Streamline the path from discovery to cure

Cell therapy solutions for every step
Your work holds the potential to deliver life-changing treatments

Our mission is to help you succeed

As the world leader in serving science, Thermo Fisher Scientific provides the quality materials, services, and support you need to translate your cell therapy from discovery to clinical research and commercial manufacturing.

We’re working alongside the scientific community to accelerate the pace of cell and gene therapy development. Because, like you, we believe in the promise of those therapies to fundamentally transform our approach to health care. And we won’t stop until that’s a reality.
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Our commitment
to cell therapy

The beliefs that drive every decision we make

**Quality comes first.** The proof is in our performance. We have almost 60 years of experience with Gibco™ media, manufacturing that is compliant with current good manufacturing practices (cGMP), a robust quality management system, and a track record of supplying the top 50 biopharma companies worldwide with solutions that help them succeed.

**Scale and security of supply are critical.** Our products are backed by our professional regulatory support, a robust supply chain, and global manufacturing. Cloud-connected equipment, along with a range of informatics and laboratory information management systems (LIMS), offers peace of mind, workflow efficiency, and facilitates regulatory reporting. This translates to consistent supply and scalable solutions that help clear the path to commercialization.

**Continued advancement requires continued investment.** Every year, we make significant investments in operational expansion to grow our cell therapy solutions. And we'll continue to invest so we can deliver leading innovation, support, and manufacturing capabilities to help accelerate your work.

**A good partner goes the distance.** We support our customers from discovery through to commercialization with a full suite of products and services ranging from Gibco™ Cell Therapy Systems (CTS™) media and reagents, scale-up and scale-out bioprocessing solutions, a wide array of laboratory equipment, liquid handling equipment and consumables, state-of-the-art analytics, viral vector development and manufacturing services, clinical supplies, and global cold-chain logistics and distribution services.
Regardless of where you are in your cell therapy development, we have solutions to help you achieve your cell therapy goals—all the way through to commercialization.

Cell therapy discovery can be a lengthy process, but it holds extraordinary promise. We have an extensive portfolio of cell culture, cell engineering, and characterization solutions to aid in your discovery process.

- **Cell culture reagents**—product-level xeno-free and animal origin–free media and reagents to support cost-effective research, with complementary Gibco™ CTS™ products to help you maximize the potential of your research by supporting a smooth transition to the clinic.

- **Cell culture equipment**—Thermo Scientific™ CO₂ incubators, biosafety cabinets, and filtration devices are designed to help avoid contamination. We also offer a broad range of centrifuges, culture vessels (including single-use hardware), and consumables to maximize workflow efficiency.

- **Cell engineering**—solutions including gene editing and electroporation tools, viral vector production and purification products, and viral vector CDMO services.

- **Broad characterization portfolio**—equipment, tools, and reagents for cell counting, whole cell analysis, protein analysis, and genetic analysis, along with safety testing including screening for endotoxin and mycoplasmas.

Learn more at [thermofisher.com/celltherapy](http://thermofisher.com/celltherapy)
Developing your cell therapy product from research to clinical applications requires careful material selection and thoughtful process development. Our solutions can help you translate your therapy to the clinic.

- **CTS media and reagents**—extensive selection of GMP-manufactured media and reagents designed for cell therapy applications, including serum-free media (SFM), serum replacement, wash buffers, and cryopreservation solutions.

- **CTS series laboratory equipment**—explore integrated solutions that support your GMP and clean room needs for cell and gene therapy, from CO₂ incubators and centrifuges to cold storage, biological safety cabinets, and beyond. Our product innovations are supported by high-quality materials, factory acceptance certification, and on-site compliance services.

- **Custom media and process development services**—Gibco media formulations available in the packaging and formats that meet your unique needs.

As you move toward commercialization, our solutions can scale with you to meet the clinical need.

- **Scale-up and scale-out solutions**—proven, robust, and scalable solutions that span the entire cell therapy development process, from cGMP-manufactured custom media to bioreactors, cultureware, and cell culture bags, for a complete cell expansion solution.

- **Analytical solutions**—state-of-the-art cellular analysis tools for your in-process and lot-release development testing needs, including microbial detection and identification, impurity testing, and cellular analysis tools.

- **Global cold-chain logistics services**—expertise and a global infrastructure to seamlessly collect patient cells, safely transport them to manufacture, then back to the patient’s bedside. Get comprehensive end-to-end supply chain management and benefit from cGMP-compliant kit production, global biobanking capabilities, and cryogenic distribution for total peace of mind.

- **Clinical trial support**—experience, resources, and global expertise and infrastructure from Patheon Viral Vector Services, a leading provider to the cell and gene therapy community.
Cell Therapy Systems (CTS) products

Designed for cell and gene therapy

CTS reagents provide you with GMP-manufactured products designed for cell and gene therapy, so you can transition your therapy to the clinic with confidence.

cGMP manufacturing
- Manufactured in conformity with GMP for medical devices, 21 CFR Part 820, following USP<1043> and Ph Eur 5.2.12
- Manufacturing sites that are FDA-registered and ISO 13485-certified and regularly audited

Testing and documentation
- Traceability documentation, including Drug Master Files (DMFs) and/or Regulatory Support Files (RSFs) and certificates of origin
- Product safety testing, including sterility, endotoxin, and mycoplasma on media and reagents

Proven use
- Used in FDA-approved and EMA-approved CAR T therapies [1,2] and the first FDA-approved therapeutic cancer vaccine [3]
- Used in over 200 clinical trials
Providing quality for our customers drives everything we do. We take every measure to deliver the best possible experience, from the products we develop to the services we provide.

GMP facilities and manufacturing excellence
Over 30 years of experience with GMP manufacturing and ongoing facility-focused investments enable us to provide high-quality products and services to support cell therapy development. Our manufacturing sites are ISO 13485– and ISO 9001–certified, and FDA-registered. And our global footprint facilitates supply of the highest-quality products to all of our customers, regardless of location.

To support our customers’ quality assurance efforts, we host more than 200 customer audits per year.

Quality manufacturing and adherence to regulatory requirements
Successful clinical translation of a cell therapy product hinges on early process- and product-selection decisions. High-quality products and proper documentation and support are essential for a streamlined transition from research to the clinic.

We offer a broad array of media and reagents to support your cell therapy development, including Gibco CTS products, that are specifically designed for use in cell and gene therapy applications. The methods and controls used for manufacturing conform with cGMP for medical devices, 21 CFR Part 820, and follow USP <1043> and Ph Eur 5.1.12.* We regularly audit our portfolio of CTS products to ensure compliance with current global regulatory guidance.

Our CTS series laboratory products, featuring CO₂ incubators, centrifuges, cold storage, and biological safety cabinets, are supported by high-quality materials, factory acceptance certification, and on-site compliance services.

Testing and regulatory documentation
Gibco CTS media and reagents undergo QC testing for sterility and presence of endotoxins, adventitious agents, and mycoplasmas. The high degree of qualification and traceability documentation, including FDA Drug Master Files, certificates of analysis, and certificates of origin, ease the burden on your quality systems by helping to support your regulatory submission and reduce risk throughout. This ultimately saves time and facilitates a seamless transition to the clinic.

