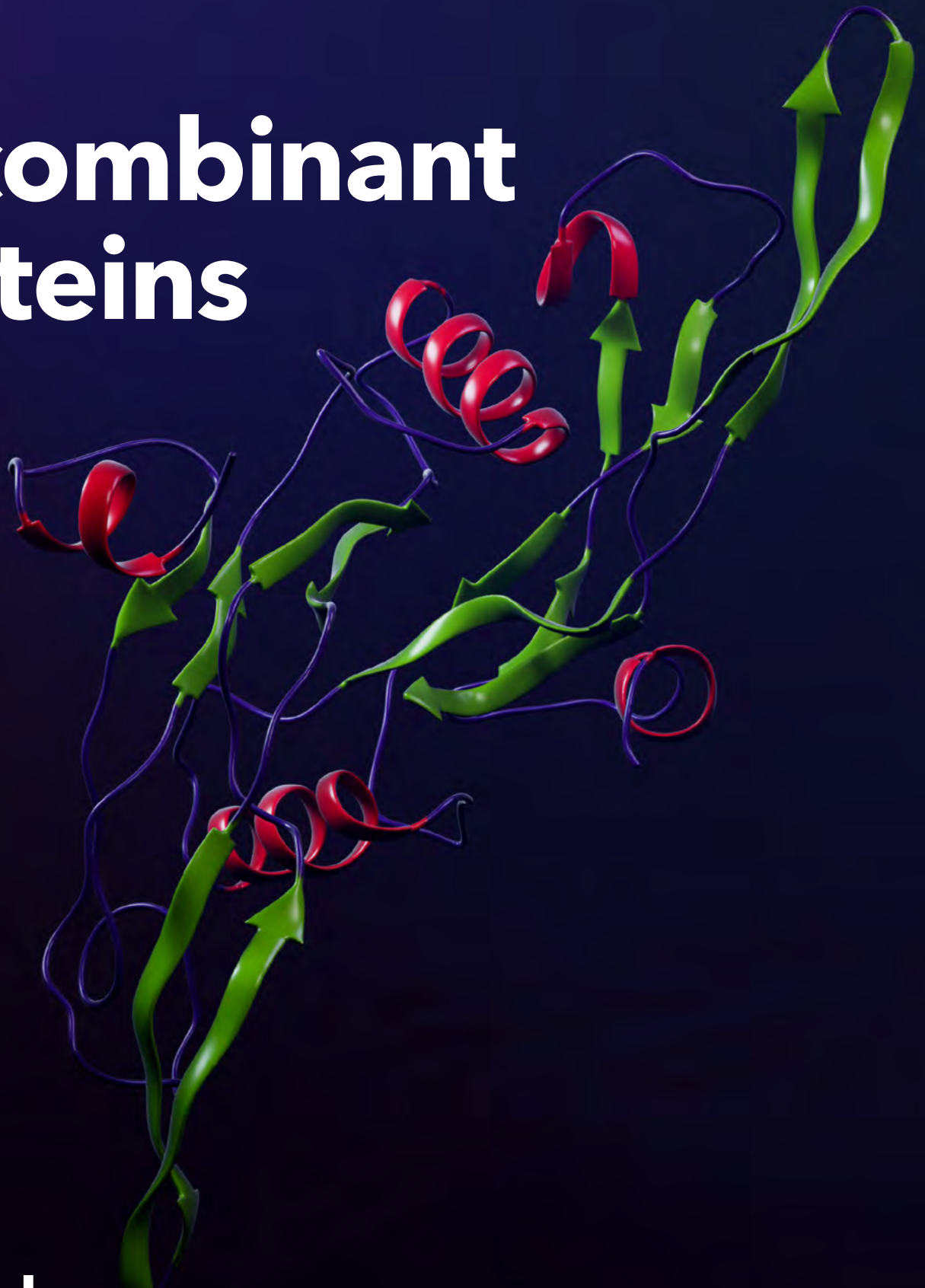


Recombinant Proteins



biotechne®

Setting the Standard in Proteins for Almost **40 years**

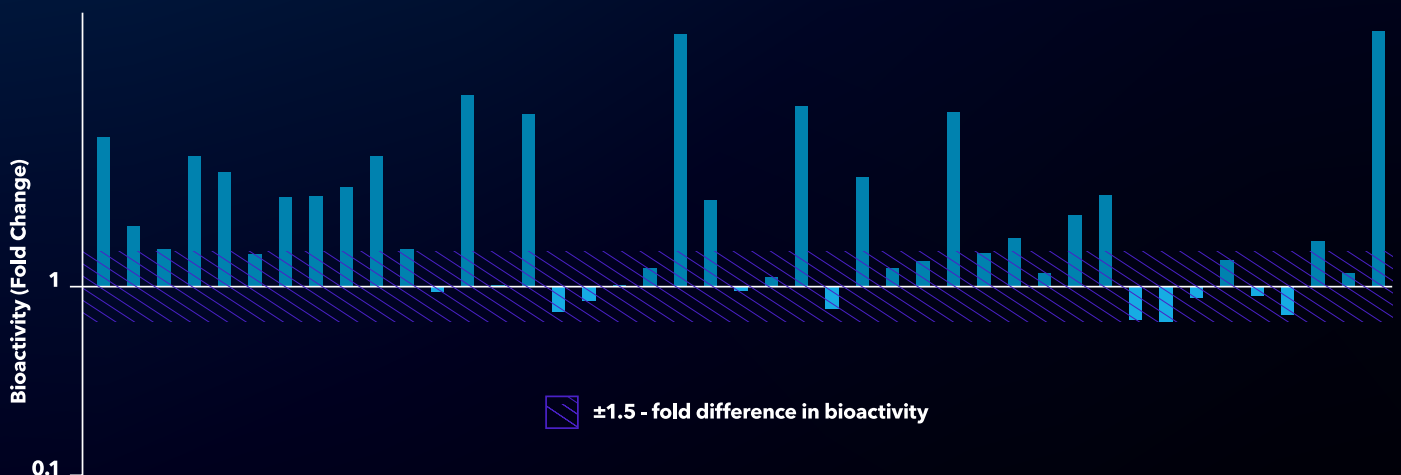
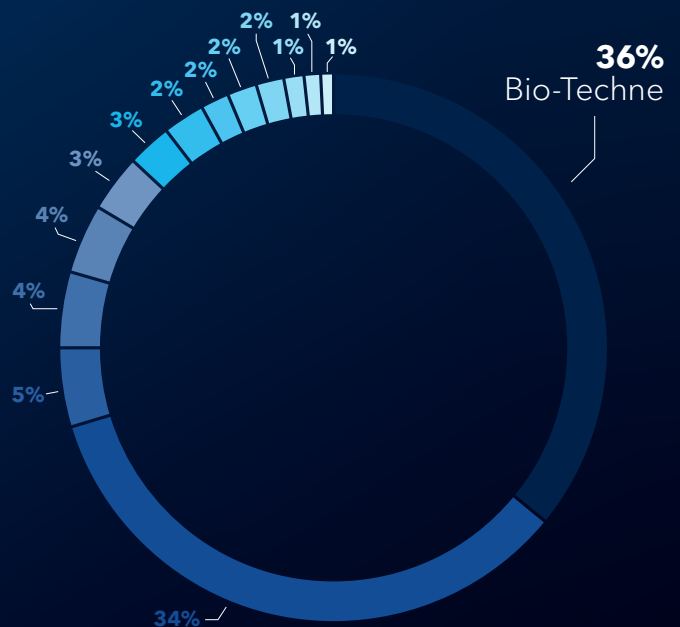
All of our R&D Systems-brand proteins by Bio-Techne are produced by scientists – for scientists, so we understand that producing recombinant proteins is about generating the reliable tools that researchers need to thrive. We manufacture more than 95% of our proteins. It give us complete control over all aspects of production, so nothing becomes a Bio-Techne protein that does not meet our industry-leading specifications.

Trusted by Research

In a survey of more than 800 publications covering proteins in areas of cancer, immunology, neuroscience and stem cell research, 36% cited use of Bio-Techne proteins, greater than any other single protein manufacturer.

Leading the Way in Bioscience

Bio-Techne recombinant proteins were compared with those from other manufacturers in side-by-side bioassays. Over half of the 43 tested Bio-Techne proteins exhibited 1.5-fold or higher bioactivity, compared to competitor proteins.



First Class Products and Services

We understand that experimental outcomes can be limited by the performance of your protein. That is why the focus on quality starts at the birth of each Bio-Techne protein.

During product development our optimization process involves analysis of protein sequence, expression system, and formulation to ensure we provide proteins with the best possible bioactivity and performance.

We are proud that Bio-Techne experience and dedication to protein development and manufacturing is unmatched in the life science industry.

Our quality commitment does not stop with our products. Wherever you are in the world, you can access our highly trained technical service staff and the scientists responsible for protein development, so we can answer any questions you might have.

The Four Pillars of Bio-Techne Quality

1

BIOACTIVITY

Biological activity assays, based on the available scientific literature, are developed for each protein we produce. Each new lot has to pass our strict QC activity parameters before it is released to the market.

