

Cell culture

## Gibco sera—produced with a commitment to quality and innovation since 1962

Providing performance and consistency essential to successful cell culture

# Contents

A history of quality and innovation	3
Performance based on science, not geography	4
Choose the right FBS category for your research	5
Specialty FBS	7
iMATCH Sera Lot Matching Tool	8
Other animal sera	8
Why Gibco sera	9
Culture with confidence	12
Grow your cells in a sustainable way	13
FBS market dynamics	14
10 reasons to select our FBS	15



# Delivering reliable cell culture products for over 60 years

## A history of innovation

In 1962, Leonard Hayflick made the important discovery that there is a finite capacity for normal human cells to replicate in culture. This finding overturned a long-held belief about the potential immortality of cultured cells and has had far-reaching implications in life science research. That same year, Bob and Earline Ferguson, two biologists working from their garage in Grand Island, New York, recognized the business potential of supplying animal sera for research use. From this humble beginning, Gibco™ sera rose to the forefront of products supporting global life science research. Gibco™ cell culture products are now an important part of Thermo Fisher Scientific.

How did we become a world leader for sera, media, and reagents? The key to the success of Gibco products has always been their high quality, which helps reduce the number of unknowns that scientists may experience in their work. Across the global life science community, Gibco products have a reputation for reliability—allowing scientists to focus on more important things than troubleshooting cell culture problems.

In addition to supporting innovators in life science research, Thermo Fisher is a leading supplier to the global biopharmaceutical industry. Another important factor in our success is our steadfast commitment to both small and large laboratories, ranging from the research bench to production-scale facilities.

The original manufacturing site located in Grand Island, New York, is now just one of many manufacturing facilities worldwide that produce Gibco cell culture products. Through our commitment to quality, we continue to provide scientists with the reliability, service, value, and innovation that have made Gibco products a global market leader for over 60 years.



# Performance based on science, not geography

## Specifications, not origin, help drive consistent performance

We commissioned an independent research group to survey more than 500 researchers around the globe. This is what we learned:

- Only 7% of FBS users believe that country of origin is the most important indicator of FBS quality
- Almost 80% said they would purchase from categories that were clearly delineated by quality indicators (i.e., endotoxin, hemoglobin, growth performance, virus testing, etc.) that matter to their research

Based on these findings, we transformed the Gibco™ FBS portfolio into categories focused on quality indicators rather than origin. Now you can easily select the best serum for your needs based on how it performs, not where it came from. This also enables us to minimize supply disruption since there is less reliance on origin.



## FAQs about our new performance-based categories

### Why switch to performance-based categories?

- **Sustainable supply**—more supply through origin flexibility assists in minimizing supply disruption
- **Performance consistency**—more supply means more customer choice and more lots with the specifications they desire
- **Product continuity**—remove the hassle of updating protocols, which can be based on specifications, the true performance driver, and not part numbers

### Does the absence of origin-based categories mean you blend your serum?

No, we never blend our FBS; each lot has a distinct origin.

### Will origin go away?

No, it will remain visible on the label and CoA.

FBS origin remains essential as it helps define the health status of the animals from the country of collection. The health status controls serum applications and if it is permitted for import. Individual countries have different regulations for importation and these regulations are based on the health of the cattle populations within the exporting country. The health status of a country is determined by the World Organisation for Animal Health (WOAH), whose mission is to ensure transparency regarding global animal diseases.

# Choose the right performance-focused FBS for your research

We provide a simplified three-tiered offering—Gibco™ Value FBS, Premium FBS, and Premium Plus FBS—where each category is clearly delineated by relevant performance markers and testing levels to help ensure you can confidently select the right serum for your research.

## Value FBS

For standard research applications with up to 30 quality specification tests

## Premium FBS

Our most popular FBS product; high quality and exceptional value with up to 60 quality specification tests

## Premium Plus FBS

Our highest-quality FBS for use with the most sensitive cells; up to 70 quality specification tests, including our lowest levels of endotoxin and hemoglobin release specifications

### Value FBS

Description	Unit size	Cat. No.	Reference*
Fetal Bovine Serum, Value, One Shot format	50 mL	A5209401	FBS, USDA-approved regions, 500 mL (Cat. No. 10437028)
Fetal Bovine Serum, Value, One Shot format	50 mL case pack	A5209402	
Fetal Bovine Serum, Value	500 mL	A5256701	
Heat Inactivated, Fetal Bovine Serum, Value, One Shot format	50 mL	A5209501	
Heat Inactivated, Fetal Bovine Serum, Value, One Shot format	50 mL case pack	A5209502	
Heat Inactivated, Fetal Bovine Serum, Value	500 mL	A5256801	