Clinical and commercial use
In addition to providing high-quality Gibco CTS products with appropriate documentation and support, we have the honor of helping many of our customers advance their work to the clinic and through to commercialization, as evidenced by:

• The use of our products in FDA-approved cell therapies and in over 200 clinical trials
• Secured rights to enable your path to commercial use

Professional support
By collaborating with our clients, we are able to provide solutions that optimize quality, service, and cost while delivering results.

• Our knowledgeable regulatory support team will help you navigate regulatory processes from research through to commercialization
• Experienced cell therapy professionals leverage decades of cumulative translational and commercial experience to help answer your questions
• Regional technical support teams and highly specialized scientific teams are available to provide detailed product and protocol consultation, as well as customization services

* CTS products are manufactured to meet the ancillary material supplier responsibilities for cell, gene, and tissue-engineered products. Other aspects of USP <1043> are the responsibility of the end-user to assess. Thermo Fisher Scientific cannot fulfill USP <1043> in regard to application and therapy specific aspects (e.g., use in a finished therapeutic, assessment of removal from a finished therapeutic, and possibly biocompatibility, cytotoxicity, or adventitious agent testing).
Workflow solutions

Complete capabilities from research to the clinic and beyond

We have capabilities that span the immunotherapy and stem cell therapy workflows. Our products, services, and support can facilitate a seamless transition from research to commercialization, with a goal to reduce the time from your initial discovery to an approved therapy.

Gene-modified T cell therapy

Gibco™ CTS™ Dynabeads™ T cell expansion products—mimic in vivo T cell activation via antigen-presenting cells. This gentle and efficient technology provides a trusted technology platform from which the beads can be used to isolate T cells and provide both the primary and co-stimulatory signals required for activation and expansion [4–6].

- Can be used for the isolation, activation, and/or expansion of polyclonal T cells, antigen-specific T cells, gene-modified T cells, and other T cell subtypes [4,5]
- Isolated and activated T cells enable efficient gene transduction [6]
- Expanded T cells have a T central memory phenotype with in vivo persistence [7]
- Delivers 100- to 1,000-fold expansion in 9–14 days [8]

Gibco™ LV-MAX™ Lentiviral Production System—addresses challenges that exist in adherent and suspension methods for lentiviral vector production by providing a cost-effective and scalable platform to support your current lentiviral vector needs and future GMP large-volume demand.

- Complete system with high-density suspension cell line, medium, supplement, transfection reagent, and enhancer
- Serum-free, chemically defined system with research-grade and GMP-manufactured options
- Delivers >1 x 10⁸ transduction units/mL (original concentration LVV-GFP)

Gibco™ CTS™ Immune Cell Serum Replacement (SR)—a defined xeno-free formulation proven for clinical use and designed to support expansion of in vitro cultured human T cells when added as a supplement to a basal cell culture medium such as Gibco™ CTS™ OpTmizer™ T Cell Expansion SFM or Gibco™ CTS™ AIM V™ Medium.

- Minimizes the supply and safety risks associated with human serum
- Supports T cell phenotype (CD4, CD8, and CD62L), similar to human serum [9]
- Supports expansion, efficacy, and persistence of lentiviral gene-modified CAR T cells

Gibco™ CTS™ OpTmizer™ medium—a complete, product-level xeno-free medium formulation proven for clinical success and specifically developed for the growth and expansion of human T lymphocytes.

- Supports high-density T cell culture (>3 x 10⁶ CD3+ T cells/mL) in static culture, including CAR T cells
- Supports T cell activation using Dynabeads magnetic beads and stimulatory antibody-presenting cell protocols
- Supports phenotype, function, and viability (e.g., cytokine secretion profile) similar to T cells cultured with conventional medium supplemented with human AB serum

Learn more about CTS products for immunotherapy at thermofisher.com/ctsimmunotherapy and thermofisher.com/immunotherapy

For ordering information, go to page 30
## Gene-modified T cells

### Isolation and activation
- **Gibco isolation/activation**
  - CTS Dynabeads CD3/CD28
  - Dynabeads Human T-Expander CD3/CD28
  - CTS Dynabeads Treg Xpander
- **Gibco magnet**
  - CTS DynaMag Magnet

### Engineering
- **Gibco gene editing**
  - TrueCut Cas9 Protein (CTS-Prototype)
- **Invitrogen gene editing**
  - CRISPR-Cas9 and designer TALEN products and services
  - TrueGuide Synthetic gRNA
  - TrueCut Cas9 Protein v2
- **Invitrogen electroporation device**
  - Neon Transfection System
- **Invitrogen transfection reagents**
  - Lipofectamine 3000 Transfection Reagent
  - Lipofectamine 2000 CD Transfection Reagent
  - Lipofectamine MessengerMAX Transfection Reagent

### Expansion
- **Gibco catalog and custom media**
  - CTS OpTmizer T-Cell Expansion SFM
  - CTS AIM-V Medium, without phenol red, without antibiotics
  - Custom media and services
- **Gibco cell culture supplements**
  - CTS GlutaMAX-I Supplement
  - CTS Immune Cell SR
  - **Thermo Scientific equipment**
    - Herasafe 2030i biological safety cabinets
    - Heracell VIOS CO₂ incubators
    - Sorvall X4 Pro centrifuges
- **Gibco cryopreservation**
  - CTS Synth-a-Freeze Medium
- **Invitrogen instrumentation**
  - Attune NxT Acoustic Focusing Cytometer
  - Attune NxT Software 21 CFR Part 11 CytKick Autosampler
  - **Thermo Scientific assay**
    - Pierce LAL Chromogenic Endotoxin Quantitation Kit

### Wash and cryopreservation
- **Gibco wash**
  - CTS DPBS, without calcium chloride, without magnesium chloride
- **Gibco cryopreservation**
  - CTS Synth-a-Freeze Medium
- **Thermo Scientific cryopreservation**
  - CryoMed System for controlled-rate freezing
  - CryoPlus Storage System
  - Nunc Internally Threaded Universal Cryotubes

### Lot release and characterization
- **Applied Biosystems assays**
  - PureQuant CD8+ T Cell Assay
  - PureQuant Treg Assay
  - PureQuant Th17 Assay
  - MycoSEQ Mycoplasma Detection Kit
  - resDNASEQ Human Residual DNA Quantitation Kit
  - resDNASEQ Quantitative HEK293 DNA Kit with PrepSEQ Residual DNA Sample Preparation Kit
  - AmpFLSTR Identifier Direct PCR Amplification Kit
- **Invitrogen assays**
  - eBioscience Essential Human Treg Phenotyping Kit
  - eBioscience Essential Human Th1/Th17 Phenotyping Kit
  - eBioscience Essential Human T-Cell Phenotyping Kit
  - CyQUANT LDH Cytotoxicity Assay
  - ProcartaPlex multiplex immunoassays
- **Invitrogen instrumentlaion**
  - Attune NxT Acoustic Focusing Cytometer
  - Attune NxT Software 21 CFR Part 11 CytKick Autosampler
- **Thermo Scientific assay**
  - Pierce LAL Chromogenic Endotoxin Quantitation Kit

