



Innovative  
Pre-Clinical Contract Research Organization

Offering  
Discovery Research Products and Services

August 2020



SBH Sciences is an innovative contract research organization which has been in operation for 23 years, providing over 250 companies with quality products and services.

SBH Sciences supported and guided 3 companies through all stages of drug development, bringing seven NCE's to clinical trials. One Drug - Xpovio was already approved (07/2019).





SBH Sciences has produced and commercialized  
30 recombinant cytokines, 8 enzymes, and 40 MAb

**Activin-A**

**Bone Morphogenic Proteins**

**(BMP-2, BMP-7)**

**CD22**

**Growth Factors (HGF)**

**GDF-15/MIC-1 \***

**IGF-BPs (IGF-BP-6)**

**Interferon (IFN- $\beta$ )**

**Interleukins (IL-12, IL-23) \*\***

**Soluble receptors (s-IL-6R)**

**TGF-Beta (TGF- $\beta$ 2)**

**TNF Receptor (HVEM-Fc)**

**Enzymes (8 Glycosyltransferases)**

**Mab (Anti-TNF $\alpha$ ; Anti-Galectin**

**Anti-VEGF ; Anti-Tn; Anti-STn)**

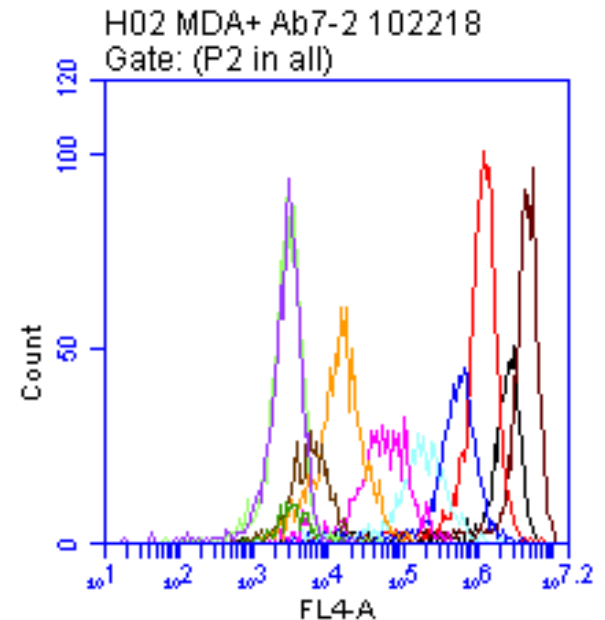
\* Only company that produces GDF-15/MIC-1 naturally from human cells

\*\* Licensed human IL-12 process technology to Neumedicines, a California based company, and collaborated with them to develop IL-12 for Acute Radiation Syndrome. The project was supported by BARDA and DoD and is in Phase II / III clinical trials.



# Extensive Services Offered to Support and Accelerate Your Research Programs

- Biomarker Analysis
- Cell-Based Assays  
[cytokine, oncology, inflammation  
T-Cell Activation, TLRs]
- Development of Biologics
  - Cell Culture
  - Protein Purification
  - Cell-based assays
  - Analytical HPLC
  - ELISA / RBA
  - FACS
  - Formulation
  - Stability
  - Anti-Drug Antibody (ADA) assay
- Molecular Biology





## Comprehensive Biomarker Analysis Services

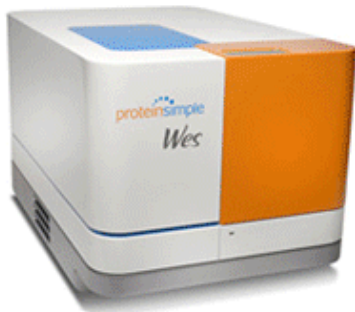
- We offer 10 platforms for the analysis of biomarkers.
- First CRO to offer automated simple western blot services on “Peggy Sue” and “WES” [ProteinSimple].
- First CRO to offer Simple Plex assays on “ELLA”.
- SBH Diagnostics, our strategic partner company, is a contract research organization providing biomarker analysis under CLIA certification and GLP.

We assist companies and enable translation from non-regulated to regulated environment [clinical trials].



# Ten Platforms to Assist with Biomarker Analysis

- AlphaScreen® and AlphaLISA®
- MultiPlex: ProteinSimple ELLA
- ELISA [Tecan]
- Flow Cytometry – FACS Analysis
- HTRF®/TR-FRET
- Luminex® 200 [Multiplex Analysis]
- Automated Western Blot [Peggy Sue / Wes ]
- RT-PCR
- Chemical analyzer, VITROS®350





## Cell Culture Services (Mammalian & Insect Cells)

- Production of recombinant proteins, monoclonal antibodies, and vaccines.
- Optimization of growth conditions (media optimization and serum-free adaptation).
- Multi-liter supply of any mammalian cell line, before or after cytokine stimulation.
- Customized services (10 human primary cells and > 450 mammalian cell lines are currently available).
- Creation of new stable cell lines.
- Commercial production of cell culture spent media [5 years ; 13 lots ; > 150 L each lot].
- 2D and 3D assay capabilities.
- Irradiation experiments (combination of anti-cancer therapy).
- Preparation and isolation of Exosomes.

## Protein Purification Services for Biologics

- Development of scalable, well-validated, and reproducible purification processes.
- Liquid chromatography capabilities (Ion Exchange, HIC, Affinity, Metal, HA, SEC).
- HPLC (Preparative and Analytical methods development).
- Protein formulation and stability studies.



# Cell-Based Assay Capabilities

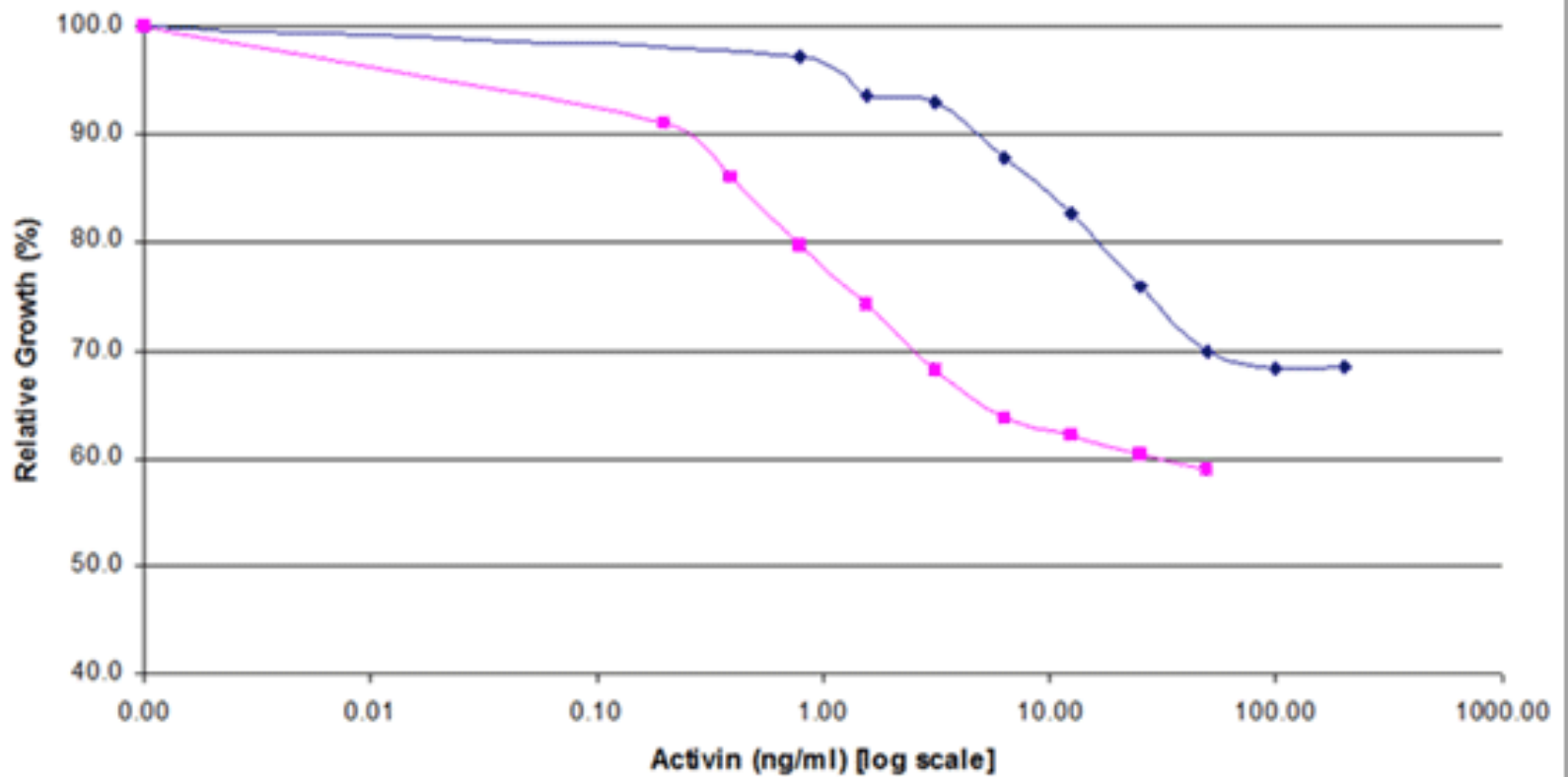
Inflammation, oncology, and fibrosis are the therapeutic areas where SBH Sciences is best positioned to assist you.