### Premium FBS

Description	Unit size	Cat. No.	Reference*
Fetal Bovine Serum, Premium, One Shot format	50 mL	A5670401	FBS, qualified, US origin, 500 mL (Cat. No. 26140079)
Fetal Bovine Serum, Premium, One Shot format	50 mL case pack	A5670402	
Fetal Bovine Serum, Premium	500 mL	A5670701	
Heat Inactivated, Fetal Bovine Serum, Premium, One Shot format	50 mL	A5670501	
Heat Inactivated, Fetal Bovine Serum, Premium, One Shot format	50 mL case pack	A5670502	
Heat Inactivated, Fetal Bovine Serum, Premium	500 mL	A5670801	

### Premium Plus FBS

Description	Unit size	Cat. No.	Reference*
Fetal Bovine Serum, Premium Plus, One Shot format	50 mL	A5669401	FBS, certified, US origin, 500 mL (Cat. No. 16000044)
Fetal Bovine Serum, Premium Plus, One Shot format	50 mL case pack	A5669402	
Fetal Bovine Serum, Premium Plus	500 mL	A5669701	
Heat Inactivated, Fetal Bovine Serum, Premium Plus, One Shot format	50 mL	A5669501	
Heat Inactivated, Fetal Bovine Serum, Premium Plus, One Shot format	50 mL case pack	A5669502	
Heat Inactivated, Fetal Bovine Serum, Premium Plus	500 mL	A5669801	

\* Our previously offered catalog numbers.

## FBS quality control release criteria

Analysis	Description	Value FBS	Premium FBS	Premium Plus FBS
Quality	<b>Endotoxin</b> Directly related to the quality of collection and processing of serum; the higher the level, the more introduction to gram-negative bacteria	≤20 EU/mL	≤10 EU/mL	≤5 EU/mL
	<b>Haemoglobin/hemoglobin</b> Indicator of proper and/or improper collection and processing of blood and/or serum	≤25 mg/dL	≤25 mg/dL	≤20 mg/dL
	Appearance	✓	✓	✓
	Sterility: bacterial and fungal testing	✓	✓	✓
	Osmolality	✓	✓	✓
	pH	✓	✓	✓
	Mycoplasma: supplemental testing (H-stain)	✓	✓	✓
	Mycoplasma	✓	✓	✓
	Country of origin confirmation	✓	✓	✓
	Oritain™ testing (origin confirmation)		✓	✓
Biochemical and hormonal profile	<b>Biochemical</b> Alkaline phosphatase, ALT, AST, bicarbonate, bilirubin (total), BUN, BUN/creatinine ratio, calcium, chloride, cholesterol, creatinine, GGPT, glucose, HDL, iron, iron saturation, LDH, LDL, phosphorous (inorganic), potassium, sodium, TIBC, triglycerides (TG), uric acid		✓	✓
	<b>Hormonal</b> Estradiol, insulin, progesterone, testosterone, thyroxine (T4)		✓	✓
Virus	<b>Serology</b> BVDV serum neutralization titer (Ab)		✓	✓
	<b>Serology</b> Anti-BVDV antibody test (EMA lots only)			✓
	<b>Virus (9 CFR)</b> Bluetongue virus, bovine adenovirus, bovine parvovirus, bovine viral diarrhoea virus, bovine respiratory syncytial virus (BRSV), rabies virus, reovirus Cytopathogenic agents, including bovine herpesvirus 1 (BHV-1/BR) Haemadsorbing agents, including bovine parainfluenza virus 3 (PI-3)	✓	✓	✓
	<b>Virus (EMA)</b> Bluetongue virus, bovine adenovirus, bovine parvovirus, bovine viral diarrhoea virus, bovine respiratory syncytial virus (BRSV), rabies virus, reovirus Cytopathogenic agents, including bovine herpesvirus 1 (BHV-1/BR) Haemadsorbing agents, including bovine parainfluenza virus 3 (PI-3)			✓
	<b>USDA safety testing</b> Bluetongue virus (Mexican and Australian origin)	✓ (Mexican only)		✓ (AUS only)
	<b>USDA safety testing</b> Akabane virus (Australian origin only)			✓ (AUS only)
Protein electrophoresis and analysis	<b>Identification</b> Electrophoretic profile	✓	✓	✓
	<b>Identification</b> Bovine gamma globulin (≤500 mg/L)	✓	✓	✓
	<b>Protein</b> Albumin, alpha globulin, beta globulin, total protein	✓	✓	✓
<b>Performance</b>	Relative growth promotion (RGP), relative cloning efficiency (RCE), relative plating efficiency (RPE)	✓	✓	✓
<b>Documentation</b>	Certificate of Suitability (TSE CEP)		✓	✓

Important to note that our FBS is sourced from BSE-negligible countries.