For more information, see the cell therapy characterization section (p. 20)
Pluripotent stem cell therapy

**Gibco™ CTS™ Essential 8™ Medium**—the first globally available human pluripotent stem cell (hPSC) culture medium without components derived directly from animals. Based on the widely cited Gibco™ Essential 8™ Medium, CTS Essential 8 Medium:

- Enables seamless transition—same defined and highly consistent eight-component formulation as RUO Essential 8 Medium but with components not directly derived from animals
- Supports long-term PSC culture—maintains PSC marker expression, trilineage differentiation potential, and a normal karyotype over multiple passages

**Gibco™ CTS™ Vitronectin (VTN-N) Recombinant Human Protein**—a defined matrix for feeder-free culture of PSCs. Designed in the laboratory of James Thomson for use with the Essential 8 system, this protein is:

- A recombinant matrix that reduces variability and contamination risk in PSC cultures
- An optimized VTN-N variant that was shown to support hPSC attachment and survival better than wild type vitronectin [10]
- Able to maintain pluripotency, normal growth characteristics, trilineage differentiation potential, and a normal karyotype after extended culture

**Gibco™ CTS™ KnockOut™ SR XenoFree Medium**—a defined, product-level xeno-free serum replacement based on the traditional Gibco™ KnockOut™ Serum Replacement, which has been cited in more than 2,000 publications and trusted for over 20 years. CTS KnockOut SR XenoFree Medium is:

- Able to maintain the pluripotency, normal morphology, and karyotype of hPSCs
- Versatile—can also be used for cryopreservation, derivation, and differentiation of PSCs

**Complete and cost-effective solution for qualification of hPSC lines**—we offer a variety of methods to help you characterize your hPSC lines so you can move your research forward with confidence.

- PluriTest™ tool-compatible Applied Biosystems™ PrimeView™ global gene expression profile assays
- Applied Biosystems™ TaqMan® hPSC ScoreCard™ Panel
- Applied Biosystems™ KaryoStat™ assays

Learn more about CTS products for pluripotent stem cell research at [thermofisher.com/ctsstemcells](http://thermofisher.com/ctsstemcells) and [thermofisher.com/characterization](http://thermofisher.com/characterization)

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**Isolation**
- **Gibco media** (PBMC/CD34 cells)
  - StemPro-34 SFM
  - (Fibroblasts) CTS KnockOut
  - SR XenoFree

**Reprogramming**
- **Invitrogen reprogramming kit**
  - CTS CytoTune-iPS 2.1 Sendai Reprogramming Kit

**Banking and recovery**
- **Gibco cryopreservation**
  - CTS Synth-a-Freeze Medium
  - CTS PSC Cryopreservation Kit
  - CTS PSC Cryomedium

**Expansion and gene editing**
- **Gibco expansion media systems**
  - CTS Essential 8 Medium
  - CTS VTN-N
  - CTS KnockOut SR XenoFree
  - CTS KnockOut DMEM/F-12
  - CTS KnockOut DMEM
  - CTS Essential 6 Medium
  - CTS Versene Solution
  - Custom media and services

**Differentiation**
- **Gibco differentiation reagents**
  - PSC Cardiomyocyte Differentiation Kit
  - PSC Dopaminergic Neuron Differentiation Kit
  - PSC Definitive Endoderm Induction Kit
  - CTS N-2 Supplement
  - CTS KnockOut DMEM/F-12

**Wash, fill, finish, and cryo**
- **Gibco wash**
  - CTS DPBS

**Characterization**
- **Applied Biosystems characterization products**
  - PrimeView global gene expression profile assays
  - TaqMan hPSC ScoreCard Panel
  - KaryoStat assays

**Gibco dissociation reagents**
- CTS TrypLE Select Enzyme
- CTS Versene Solution

**Invitrogen transfection reagents**
- (Fibroblasts) Lipofectamine 3000 Transfection Reagent

**Invitrogen electroporation device**
- Neon Transfection System

**Gibco recovery**
- CTS RevitaCell Supplement
  - CTS Essential 8 Medium/CTS VTN-N
  - rh-Laminin 521

**Thermo Scientific equipment**
- Liquid handling instrumentation
- Biological safety cabinets
- Cryogenic storage consumables
- Ultra-low and cryogenic freezers

**Invitrogen gene editing**
- CRISPR-Cas9 products and services
- Designer TALEN products and services
- Lipofectamine Stem Transfection Reagent
- Lipofectamine MessengerMAX Transfection Reagent
- Neon Transfection Instrument

**Thermo Scientific single-use technologies**
- BioProcess Containers (BPCs)
- Transfer assemblies
- Static bags
- Rocker bags
- Equipment and consumables

**Gibco growth factors**
- TGF-β 1
- Stem Cell Factor (SCF)
- FLT 3 Ligand
- FGF Basic Full Length

**Cryogenic storage and logistics**
- Thermo Scientific Naigene and Nunc cryotubes
- Banking services
- Cold-chain logistics solutions

For more information, see the cell therapy characterization section (p. 20)
Mesenchymal stem cell therapy research

**Gibco™ StemPro™ MSC SFM XenoFree**—a serum-free, xeno-free medium developed for the growth and expansion of human mesenchymal stem cells (MSCs) and adipose-derived stem cells (ADSCs) under completely serum-free and xeno-free conditions.

- Enables expansion for multiple passages while maintaining multipotent phenotype (e.g., the ability to differentiate into osteogenic, chondrogenic, and adipogenic lineages)
- cGMP-compliant, allowing for traceability and manufacturing reliability

**Gibco™ StemPro™ MSC SFM**—a serum-free medium (SFM) specially formulated for the growth and expansion of human mesenchymal stem cells (MSCs) and human adipose-derived stem cells (ADSCs).

- Enables superior human MSC growth and increased consistency compared to classical serum-supplemented medium (DMEM + 10% FBS)
- Using StemPro MSC SFM, human MSCs can be expanded beyond 5 passages while still maintaining their trilineage mesoderm differentiation potential
- Human MSCs grown in serum-supplemented media can be transitioned directly into StemPro MSC SFM with little or no adaptation required

**Gibco™ CELLystart™ Substrate**—a defined substrate developed for stem cell attachment under serum-free conditions that contains only components of human origin (product-level xeno-free)

- Can be used for MSC, NSC, and PSC attachment under serum-free conditions
- Defined formulation provides improved lot consistency

**Gibco™ StemPro™ Differentiation Kits**—developed for standardized differentiation of human mesenchymal stem cells (MSCs) in culture, these kits contain all reagents required for inducing MSCs to become committed to trilineage pathways.

