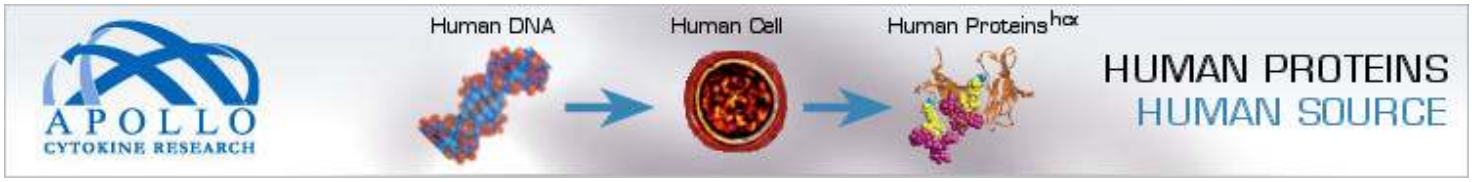

THE HUMAN EXPRESS

Issue 1 : April 2006

Welcome to the first edition of The Human Express

In these quarterly newsletters we will be providing you with a selection of the latest insights, research and product development from Apollo Cytokine Research. In this edition we introduce our unique protein range and discuss some of the key features and benefits of these human cell expressed hcx proteins.

Human Proteins Expressed in Human Cells

Recombinant human proteins expressed in human cells are distinct from those produced by non-human cell expression systems. In particular, human proteins undergo a variety of highly specific post-translational modifications (PTMs), glycosylation being one of the best-known examples. The cells of non-human species do not glycosylate their proteins in the same way that human cells do. In many cases the differences are profound, especially in species that are phylogenetically distant to humans e.g., *E. coli* - which does not glycosylate human proteins at all [Brooks SA. (2004) *Mol Biotechnol* 28:241-55].

Read more >>

Apollo's human cell expressed hcx proteins may have considerably different biological properties than non-human expressed proteins, due to correct protein folding, improved protein-protein interactions, increased stability and half-life, and exposure of only natural epitopes.

These different biological properties may allow Apollo's proteins hcx to be used in pre-trial investigation to create an *in vitro* human test environment that is a useful predictor of drug interaction in humans.

Apollo Cytokine Research supplies proteins and ELISA kits from the following families:

Cytokines	Chemokines
Receptors / Fc Chimeras	Growth Factors

View full protein range >>

Tag-Free Proteins

Apollo utilizes conventional chromatography purification techniques to purify proteins. No tag-based affinity chromatography techniques are used for our ligands.

While peptide or other tags can facilitate protein purification or immunoassay, they can also prevent the correct folding of proteins, or be internalized, rendering them ineffective for purification or immunoassay and potentially affecting protein function.

IN THIS ISSUE

USEFUL LINKS

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>> FAQs
>> Contact Us

PRODUCTS

>> View Proteins
>> View ELISA kits

Apollo's Proteins hcx

Amphiregulin
BAFF
BMP-7
CCL2/MCP-1
CCL3/MIP-1 alpha
CCL4/MIP-1 beta
CD209L - Fc Chimera
DCSIGNR - Fc
EPO
FGF R1 alpha (IIIc) - Fc Chimera
FGF R4 - Fc Chimera
Flt-3 - Fc Chimera
Flt-3 Ligand
G-CSF
GM-CSF
Growth Hormone
Growth Hormone R - Fc Chimera
IFN alpha 2b
IFNAR2 - Fc Chimera
IFN gamma
IGFBP-3
IL-10
IL-10 R alpha - Fc Chimera
IL-1ra
IL-1 RI - Fc Chimera
IL-2
IL-2 R alpha - Fc Chimera
IL-2 R beta - Fc Chimera
IL-2 R gamma - Fc Chimera

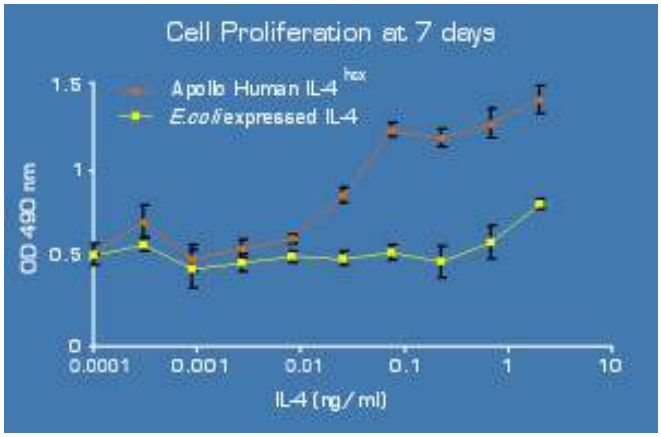
Tags can also be highly immunogenic. For instance, using tagged proteins for immunization to produce antibodies for immunoassays targeting the protein of interest can result in antibodies being generated against the tag, instead of epitopes in the target protein.