## Did you know?

**9 CFR virus testing:** virus panel testing according to Code of Federal Regulations (CFR), Title 9, Part 113.53(c) [113.46, 113.47]; detected by fluorescent antibody

**Biochemical and hormonal profiling:** quantification of biochemical and hormonal (estradiol, insulin, progesterone, testosterone, and thyroxine) profiling that may have an impact on cell culture

**European Medicines Agency (EMA) virus testing:** virus panel testing according to EMA/CHMP/BWP/457920/2012 Part 7.3.1 and 7.3.2 and EMEA/CVMP/743/00 Part 4.3.3; detected by fluorescent antibody; conducted on selected lots

**Fingerprinting technology (origin confirmation):** a proprietary technology for Gibco sera to confirm FBS origin and eliminate the potential for counterfeit product

**Heat-inactivated FBS:** heated for 30 minutes at 56°C with mixing to inactivate complement proteins that are part of the immune response

**Gamma-irradiated FBS:** the most commonly used postmanufacturing approach for viral reduction in animal serum through exposure to gamma radiation

# Specialty FBS

These sera are designed for specialty applications and sensitive cell culture, including stem cell research, cancer research, reporter assays, immunoassays, and more.

Specialty sera	Description	Ideal for studying these research areas*
<b>MaxSpec FBS</b>	<ul style="list-style-type: none"> <li>• Our highest-quality FBS, meeting selective specifications to help provide consistent, reproducible results</li> <li>• Best-in-class endotoxin specifications: <math>\leq 1</math> EU/mL</li> <li>• Additional cell culture proliferation assessment using six widely used cell lines</li> </ul>	<ul style="list-style-type: none"> <li>• Vaccines</li> <li>• Therapeutic research</li> <li>• Diagnostic research</li> <li>• And other demanding research applications</li> </ul>
<b>Charcoal Stripped FBS</b>	<ul style="list-style-type: none"> <li>• Reduced lot-to-lot variability on hormone levels, which helps eliminate some of the influences that steroids and other components have on cells</li> <li>• Growth assay using Vero cells</li> </ul>	<ul style="list-style-type: none"> <li>• Hormones or hormone receptors (androgens, estrogens, progesterone)</li> <li>• Cytotoxic drug response</li> <li>• Cellular signaling and reporter assays</li> <li>• Tumor cells</li> </ul>
<b>Ultra-low IgG FBS</b>	<ul style="list-style-type: none"> <li>• IgG levels are less than 5 <math>\mu\text{g/mL}</math>; bovine viral diarrhea (BVD) antibody titer is low and not detectable</li> </ul>	<ul style="list-style-type: none"> <li>• Antibodies</li> <li>• Viruses and viral response</li> <li>• Cell-surface epitopes</li> </ul>
<b>Dialyzed FBS</b>	<ul style="list-style-type: none"> <li>• Dialyzed by tangential flow filtration utilizing 10,000 molecular weight (MW) cutoff filters</li> <li>• Performance tested for cloning and plating efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Proteomics</li> <li>• Isotope labeling</li> <li>• Cellular signaling and reporter assays</li> </ul>
<b>ES Cell-Qualified FBS</b>	<ul style="list-style-type: none"> <li>• Specially tested for the ability to sustain undifferentiated ES cells while maintaining karyotype integrity, leukemia inhibitory factor (LIF) responsiveness, and pluripotency markers</li> <li>• New improved screening with germline-competent PRX129/X1 mESC line using a predictive assay that measures plating efficiency and pluripotency maintenance</li> <li>• High consistency between lots, with proven applications in iPSC generation and PSC culture</li> </ul>	<ul style="list-style-type: none"> <li>• Induced pluripotent stem cells (iPSCs)</li> <li>• Cellular reprogramming</li> <li>• Embryonic stem cells (ESCs)</li> <li>• Embryonic development</li> </ul>
<b>MSC-Qualified FBS</b>	<ul style="list-style-type: none"> <li>• Performance tested using standard 14-day MSC CFU-F assay</li> <li>• Each lot is tested against an in-house FBS reference standard using cells from a master cell bank of MSCs from normal bone marrow donors, which helps ensure lot-to-lot consistency</li> </ul>	<ul style="list-style-type: none"> <li>• Mesenchymal stem cells (MSCs)</li> <li>• Mesenchymal stromal cells</li> <li>• Osteogenesis</li> <li>• Chondrogenesis and cartilage</li> <li>• Collagen and other extracellular matrices (ECM)</li> <li>• Adipose tissue and adipogenesis</li> </ul>
<b>Exosome-Depleted FBS</b>	<ul style="list-style-type: none"> <li>• <math>\geq 90\%</math> of exosomes depleted</li> <li>• Complex manufacturing process that retains the nutrients your cells need</li> <li>• Full quality testing for sterility, mycoplasmas, performance, and endotoxins</li> </ul>	<ul style="list-style-type: none"> <li>• Exosomes and extracellular vesicles</li> <li>• MicroRNA</li> <li>• Cell-cell communication</li> </ul>
<b>Tet System-Approved FBS</b>	<ul style="list-style-type: none"> <li>• Functionally tested to provide researchers with optimal control over their gene expression systems, thus minimizing challenges that can be posed by this type of reagent</li> <li>• Delivers a quick workflow, reduced background noise, and more control and consistency</li> </ul>	<ul style="list-style-type: none"> <li>• Neuroscience</li> <li>• Cancer</li> <li>• Drug screening</li> <li>• Vaccine development</li> <li>• Gene editing</li> </ul>

