YOUR DRUG DISCOVERY PARTNER

Contract Assay Services at STEMCELL Technologies

Introduction to CAS

Are you looking for expertise beyond your in-house drug discovery capabilities? Have you considered using a contract research organization (CRO) to obtain timely, high-quality, and clinically relevant data?

Contract Assay Services (CAS) is a CRO established within STEMCELL Technologies that performs services based on in vitro and in vivo primary cell assays. The use of primary cells in our in vitro assays can provide more physiologically relevant results than cell line-based assays. Our speciality lies in the various applications of the in vitro hematopoietic colony-forming unit (CFU) assay, also known as the colony-forming cell (CFC) assay. In addition, we perform standardized and customized immunological and mesenchymal cell-based assays for use at a variety of points in the drug discovery and development pathway.

CAS combines the power of specialized STEMCELL Technologies products with the practical knowledge of our scientists to provide both standardized and customized assay services. Get the data you need by choosing from our portfolio of standardized assays using pre-qualified primary stem cells or discuss your customized needs with our in-house experts.

Since 2000, Contract Assay Services has performed studies for pharmaceutical, biotechnology, government, and academic life science clients worldwide. We provide exceptional service through frequent communication, quality products and unparalleled expertise.

Our Assay Services Workflow

1. Confidential, one-on-one consultation with expert scientific staff.
2. Preparation of a proposal for customized studies, including a clearly defined project scope, timeline, and cost.
3. Experimental execution and data analysis with STEMCELL Technologies' industry-standard reagents.
4. Preparation of a final report including a study summary, concise details of experimental design, tabulated data and figures, statistical analyses, and photographic records.

Why Choose CAS?

QUALITY. The highest standards for methods, materials, and processes, coupled with industry-standard products manufactured by STEMCELL Technologies.

COMMUNICATION. Clear, frequent communication with clients throughout the study process.

COMPLIANCE. Facilities are audited and certified to ISO 13485:2016 standards.

EXPERTISE. In-house experts are available for many cell types, media, and assays.

Why Primary Cell-Based Assays?

Traditional drug discovery platforms based on animal, tumor, or genetically-transformed cell lines are often poorly representative of human physiology. We can help you obtain more clinically relevant data sooner with primary progenitor cells that can significantly improve your drug candidate's translation into the clinic.

Our primary cell-based assays:

- Help determine potency and safety of compounds
- Can provide clinically relevant, cost-effective information
- Reduce animal testing

Studies may be performed with:

- Hematopoietic stem and progenitor cells (HSPCs)
- Innate and adaptive immune cells
- Mesenchymal stem and progenitor cells (MSCs)

Interested?

Visit **www.contractassay.com** or contact us at **contractassay@stemcell.com** to learn more about how we can help you meet your goals.

Hematopoietic Services

Hematopoietic stem and progenitor cells (HSPCs) differentiate into erythroid, myeloid, and lymphoid cells, which comprise the essential components of the blood system. HSPCs can be accessed from sources such as cord blood, bone marrow, and peripheral blood, from both human and animal sources. We offer both in vitro and in vivo assay systems to investigate the proliferation and differentiation of these primary cells.

Colony-Forming Cell (CFC) Assays

CFC assays are in vitro assays in semi-solid media that are used for the quantitative assessment of proliferation and differentiation of hematopoietic progenitors to lineage-committed colonies for myeloid, erythroid, and megakaryocyte cells.

Some CFC assays are validated for predicting in vivo parameters (maximum tolerated dose[1], Cmax[2]).

Applications:

- Prediction of myelosuppression, anemia, and thrombocytopenia for therapeutics in development
- Assessment of genetically modified HSPCs ($CD34^+$ cells)
- Colony frequency in clinical samples

