

# Shenandoah CTGrade Recombinant Human GM-CSF

Optimize Cell Proliferation and Function for Immunotherapy

CTGrade rh GM-CSF (granulocyte macrophage-colony stimulating factor) is a recombinant human protein that is produced from *E. coli* and is designed to support preclinical and clinical research, as well as commercial applications, and offers:

- High biological activity verified by a relevant bioactivity assay
- Low endotoxin levels
- $\geq 98\%$  purity
- High lot-to-lot consistency



## Making the Right Decision the First Time

When designing robust cell and gene therapy processes, making the right decision the first time is critical for delivering therapies to market.

Shenandoah CTGrade interleukins and growth factors are formulated to reduce variability and ensure predictable workflow performance in the proliferation and differentiation of T cells, natural killer (NK) cells, B cells, and chimeric antigen receptor (CAR T) cells.

Together with our unparalleled regulatory guidance and assurance of expected performance, CTGrade interleukins and growth factors help cell and gene therapy developers proactively deliver the full promise of their discoveries.



# Achieve Predictable Workflows and Reduce Variability with CTGrade Interleukins and Growth Factors

The predictability and performance of CTGrade interleukins and growth factors help cell and gene therapy developers accelerate delivery of life-changing therapies to market.

The biological activity of CTGrade interleukins and growth factors is standardized, where applicable, to WHO International standards, providing cell and gene therapy developers consistent, lot-to-lot biological activity and performance.

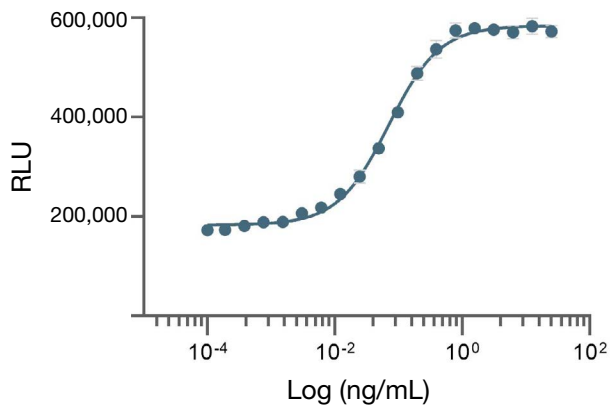
The CTGrade products are manufactured in a facility that does not use or process beta-lactam containing materials. No animal- or human-derived materials were used during manufacturing or as ingredients. These products are manufactured, tested, and released in an ISO 9001:2015 certified facility following cGMP practices. USP chapter <1043> for ancillary materials has been considered in the manufacture of these products.

GM-CSF is a hematopoietic growth factor due to its ability to form colonies of granulocytes and macrophages.

- Enhances the number of circulating white blood cells and function of neutrophils and monocytes
- Regulates multiple functions via transcription factors in the differentiated cells, including cell survival, proliferation, and maturation
- Generates *in vitro* murine and human DC populations from bone marrow precursors and blood monocytes, respectively
- Lacks cross-reactivity with human and mouse GM-CSF

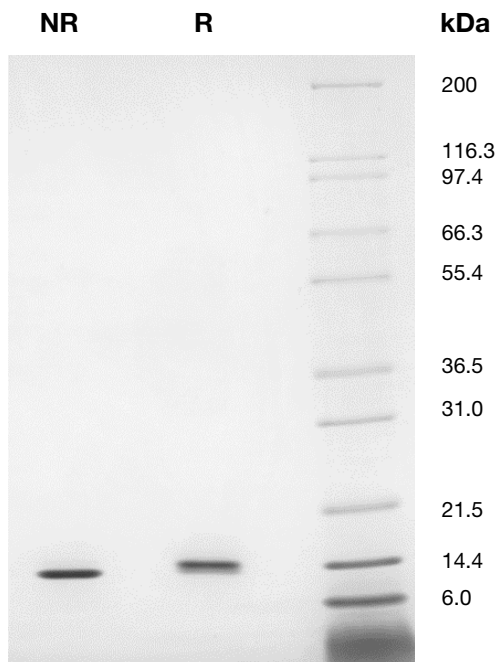
# Drive Scale-up Readiness with Performance-based Solutions

## Cell-Based Proliferation Assay



**Figure 1.** The biological activity of CTGrade rh GM-CSF was determined in TF-1 cell-based proliferation assay.

## SDS-PAGE Showing a Single Prominent Band at 14.6 kDa



**Figure 2.** CTGrade rh GM-CSF (1  $\mu$ g) was resolved with SDS-PAGE under non-reducing (NR) and reducing (R) conditions and visualized by InstantBlue staining showing a single prominent band at 14.6 kDa

## Shenandoah CTGrade Recombinant Protein Ordering Information

Product Description	Catalog #	Size*	Additional Info
CTGrade rh GM-CSF	500-11	50 µg 100 µg 1 mg	Provided in lyophilized form.

### Related Products

Product Description	Catalog #	Size*	Additional Info
PRIME-XV Dendritic Cell Maturation CDM	91146	500 mL	Chemically defined, animal component-free formula. Does not contain antibiotics or phenol red.
PRIME-XV Hematopoietic Cell Basal XSBM	91211	500 mL	Xeno-free, serum-free HSC basal medium.
DME High Glucose w/o L-Glutamine	9024	500 mL 1 L	Contains 4,500 mg/L glucose, 3,700 mg/L sodium bicarbonate. Does not contain L-glutamine.
DME High Glucose	9031	500 mL 1 L	Contains 4,500 mg/L glucose, 3,700 mg/L sodium bicarbonate, L-glutamine.
Water for Injection	9309	1 L	Bottle packaging.

\* Custom sizes and packaging available on request.

To discuss your requirements, contact us at [getinfo@irvinesci.com](mailto:getinfo@irvinesci.com)  
Or visit our website at [www.irvinesci.com/contact-us](http://www.irvinesci.com/contact-us)

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Value from Innovation

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