\* These results are based on a review of approximately 10,000 publications using the six Specialty FBS products that Thermo Fisher offers. These terms were given by the MeSH taxonomy based on the full text of the paper.

Learn more at [thermofisher.com/specialtyfbs](https://thermofisher.com/specialtyfbs)



## Did you know?

You can maintain your cell cultures in standard FBS and introduce Specialty FBS in the critical days prior to running assays to enable optimal control over your experiment.

# iMATCH Sera Lot Matching Tool

## Skip FBS testing to save time, money, and frustration

Sera can often have variations in composition from one lot to the next. Minimize these challenges and drive consistency using our one-of-a-kind matching tool, which can help you find an excellent lot of serum for your research.

With the [Gibco™ iMATCH™ Sera Lot Matching Tool](#), you can find the right sera **two ways**:

**1** Answer a few quick questions to find your ideal match  
[Get started](#)

**2** Search based on Gibco FBS lot number  
Enter Gibco FBS Lot # (Ex. 2115850RP) [Search lot](#)

Regardless of the option you choose, the iMATCH Sera Lot Matching Tool can help you find a consistent, high-performing serum lot available for your research—all without having to test.

“My lab would spend 3 to 4 weeks testing numerous lots of FBS to find that ideal one. I started noticing when we got good lot matches through the iMATCH tool, our cells’ reaction and performance were consistent every time. Now, we have confidence to buy our FBS without having to test, based on the results from this tool.”

—Stem cell researcher from a European biotech company



### Did you know?

All sera represent an undefined mixture in which composition can vary from one lot to the next, which can make it difficult to get consistent results. There are more than 1,000 different components found in serum.

Start matching now at [thermofisher.com/imatch](https://thermofisher.com/imatch)