2

CONSISTENCY

You can be sure of the reliability of our proteins because of our rigorous QC and production standards. Each new lot is compared to the previous for bioactivity, purity and endotoxin level.

3

STABILITY

We constantly monitor the condition of our proteins to check for long term performance. Our proteins are shipped lyophilized or in specially optimized formulations, so each recombinant protein reaches you in perfect condition.

4

PURITY

Be confident that the results obtained in your experiments are not due to contaminants. The majority of our proteins have >95% purity and have guaranteed industry-leading endotoxin level of ≤ 0.1 EU/ μ g (established by LAL assay).

Covering the Research Areas You Need At Every Step

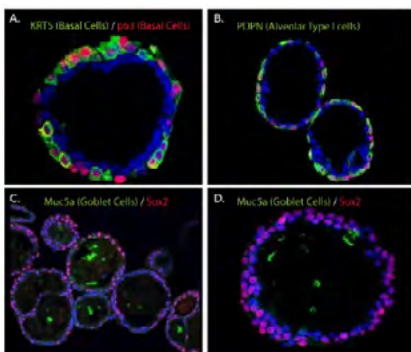
What is important to you in a recombinant protein? Is it the species, the activity, available size, expression system or documentation?

Every research question is unique and so requires a unique solution. That is why the range of Bio-Techne recombinant proteins give you the choices to tailor the right protein solution to your research.

By listening to the scientists we serve, Bio-Techne produces the protein tools that are the most useful to you.

From immunology to apoptosis, neuroscience to cancer research – our protein catalogue spans the widest range of research areas. This ensures that Bio-Techne is your partner for all recombinant protein needs – whatever your research goals.

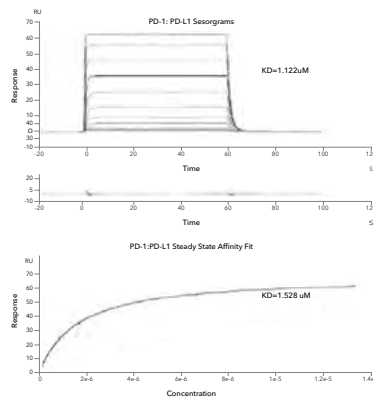
STEM CELLS



Culture and Characterization of Adult Stem Cell-derived Human Lung Organoids.

Adult stem cells isolated from human lung biopsy tissue were embedded in **Cultrex UltiMatrix RGF Basement Membrane Extract** (Catalog # BME001-05) and cultured for 20-60 days in lung organoid expansion medium, which includes **R-Spondin 1** (Catalog # 4645-RS), **Noggin** (Catalog # 6057-NG) **FGF-7** (Catalog # 251-KG), and **FGF-10** (Catalog # 345-FG), along with the other reagents listed in the lung organoid expansion medium recipe in the human lung organoid culture protocol. Lung organoids were able to differentiate and exhibit markers for various cell types of the lung. Lung organoids were stained with **(A)** a Rabbit Anti-Human Cytokeratin 5 (KRT5) Monoclonal Antibody (Catalog NB110-56916; green) and a Goat Anti-Human p63/TP73L Polyclonal Antibody (Catalog # AF1916; red) to visualize basal cells, **(B)** a Hamster Anti-Mouse Podoplanin (PDPN) Monoclonal Antibody (Catalog # NB600-1015; green) to visualize alveolar type I cells and a Goat Anti-Human p63/TP73L Polyclonal Antibody (Catalog # AF1916; red) to visualize basal cells, and **(C, D)** a Mouse Anti-MUC5AC Monoclonal Antibody (Catalog # NBP2-15196; green) to visualize Goblet cells and a Mouse Anti-Human/Mouse/Rat SOX2 Monoclonal Antibody (Catalog # MAB2018; red). All samples were counterstained with DAPI (Catalog # 5748; blue).

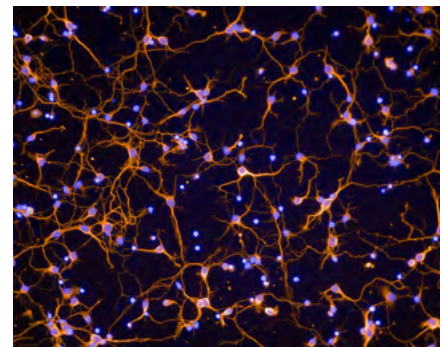
IMMUNOLOGY



Affinity Measurements and Binding Kinetics of the PD-1:PD-L1 Interaction by Surface Plasmon Resonance.