- Complements cell expansion systems containing StemPro MSC SFM, StemPro™ MSC SFM XenoFree, MesenPRO RS™ Medium, and MSC-Qualified FBS
- Know your cells have retained trilineage differentiation potential via reliable induction of human MSCs into osteocytes, chondrocytes, and adipocytes
- Each lot is performance-qualified by PCR and its ability to support differentiation of human MSCs

Learn more about CTS products for stem cell research at [thermofisher.com/msc](http://thermofisher.com/msc)

For ordering information, go to page 30
### Isolation

**Gibco cells**
- StemPro BM Mesenchymal Stem Cells*
- StemPro Human Adipose-Derived Stem Cells
- Custom cells and services

* For Research Use Only. For information on obtaining additional rights, please contact outlicensing@thermofisher.com.

**Thermo Scientific cell culture plastics**
- Nunc cell cultureware

### Expansion

**Gibco expansion media systems**
- StemPro MSC SFM XenoFree
- StemPro MSC SFM
- MesenPRO RS Medium
- MSC-Qualified FBS
- CELLstart Substrate
- CTS GlutaMAX-I Supplement
- DMEM classical media
- Custom media and services

**Gibco differentiation media and enzymes**
- StemPro Osteogenesis Differentiation Kit
- StemPro Chondrogenesis Differentiation Kit
- StemPro Adipogenesis Differentiation Kit
- CTS TrypLE Select Enzyme

**Gibco growth factors**
- TGF-β-1
- FGF-Basic
- PDGF-bb

**Thermo Scientific single-use technologies**
- Bioreactors/liners
- Transfer assemblies
- Cell culture factories
- Equipment and consumables

**Thermo Scientific cell culture and bioproduction systems**
- Nunc cell cultureware
- Equipment and consumables

### Wash, fill, finish, and cryo

**Gibco wash**
- CTS DPBS

**Cryogenic storage**
- Thermo Scientific Nalgene and Nunc cryotubes
- Biobanking services
- Cold-chain logistics solutions
- Thermo Scientific ultra-low and cryogenic freezers

### Lot-release testing

- Safety
- Identity
- Potency
- Purity

### In-process characterization

- Functional analysis
- Cellular analysis
- Protein analysis
- Genetic analysis

For more information, see the cell therapy characterization section (p. 20)
Hematopoietic stem cell therapy research

**Gibco® StemPro™-34 SFM**—a serum-free medium (SFM) specifically formulated to support the development of human hematopoietic stem cells (HSCs) in culture.

- Enables superior expansion of CD34+ cells compared to classical serum-supplemented medium (IMDM + FBS and cytokines)
- Appropriate for HSCs isolated from bone marrow, peripheral blood, or cord blood
- Manufactured without cytokines and hematopoietic growth factors, allowing freedom to use any factor or combination of factors required for your studies

**Invitrogen™ Dynabeads™ CD34 Positive Isolation Kit**—used to isolate human CD34+ progenitor cells for cell therapy research.

- Positive isolation of human CD34+ progenitor stem cells with bead release
- Stem cells can be isolated directly from whole or cord blood, or bone marrow
- Isolated CD34+ cells can be used in any application (i.e., they can be differentiated into dendritic cells or natural killer cells)

**Thermo Scientific™ CO2 incubators**—optimized cell growth through advanced design and technology.

- HEPA air filtration surrounds cell with clean room–like air quality
- High-temperature decontamination features maximize efficiency by eliminating the need for separate autoclaving and reassembly of components
- Simplified touchscreen user interfaces provide ease of use and real-time data
- Wireless monitoring options for regulatory peace of mind and compliance

Learn more about CTS products for stem cell research at thermofisher.com/hsc and thermofisher.com/cellculture

For ordering information, go to page 30
## Hematopoietic stem cells

### Workflow solutions

#### Isolation
- **Gibco isolation**
  - Dynabeads CD34 Positive Isolation Kit
  - DynaMag magnets

#### Expansion
- **Gibco expansion media systems**
  - StemPro-34 SFM
  - Custom media and services
  - CTS GlutaMAX-I Supplement
- **Gibco growth factors**
  - IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, GM-CSF, SCF, FLT3 ligand, TPO, M-CSF
- **Thermo Scientific cell culture plastics**
  - Nunc cell cultureware
- **Thermo Scientific single-use technologies**
  - Bioreactors/liners
  - Transfer assemblies
  - Equipment and consumables

#### Wash, fill, finish, and cryo
- **Gibco wash**
  - CTS DPBS
- **Gibco cryopreservation medium**
  - CTS Synth-a-Freeze Medium
- **Cryogenic storage**
  - Thermo Scientific Nalgene and Nunc cryotubes
  - Biobanking services
  - Cold-chain logistics solutions
  - Thermo Scientific ultra-low and cryogenic freezers

#### Lot release and characterization
- **Lot-release testing**
  - Safety
  - Identity
  - Potency
  - Purity
- **In-process characterization**
  - Functional analysis
  - Cellular analysis
  - Protein analysis
  - Genetic analysis

*For more information, see the cell therapy characterization section (p. 20)*
Workflow solutions cont.

Cell therapy selection guide

Cell type

Media/supplements

Growth factors/cytokines

Extracellular matrix

Reagents

Preservation

T cell

CTS OpTmizer SFM
CTS AIM V Medium
CTS Immune Cell SR

IL-2
IL-4
IL-7
IL-15
IL-21
GM-CSF
TNF-α

NA

CTS Dynabeads CD3/CD28
CTS DPBS
CTS GlutaMAX-I Supplement
L-Glutamine
LV-MAX Lentiviral Production System

CTS Synth-a-Freeze Medium

Learn more at thermosthisher.com/celltherapy. For ordering information, go to page 30.
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<td>PSC Dopaminergic Neuron Differentiation Kit</td>
<td>CTS TrypLE Select Enzyme Lipofectamine Stem Transfection Reagent</td>
<td>CTS GlutaMAX-I Supplement</td>
</tr>
<tr>
<td>StemPro Adipogenesis Differentiation Kit</td>
<td>PSC Definitive Endoderm Induction Kit</td>
<td></td>
<td></td>
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<tr>
<td>CTS DPBS</td>
<td>CTS TrypLE Select Enzyme</td>
<td></td>
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<tr>
<td>CTS GlutaMAX-I Supplement</td>
<td>Lipofectamine Stem Transfection Reagent</td>
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<tr>
<td>CTS Synth-a-Freeze Medium</td>
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<tr>
<td>CTS PSC Cryopreservation Kit</td>
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<td>CTS PSC Cryomedium</td>
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<td>CTS Synth-a-Freeze Medium</td>
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<td>CTS Synth-a-Freeze Medium</td>
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</tbody>
</table>
Cell therapy characterization

Tools for in-process and lot-release development testing

Invitrogen™ Attune™ NxT Flow Cytometer—combines precision with performance in a true benchtop flow cytometer with up to 4 lasers and 16 parameters of detection.

- Clog-resistant design, acoustic focusing technology, and high-quality fluidics help prevent loss of precious samples and enable analysis of difficult sample types like tumors
- Delivers a superior level of data fidelity at speeds up to 10 times faster than other flow cytometers
- The CytKick plate autosampler enables true walk-away automation on conventional and deep well 96-well or 384-well plates
- Includes the option to purchase access to 21 CFR part 11 software for security, auditing, and electronic signatures

Applied Biosystems™ MycoSEQ™ Mycoplasma Detection Kits—these allow for highly sensitive, specific, and comprehensive detection of more than 90 mycoplasma species. These kits are designed for the routine screening and detection of mycoplasmas and closely related species such as Acholeplasma laidlawii and Spiroplasma citri, and they meet European Pharmacopoeia guidance.

