Miltenyi Biotec

# Human GM-CSF
## premium grade

| | |
|---|---|
| 10 µg | 130-093-864 |
| 50 µg | 130-093-865 |
| 100 µg | 130-093-866 |
| 500 µg | 130-093-867 |
| 1000 µg | 130-093-868 |

## Contents



## 1. Description

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|---|---|
| **Components** | **Human GM-CSF, premium grade:** Purified recombinant human granulocyte macrophage colony stimulating factor. |
| **Size** | 10 µg, 50 µg, 100 µg, 500 µg, 1000 µg. |
| **Biological activity** | The $ED_{50}$ is ≤0.2 ng/mL* corresponding to a specific activity of ≥$5\times10^6$ I.U./mg. |
| **Primary structure** | Single, non-glycosylated polypeptide chain (127 amino acid residues). |
| **Molecular mass** | 14.5 kDa. |
| **Source** | Produced in *E. coli*. |
| **Product format** | Lyophilized from a 0.2 µm filtered buffer solution. |
| **Stabilizer** | None. |
| **Purity** | >97% as determined by SDS-PAGE analysis. |
| **Endotoxin level** | Low endotoxin (<1.0 EU/µg cytokine) as determined by Limulus Amebocyte Lysate (LAL) assay. |
| **Storage** | Lyophilized Human GM-CSF, premium grade should be stored at –20 °C. The expiration date is indicated on the vial label. Upon reconstitution aliquots should be stored at –20 °C. Avoid repeated freeze-thaw cycles. |
| **Reconstitution** | It is recommended to reconstitute lyophilized Human GM-CSF with deionized sterile-filtered water to a final concentration of not less than 100 µg/mL. ▲ **Note:** Addition of carrier protein, such as 0.1% bovine serum albumin (BSA) or human serum albumin (HSA) may have stabilizing effects. Further dilutions should be prepared with 1% BSA or HSA in phosphate-buffered saline (PBS). |

* The $ED_{50}$ is determined by proliferation assay using TF-1 cells according to Kitamura *et al.*[1]. The proliferation assay was calibrated with the international standard for human GM-CSF (NIBSC code 88/646) provided by the WHO/National Institute for Biological Standards and Control.

### 1.1 Background information

Human granulocyte macrophage colony stimulating factor (GM-CSF) is a hematopoietic growth factor that is essential for proliferation and development of granulocyte and monocyte/macrophage progenitors. It also functions as a growth factor for erythroid and megakaryocytic precursor cells in conjunction with erythropoietin. GM-CSF is secreted by various cell types including T cells, macrophages, endothelial cells, and fibroblasts in response to inflammatory stimuli and cytokines. In addition, GM-CSF is a potent chemoattractant for neutrophils and eosinophils and enhances the effector functions of neutrophils and macrophages.

### 1.2 Applications

Human GM-CSF can be used for a variety of applications, including:

- Cultivation of hematopoietic progenitor cells from human bone marrow in semi-solid medium.
- *In vitro* generation of Mo-DCs (e.g. together with IL-4)[2].
- *In vitro* differentiation of $CD34^+$ cells towards eosinophils[3].
- Migration assays for eosinophils[4].

Optimal concentration for a specific application should be determined by a dose-response experiment.

## 2. References


1. Kitamura, T. *et al.* (1989) Establishment and characterization of a unique human cell line that proliferates dependently on GM-CSF, IL-3, or erythropoietin. J. Cell Physiol. 140: 323–334.
2. Kandler, K. *et al.* (2006) The anti-microbial peptide LL-37 inhibits the activation of dendritic cells by TLR ligands. Int. Immunol. 18: 1729–1736.
3. Ulfman, L. H. *et al.* (2008) Homeostatic intracellular-free $Ca^{2+}$ is permissive for Rap1-mediated constitutive activation of $\alpha_4$ integrins on eosinophils. J. Immunol. 180: 5512–5519.
4. Muessel, M. J. *et al.* (2008) CCL11 and GM-CSF differentially use the Rho GTPase pathway to regulate motility of human eosinophils in a three-dimensional microenvironment. J. Immunol. 180: 8354–8360.


All protocols and data sheets are available at **www.miltenyibiotec.com**.




140-002-354.05



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