Sensorgram data of captured **Avi-tag Biotinylated PD-L1 His tag** (Catalog # AV19049) binding to **PD-1 His tag** (Catalog # 8986-PD). The corresponding overlaid kinetic fits with the residual plot shown below. The concentration of PD-1 His-tag ranged from 3.2 nM to 13.2 μM. The corresponding steady state affinity fit is shown below. The experiment was performed on a **BiacoreT200**, GE Healthcare.

NEUROSCIENCE



Recombinant Mouse Meteorin CATALOG # 3475-MN

Immunofluorescent image of E16-E18 stage rat cortical neurons treated with Meteorin (10 ug/uL) to induce neurite outgrowth. Cells were stained with a nuclear stain (Blue, DAPI) and beta-III Tubulin (Red, Cat# MAB1195).

The Format You Need – For Your Research and Clinical Applications

As research projects evolve – from basic research to pre-clinical applications, the requirements for your reagents also evolve. The availability of key reagents in the format you need can influence the pace of your discovery.

With over 30 years of experience in producing the most trusted natural and recombinant proteins, Bio-Techne produces proteins in a range of formats that give you choice and flexibility whatever your requirements.

Research Grade

Designed for the researcher, we offer a wide selection of cytokines, growth factors, enzymes, and drug targets. Often these are available with different tags, biotinylation, or fluorescent conjugation.

