

# GM-CSF<sup>HuXp</sup>

## Recombinant Human Cytokine Authentic - Human Cell Expressed



### INTRODUCTION

Cytokines are a group of proteins and polypeptides that organisms use as signaling molecules. Most cytokines are glycoproteins less than 30 kDa in size and bind to specific, high-affinity cell surface receptors. Due to their central role in the immune system, cytokines are involved in a variety of immunological, inflammatory and infectious diseases and widely used in research, diagnostics and therapeutics. Cytokines generally alter the gene expression pattern of the target cell which leads to changes in the rate of cell proliferation and/or in the state of cell differentiation. Currently, these proteins are predominantly produced in non-human cells (e.g. *E. coli*) and therefore lack authenticity due to the absence of physiologically relevant glycosylation. In addition, a number of important cytokines are not commercially available due to inadequate proteolytic processing, protein folding or other post-translational modifications that occur in the non-human cell expression systems.

HumanZyme has developed an efficient human-cell based technology, **HumaXpress™**, for scalable production of human cytokines. Currently, we have successfully produced expanding range of tag-free cytokines, including difficult-to-express protein members of the TGFβ superfamily. As demonstrated below, HumanZyme's authentic cytokines can be used as highly preferred reagents for cancer, inflammation, stem cell research, and antibody development.

### GM-CSF

GM-CSF is a hematopoietic growth factor that stimulates the development of neutrophils and macrophages and promotes the proliferation and development of early erythroid megakaryocytic eosinophilic progenitor cells. This protein is produced by a number of different cell types (including activated T cells, B cells, macrophages,

mast cells, endothelial cells and fibroblasts) in response to cytokine or immune and inflammatory stimuli.

Currently, commercially available GM-CSF proteins are produced from *E. coli*. HumanZyme has produced GM-CSF<sup>HuXp</sup> from engineered human 293 cells. The *E. coli* expressed protein has a molecular mass of 14 kD. This compares with the GM-CSF<sup>HuXp</sup> which migrates as a broad band of 15-30 kD due to glycosylation and sialylation.

The biological activity of GM-CSF was determined by the dose-dependent stimulation of the proliferation of human TF-1 cells. Both versions of GM-CSF were assayed for cell proliferation at 37°C for seven days. As shown in Fig. 1, GM-CSF<sup>HuXp</sup> has 10-fold higher potency, demonstrating that it has higher activity and greater stability in cell culture conditions after seven days than *E. coli* expressed cytokine. (Our Technical Report - available on the humanzyme website - "New Protocol for Efficient Generation of Immature Human Dendritic Cells with Authentic GM-CSF<sup>HuXp</sup> and IL-4<sup>HuXp</sup> discusses a preferred, time saving protocol. (See product catalog number HZ-1016, HZ1017, and HZ-1018 at [www.humanzyme.com](http://www.humanzyme.com))