- 300 cell-based assays to measure cytokine activity (cytokine-induced proliferation, cytokine-induced killing, cytokine release assays, and cytokine neutralization)
- Screening of therapeutic antibodies for specific activity (includes receptor binding assays, ADCC, ADCP, ADC and CDC assays)
- 370 different human cancer cell lines to facilitate in-vitro lead drug optimization (cytotoxicity, invasion, and migration assays)
- Cell-based disease models for compound selection. (inflammation/fibrosis – THP-1, RAW 264.7, BEAS-2B, human Lung Fibroblast, PBMC and immortalized liver cell line)
- T-Cell Activation
- Co-Culture Experiments [e.g., RAW264.7 and ID8 cancer cells]
- Testing for the presence of anti-Adeno-Associated Virus (AAV) in pig serum



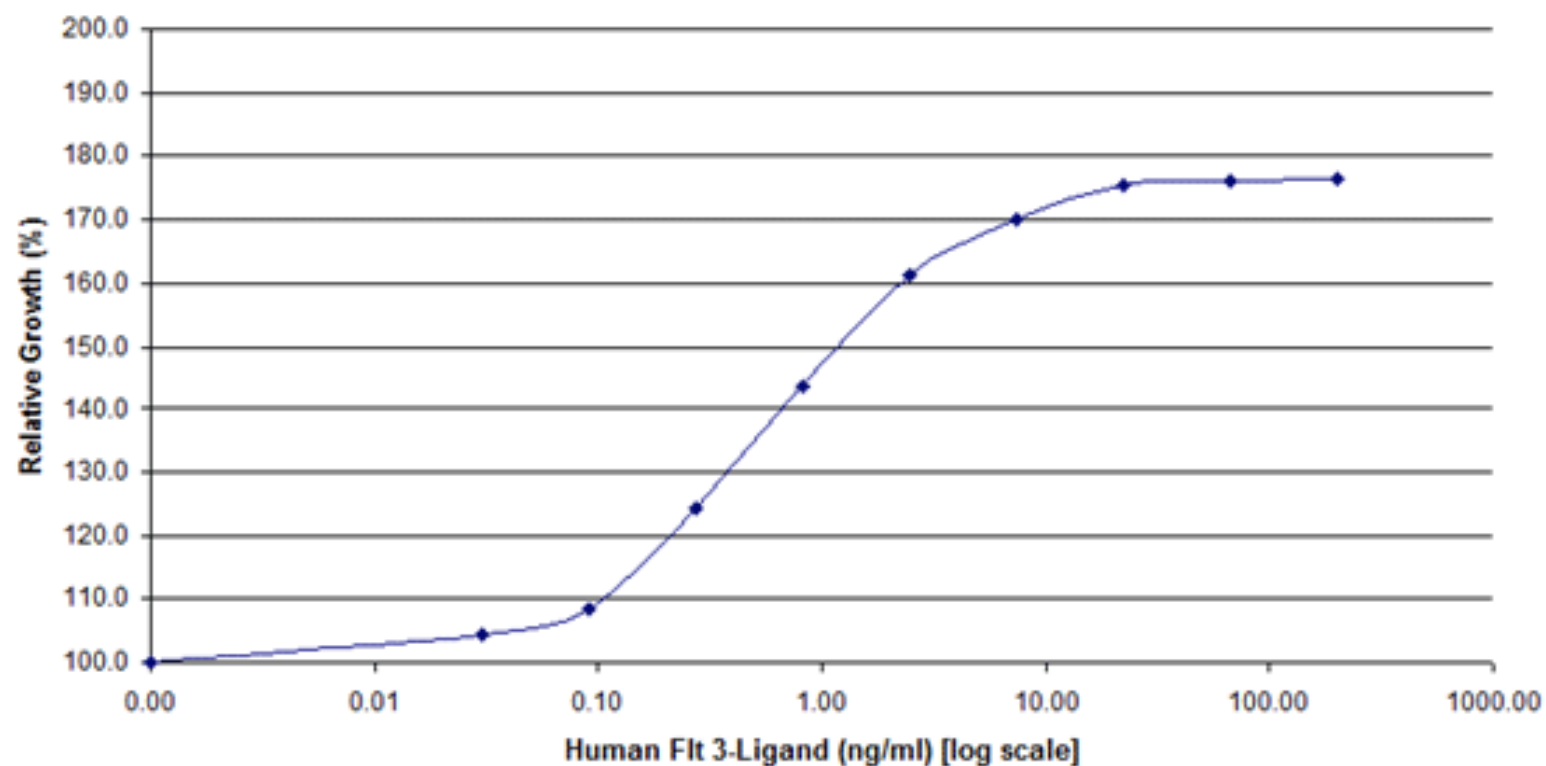