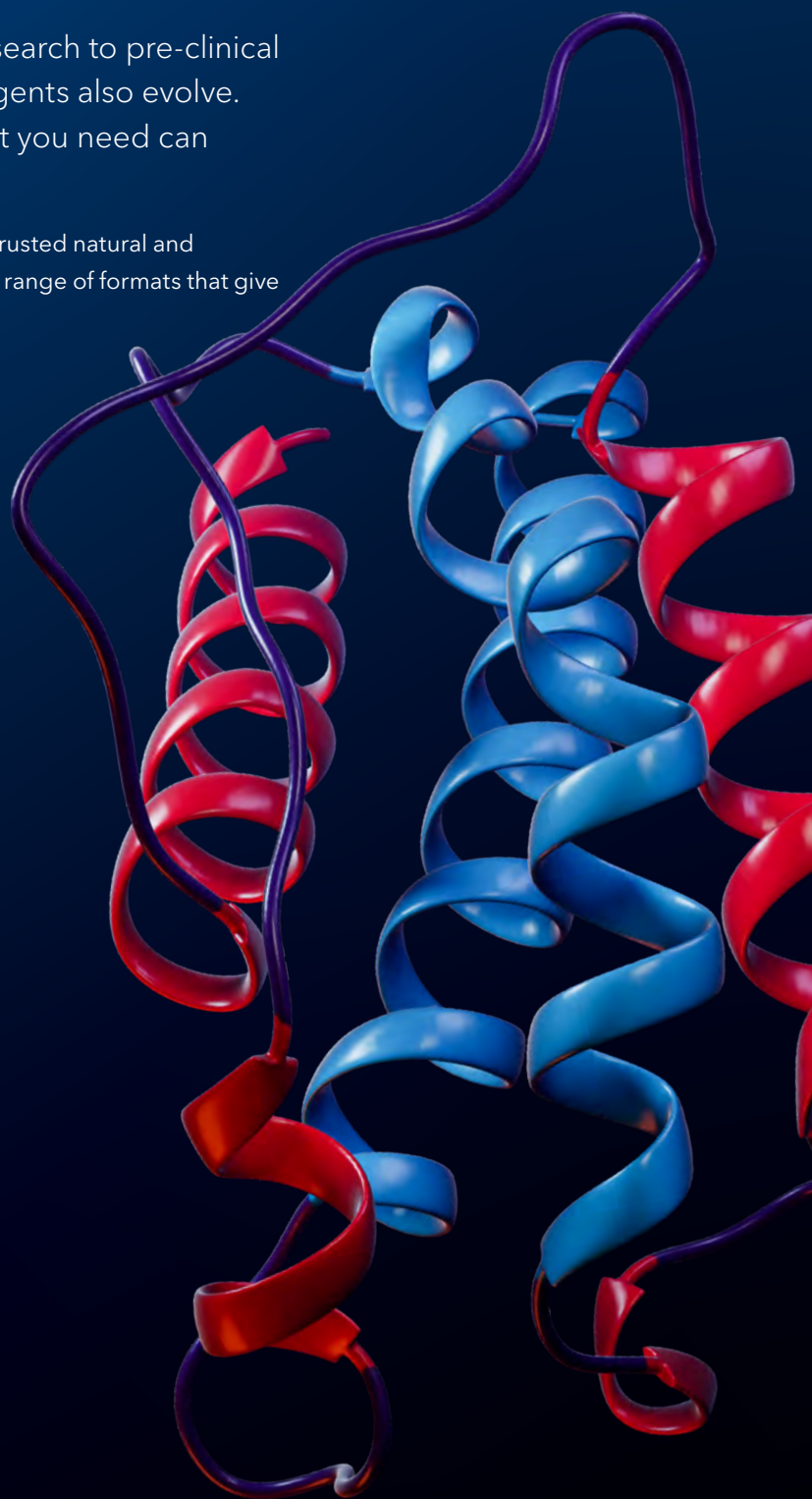
Animal-Free Manufacturing Conditions

For those interested in pursuing clinical applications in cell therapy or minimizing ethical and safety issues associated with animal-derived reagents. These proteins are made in the same facility and have the same specifications as our GMP proteins allowing for smooth transitions to clinical manufacturing.

Good Manufacturing Practices (GMP) - Grade

Meeting regulatory guidelines for use in clinical manufacturing in immune cell and regenerative medicine-based cell therapies. To find out more about our wide range of GMP-grade proteins see page 6.

Learn More // bio-techne.com/reagents/proteins



GMP-Grade Proteins

Benefits of Our GMP Facilities

- Entirely dedicated to cytokines and growth factors used in cell therapy manufacturing
- All animal-free facility
- Capacity to meet supply needs now and in the future
- ISO 5/7/8 cleanrooms for the entire production process
- ISO 9001:2015 and ISO 13485:2016 Quality Management Systems
- Additional Facilities, Quality & Regulatory [Information](#)

Totally Animal-Free

Bio-Techne uses a strict definition of animal-free. Some may label a protein animal-free even when there are animal components in the manufacturing process. Be confident when we call something animal-free.

- Animal-Free RUO proteins are made exclusively in E. coli
- Produced in dedicated, controlled-access, animal-free laboratories
- Animal-free media and equipment used in the manufacturing process
- Proteins are NOT exposed to potential contamination by animal components at any point during the production process
- Animal-free statements required for incoming materials

For Clinical Applications

These reagents meet regulatory guidelines as ancillary materials for cell therapy manufacturing. They are designed with consistency and scalability in mind. GMP proteins come with full quality and regulatory support and Bio-Techne understands the importance of partnership as you advance through clinical trials and commercialization.

Full Document and Traceability

All proteins are produced in our ISO-9001:2008 and ISO 13485:2003 facilities. All are supported by extensive documentation with quality and regulatory oversight. Drug master files are available.

Ideal for Transitional Research

We also offer Research Use Only (RUO) Animal-Free proteins produced in the same animal-free GMP facility. These RUO animal-free proteins share the same biological activities as our GMP-grade proteins, easing the process of transition from pre-clinical to clinical applications.