- Highly optimized sample preparation and same-day results allow for in-process testing (results typically obtained in <5 hr)
- Demonstrated sensitivity to detect <10 CFU/mL
- Widely used and validated by users in biopharma
- Include application support to guide you through the validation process

Learn more at thermofisher.com/celltherapy

<table>
<thead>
<tr>
<th>Cell health and identity reagents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell viability</strong>—choose from a selection of Invitrogen viability dyes and assays.</td>
</tr>
<tr>
<td><strong>Cell proliferation</strong>—Invitrogen™ Click-iT™ EdU assays provide:</td>
</tr>
<tr>
<td>- Quantitation of newly synthesized DNA</td>
</tr>
<tr>
<td>- Detection without denaturation of DNA</td>
</tr>
<tr>
<td>- Compatibility with sensitive R-PE tandems and fluorescent proteins</td>
</tr>
<tr>
<td>- An alternative to the cumbersome BrdU assay</td>
</tr>
</tbody>
</table>

**Detection of cell populations**—permanently label cells with fluorescent stains to trace generations or divisions without affecting morphology or physiology. Invitrogen™ CellTrace™ cell proliferation kits offer:

- Cell tracking in vitro or in vivo
- Bright, single-peak staining
- Long-term signal stability

**Phenotyping**—optimized protocols and antibodies to accelerate multiparameter experiment success.

- Broad portfolio of immunology targets
- Directly conjugated antibodies that support 18 standard channels
- Simplified and standardized intracellular buffers and protocols

Applied Biosystems™ PureQuant™ assays—these qPCR-based assays, based on Applied Biosystems™ TaqMan® Assay technology, can accurately identify and quantify specific immune cell types in a mixed population of cells.

- **Proven performance**—core technology has been used for identification and quantification of immune cell types for over a decade
- **Easily standardized**—qPCR method enables consistent results across multiple users, instruments, and sites
- **Facilitates regulatory filings**—established performance specifications following ICH Q2(R1) guidelines
Cell therapy characterization capabilities
We offer a wide variety of analytical platforms and assays to support cell therapy development.

<table>
<thead>
<tr>
<th>Assay type</th>
<th>Assay platform</th>
<th>Products</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identity, purity, potency</strong></td>
<td></td>
<td></td>
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<tr>
<td>Biomarker profiling</td>
<td>Flow cytometry</td>
<td>Antibodies and reagents</td>
<td>Attune Nxt Flow Cytometer</td>
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<tr>
<td></td>
<td>Luminex xMAP</td>
<td>Multiplex assays</td>
<td>MAGPIX, Luminex 200, or FLEXMAP 3D systems</td>
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<tr>
<td></td>
<td>ELISA</td>
<td>Invitrogen ELISAs</td>
<td>ELISA plate reader</td>
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<tr>
<td></td>
<td>HCS</td>
<td>Antibodies and reagents</td>
<td>CellInsight CX7 LZR system</td>
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<tr>
<td></td>
<td>ICC</td>
<td>Antibodies and reagents</td>
<td>EVOS M7000 Imaging System</td>
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<td>IP</td>
<td>Antibodies</td>
<td>Fluoroskan fluorometer</td>
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<tr>
<td><strong>Functional</strong></td>
<td>Flow cytometry</td>
<td>Antibodies and reagents</td>
<td>Attune Nxt Flow Cytometer</td>
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<tr>
<td></td>
<td>Luminex xMAP</td>
<td>Luminex multiplex assays, QuantiGene Plex assays,</td>
<td>Luminex 200 with xPONENT 3.1, MAGPIX, Luminex 200, and FLEXMAP 3D systems</td>
</tr>
<tr>
<td><strong>Molecular</strong></td>
<td>PCR-based</td>
<td>PureQuant Assays, custom TaqMan primers and probes</td>
<td>QuantStudio real-time PCR instruments</td>
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<tr>
<td></td>
<td>Array-based</td>
<td>Human Genome U219 and U133 arrays, Clariom S and D Assays</td>
<td>GeneChip Scanner 3000, GeneAtlas, and GeneTitan instruments</td>
</tr>
<tr>
<td></td>
<td>NGS-based</td>
<td>Ion AmpliSeq panels and Oncomine assays</td>
<td>Ion GeneStudio S5 systems</td>
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<tr>
<td><strong>Genomic stability</strong></td>
<td>Array-based</td>
<td>KaryoStat and KaryoStat HD assays</td>
<td>GeneChip Scanner 3000 instrument</td>
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<tr>
<td><strong>HLA typing</strong></td>
<td>Reverse sequence-specific oligonucleotide typing (rSSO)-Luminex xMAP</td>
<td>LABType rSSO</td>
<td>LABScan3D instrument</td>
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<tr>
<td></td>
<td>Sanger sequencing</td>
<td>SeCore SBT kit</td>
<td>Applied Biosystems 3100, 3730, 3500xL, and 3500xL Dx Genetic Analyzers</td>
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<tr>
<td><strong>Sample tracking and authentication</strong></td>
<td>Capillary electrophoresis</td>
<td>Identifier STR assays</td>
<td>Thermal cycler and 3500, 3500xL, and SeqStudio Genetic Analyzers</td>
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<tr>
<td><strong>Mycoplasma</strong></td>
<td>SYBR Green RT-PCR</td>
<td>MycoSEQ kits</td>
<td>Applied Biosystems 7500 Fast Real-Time PCR System</td>
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<tr>
<td><strong>Endotoxin</strong></td>
<td>Chromogenic assay</td>
<td>Pierce LAL Chromogenic Endotoxin Kit</td>
<td>Multiskan Sky Plate Reader</td>
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</tbody>
</table>
Success story: providing professional support for raw materials used in clinical manufacturing

**Situation**
A biotech customer developing a novel cell therapy was in need of a cell culture system for efficient expansion of cells while maintaining cell phenotype and function.

**Solution**
We communicated with the company to understand their raw material and quality requirements and worked with their team to evaluate CTS OpTmizer SFM in combination with CTS Immune Cell Serum Replacement.

**Results**
The customer was able to achieve the required cell numbers with the correct phenotype in a serum-free environment while reducing the risk of both lot-to-lot variability and supply issues associated with human serum. They are now using CTS OpTmizer SFM in combination with CTS Immune Cell Serum Replacement in their commercial cell therapy manufacturing process.
Careful selection of materials and thoughtful development decisions early in the process can help ease the transition to a scalable and robust cell production process. Gibco CTS products are designed to help you translate your cell therapy to clinical applications with extensive safety testing and traceability documentation to facilitate regulatory approval, so you can transition your cell therapy to the clinic with confidence.

Cell isolation
Dynabeads products for cell isolation and activation provide a trusted technology platform to isolate, activate, and expand T cells used in immunotherapy [1-3].