### Cell-Based Assay : h-Activin A and h-Activin B using MPC-11 cell line



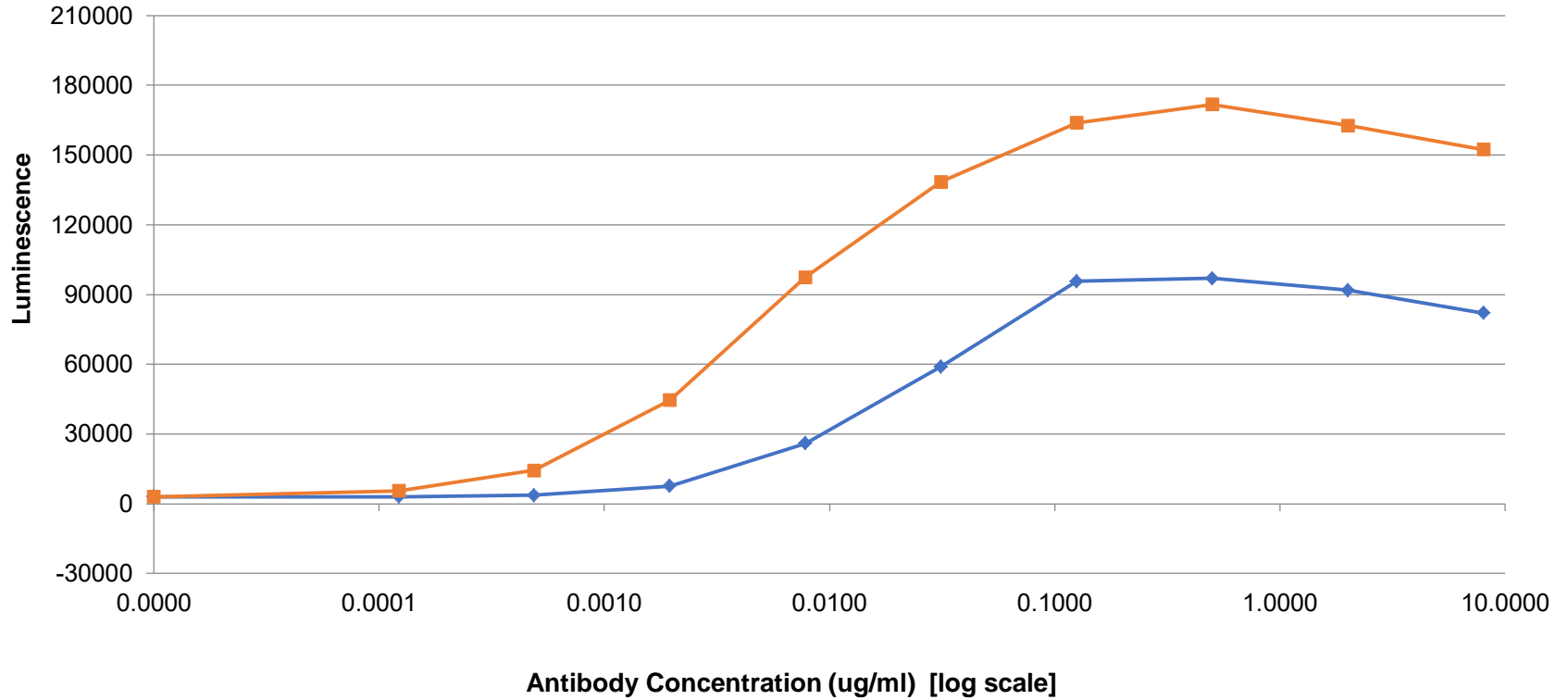


**Cell-Based Assay :**  
**h-Flt 3-Ligand**  
**using AML-5 cell line**



—•— Human Flt 3-ligand

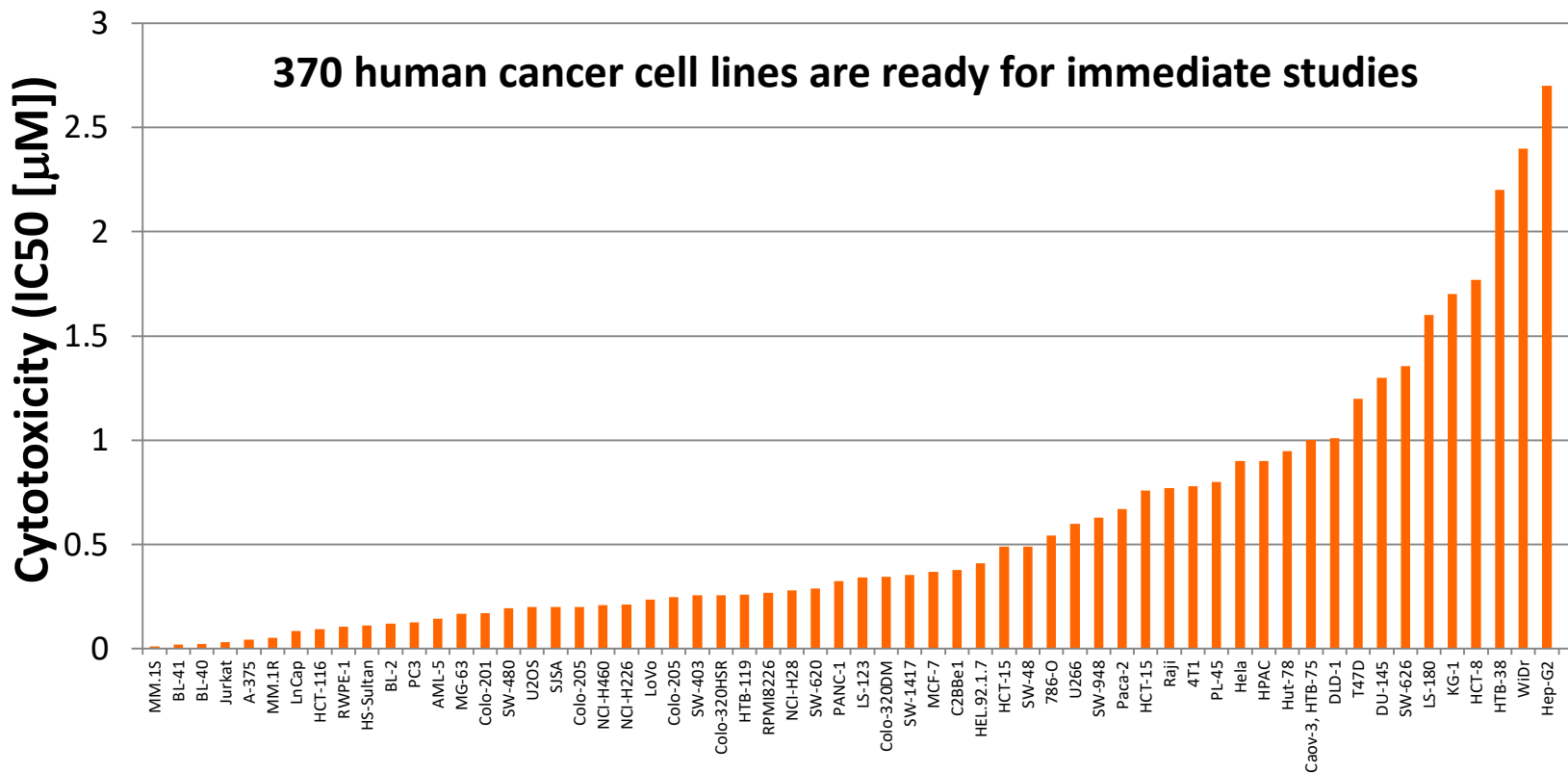
**Antibody-Dependent Cell-Mediated Cytotoxicity (ADCC)  
Promega Kit (G7010 ; 12.8-Fold Effector-to-Target)  
Using SK-BR-3 Cells**



—■— Herceptin - Drug

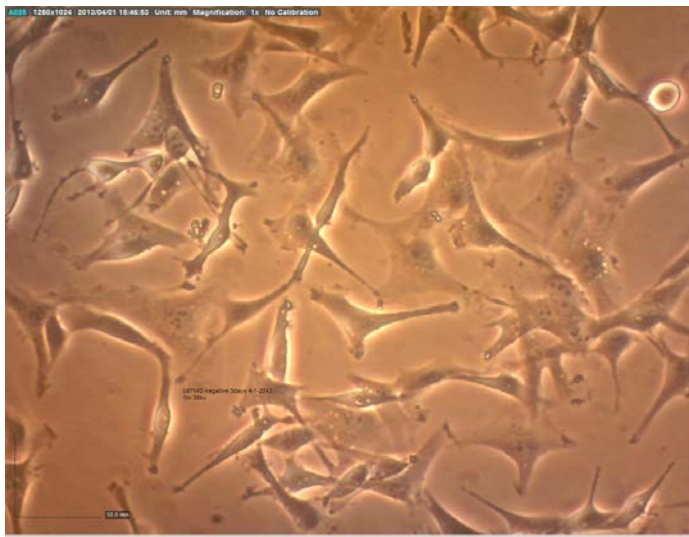
# Cancer Cell Cytotoxicity

(72 hours)



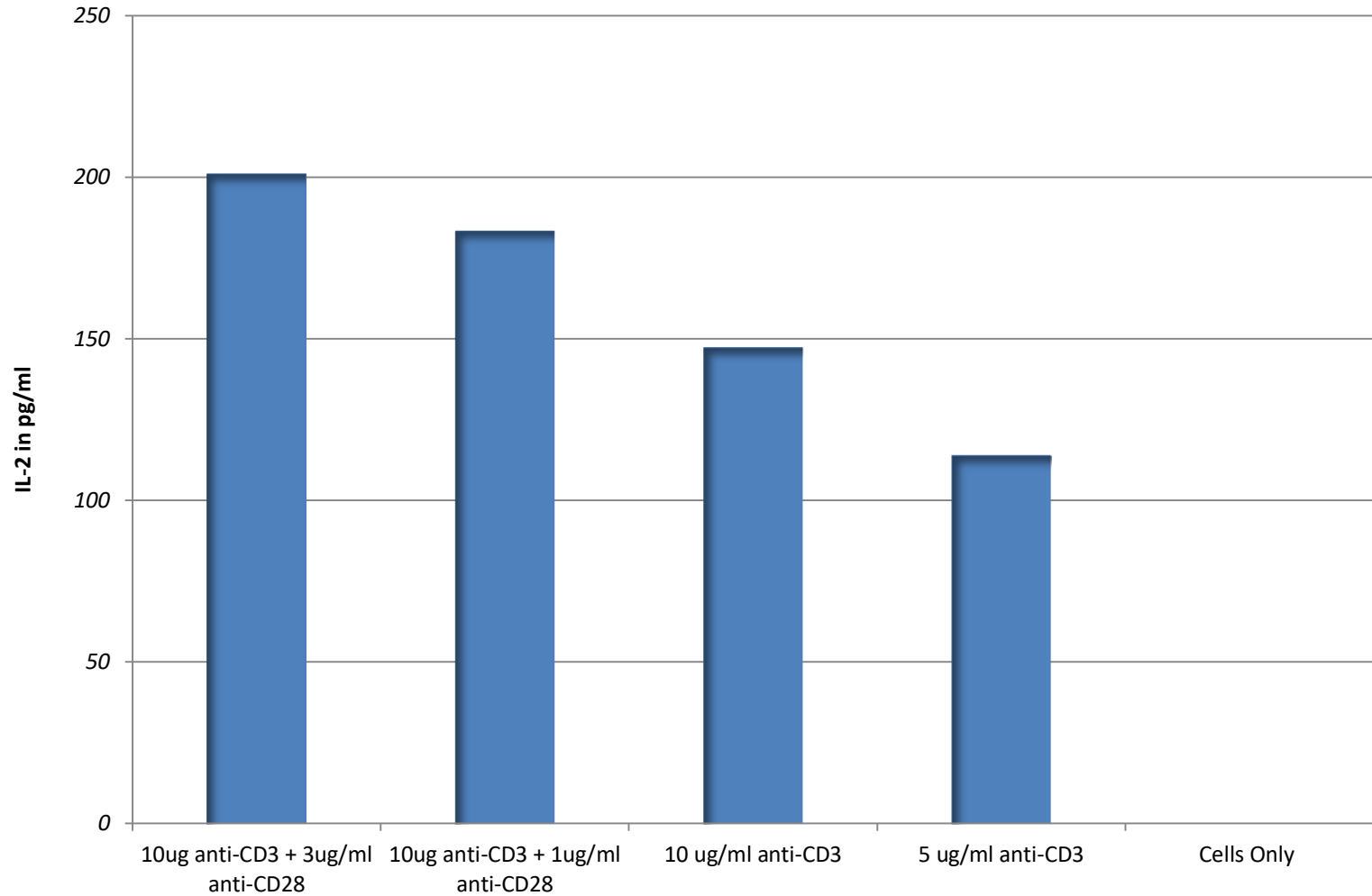
# Irradiation Capability

U87MG cell line



# T-Cell Activation

## Human IL-2 secreted by Jurkat clone E6-1 cells after stimulation with immobilized anti-CD3 and soluble anti-CD28





# 2019 -2020 - Drug Development Solutions

Examples of discovery projects supported by SBH Sciences

## **I. Inflammation:**

Differentiation of THP-1 cells to:

