Human Macrophage Colony Stimulating Factor (hM-CSF)

**Source:** Recombinant human M-CSF (hM-CSF) Glu33-Ser190 (Accession #P09603-3) was expressed in human 293 cells at Cell Signaling Technology.

**Molecular Characterization:** Recombinant hM-CSF contains no “tags” and the nonglycosylated protein has a calculated MW of 18,403. DTT-reduced protein migrates as a 16-26 kDa polypeptide and the non-reduced cystine-linked homodimer migrates as a 34-40 kDa protein. Heterogeneity in SDS PAGE is due to glycosylation. The expected amino-terminal EEVSE of recombinant hM-CSF was verified by amino acid sequencing.

**Endotoxin:** Less than 0.01 ng endotoxin/1 µg hM-CSF.

**Purity:** >98% as determined by SDS-PAGE of 6 µg reduced (+) and non-reduced (-) recombinant hM-CSF. All lots are greater than 98% pure.

**Formulation:** With carrier: Lyophilized from a 0.22 µm filtered solution of PBS, pH 7.2 containing 20 µg BSA per 1 µg hM-CSF. Carrier free: Lyophilized from a 0.22 µm filtered solution of PBS, pH 7.2.

**Reconstitution:** With carrier: Add sterile PBS or PBS containing 1% bovine or human serum albumin or 5-10% FBS to a final hM-CSF concentration of greater than 50 µg/ml. Solubilize for 30 minutes at room temperature with occasional gentle vortexing. Carrier free: Add sterile PBS or PBS containing protein to minimize absorption of hM-CSF to surfaces. Solubilize for 30 minutes at room temperature with occasional gentle vortexing. Stock hM-CSF should be greater than 50 µg/ml.

**Bioactivity:** The bioactivity of recombinant hM-CSF was determined in a M-NFS-60 cell proliferation assay. The ED₅₀ of each lot is between 0.5-15.0 ng/ml.

**Storage:** Stable in lyophilized state at -20ºC for 1 year after receipt. Sterile stock solutions reconstituted with carrier protein are stable at 4ºC for 2 months and at -20ºC for 6 months. Avoid repeated freeze-thaw cycles. Maintain sterility. Storage at -20ºC should be in a manual defrost freezer.

**Applications:** Optimal concentration for the desired application should be determined by the user.

**Background:** Macrophage-colony stimulating factor (M-CSF) is produced by fibroblasts, endothelial cells, stromal cells, macrophages, osteoblasts and other cell types (1). M-CSF is required for growth and differentiation of monocytes and macrophages (1,2). M-CSF polarizes macrophages into the M2 phenotype where anti-inflammatory IL-10 is produced, rather than the M1 phenotype where inflammatory cytokines are produced. M-CSF also recruits monocytes and enhances angiogenesis by inducing VEGF production (1,2). M-CSF binds to its receptor (CSF1R); downstream signaling involves PI3K/Akt, ERK and STATs 1, 3, and 5 (1,3). An increase in M-CSF expression may contribute to cancer progression and a higher plasma M-CSF level is associated with rheumatoid arthritis (1,4,5).

**Background References:**