Cell expansion
Gibco cell culture represents over 50 years of applying deep scientific cell culture expertise. Our broad portfolio of media, reagents, and single-use technologies supports cost-effective research with complementary CTS products to support your transition to the clinic.

Media, reagents, and vessels
Choose from a broad array of off-the-shelf and custom media, reagents, and culture vessels to support your cell therapy research, including CTS media and reagents that are specifically designed for use in cell therapy applications, and extensive custom media and optimization capabilities. We also have an extensive portfolio of high-quality RUO products.

Single-use technologies
We have a wide range of standard and custom-configured single-use technologies for bioreactors, rotary platforms, and closed systems that include BPCs, transfer assemblies, static bags, and Rock-it bags. All of these offerings can be customized to meet your requirements.

Equipment and consumables
A comprehensive range of Thermo Scientific™ laboratory equipment, liquid handling equipment, and consumables, including biosafety cabinets, products for pipetting, filtration devices, lab-water purification systems, CO₂ incubators, centrifuges, and cold storage equipment is available to maximize workflow efficiency.

Cell engineering
We offer complete cell engineering solutions to meet your gene editing and cell delivery needs, including transfection reagents, lentiviral transduction, electroporation, and proven gene editing tools and solutions.

Invitrogen™ Lipofectamine™ transfection reagents
These products are among the most trusted and cited due to their superior transfection performance with a broad spectrum of cell types.

Lentiviral transduction
We offer a complete solution for high-titer and cost-effective adherent and suspension viral vector production, including the Gibco™ CTS™ LV-MAX™ Lentiviral Production System, Thermo Scientific™ CaptureSelect™ affinity products for vector purification, and viral vector CDMO services.

Invitrogen™ Neon™ electroporation device
The innovative design of tips for the Neon system provides high transfection efficiency and cell viability, and the preprogrammed 24-well optimization protocols help decrease hands-on time.

CRISPR and TAL products and services
We offer both CRISPR-Cas9 and TAL effector genome editing tools, because we know the best fit depends on your application, cell type, target gene, and delivery method.

Our proven solutions are designed to help you accelerate your research. Whether you are looking to perform a gene knockout, knock-in, activation, or repression, know that we have a solution for you.
Success story: optimizing media format for savings and risk reduction

**Situation**
A large biotech company’s drug formulation required four separate dry media components in their process.

- Each component requires a separate raw-material release test
- Multiple components require additional storage containers
- Formulation errors resulting from multiple components can be costly

**Solution**
Proposed format upgrade from dry powder media (DPM) to the Gibco™ Advanced Granulation Technology™ (AGT™) Format. We combined the DPM components into one powdered medium for their process.

**Results**
Reduction in on-site container inventory for storage and staff handling (one AGT format vs. four DPM components).

- Reduced total number of required raw-material release tests
- Gained formulation and mixing efficiencies due to single-component media and fast rehydration
- Reduced potential formulation errors (both on working floor and in QC)
Bioprocessing

Support at every step of the way

The unique demands of your business can only be met by working with a flexible, solutions-oriented partner who is focused on your success. Thermo Fisher Scientific is that partner. We offer integrated solutions across the workflow, custom packaging and media capabilities, and the ability to scale with you as your project grows. And our team of experienced professionals is ready to assist you in any way you need, whether with protocols, product transitions, or technical consultation.

Gibco cell culture
We offer a full array of innovative performance solutions and knowledge-based services, including:

- **Gibco™ PD-Express Services**—quality custom media development and optimization, including the Gibco™ Media Express™ custom media service

- **Multiple media formats**—including AGT media, dry powder media, liquid, and concentrated

**Thermo Scientific™ single-use technologies**
Our comprehensive suite of standard and custom-configured, single-use technologies includes rotary platforms as well as rigid and flexible containment solutions, such as bottles, flasks, pillow and 3D BPCs, transfer assemblies, cell factory systems, and cell culture bags. We also offer flexible control systems and bioreactors, both in rocking motion and stirred tank reactors.

**Purification solutions**
Our superior purification technology has been used in numerous commercial biotherapeutic downstream processes. Our affinity resins are available as a platform for purification of all AAV subtypes. We also offer affinity resins that are specially designed to purify AAV8 and AAV9 vectors. Combining the innovative CaptureSelect affinity technology and Thermo Scientific™ POROS™ large-pore beads allows for high-throughput chromatography of large biomolecules. Our proprietary technology provides high product purity in a single step while maximizing yield helping to simply the purification process. We offer a novel platform with scalable resins designed for bench-scale to process-scale purification of a range of viral vectors.

**Global facilities**
We have a large network of fully owned cGMP facilities, strategically located around the world to support our customers. These state-of-the-art, ISO-certified facilities help ensure that we can supply the highest-quality products to all of our customers globally, uninterrupted. Our team will work closely with you to understand your demand and set safety stocks to keep you on a steady path to success.

**Professional support**
Bioproduction teams provide support for early phases through commercial scale-up and scale-out; this includes access to a large global supply of cell therapy–ready ancillary materials, equipment, and consumables for small- to large-scale manufacturing; characterization platforms to help confirm product quality and safety; and process development and media development services to help you achieve your goals in a cost-effective, efficient way.

Learn more at [thermofisher.com/bioproduction](http://thermofisher.com/bioproduction)
Clinical trial support and cold-chain logistics

Experience, resources, and expertise to guide you on your path toward commercialization

We have the global infrastructure to enable our customers to seamlessly conduct clinical trials across multiple regions, while providing patients around the world with access to life-changing therapies.

**Kit production**
We design customized collection and administration kits to drive consistency and standardization. The kits can include patient-specific identification labels and collection containers designed for:

- Pre-manufacture collection of biological samples
- Patient administration
- Post-administration sample collection

**Secondary packaging and labeling**
We offer client-specific secondary packaging and labeling for clinical distribution.

- Patient-specific identification labels and collection containers
- Chain-of-custody documentation
- Just-in-time options available for rapid deployment worldwide

**Cold-chain logistics**
From collection through manufacture to final clinical-site delivery, we have the knowledge and equipment required for transport of cellular therapies at cryogenic temperatures anywhere in the world.

- Global fleet of qualified cryogenic shippers
- Certified and trained in cGMP practices
- All shipments prepared according to SOP
- Continuous monitoring

**GMP storage and monitoring**
We provide professional assistance in storing cell therapy products from ambient to cryogenic temperatures.

- 24-hour temperature and humidity monitoring
- Facilities equipped with both uninterrupted power supply (UPS) systems and one or more back-up generators
- On-call staff, day or night, monitoring for temperature deviations of any unit from its acceptable range
- 21 CFR Part 11–compliant inventory management system

**Qualification/validation services**
By validating processes and qualifying equipment, we help ensure that risk is minimized, material integrity remains intact, and regulatory requirements are met throughout the chain of custody.

