Immuno-oncology Tools
Immuno-oncology Tools

Cancer immunotherapy has emerged as an exciting new approach for cancer treatment, and immuno-oncology is one of the fastest growing fields in oncology. As compared to traditional cancer therapies that act directly on cancerous tumors, immuno-oncology therapy offers a unique approach that uses the body’s immune system to selectively target and eradicate tumor cells. These therapies also provide long-lasting memory to the immune system, enabling it to continue fighting against cancer cells even after remission.

The development of immunomodulatory drugs and biologics dictates a clear need for human cell-based models to evaluate immune activation. To answer this need, ATCC provides a large collection of fully characterized and authenticated cell lines, human primary cells, and advanced cell models.

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PRIMARY HUMAN IMMUNE CELLS

PHYSIOLOGICALLY RELEVANT MODELS OF THE IMMUNE SYSTEM

ATCC primary immunology cells are able to support complex, physiologically relevant research projects, including toxicity screening, transplantation and graft rejection, inflammation and allergy, vaccine, drug development, as well as cancer immunology studies. Our Scientists have conducted in-depth characterization of the cells in this collection.¹,² Furthermore, this collection reliably provides:

- Greater than 90% cryo-recovery
- Functional data available
- High differentiation capacity or immune activity
- Greater than 90% purity for select biomarkers
- Expansion and differentiation protocols
- Diverse pool of donors available
- Positive and negative biomarkers
- Normal cell morphology

The multipotent bone marrow and cord blood CD34+ hematopoietic stem cells within this collection give rise to either more stem cells or to common myeloid or lymphoid progenitor cells. These cells then give rise to the more differentiated components of the immune system, which may then migrate to the tissues for further specialization. Moreover, the peripheral CD14+ cells in this collection can be induced to differentiate into dendritic cells or macrophages. Finally, the mononuclear cell preparations from the bone marrow or peripheral blood include differentiated macrophages, dendritic cells, monocytes, and lymphocytes, as well as a smaller fraction of hematopoietic cells (Figure 1).

![Differentiation of Multipotent Hematopoietic Progenitor Cells](image)

**CUSTOMIZABLE FOR ANY EXPERIMENT**

The cells in this product listing have many donor options. ATCC has access to a wide range of unique donors, presenting immunologists the ability to design almost any experiment.

- Height and weight
- Age
- Ethnic and gender
- Lifestyle
- HLA and blood type
- Diet
- Family history
- Other specific parameters
### Table 1: ATCC primary immune cells

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>ATCC® No.</th>
<th>Number of Cells/vial</th>
<th>Positive Biomarkers</th>
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<td>Peripheral Blood CD14+ Monocytes</td>
<td>PCS-800-010™</td>
<td>50 million</td>
<td>CD14, CD45</td>
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<td>Peripheral Blood Mononuclear Cells</td>
<td>PCS-800-011™</td>
<td>25 million</td>
<td>CD45; Lot Specific FIO*: CD3, CD8, CD4, CD56, CD14, CD19</td>
</tr>
<tr>
<td>Bone Marrow CD34+ Cells</td>
<td>PCS-800-012™</td>
<td>500,000</td>
<td>CD34, CD45</td>
</tr>
<tr>
<td>Bone Marrow Mononuclear Cells</td>
<td>PCS-800-013™</td>
<td>25 million</td>
<td>CD45; Lot Specific FIO*: CD3, CD8, CD4, CD58, CD14, CD19, CD34</td>
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<td>Cord Blood CD34+ Cells</td>
<td>PCS-800-014™</td>
<td>500,000</td>
<td>CD34, CD45</td>
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<td>Peripheral Blood CD4+ Helper T Cells</td>
<td>PCS-800-016™</td>
<td>25 million</td>
<td>CD3, CD4, CD45</td>
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<tr>
<td>Peripheral Blood CD8+ Cytotoxic T Cells</td>
<td>PCS-800-017™</td>
<td>25 million</td>
<td>CD3, CD8, CD45</td>
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<td>PCS-800-018™</td>
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<td>CD20, CD45</td>
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<td>Peripheral Blood CD56+ Natural Killer Cells</td>
<td>PCS-800-019™</td>
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<td>CD45, CD56</td>
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<td>iPSC-derived Mesenchymal Stem Cells</td>
<td>ACS-7010™</td>
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<td>CD29, CD44, CD73, CD90, CD105, CD166</td>
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<td>iPSC-derived CD34+ Cells</td>
<td>ACS-7020™</td>
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<td>CD34, CD45</td>
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<td>ACS-7030™</td>
<td>2.5 million</td>
<td>CD14</td>
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*For information only (FIO); Lot-specific FIO is not release criteria. Check individual lots for CD-specific numbers.