M1 [IFN-gamma & LPS]

M2 [IL-13 & IL-4]

WES Analysis of iNOS expression by RAW 264.7 cells

Measurement of TLR-4, TLR-7 & TLR-8 agonist activity using the SEAP reporter HEK293 cell lines (InvivoGen)

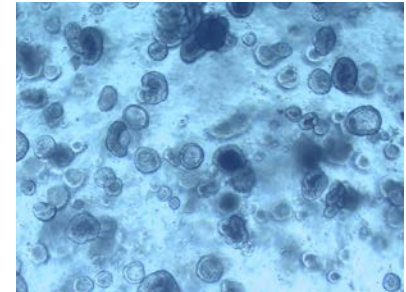
Screening Agonist / Antagonist compounds targeting CB1 & CB2 receptors

## **II. Experiments using isolated: Neutrophil, Eosinophils, Basophils**

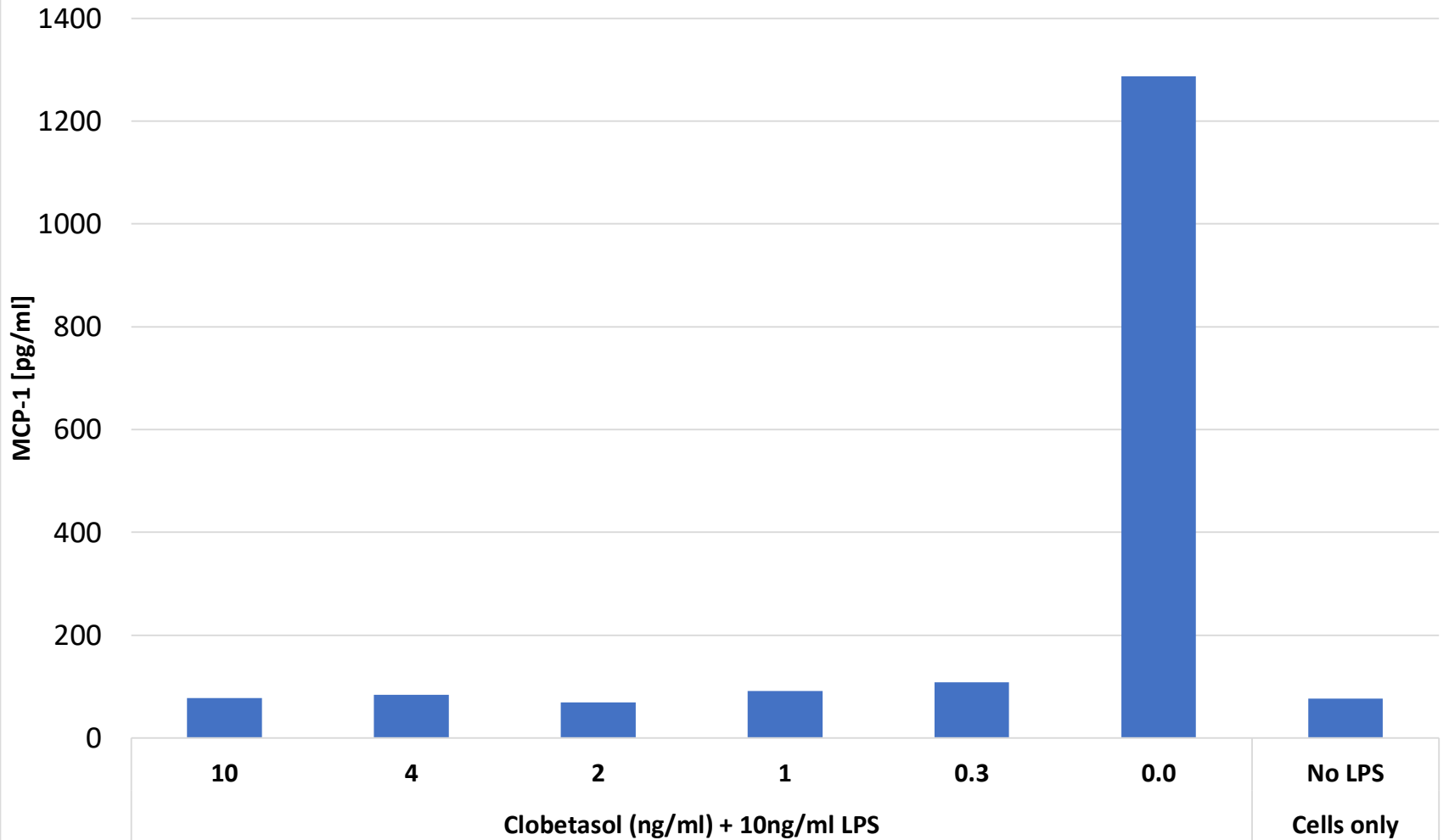
## **III. Modulation of T-cell activation**

## **IV. Isolation of Stem Cells from Human Milk**

## **V. Pig, Rat and Mouse – Scale up of intestinal organoids [ileum & duodenum] and transfect and create stable cells prior to in-vivo transplantation**

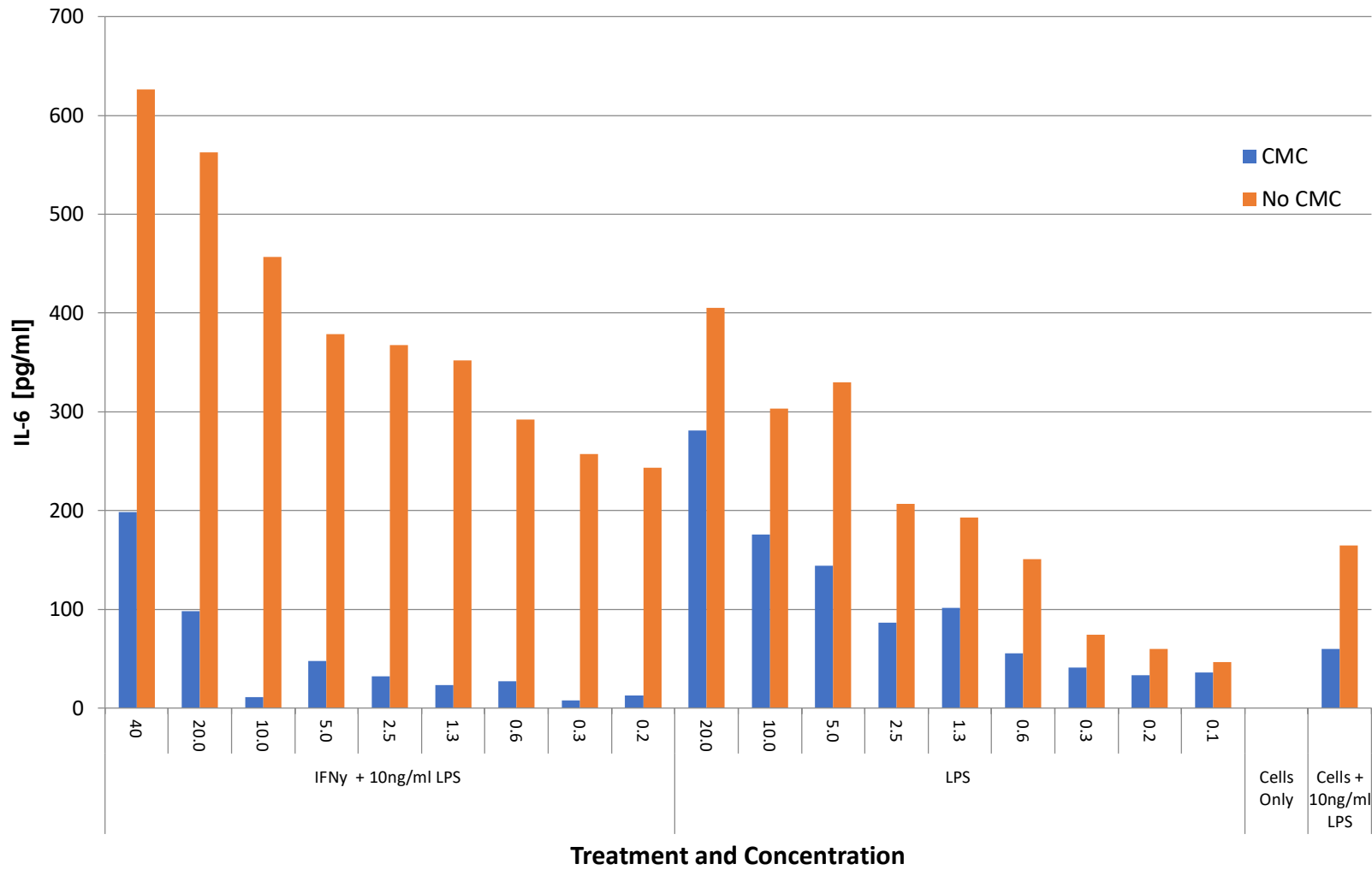


**MCP-1 (CCL2) Production by THP-1 Cells  
In the Presence of 10 ng/ml LPS alone, or in combination of Clobetasol and 10ng/ml LPS  
Pre-Treatment with PMA followed by LPS Treatment for 3 Days**