Even without the use of tags for purification, our proteins exhibit purity greater than 95% by silver stain, with most proteins >97% pure.

Apollo's IL-4hex vs. *E. coli* IL-4 - Summary of Bioassay Results

It has been proposed that glycosylation is important for secretion, solubility, resistance to proteolysis, immunogenicity, biological recognition, biological activity, *in vivo* stability and clearance of glycoproteins including cytokines and growth factors from the blood. Glycosylation of IL-4, known to be important for biological activity, is completely absent in *E. coli* expressed proteins.

Results showed that, in an extended cell proliferation assay, Apollo's IL-4hex induced more cell proliferation after 7 days in culture, suggesting it has a greater biological activity and perhaps a greater half-life.



Bioactivity of IL-4 was measured in a cell proliferation assay using a human factor-dependent cell line, TF-1.

Full article >>

Maintenance & Differentiation of Stem Cells for Therapeutic Use

Human embryonic stem (hES) cells have the potential for supplying cells for transplantation therapy, drug screening, toxicology studies and functional genomics applications. However, maintaining hES in an undifferentiated state currently involves their growth on inactivated mouse embryonic fibroblast (MEF) feeder layers, supplementation of cultures with MEF conditioned medium or most recently the addition of various growth factors [Wang et al. (2005) *Bichem Biophys Res Com* 330:932-942 and Xu et al. (2005) *Nat Methods* 2(3):185-90].

It has been shown that non-human glycosylation structures can be incorporated into hES making them immunogenic and hence unsuitable for therapeutic uses [Martin et al. (2005) *Nat Med* 11(2):228-32]. The use of human cell expressed stem cell factors circumvents this problem and limits the possibility of infectious material transfer from MEF feeder layers.

Full article >>

IL-3
IL-3 R alpha - Fc Chimera
IL-4
IL-4 R alpha - Fc Chimera
IL-5
IL-5 R alpha - Fc Chimera
IL-6
IL-7 R alpha - Fc Chimera
IL-8
L-Selectin - Fc Chimera
Lymphotoxin-alpha
MC-148-Fc Chimera
MCP-1/CCL2
MIP-1 alpha/CCL3
MIP-1 beta/CCL4
NGF R - Fc Chimera
Noggin
Oncostatin-M
Ox40 - Fc Chimera
SCF
TGF-beta RII - Fc Chimera
TNF-alpha
TNF-beta
TNF RI - Fc Chimera
TNF RII - Fc Chimera
TrkA - Fc Chimera
TrkB - Fc Chimera
VEGF-165

Apollo's AccuKine™ ELISA Kits

G-CSF ELISA Kit
GM-CSF ELISA Kit
IL-10 ELISA Kit
IL-2 ELISA Kit
IL-3 ELISA Kit
IL-4 ELISA Kit
IL-6 ELISA Kit
Lymphotoxin-alpha ELISA Kit
TNF-alpha ELISA Kit
TNF-beta ELISA Kit
VEGF-165 ELISA Kit

New Proteins

We are constantly adding new proteins and ELISA kits to our unique range. The following proteins are now available on our website and more will be coming soon.

- Stem Cell Factor (SCF)

- Oncostatin M (OSM)

If you are interested in proteins not yet on our product list, please contact us with details about the protein and your requirements.

Trade Conference Schedule

This month we'll be at some conferences in the United States. Come and have a chat and we can talk to you more about our proteins and their potential for your work.

- **The 97th Annual Meeting of the American Association for Cancer Research Conference (Booth 107)**
1-5 April, Washington, DC, USA

- **Experimental Biology 2006 (Booth 839)**
1-5 April, San Francisco, California, USA

If you'd like to make an appointment with our team, please email us at contact@apollocytokineresearch.com

For more information on any of the articles introduced in this newsletter, please refer to our website.