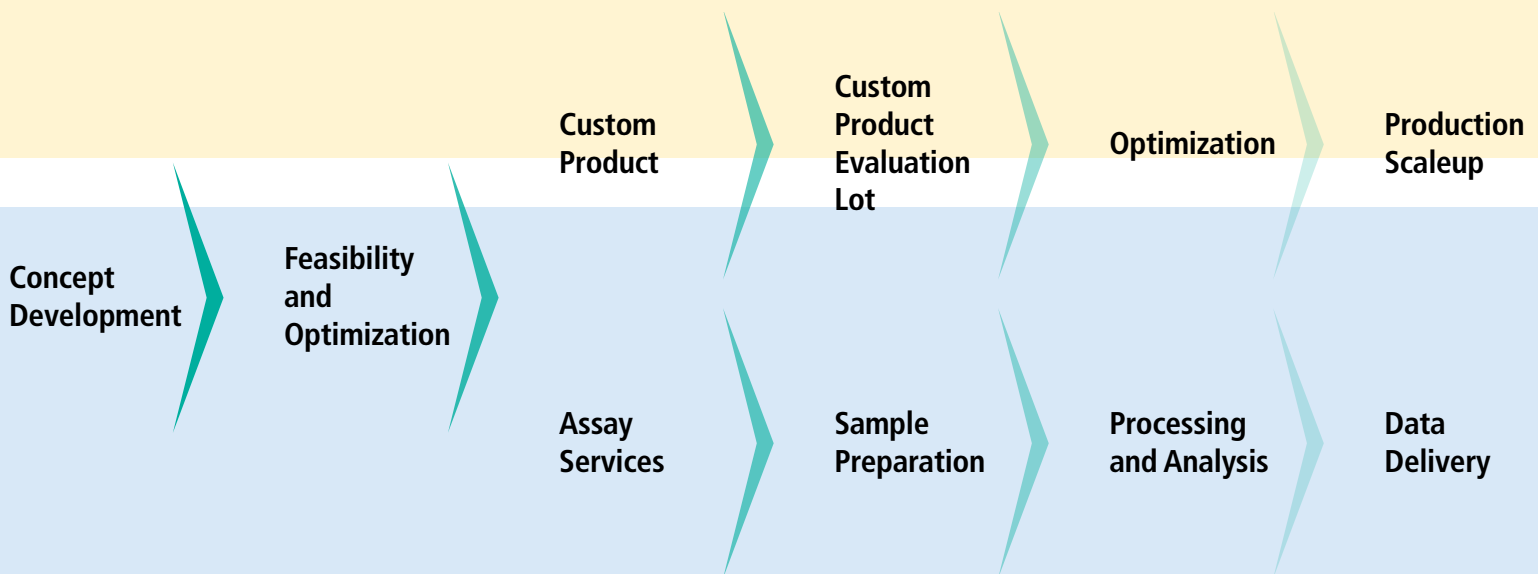
- Screening of cell lines for endogenous and adventitious agents, and producing antibody in serum-free media
- Animal-free excipient formulation in single-use vials
- Testing of final antibody product for sterility, endotoxin, and toxicity

Custom Technology Team

For comprehensive services, BD Biosciences Custom Technology Team (CTT) is a specialized contract research group that offers custom products, assay development, and assay services for global biotechnology, pharmaceutical, and research organizations. Core competencies include flow cytometry and multiplexed protein assay development.

CTT assay services include immunophenotyping, cell surface proteomics, and immune function testing. CTT helps clients design their studies, formulate assay materials, and choose protocols, instrumentation, and analysis methods. If desired, CTT can also prepare and analyze the collected samples and report the data.

CTT custom products include pre-optimized antibody cocktails, multiplexed bead reagents (for protein quantitation assays), cytokine flow cytometry kits, buffers, and controls. Manufacturing and packaging solutions are versatile. Lyophilization of antibodies, antibody cocktails, immunological proteins, and control cells can improve standardization and reduce hands-on time.



An overview of the Custom Technology Team process

A Comprehensive Line of Support Services

BD Biosciences customer care teams handle support and service issues across the product life cycle. Contact information is available online in the Support section of bdbiosciences.com. The Support section offers a range of resources such as documentation, protocols, and tools that can be found under Resources.

Question or Issue	Service Group
Pricing and availability Order advice and placement Order assistance and tracking	Sales or Customer Service
Instrument delivery and installation Preventive maintenance Instrument and computer hardware repairs Updates and upgrades	Installation Coordination or Field Service Engineering
Instrument and computer hardware technical support	Instrument Support
Service contract options for post-warranty maintenance, service, and support	Contract Administration
Technical assistance for: <ul style="list-style-type: none"> • Sample preparation • Sorting • Reagent specifications and use • Software and data analysis • Experimental design 	Application and Scientific Support
Special order cell sorters and analyzers	Special Order Program
Custom reagents, panels, and assay protocol Sales	Express Conjugation Service Custom Technology Team
Operator Training	Customer Education and Training Services

Regional Offices bdbiosciences.com/contact

Asia Pacific

Singapore
Tel 65.6861.0633
Fax 65.6860.1590

China
Tel 86.21.3210.4610
Fax 86.21.5292.5191

India
Tel 0091.124.2383566
Fax 0091.124.2383224/25/26
bd_india@bd.com

Australia/New Zealand

Australia
Toll Free: 1800 656 100
Tel 61.2.8875.7000
Fax 61.2.8875.7200
bd_anz@bd.com

New Zealand
Toll Free: 0800 572.468
Tel 64.9.574.2468
Fax 64.9.574.2469
bd_anz@bd.com

Europe

BD Biosciences
Tel 32.2.400.98.95
Fax 32.2.401.70.94
help.biosciences@europe.bd.com

Canada

BD Biosciences
Tel 800.268.5430
Fax 888.229.9918
canada@bd.com

Japan

Nippon Becton Dickinson
Toll Free 0120.8555.90
Tel 81.24.593.5405
Fax 81.24.593.5761

United States

BD Biosciences
Toll Free 877.232.8995
Fax 800.325.9637
answers@bd.com

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BD Biosciences
2350 Qume Drive
San Jose, CA 95131
bdbiosciences.com