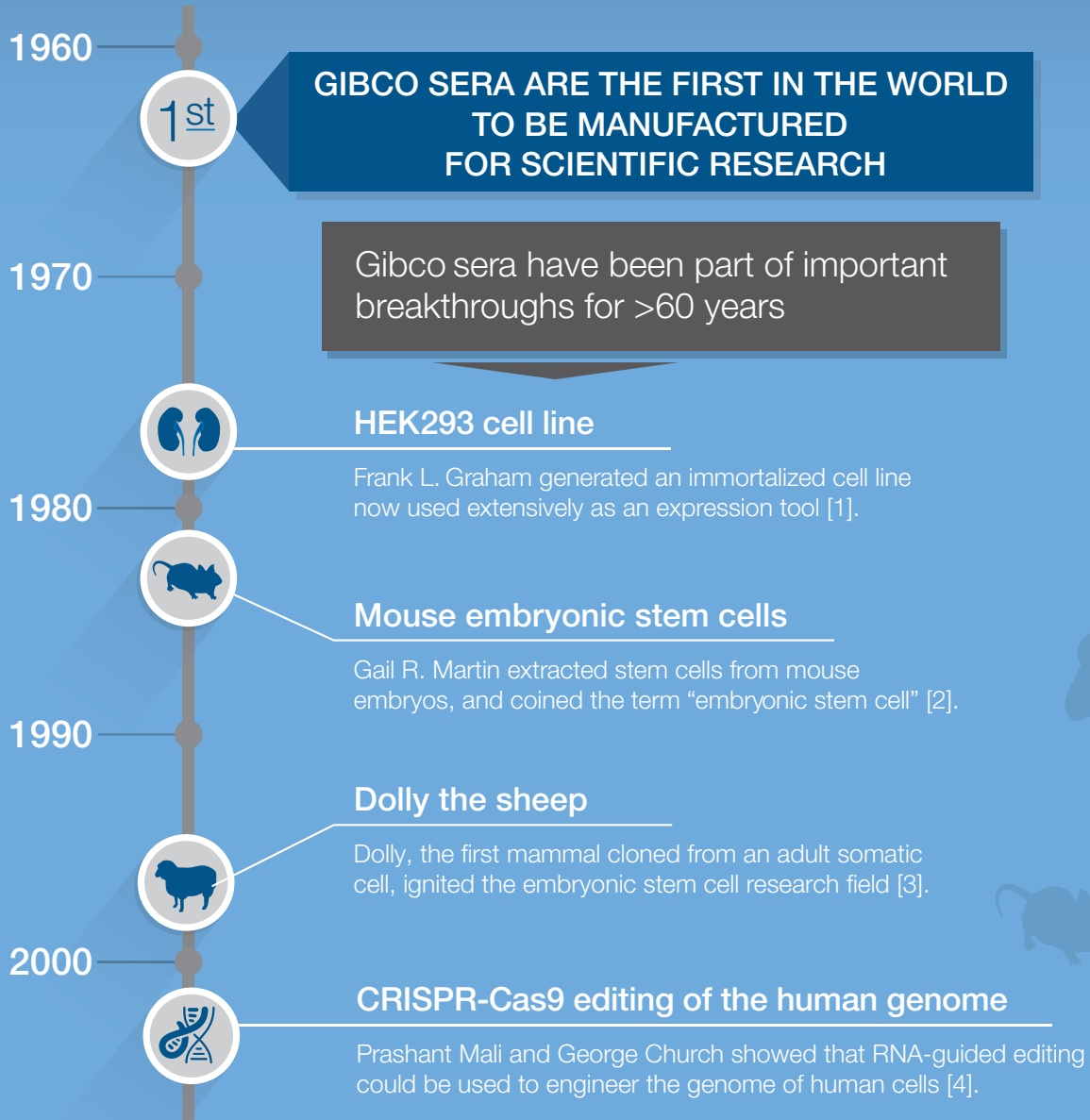
## Other animal sera

Although FBS is the most commonly used serum product, many other products provide lower-cost alternatives. These include bovine serum, horse serum, newborn calf serum, goat serum, rabbit serum, lamb serum, porcine serum, and chicken serum. Learn if these products are right for your research at [thermofisher.com/otheranimalsera](https://thermofisher.com/otheranimalsera).




# Scientists worldwide recommend Gibco sera more than any other sera

Delivering the performance and consistency scientists demand



## GIBCO PRODUCTS ARE BACKED BY:

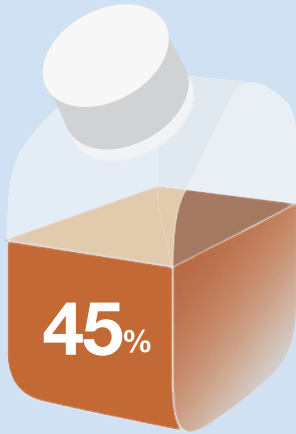
### SUPERIOR QUALITY

Up to **70**   
quality tests per batch

**>200**   
customer audits yearly

Awarded the International Serum Industry Association (ISIA) traceability certification in February 2014