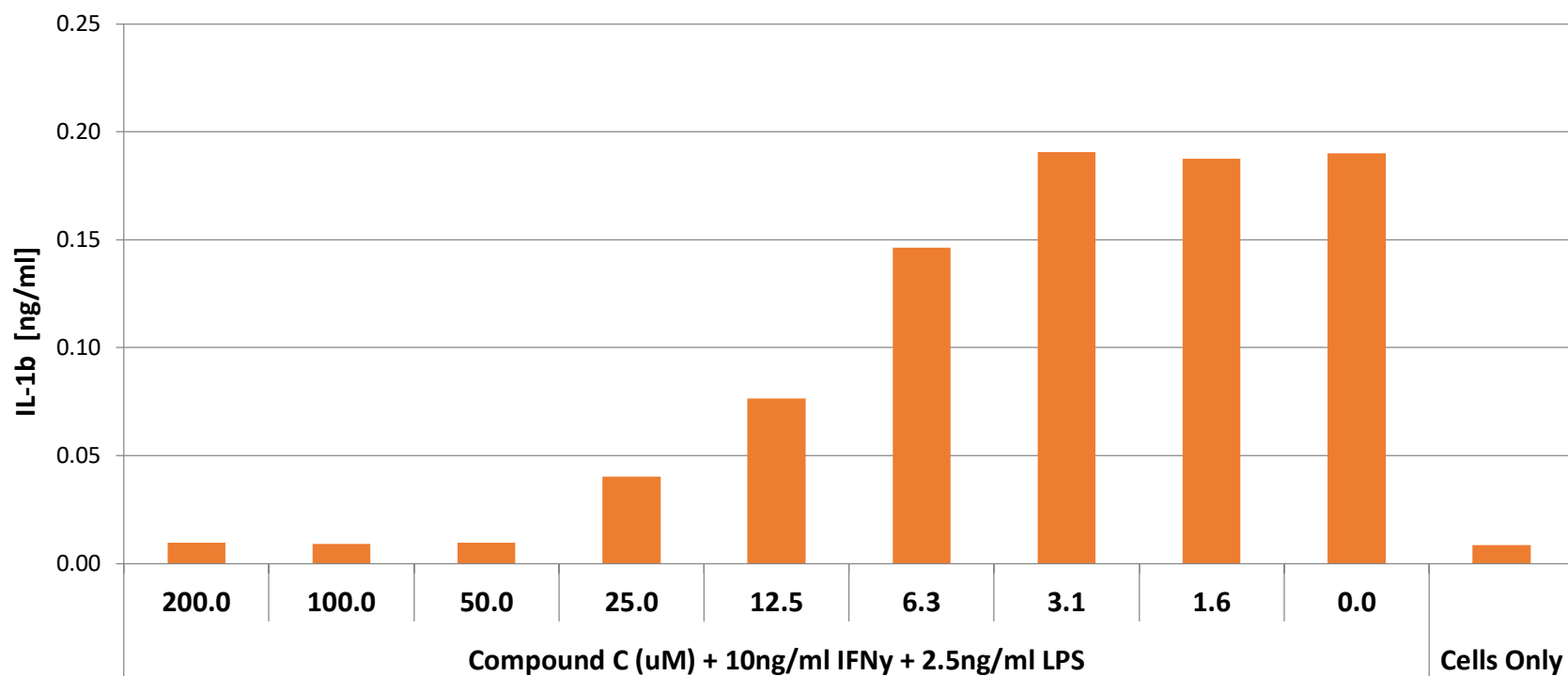




**Human IL-6 production by THP-1 cells stimulated with LPS alone or in combination with IFN $\gamma$  after Complete Media Change (CMC) to remove PMA or No Media Change**

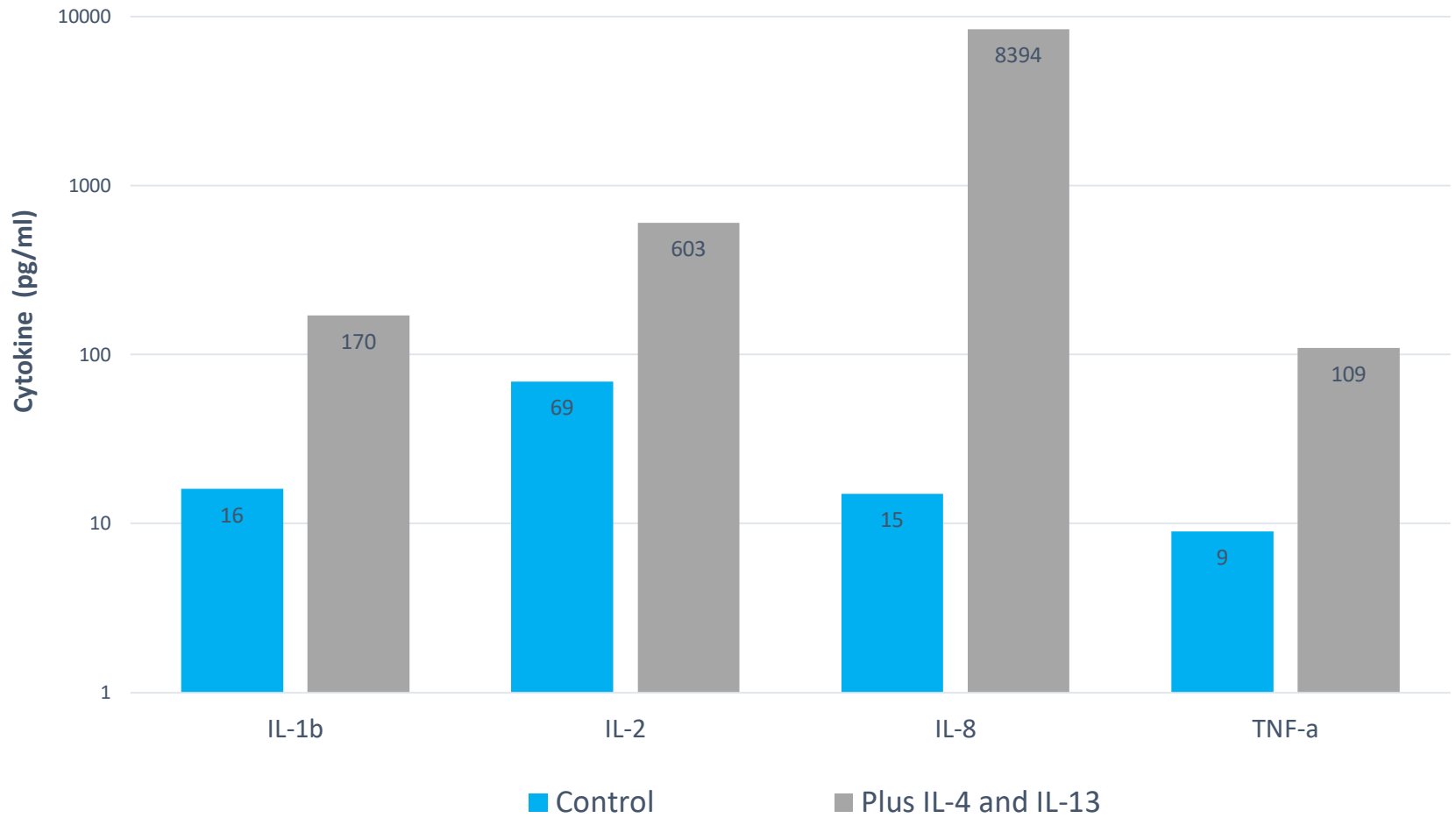


**h-IL-1b Production by THP-1 Cells Treated with Compound C  
in Combination with 10ng/ml IFN $\gamma$  and 2.5ng/ml LPS for 3 Days [M1]  
[Pre-Treatment with PMA for 3 days prior to the experiment]**

