White Paper

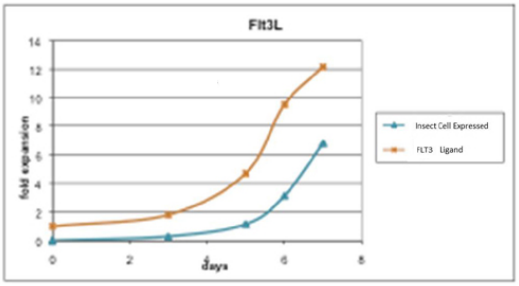
Recombinant FLT3 Ligand Demonstrates More Efficient Expansion of Human Hematopoietic Stem Cells

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 can lead 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, SF9, CHO) 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 do not occur in the non-human cell expression systems. United States Biological has developed an efficient human-cell based technology for scalable production of human cytokines.

RECOMBINANT FLT3 LIGAND

FLT3 ligand (FLT3L) is a growth factor that regulates proliferation of early hematopoietic cells. United States Biological has produced FLT3L, a stable proprietary human 293 cell expression system. The protein is a glycosylated monomer of 24-30 kD. This is a narrower range than is reported for this cytokine when expressed in insect Sf21 cells (17-30 kD), emphasizing the qualitative difference in glycosylation of the expression systems. The bioactivity of FLT3L, shown in the chart below, was determined by the expansion of human CD34+ cells at 10 ng/ml and in the presence of 100 ng SCF. The results indicate FLT3L is substantially more active than the insect cell expressed protein, suggesting that FLT3L is a superior and cost-effective cytokine for application to hematopoietic stem cells. (The data was provided by an independent laboratory working in the field of stem cell therapeutics.) This product adds to the rapidly expanding range of stem cell related cytokines available from United States Biological, manufactured to high quality standards and providing high biological activity, lot-to-lot consistency and low endotoxin levels. See product numbers H2005-02A, N3100-053, I0945-06A, B2553-20C, AND A2281-45A at www.usbio.net.



The results indicate FLT3 Ligand is substantially more active than the insect cell expressed protein, suggesting that FLT3L is a superior and more cost-effective cytokine for hematopoietic stem cell expansion.