- Pack-out configurations based on maximum transit times, shipping routes, payloads, and temperature requirements
- Testing of dry shippers using mock material loads in different thermal environments
- Real-time transit studies using mock payloads
- Comprehensive report of qualification data provided in a timely manner

Learn more at [fisherbioservices.com/market-solutions/cell-therapy](http://fisherbioservices.com/market-solutions/cell-therapy)
Success story: providing end-to-end clinical trial support, from cell collection through patient administration

**Situation**
A cell therapy company needed support for their complex Phase III trial. This multidose autologous therapy required blood samples from leukapheresis and tissue materials from patients in the US and Europe to be shipped to a manufacturing site in the US and distributed back to the 450 patients at 120 global clinical sites.

**Solution**
- Customized collection/shipping kits for temperature-specific, time-sensitive cell collection
- Short-term storage of material in GMP facility and management of cell-based API prior to manufacture
- Global cryogenic distribution to clinical sites using qualified equipment and validated processes to ensure compliance with global regulatory and quality standards

**Results**
- Project management support to develop customized solutions, fulfill client requests, and resolve challenges
- Reliable, reproducible chain of custody to ensure material integrity and viability
- Validated process to ensure consistency in each cell collection and distribution
- Cryogenic drug product management from point of manufacture to patient bedside

Learn more at fisherbioservices.com/market-solutions/cell-therapy
### Ordering information

<table>
<thead>
<tr>
<th>Cell type</th>
<th>Media and supplements</th>
<th>Growth factors and cytokines</th>
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<tbody>
<tr>
<td>MSC</td>
<td>CTS OpTmizer T Cell Expansion SFM&lt;sup&gt;1&lt;/sup&gt;</td>
<td>IL-2 Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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<tr>
<td>PSC</td>
<td>CTS OpTmizer T Cell Expansion SFM, no phenol red&lt;sup&gt;1&lt;/sup&gt;</td>
<td>IL-3 Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>NSC</td>
<td>CTS AIM V SFM&lt;sup&gt;1&lt;/sup&gt;</td>
<td>IL-4 Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>HSC</td>
<td>CTS AIM V Medium, (-) gentamicin sulfate, (-) phenol red, (-) streptomycin sulfate&lt;sup&gt;1&lt;/sup&gt;</td>
<td>IL-5 Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>CTS AIM V SFM&lt;sup&gt;1&lt;/sup&gt;</td>
<td>IL-6 Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>TNF-α Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>FLT3 Ligand Recombinant Human Protein&lt;sup&gt;3&lt;/sup&gt;</td>
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## Ordering information

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<tr>
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<th>PSC</th>
<th>NSC</th>
<th>HSC</th>
<th>Product</th>
<th>Quantity</th>
<th>Cat. No.</th>
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</table>
| Immune    |     |     |     |     | PDGF-BB Recombinant Human Protein
|           |     |     |     |     | M-CSF Recombinant Human Protein
|           |     |     |     |     | EGF Recombinant Human Protein
|           |     |     |     |     | TPO (Thrombopoietin) Recombinant Human Protein
| Growth factors and cytokines (cont.) |     |     |     |     |                                                    |          |            |
|           |     |     |     |     |                                                  |          |            |
| Extracellular matrices |     |     |     |     | CELLstart Substrate
|           |     |     |     |     | CTS Vitronectin (VTN-N) Recombinant Human Protein, Truncated
|           |     |     |     |     | rh-Laminin 521
|           |     |     |     |     |                                                    |          |            |
| Reagents |     |     |     |     | StemPro BM Mesenchymal Stem Cells
|           |     |     |     |     | StemPro Human Adipose-Derived Stem Cells
|           |     |     |     |     | CTS Dynabeads CD3/CD28
|           |     |     |     |     | CTS Dynabeads Treg Xpander
|           |     |     |     |     | CTS Dynabeads CD34 Positive Isolation Kit
|           |     |     |     |     | CTS DynaMag Magnet
|           |     |     |     |     | CTS GlutaMAX-I Supplement
|           |     |     |     |     | L-Glutamine
|           |     |     |     |     | CTS DPBS with calcium and magnesium
|           |     |     |     |     | CTS DPBS without calcium and magnesium
|           |     |     |     |     | CTS TrypLE Select Enzyme
|           |     |     |     |     | CTS Versene Solution
|           |     |     |     |     | CTS CytoTune-iPS 2.1 Sendai Reprogramming Kit
|           |     |     |     |     | PSC Definitive Endoderm Induction Kit
| Preservation media |     |     |     |     | CTS Synth-a-Freeze Medium
|           |     |     |     |     | CTS PSC Cryopreservation Kit
|           |     |     |     |     | CTS RevitaCell Supplement (100X)
|           |     |     |     |     | CTS Hibernate-A Medium
|           |     |     |     |     | CTS Hibernate-E Medium
|           |     |     |     |     | CTS PSC Cryomedium
|           |     |     |     |     |                                                    |          |            |
## Ordering information

<table>
<thead>
<tr>
<th>Product</th>
<th>Quantity</th>
<th>Cat. No.</th>
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<tbody>
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<td><strong>Suspension lentiviral production system</strong></td>
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<tr>
<td>LV-MAX Lentiviral Production System Starter Kit</td>
<td>For 0.3 L of LV vector production</td>
<td>A35684</td>
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<tr>
<td>LV-MAX Production Medium</td>
<td>1 L</td>
<td>A3583401</td>
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<tr>
<td>LV-MAX Transfection Kit</td>
<td>For 1 L of LV vector production</td>
<td>A35348</td>
</tr>
<tr>
<td>LV-MAX Lentiviral Packaging Mix</td>
<td>1.5 mL</td>
<td>A43237</td>
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<td>CTS LV-MAX Production Medium</td>
<td>1,000 mL</td>
<td>A4124001</td>
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<td>CTS LV-MAX Transfection Kit</td>
<td>1 L</td>
<td>A4132601</td>
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<tr>
<td><strong>LV-MAX production system components</strong></td>
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<td>LV-MAX Production Medium</td>
<td>1 L</td>
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<td>LV-MAX Transfection Kit</td>
<td>For 1 L of culture</td>
<td>A35348</td>
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<tr>
<td>Viral production cells</td>
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<td><strong>Transfection reagents</strong></td>
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<td>Lipofectamine MessengerMAX Reagent</td>
<td>1.5 mL</td>
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<td>Lipofectamine 3000 Transfection Reagent</td>
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<td><strong>Gene editing products</strong></td>
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<tr>
<td>TrueCut Cas9 Protein (Prototype)</td>
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<td>TrueCut Cas9 Protein v2 (1 mg/mL)</td>
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<td>LentArray Cas9 Lentivirus, 1 x 10⁸ TU/mL</td>
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<td>A32064</td>
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<tr>
<td>TrueGuide sgRNA, modified predefined</td>
<td>3 nmol</td>
<td>A35533</td>
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<tr>
<td>TrueGuide sgRNA, modified custom</td>
<td>3 nmol</td>
<td>A35534</td>
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<tr>
<td>LentArray Lentiviral sgRNA, 1 x 10⁸ TU/mL</td>
<td>200 μL</td>
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<td><strong>Electroporation devices</strong></td>
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<td>Neon Transfection System Starter Pack</td>
<td>1 starter pack</td>
<td>MPK5000S</td>
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<td><strong>Quality and safety testing</strong></td>
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<tr>
<td>MycoSEQ Mycoplasma Detection Kit</td>
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<td>resDNASEQ Human Residual DNA Quantitation</td>
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<td>CaptureSelect AVB Sepharose HP Leakage ELISA Kit</td>
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<td>CaptureSelect AAVX Ligand Leakage ELISA</td>
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<td>CaptureSelect AAV9 Ligand Leakage ELISA Kit</td>
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## Ordering information