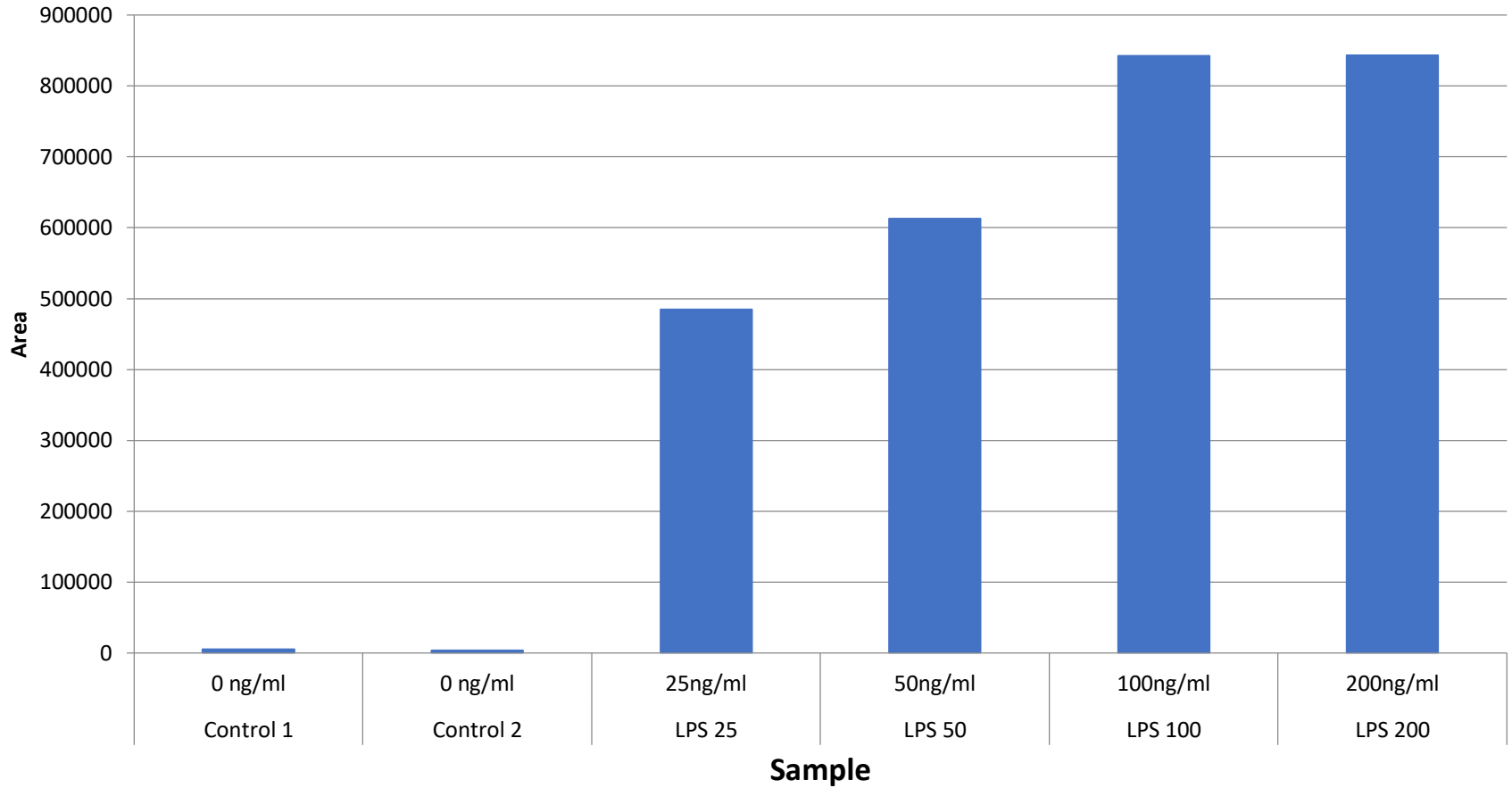


**Please note: Up to 100 uM Compound C did not cause any cytotoxicity effect on the cells.**

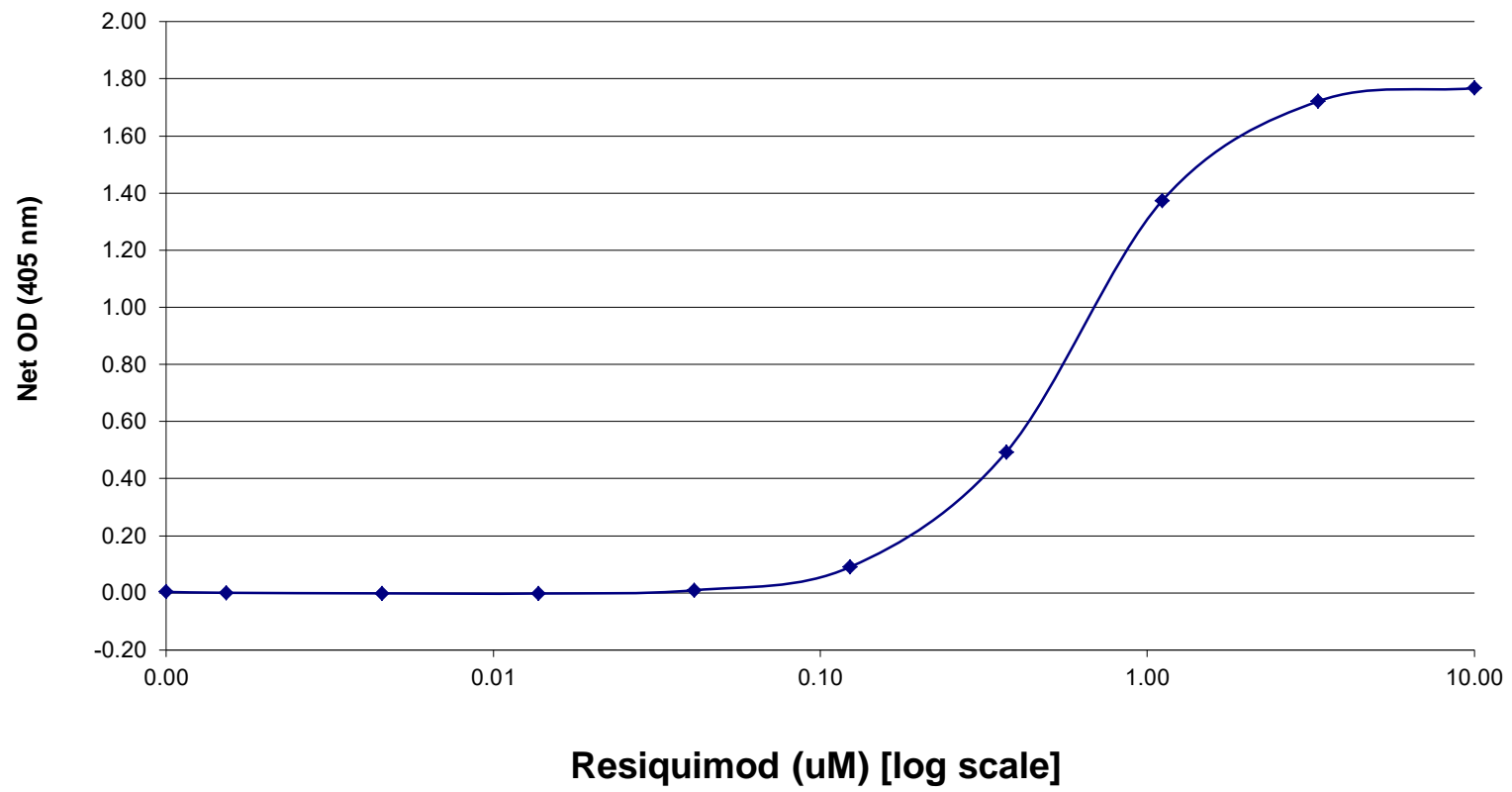
## Polarization / Differentiation of THP1 Cells [M2]