## REFERENCES


EXPLORE MORE AT [WWW.ATCC.ORG/PRIMARYIMMUNE](http://WWW.ATCC.ORG/PRIMARYIMMUNE)
CHECKPOINT LUCIFERASE REPORTER CELLS

Immune checkpoint inhibitors have shown recent success in the treatment of lung, liver, breast, renal, and skin cancers; however, the built-in complexity of the immunological models and the variable drug responses among different cancer types are currently the most conspicuous challenges in this area of immuno-oncology. To facilitate large scale drug discovery of this growing class of immunomodulator, ATCC created tumor and immune cell lines with high endogenous expression of checkpoint inhibitory and co-stimulatory expression levels. For easy tracking of candidate blocker efficacy, the reporter cell lines contain gamma interferon activation site (GAS)-response element or nuclear factor of activated T cells (NFAT)-response element upstream of the luciferase gene. This portfolio includes a wide range of clinically relevant targets, including PDL1/2, B7-H3, PD1, and CTLA-4. These novel cell lines can be incorporated into simple blocking assays or be integrated into sophisticated co-culture cell-based drug screening assays.

Table 2: ATCC Checkpoint Luciferase Reporter Cells

<table>
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<tr>
<th>Designation</th>
<th>ATCC® No.</th>
<th>Disease</th>
<th>Biomarker</th>
<th>Tissue of origin</th>
<th>Status</th>
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<td>CRL-1942-NFAT-LUC2™</td>
<td>Lymphoblastic Lymphoma</td>
<td>PD-1</td>
<td>Pleural effusion</td>
<td>Coming soon</td>
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Figure 2: Mechanism of action. Luciferase signal generated by HCC827-GAS-Luc2 cells upon T cell activation through PD-L1 blockade.
Figure 3: Evaluation of HCC827-GAS-Luc2 cell line. Luciferase expression from HCC827-GAS-Luc2 cells upon signaling activation by (A) IFN-γ stimulation (0.01 – 1,000 ng/mL), (B) conditioned-media stimulation from checkpoint matched non-activated and activated primary CD8+ T cells, and (C, D) co-culture with primary human CD8+ T cells in the presence of PD-L1 blocking antibody or isotype control IgG1 (1-1,000 ng/mL). N=3 in all experiments. *, P < 0.05.
CHECKPOINT MOLECULE PROFILING IN TUMOR AND IMMUNE CELLS AND APPLICATION FOR IMMUNO-Oncology Drug Screening

Cancer immunotherapies have emerged as an exciting new method in treating cancer. In addition, treatments targeting immune checkpoints are promising approaches to unleash the potential of the anti-tumor immune response.

Although immune checkpoint blockades have exhibited anti-tumor effects in multiple cancer types, there are still challenges to overcome such as resistance and low response rate. Thus, there is a need for comprehensive data on the expression levels of checkpoint molecules based on cancer type, which can be utilized to guide specific treatment plans and combinations.

ATCC has compiled a comprehensive data set of checkpoint molecule expression levels on a variety of tumor and immune cell lines and primary T cells. The cells that were tested demonstrate high expression levels of both checkpoint inhibitory and co-stimulatory molecules. These established cell lines can be incorporated into simple blocking assays or be integrated into co-culture testing systems. Additionally, this information provides a relevant and accessible model system for studying checkpoint molecule interactions and screening biologics as cancer immunotherapy treatments.