[Learn More //](#)
bio-techne.com/gmp-products/gmp-proteins

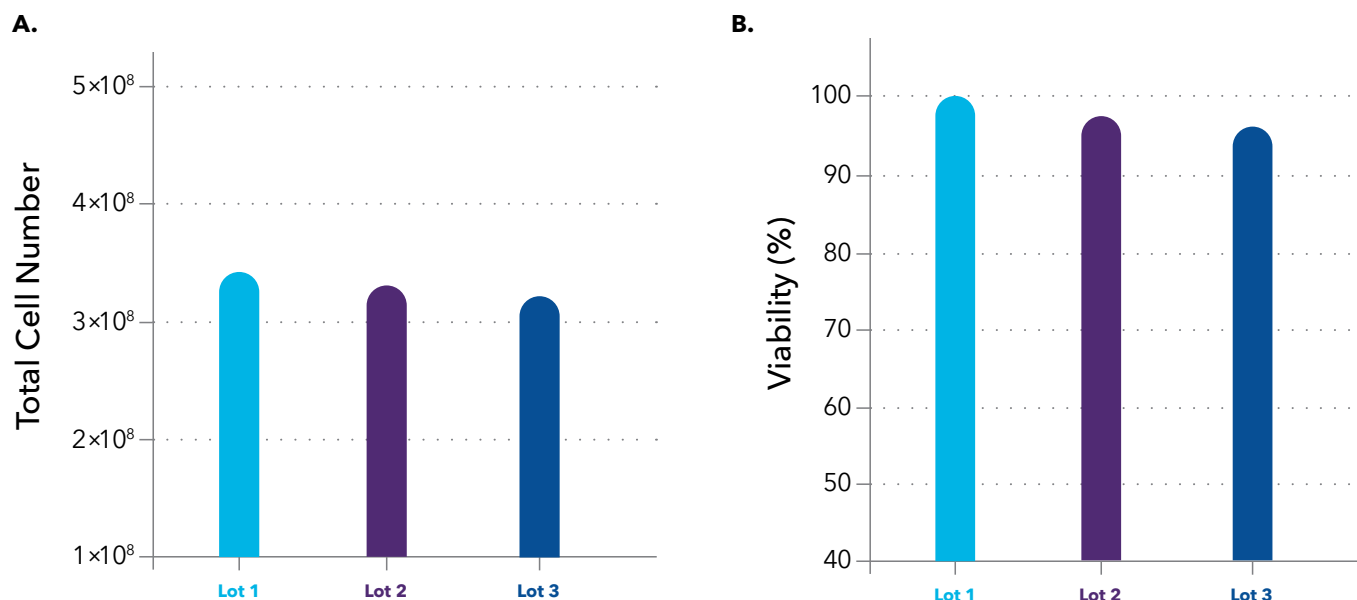


GMP-Grade Proteins: Consistency Data Highlighted with G-Rex

T Cell Yield and Viability After G-Rex® Culture in Media Containing GMP IL-7 & IL-15

Quality is Key

Bio-Techne understands that consistency is a key characteristic of cytokines and growth factors used in clinical manufacturing. New GMP lots must not only meet the indicated specifications for activity, but also must match the activity of master lots maintained by Bio-Techne. This lot-to-lot consistency is highlighted below in a T cell isolation assay using a G-Rex cell culture device from Wilson Wolf, part of our ScaleReady joint venture with Fresenius Kabi.



CD4⁺ and CD8⁺ T cells isolated from a human donor were cultured in a G-Rex® 6M Well Plate (ScaleReady) containing media with one of three lots of GMP-grade IL-7 and IL-15 (Catalog # BT-007-GMP and Catalog # BT-015-GMP). The average (A) cell yield and (B) cell viability for each lot of cytokines were determined by flow cytometry on day 14. This data shows around a 60-fold expansion of the cells after G-Rex culture with GMP-grade IL-7 and IL-15.

G-Rex® is a registered trademark of Wilson Wolf Corporation. This data is not yet available on the Bio-Techne website.

[Learn More // https://www.scaleready.com/product/gmp-cytokines-for-cell-therapy-manufacturing/](https://www.scaleready.com/product/gmp-cytokines-for-cell-therapy-manufacturing/)

Bulk Quantities

Quality Protein on the Scale You Need

Ordering Bio-Techne recombinant proteins in bulk delivers the same quality proteins you know and expect, but at the perfect price and scale for your research. We have the ability to scale up protein production to meet your large scale needs. Ask us about bulk availability in either liquid or lyophilized formats. With our new GMP facility, large lot sizes minimize the need for bridging lots.

Learn More //

bio-techne.com/services/bulk-quotes

Custom Protein Services

Apply Our Experience to Your Research

When your research demands unique proteins or specialist solutions, Bio-Techne can be your partner to achieve your aims. Since 1985, Bio-Techne has produced proteins to meet the highest development and purification standards and as part of Bio-Techne, we share expertise spanning laboratory research, pre-clinical studies, and reagents for manufacturing diagnostic tests.

Harnessing our decades of product development experience, our specialist protein solutions and custom services provide the unique tools and reagents.

Expertise and Communication

All projects start with an extensive consultation to capture all the specific project and performance requirements.

A team is assembled from our expert research and development scientists, manufacturing engineers, and project management staff.

Together, our expert team will work with you to deliver the protein that meets your required specifications.

From Cloning to Purification

From the initial cloning to the choice of expression systems and purification method - we can cater to any level of specification. Harness our specialist animal free and GMP grade protein facilities for your custom protein production.