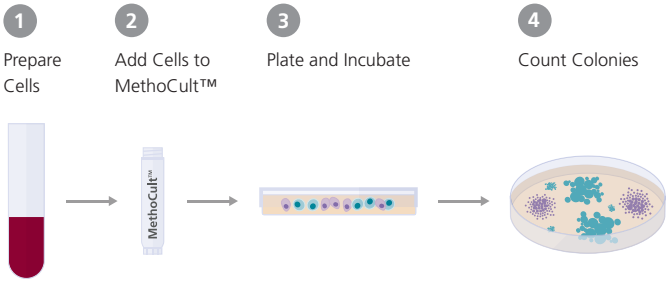
HemaTox™ Assays

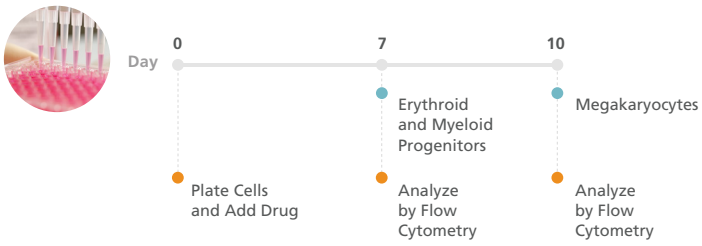
HemaTox™ assays are 96-well plate-based liquid media assays for lineage-specific differentiation and expansion of erythroid, myeloid, and megakaryocyte cells with cell surface marker expression readout.

HemaTox™ assays are higher throughput and more flexible and rapid than the CFC assay.

Applications:

- Screening for potential toxicity on hematopoietic lineages of therapeutics in development
- Directly assessing effects on differentiation
- Assessment of genetically modified HSCs ($CD34^+$ cells)





Cell Sources & Species

	Human	Mouse Rat	Minipig NHP Canine
Cord Blood	•		
Bone Marrow	•	•	•
Peripheral Blood	•	•	•
Diseased cell samples (please inquire)	•		
Spleen		•	

Cell Sources

	Human
Cord Blood	•
Bone Marrow	•

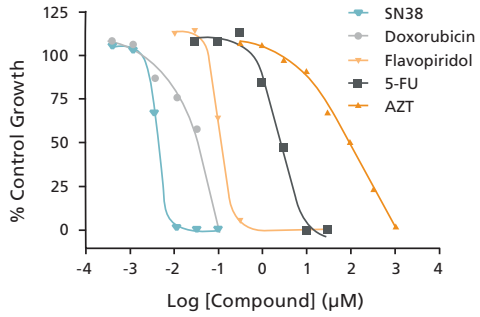


Figure 1. Typical quantitative dose-response curves that can be generated from CFC or HemaTox assays

In Vivo Services

Engraftment Models in NSG mice to measure in vivo functionality of human HSPCs.

Applications:

- Effects of drugs or genetic modifications on HSPCs
- Cancer immunotherapy
- Immunogenicity of biologics

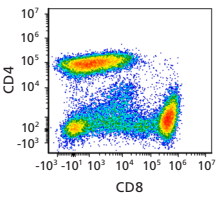
Mobilization studies to monitor hematopoietic stem and progenitor cell release from bone marrow into peripheral blood.

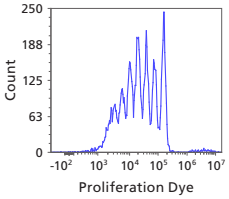
Applications:

- Mobilization of cells for HSPC transplant
- Assessment of in vivo potency of G-CSF and biosimilars for neutropenia treatment (myeloablation mouse model)

Immune Services

The immune system consists of a complex network of cells that work together to protect the host against infections and malignancies. Preclinical test compounds and biologics can be evaluated for their abilities to modulate the immune system. Customized cell-based assays are designed based on the needs of each client to assess the effects of potential immunomodulatory agents, using our immunological tools and assay systems.





Cells	Assays	Quantitative Endpoint

Cell Sources (normal/diseased human samples):

- Whole blood
- Enriched leukapheresis product
- Cord blood
- Bone marrow

Isolated Cells:

- T cells (pan $CD3^+$, $CD4^+$, $CD8^+$, Treg)
- B cells (pan, naïve, memory)
- Peripheral blood mononuclear cells (PBMCs)
- Monocytes
- NK cells
- Dendritic cells (pan, myeloid, plasmacytoid)
- Granulocytes (neutrophils, basophils, eosinophils)
- Custom sorting

Cell Differentiation:

- T cells (Treg, Th1, Th2)
- Macrophages (M1 and M2)
- Dendritic Cells

Assays and Quantitative Methods:

Immunophenotyping (cell subset and surface marker expression)

- Flow cytometry

Cell Activation and Suppression

- Flow cytometry

Cell Proliferation

- BrdU
- Flow cytometry

Cell Viability

- Flow cytometry
- CellTiter-Glo®
- MTT

Cytokine Expression and Production

- Intracellular flow cytometry
- Meso Scale Discovery multiplex detection
- ELISA

Other cell types and custom assays available; please inquire.

