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1. Description

Components	Human GM-CSF, research grade: Purified recombinant human granulocyte macrophage colony stimulating factor.
Size	10 µg, 50 µg.
Biological activity	The ED ₅₀ is ≤0.5 ng/mL* corresponding to a specific activity of ≥2×10 ⁶ IU/mg.
Primary structure	Single, non-glycosylated polypeptide chain (127 amino acid residues).
Molecular mass	14.5 kDa.
Source	Produced in <i>E. coli</i> .
Product format	Lyophilized from a 0.2 µm filtered buffer solution.
Stabilizer	Trehalose and mannitol.
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, research 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 or below. 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 0.1–1.0 mg/mL in a minimal volume of 100 µL. Further dilutions should be prepared with 0.1% bovine serum albumin (BSA) or human serum albumin (HSA) in phosphate-buffered saline.

* The ED₅₀ 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 eosinophils³.
- Migration assays for eosinophils⁴.

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 Ca²⁺ is permissive for Rap1-mediated constitutive activation of α₄ 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.

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