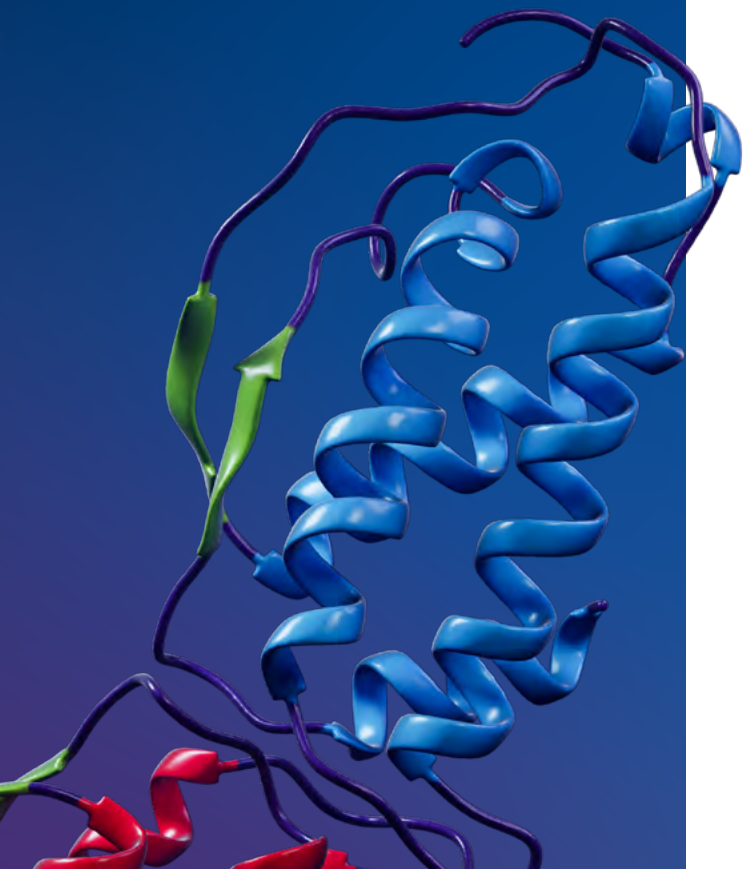
Protein Modification and Processing

We can tailor *in vitro* modification and processing to meet your needs. Avi-tagged biotinylation, PEGylation, proteolytic cleavage and fluorokines are just some of the modifications available.

Expert Bioactivity Testing

No company matches the bioassay experience of Bio-Techne. We have over 900 established bioassays available to test proteins, small molecules and antibodies.

Learn More // bio-techne.com/services/custom-protein-services



Constantly Striving for **Great Performance**

We know that scientific progress doesn't stand still, and in developing research solutions neither do we.

From the daily challenges of the laboratory, changing reagent demands and emerging scientific trends, we are constantly challenged by our customers to solve their research demands.

Providing the best reagents and solutions to meet your challenges is at the heart of Bio-Techne mindset. Using our expertise and experience we develop innovative protein reagent and kits to help you solve your important scientific questions.

Protein Process Engineering

From innovative cell culture and purification techniques to engineering proteins with enhanced characteristics, we employ industry leading protein biochemistry to create innovative new products.

Bioactivity –So What?

You may think that all recombinant proteins are created equally, but using poorly performing proteins in your experiments could be wasting your precious research budget.

Better performing protein means you need to use less, therefore saving you money.

Learn More // bio-techne.com/reagents/proteins



Specialized Proteins

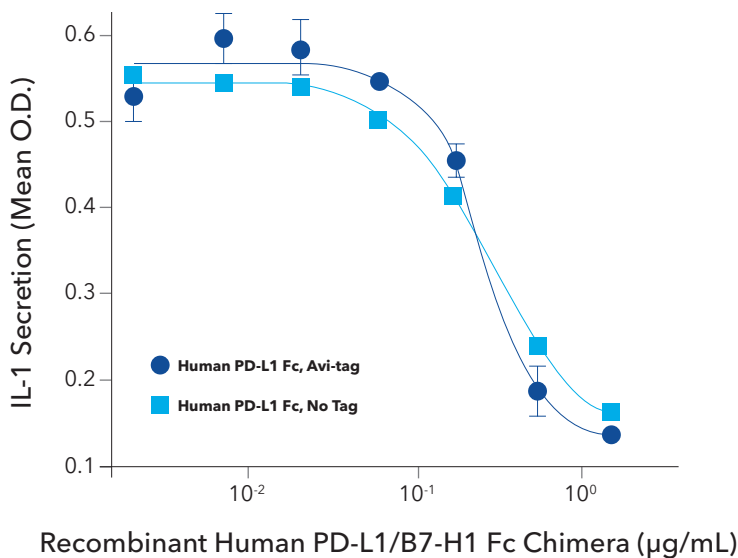
Avi-Tag Biotinylation and Fluorescent Conjugation

Bringing You the Best Solutions

All Bio-Techne proteins and products are born with the demands of our customers in mind, as they are developed by experienced researchers.

To make sure we bring only the best protein products to life, we use the latest science and technology, which ensures they are relevant and useful scientific tools.

Biotinylated Proteins and Fluorescent-labeled Proteins (Fluorokines)



Unlabeled and Avi-tag Biotinylated Recombinant Human PD-L1/B7-H1 Display Comparable Bioactivity.

Human T lymphocytes were treated with the indicated concentrations of either unlabeled PD-L1/B7-1 Fc Chimera (Catalog # 156-B7; green line) or Avi-tag Biotinylated PD-L1/B7-H1 Fc Chimera (Catalog # AVI156; orange line). IL-2 secretion was measured in cell culture supernatants using the Human IL-2 Quantikine® ELISA Kit (Catalog # D2050). The similarity in the activities of the two proteins highlights that the Avi-tag biotinylated protein is fully functional.