Table 3: Checkpoint molecule expression levels of immune cell receptors

<table>
<thead>
<tr>
<th>Cell Lines</th>
<th>ATCC® No.</th>
<th>HLA typing</th>
<th>Inhibitory checkpoint molecules</th>
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<td>HLA class I</td>
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<td>Primary CD4+ T cells</td>
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The expression levels of established and novel inhibitory check point molecule receptors were profiled on basal immune cell lines available at ATCC by FACS analysis. HLA typing is identified by low expression (-) and high expression (+). Conditional formatting is added to the table to compare the expression of checkpoint molecules between cell lines (compare within each column). The value is calculated by subtracting the median fluorescence intensity (MFI) of the sample by the MFI of the isotype control.
Table 4: Checkpoint molecule expression levels of immune cell receptors

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<th>Cell Lines</th>
<th>ATCC® No.</th>
<th>Co-stimulatory checkpoint molecules</th>
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The expression levels of established and novel co-stimulatory check point molecule receptors were profiled on basal immune cell lines available at ATCC by FACS analysis. HLA typing is identified by low expression (-) and high expression (+). Conditional formatting is added to the table to compare the expression of checkpoint molecules between cell lines (compare within each column). The value is calculated by subtracting the median fluorescence intensity (MFI) of the sample by the MFI of the isotype control.
Table 5: Checkpoint molecule expression levels of tumor cell ligands

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<th>Cancer type</th>
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<td>+</td>
<td>PD-L2-</td>
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<tr>
<td></td>
<td>Panc-10.05</td>
<td>CRL-2547™</td>
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<td>+</td>
<td>PD-L2-</td>
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<tr>
<td>Prostate</td>
<td>PC-3</td>
<td>CRL-1345™</td>
<td>+</td>
<td>+</td>
<td>PD-L2-</td>
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<tr>
<td></td>
<td>PC-3-Luc2</td>
<td>CRL-1345-LUC2™</td>
<td>+</td>
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<td>PD-L2-</td>
</tr>
<tr>
<td>Skin</td>
<td>A-431</td>
<td>CRL-1555™</td>
<td>+</td>
<td>+</td>
<td>PD-L2-</td>
</tr>
<tr>
<td></td>
<td>A-431-Luc2</td>
<td>CRL-1555-LUC2™</td>
<td>+</td>
<td>+</td>
<td>PD-L2-</td>
</tr>
<tr>
<td>Uterine</td>
<td>HEC-3-A</td>
<td>HTB-112™</td>
<td>+</td>
<td>+</td>
<td>PD-L2-</td>
</tr>
</tbody>
</table>

The expression levels of established and novel checkpoint inhibitory molecule ligands were profiled on basal (-) and 100 ng/mL IFNγ-stimulated (+) tumor cell lines available at ATCC were profiled by FACS analysis. HLA typing is identified by low expression (-) and high expression (+). Conditional formatting is added to the table to compare the expression of checkpoint molecules between cell lines (compare within each column). The value is calculated by subtracting the median fluorescence intensity (MFI) of the sample by the MFI of the control isotype.

Order online at www.atcc.org, call 800.638.6597, 703.365.2700, or contact your local distributor.
Table 6: Checkpoint molecule expression levels of tumor cell ligands.

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Cell lines</th>
<th>ATCC® No.</th>
<th>HLA class I</th>
<th>HLA class II</th>
<th>Co-stimulatory checkpoint molecule ligands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder</td>
<td>HTB-9™</td>
<td>+</td>
<td>3085</td>
<td>1852</td>
<td>CD155 +, CD80 +, ICOS-L -</td>
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<tr>
<td></td>
<td>HT-117T</td>
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<td>1862</td>
<td>1837</td>
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<td></td>
<td>HT-1376</td>
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<td></td>
<td>RT4</td>
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<td></td>
<td>TCCSUP</td>
<td>-</td>
<td>3016</td>
<td>3758</td>
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<td>Brain</td>
<td>SK-N-BE(2)</td>
<td>+</td>
<td>626</td>
<td>528</td>
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<td></td>
<td>U-87 MG</td>
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<td></td>
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<td></td>
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<td>HOS</td>
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<td></td>
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<td>+</td>
<td>2525</td>
<td>1975</td>
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<tr>
<td></td>
<td>U-2-OS</td>
<td>+</td>
<td>2321</td>
<td>2660</td>
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<td>Hela</td>
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<td></td>
<td>FaDu</td>
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<td>1640</td>
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<td>FaDu-Luc2</td>
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<td>Liver</td>
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<td></td>
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<td>CD155 +, CD80 +, ICOS-L -</td>
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<td>A375-KRAS-Luc2</td>
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<td></td>
<td>RPMI-7951</td>
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<td>HT-71™</td>
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<td>2903</td>
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<td>AsPC-1</td>
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<td>2108</td>
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<td>PC-3-Luc2</td>
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<td>2971</td>
<td>209</td>
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<tr>
<td>Skin</td>
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<td>Uterine</td>
<td>HEC-1-A</td>
<td>+</td>
<td>1401</td>
<td>1471</td>
<td>CD155 +, CD80 +, ICOS-L -</td>
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</tbody>
</table>