Mesenchymal Services

Mesenchymal stromal cells (MSCs) are a heterogeneous population of cells that can be derived from multiple tissue types in the body. Their ability to modulate the immune response and enhance tissue regeneration and repair has led to numerous clinical investigations assessing the therapeutic potential of MSCs for a variety of diseases and conditions. We offer a number of in vitro assays to characterize the phenotype and function of mesenchymal stromal cells or agents that may modulate them.

Phenotypic Characterization

Flow cytometric analysis for expression of positive and negative markers, as outlined by the International Society for Cellular Therapy (ISCT).

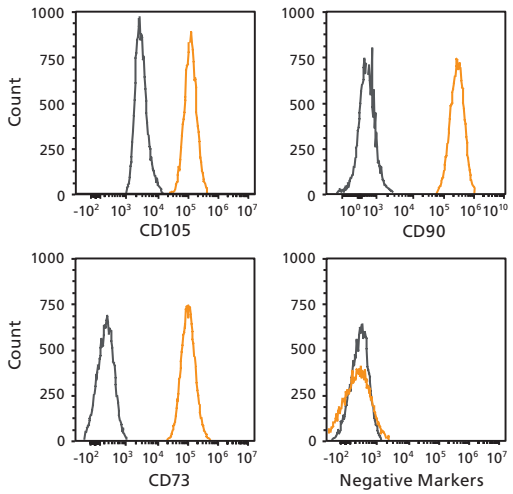


Figure 2. Human MSCs were stained with antibodies against positive and negative markers (orange lines) or isotype control (gray lines)

Differentiation Assays

Assessment of MSC differentiation into adipocyte, osteocyte, and chondrocyte lineages.

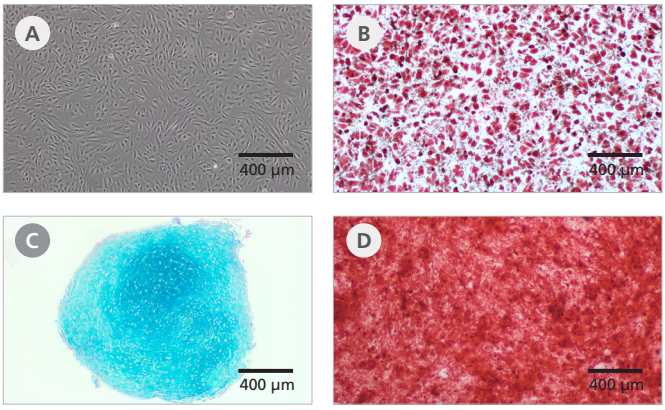


Figure 3. Human MSCs were (A) undifferentiated or differentiated into (B) adipocytes, (C) chondrocytes, or (D) osteoblasts with MesenCult™ differentiation kits

Growth Assays

Quantitative assessment of MSCs for CFU-F colony formation on plastic (A) and proliferation (B) with doubling rate calculated.

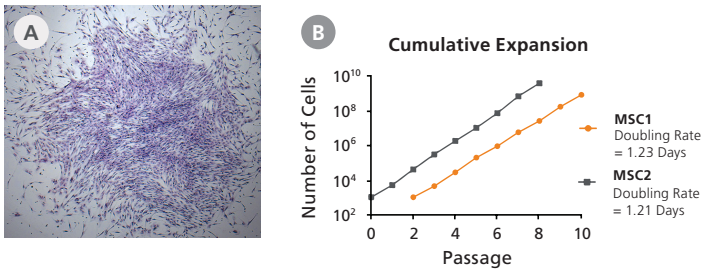


Figure 4. (A) CFU-F colony plated on tissue-culture plasticware was fixed and stained with methylene blue. (B) Cumulative cell expansion of bone marrow-derived MSCs in animal component-free MesenCult™ medium over 8 passages.

Functional Assay

Quantitative assessment of the ability of MSCs to suppress T cell function.

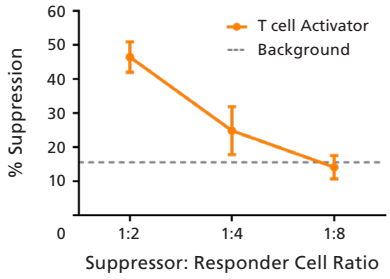


Figure 5. Dose-dependent MSC suppression of $CD4^+$ T cell proliferation

CONTRACT ASSAY SERVICES

Visit **www.contractassay.com** for more information

Email: **contractassay@stemcell.com**

References

1. Pessina A, et al. (2003) Toxicological Sciences 75; 355–367
2. Pessina A, et al. (2009) Toxicology In Vitro 23; 194-200