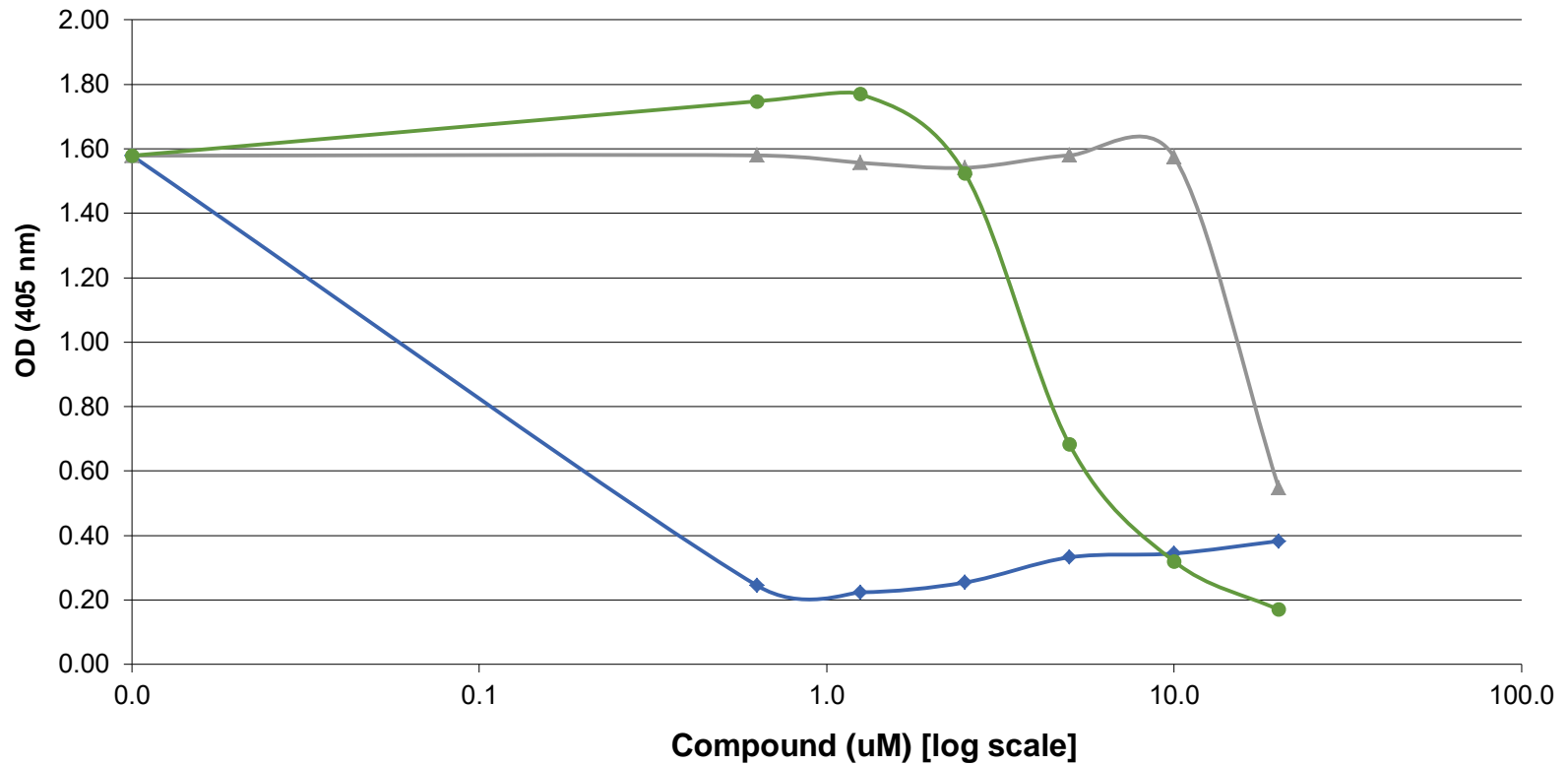
**RAW 264.7 Cells  
iNOS Peak Area  
WES Analysis [Protein Simple]**



**HEK-Blue hTLR7 Cells  
Bioassay of Resiquimod (R-848)  
Treatment for 46 Hours  
Alkaline Phosphatase Activity**



**Bioassay STAT-3 Activity using HEK-Blue Cell Line  
Anti - STAT-3 Activity (in the presence of hIL-6)**



◆ Niclosamide

▲ BP-1-102

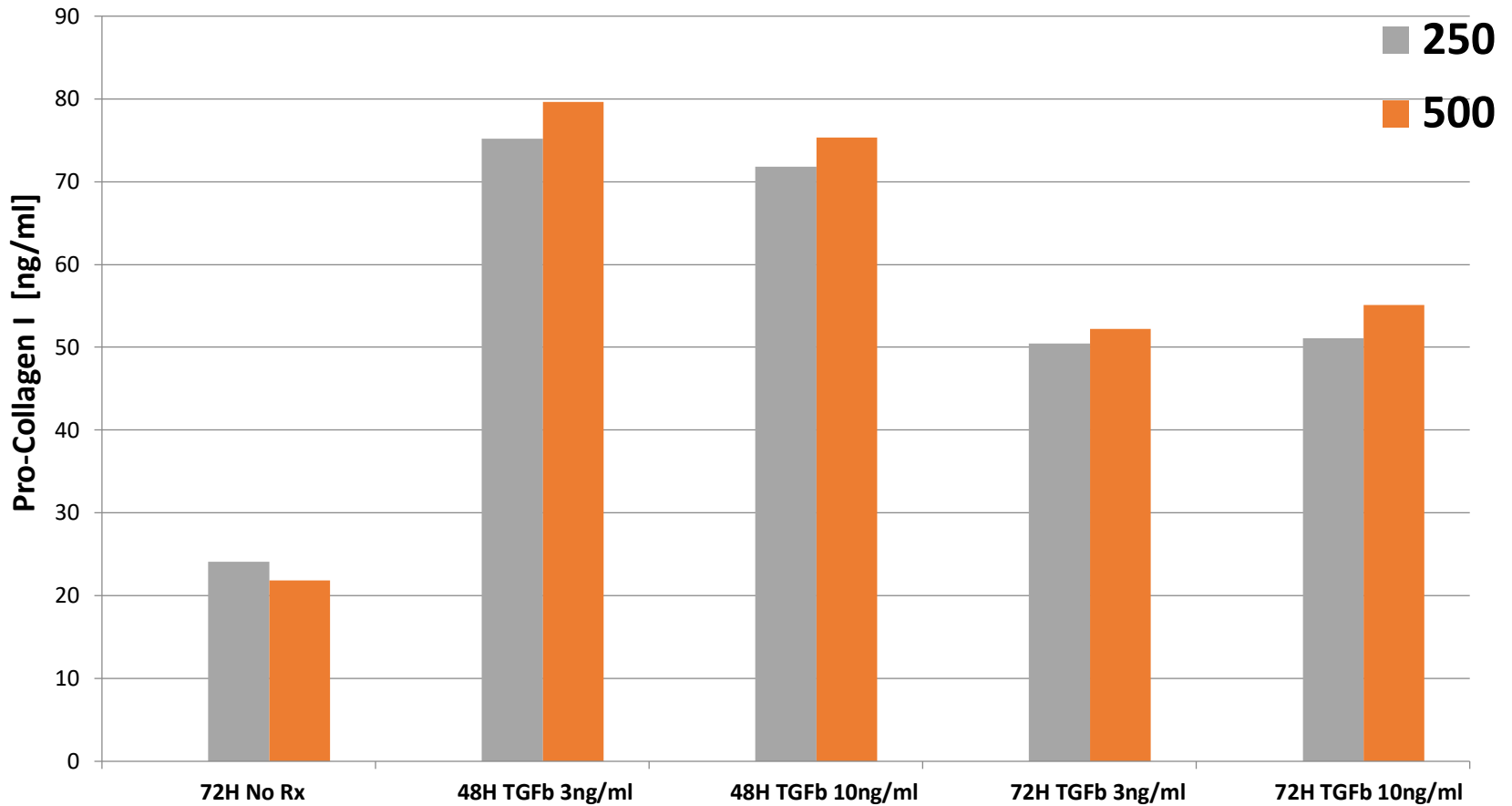
● FLLL32

**January 2014**  
**Galectin Therapeutics and SBH Sciences,**  
**announce the formation of**  
**Galectin Sciences, LLC,**  
**a Collaborative Venture for Research and Development**  
**Galectin Inhibitors**  
**for Oral Administration**