Bio-Techne offers a huge selection of avi-tag and amine-biotinylated proteins to fit your research needs.

What are Bio-Techne Fluorokines™ and how can I use them for my research?

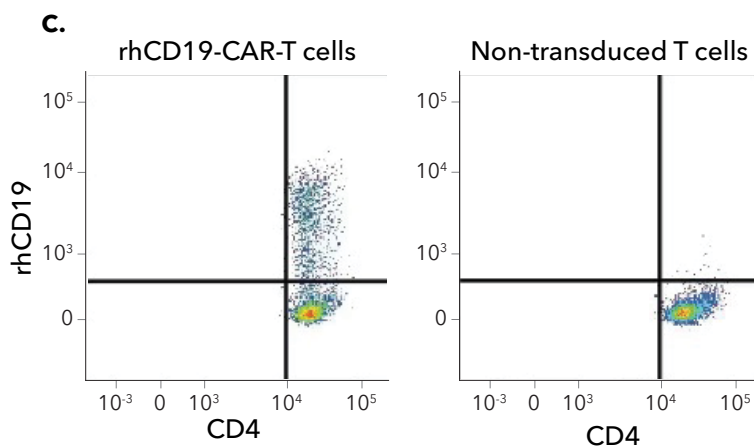
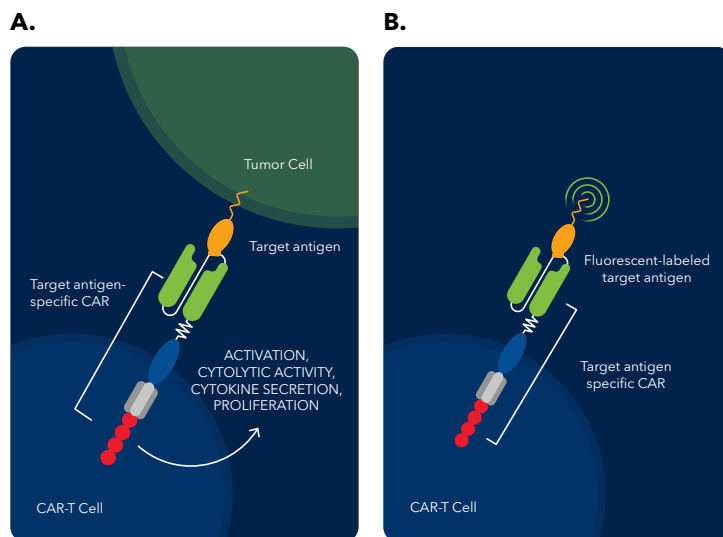
Fluorokines™ are fluorescent-labeled recombinant proteins that are used to directly stain and detect target molecules using flow cytometry. We offer a line of fluorescent CAR targets that can be used in flow cytometry and offer greater specificity than antibodies or Ig-labeling reagents. Fluorescent-labeled Covid targets and immune checkpoint targets are also available. These reagents undergo rigorous testing to ensure consistent labeling across lots.



Try our Fluorokines™
for your CAR T, SARS-
CoV-2, and immune
checkpoint research.

Learn More //

Scan the QR Code or Visit:
[bio-techne.com/reagents/
proteins/fluorokines-fluorescent-
labeled-proteins](https://bio-techne.com/reagents/proteins/fluorokines-fluorescent-labeled-proteins)



Demonstration of the Utility of Fluorokines for Evaluating CAR Expression.

(A) CAR-T cell therapy is based on the principle that T cells removed from a patient or donor can be genetically engineered to express a specific chimeric antigen receptor (CAR). Once these CAR-T cells are infused back into the patient, the CAR will bind to its specific target antigen on the surface of the patient's tumor cells, activating the T cells, and allowing them to attack and destroy the tumor cells. **(B)** T cells expressing the CAR can be directly stained using a Fluorokine (fluorescent target antigen) and the percentage of CAR-expressing cells can be detected by flow cytometry. **(C)** CD4+CD8+ T cells were transduced with a hCD19-CAR (left) or not transduced (right). Cells were stained with a PE-Cy7-CD4 and CD19 Fc Chimera Atto 488 Protein (Catalog # ATJ9269), and detected by flow cytometry.

Where Science Intersects Innovation®

Bio-Techne® | R&D Systems™ Novus Biologicals™ Tocris Bioscience™ ProteinSimple™ ACD™ ExosomeDx™ Asuragen®

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