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<td><strong>Thermo Scientific General Purpose Pro Centrifuges – CTS Series Complete validation packages</strong></td>
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<td>220 V, 60 Hz</td>
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<td>220-240 V, 50/60 Hz</td>
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<tr>
<td><strong>Factory acceptance compliance packages</strong></td>
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<td>120 V</td>
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<td>100 V</td>
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<td>Thermo Scientific Multifuge X4R Pro Cell Therapy Centrifuge Package CTS Series, Factory Acceptance Testing Documentation</td>
<td>220-240 V, 50/60 Hz</td>
<td>75009009</td>
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* Complete validation packages are only available in selected locations including the United States, Germany, France, the United Kingdom, Ireland, Spain, Portugal, Italy, Austria, Switzerland, Norway, Sweden, Denmark, and the Netherlands. For more information, contact your local representative.

---

## Ordering information

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* For In Vitro Diagnostic Use.
† For Research Use or Non-Commercial Manufacturing of Cell-Based Products for Clinical Research. CAUTION: Not intended for direct administration into humans or animals.
‡ For Research Use or Manufacturing of Cell, Gene, or Tissue-Based Products. CAUTION: Not intended for direct administration into humans or animals.
§ For Research Use Only. Not for use in diagnostic procedures.
†† For Research Use or Further Manufacturing. Not for diagnostic use or direct administration into humans or animals.
### Ordering information

<table>
<thead>
<tr>
<th>Product description</th>
<th>Electrical</th>
<th>Cat. No.</th>
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<tr>
<td><strong>Thermo Scientific CO₂ incubators</strong></td>
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<tr>
<td>Heracell VIOS 160i with Steri-Run high-temperature sterilization cycle and HEPA air filtration[^1]</td>
<td>120 V, 50–60 Hz</td>
<td>TC180</td>
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<tr>
<td></td>
<td>230 V, 50–60 Hz</td>
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<td>51030287</td>
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<td>Heracell VIOS 250i with Steri-Run high-temperature sterilization cycle and HEPA air filtration[^1]</td>
<td>120 V, 50–60 Hz</td>
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</tr>
<tr>
<td></td>
<td>230 V, 50–60 Hz</td>
<td>9.0 ft³ (255 L)</td>
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<tr>
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<td>120 V, 50–60 Hz</td>
<td>51030964</td>
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<tr>
<td>Heracell VIOS 160i with Steri-Run high-temperature sterilization cycle and HEPA air filtration[^1]</td>
<td>120 V, 50–60 Hz</td>
<td>IR180Si</td>
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<td>230 V, 50–60 Hz</td>
<td>5.8 ft³ (165 L)</td>
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<td>Heracell VIOS 250i with Steri-Run high-temperature sterilization cycle and HEPA air filtration[^1]</td>
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<td>230 V, 50–60 Hz</td>
<td>9.0 ft³ (255 L)</td>
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<tr>
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<td>120 V, 50–60 Hz</td>
<td>51030994</td>
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<td>230 V, 50–60 Hz</td>
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<td></td>
<td>100% copper</td>
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<tr>
<td>Forma Steri-Cult high-volume CO₂ incubators with HEPA filtration and high-temperature decontamination[^1]</td>
<td>115 V, 50–60 Hz</td>
<td>IR</td>
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<td></td>
<td>230 V, 50–60 Hz</td>
<td>11.4 ft³ (323 L)</td>
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<td>115 V, 50–60 Hz</td>
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<td>230 V, 50–60 Hz</td>
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<td>8.2 ft³ (232 L)</td>
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<td>230 V, 50–60 Hz</td>
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<td>115 V, 50–60 Hz</td>
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### Ordering information

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<th>Product</th>
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<td><strong>Thermo Scientific Forma Steri-Cult CO₂ Incubators – CTS Series</strong></td>
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<td>Electropolished Stainless Steel 8.2 cu. ft. (232.2 L), Factory Acceptance Testing Documentation, IQ/OQ Field Service</td>
<td>115V</td>
<td>3307CTS</td>
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<td>230V</td>
<td>3308CTS</td>
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<tr>
<td>Electropolished Stainless Steel 11.4 cu. ft. (322.8 L), Factory Acceptance Testing Documentation, IQ/OQ Field Service</td>
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<td>3310CTS</td>
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<tr>
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<tr>
<td><strong>Accessories</strong></td>
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<td>Smart-Vue Wireless Radio Module (North America only)</td>
<td>SV210-200-LSB</td>
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<td>Smart-Vue Temperature and CO₂ Sensor, 1 m cable length</td>
<td>SV406-200-LSB</td>
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<tr>
<td>Electropolished Stainless Steel Reinforced Shelf 11.4 cu. ft. (322.8 L)</td>
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[^1]: All models in the CTS Series come complete with IR CO₂ sensor, 4–20 mA data output, and electropolished stainless steel interior.

[^1]: Complete validation packages are only available in selected locations including the United States, Germany, France, the United Kingdom, Ireland, Spain, Portugal, Italy, Austria, Switzerland, Norway, Sweden, Denmark, and the Netherlands. For more information, contact your local representative.
## Ordering information

<table>
<thead>
<tr>
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<td>Thermo Scientific CryoMed Controlled-Rate Freezers – CTS Series*</td>
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<tr>
<td>Thermo Scientific CryoMed Controlled-Rate Freezer Cell Therapy Package</td>
<td>0.6 cu. ft. / 17 L</td>
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<td>120 v/60 Hz (NEMA 5-15P)</td>
<td>7450B</td>
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<tr>
<td>Documentation</td>
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<td></td>
<td>1.7 cu. ft. / 48 L</td>
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* These products are only available to customers in North America. For more information, contact your local representative.

## Ordering information

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<thead>
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<th>Product description</th>
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<tbody>
<tr>
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<tr>
<td>Herasafe 2030i, 0.9 m Class 2 A2 Biological Safety Cabinets</td>
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<td>Herasafe 2030i, 1.5 m Class 2 A2 Biological Safety Cabinets</td>
<td>Cross Beam UV-C, Factory Acceptance Package, IQ/OQ Field Service</td>
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<tr>
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<td>120 V, 60 Hz</td>
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<td>Cross Beam UV-C; Factory Acceptance Package; Indented Single-Piece Work Tray; Prep for 3x Service Taps (Rear Wall)</td>
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### Factory acceptance compliance packages

Complete validation packages*

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* Complete validation packages are only available in selected locations including the United States, Germany, France, the United Kingdom, Ireland, Spain, Portugal, Italy, Austria, Switzerland, Norway, Sweden, Denmark, and the Netherlands. For more information, contact your local representative.
References

Streamline your path to the clinic at thermofisher.com/celltherapy