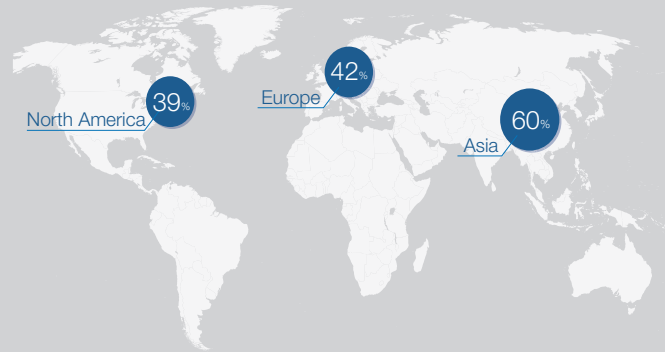
## GIBCO SERA ARE THE MOST CITED SERA IN GLOBAL SCIENTIFIC JOURNALS



Our sera account for  
45% of all FBS citations\*

>110,000 citations and counting

Across the globe, Gibco sera account for  
the highest percentage of citations compared  
to all other serum brands\*



## IT'S ALSO THE MOST TRUSTED SERUM

Used by 14 of the top 15 pharma companies



## A COMMITMENT TO INNOVATION



### The right design

Ergonomic bottle  
makes pipetting easier



### The right tools

iMATCH Sera Lot Matching Tool:  
Find our most consistent, highest-performing  
serum lot available, without having to test



### The right size

50 mL Gibco™ One Shot™ format  
of FBS\*\* is ideal for ease of use  
and convenience

\* From 2006 to 2019.

\*\* One Shot FBS is not available in all regions.

# VERTICALLY INTEGRATED FINISH-AT-SOURCE MANUFACTURING PROCESS

## Blood collection



Unlike most FBS suppliers, we invest in our own collectors, who obtain the majority of our supply (a by-product of the beef industry) straight from government-approved facilities with clinically examined healthy animals under veterinary supervision, using only the strictest aseptic collection techniques.

## Raw serum conversion



At our processing facilities we conduct numerous quality checks, such as testing for hemoglobin levels, to verify that the integrity of the product is maintained.

## Sterile filtration and processing



FBS is transferred to a clean room in specially designed stainless steel pipes where it undergoes 0.1  $\mu\text{m}$  triple filtration to minimize biological contaminants.

## Dispensing



Sterile-filtered serum is immediately and aseptically bottled and undergoes virus/quality testing before clearing quality control (QC).

## Gibco FBS



OFFERS A HIGH LEVEL OF **TRACEABILITY AND QUALITY**

**MINIMIZED RISK OF CONTAMINATION OF FINAL PRODUCT**

## Culture with confidence

Thermo Scientific™, Invitrogen™, and Gibco™ products—  
optimized to help make your research and purchase experience easier

We offer a wide selection of cell culture tools from our product brands, which are used in every area of cell biology research. Find out more about partnering with us to help accelerate your research and review our full catalog of cell culture products, services, and instruments at [thermofisher.com/bettertogether](http://thermofisher.com/bettertogether).



### Did you know?

All our cell culture products (media, reagents, plastics, and sera) are validated together every day at Thermo Fisher R&D labs around the world. This enables confidence in product compatibility for optimal cell growth and viability.

## Analyze for confidence

Don't take our word for it—analyze your results  
to help ensure you can culture with confidence

We have the tools that can enable you to analyze your cells to help ensure you're getting the results you need in your research. Make sure your cells are happy and healthy with Invitrogen™ Countess™ automated cell counters and Invitrogen™ EVOS™ cell imaging systems.

The Invitrogen™ Countess™ 3 Automated Cell Counter provides cell culture labs accurate, simple, quick, and affordable brightfield cell counts to enable them to prepare for downstream applications and culture splitting. Learn more at [thermofisher.com/countess](http://thermofisher.com/countess).

EVOS systems are easy to use and suitable for cell culture applications. See our full selection and what they can offer your lab at [thermofisher.com/evos](http://thermofisher.com/evos).



# Grow your cells in a sustainable way

## Cell culture solutions that can help your lab reduce its carbon footprint

Cell culture comprises a routine workflow that inherently has a high level of waste—from packaging and plastic waste to energy consumption. Thermo Fisher is committed to designing our products with the environment in mind. The selections highlighted below are some of our more popular sustainable cell culture products; [visit this page](#) to see our full line of greener product alternatives.