5 Provisional Patents have been submitted so far

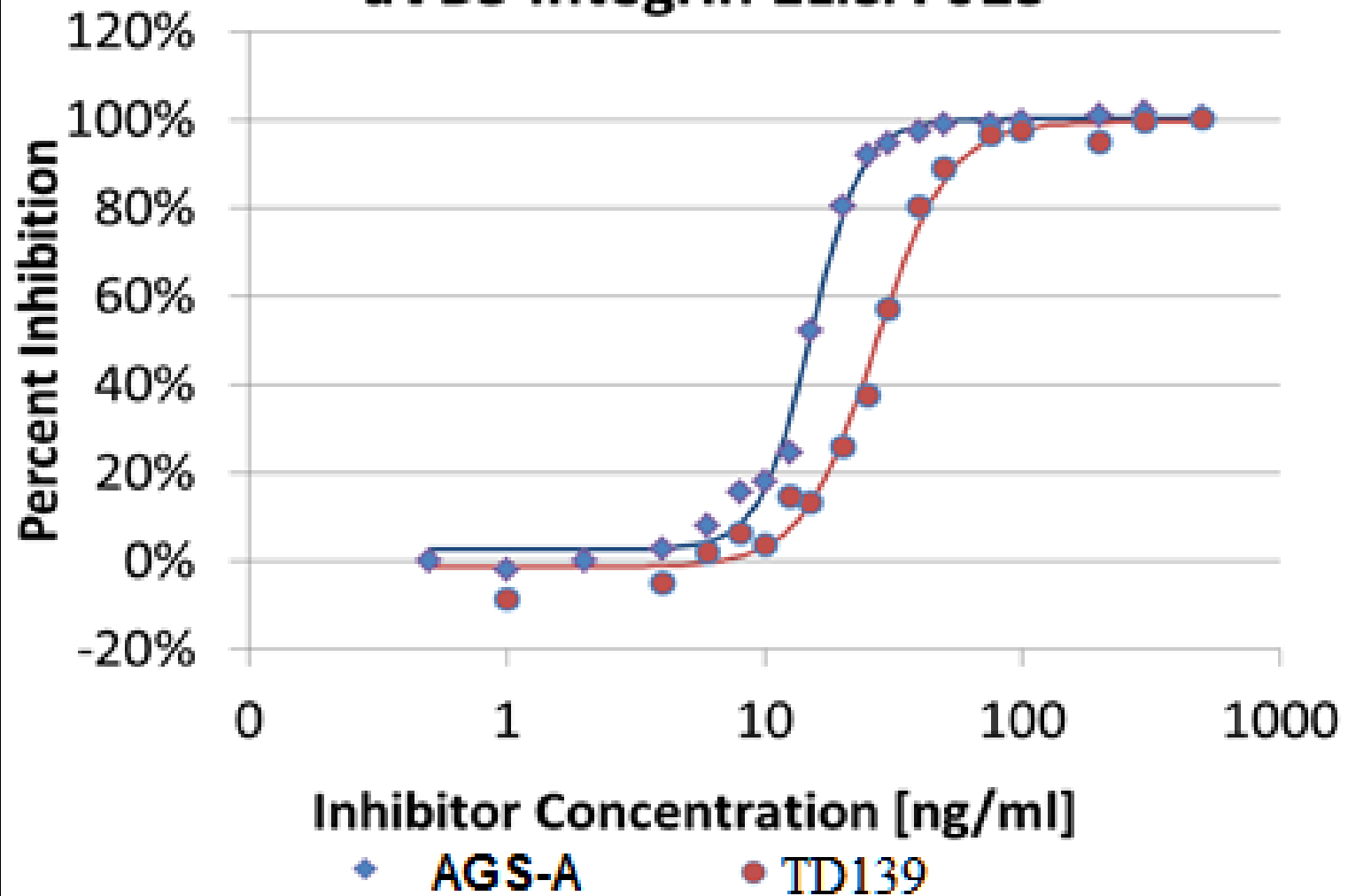


**h-Pro-Collagen I Production by human Lung Fibroblast Cells  
Treated with 3 and 10 ng/ml TGF- $\beta$ 1 for 48 or 72 Hours  
(Diluted 1:250 or 1:500 Fold)**





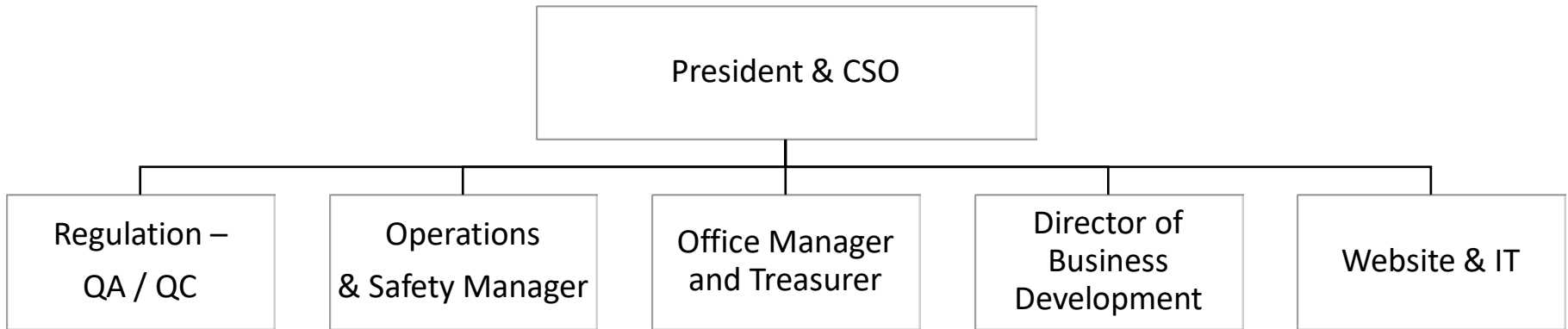
### aVB3 Integrin ELISA 015



# Clinical Product Development - Case Study: human IL-12 a Novel Radiation Medical Countermeasure

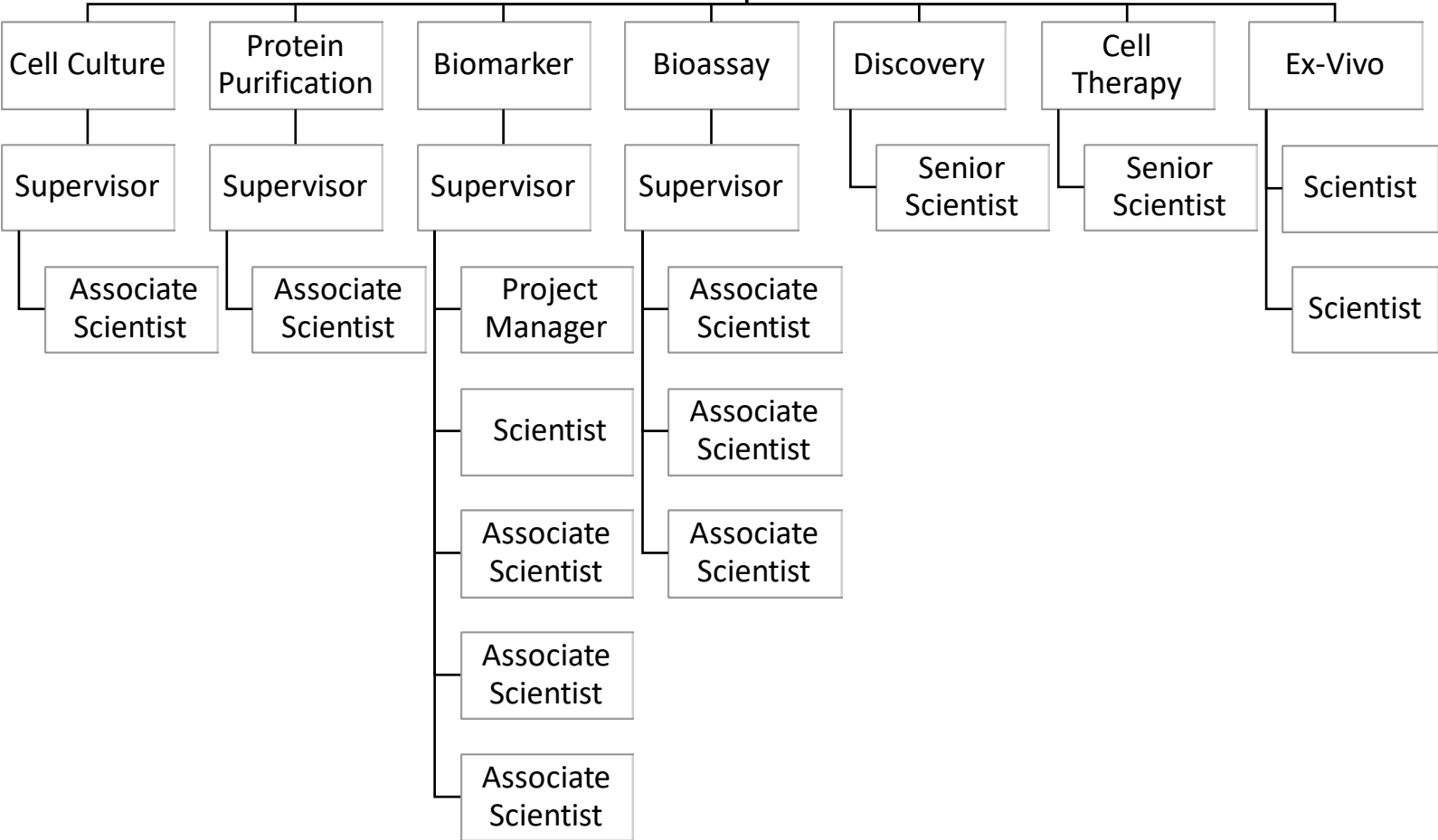
- Proprietary human IL-12 production process was developed by SBH Sciences
- COA established for commercial release to the R&D market
- Neumedicines, Inc. (CA) licensed the technology from SBH Sciences
- In 2008, both companies collaborated to secure a Biomedical Advanced Research and Development Authority (BARDA) contract to develop IL-12 for Acute Radiation Syndrome
- In 2009, SBH Sciences optimized the process, scale-up, and transferred the technology to a GMP manufacturing
- 2011 – Submission of IND and First-In-Human for Toxicity studies







President & CSO



# Create Your Competitive Advantage

## Contact SBH Sciences



THANK YOU  
Raphael Nir, PhD  
President and CSO  
SBH Sciences  
[rnir@sbhsciences.com](mailto:rnir@sbhsciences.com)  
(508) 650 - 6218