### Gibco™ media bottles

Green benefits:

- **Fewer resources**—up to 39% less material
- **Sustainable packaging**—increased recyclability
- **Decreased fuel consumption** and greenhouse gas emissions for transport



### Gibco™ BenchStable™ media

Green benefits:

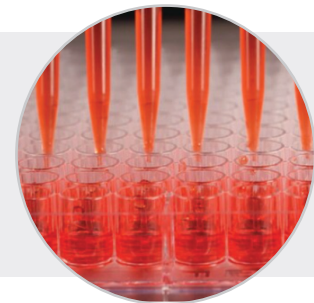
- **Energy efficient**—ambient-temperature storage
- **Sustainable packaging**—increased recyclability



### Thermo Scientific™ Nunc™ Edge™ 2.0 96-well plates

Green benefit:

- **Less waste and use of fewer resources**—up to 9% less plastic waste and 37.5% more useful capacity



### FBS One Shot format 50 mL bottle

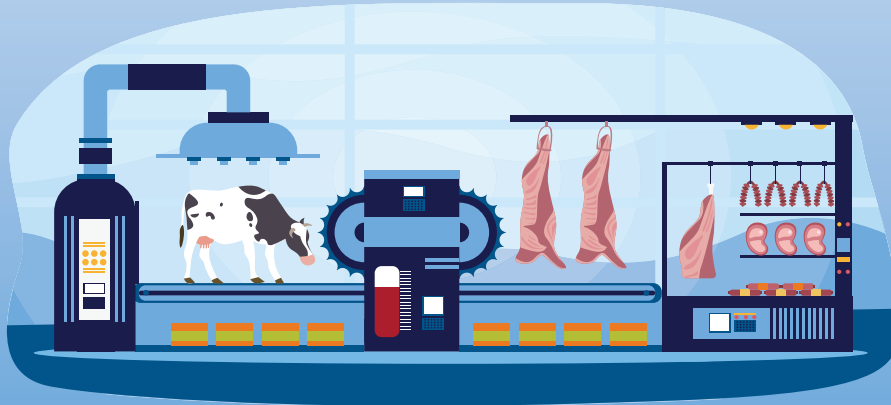
Green benefit:

- **Less waste and use of fewer resources**—33% less waste compared to aliquotting



Learn more about our sustainable solutions at [thermofisher.com/sustainability](https://thermofisher.com/sustainability)

## FBS market dynamics



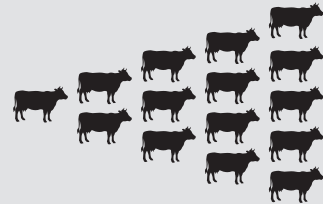
Demand for FBS products has no direct impact on the supply of upstream raw materials, but it does influence cost. Supply is finite because FBS is a byproduct of harvesting cattle for the meatpacking industry.

## Key drivers of supply and demand

**Drought**, high feed cost, high beef demand, and geopolitical issues (i.e., climate change, war, etc.) **can reduce supply.**



**Herd rebuilding**, which normally occurs after a severe drought, **can take 2–4 years.**



## Why do FBS prices fluctuate constantly?



Although the quality and integrity of FBS can be monitored and regulated, fetal bovine serum is still a byproduct of the meat industry. Therefore, FBS cost and supply is difficult to manage. Within recent years, the price of FBS has increased significantly in response to growing demand and restricted availability.

Watch the video at [thermofisher.com/fbsbasics](https://thermofisher.com/fbsbasics)

# 10 facts that make Gibco FBS stand out from other sera suppliers



## References

1. Graham FL et al. (1977) Characteristics of a human cell line transformed by DNA from human adenovirus type 5. *J Gen Virol* 36(1):59–74.
2. Martin G (1981) Isolation of a pluripotent cell line from early mouse embryos cultured in medium conditioned by teratocarcinoma stem cells. *Proc Natl Acad Sci USA* 78(12):7634–7638.
3. Wilmut I et al. (1997) Viable offspring derived from fetal and adult mammalian cells. *Nature* 385(6619):810–813.
4. Mali P et al. (2013) RNA-guided human genome engineering via Cas9. *Science* 339(6121):823–826.

All products may not be available in all regions due to importation regulations.  
Contact your sales representative regarding product availability in your country.

 Learn more at [thermofisher.com/fbs](https://thermofisher.com/fbs)

**For Research Use or Further Manufacturing Use Only. Serum and blood proteins are not for direct administration into humans or animals.** © 2018–2023 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. Oritain is a trademark of Oritain Global Limited Company New Zealand.  
**COL35781 0923**

**gibco**