The expression levels of established and novel co-stimulatory checkpoint molecule ligands were profiled on basal (-) and 100 ng/mL IFN-stimulated (+) tumor cell lines available at ATCC were profiled by FACS analysis. HLA typing is identified by low expression (-) and high expression (+). Conditional formatting is added to the table to compare the expression of checkpoint molecules between cell lines (compare within each column). The value is calculated by subtracting the median fluorescence intensity (MFI) of the sample by the MFI of the control isotype.

SEE THE DATA AT WWW.ATCC.ORG/IMMUNO-ONCOLOGY
CAR-T TARGET LUCIFERASE REPORTER CELL LINES

One of the bottlenecks in CAR-T therapeutic development is evaluating the biofunction of effector cells. This in vitro process involves a series of labor-intensive co-culture immunoassays. To address this challenge, we generated CAR-T Target Luciferase Reporter Cells lines that have high endogenous expression of clinically relevant cell surface tumor antigens, such as CD19, CD20, and HER2. These new immuno-oncology tools are comprised of both solid and liquid tumor cell lines that exhibit sensitive and stable luciferase reporter expression. These cells enable your immuno-therapeutic breakthroughs by allowing you to monitor the potency and efficacy of candidate CAR-T effector cells in your cytotoxicity and cell viability assays in real time.

### Table 7: CAR-T Target Luciferase Reporter Cells

<table>
<thead>
<tr>
<th>Designation</th>
<th>ATCC® No.</th>
<th>Disease</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIL2-S-Luc2</td>
<td>CRL-8885-LUC2™</td>
<td>B Cell Lymphoma</td>
<td>CD19</td>
</tr>
<tr>
<td>Raji-Luc2</td>
<td>CCL-86-LUC2™</td>
<td>Burkitt’s Lymphoma</td>
<td>CD19</td>
</tr>
<tr>
<td>Daudi-Luc2</td>
<td>CCL-213-LUC2™</td>
<td>Burkitt’s Lymphoma</td>
<td>CD20</td>
</tr>
<tr>
<td>Farage-Luc2</td>
<td>CRL-2630-LUC2™</td>
<td>Non-Hodgkin’s B Cell Lymphoma</td>
<td>CD20</td>
</tr>
<tr>
<td>BT-474-Luc2</td>
<td>HTB-20-LUC2™</td>
<td>Breast Ductal Carcinoma</td>
<td>HER2</td>
</tr>
</tbody>
</table>

These convenient reporter-labeled cells allow you to eliminate workflows involving radioactive or fluorescent dye labeling. The cells retain high expression of both the target antigen and luciferase up to 30 population doublings. These flexible target cells can also be incorporated in other immuno-oncology applications such as ADCC and natural killer (NK) cell cytotoxicity assays.

- High expression stability of both target antigen and luciferase
- High signal-to-noise ratio (S/N)
- Physiologically relevant low E:T ratios
- High-performing, fully authenticated cell lines
- Easy-to-use reporter system
- Real-time, live-cell imaging possible

### CHIMERIC ANTIGEN RECEPTOR

WIL2-S-Luc2 (ATCC® CRL-8885-LUC2™) or Raji-Luc2 (ATCC® CCL-86-LUC2™)

Daudi-Luc2 (ATCC® CCL-213-LUC2™) or Farage-Luc2 (ATCC® CRL-2630-LUC2™)

BT474-Luc2 (ATCC® HTB-20-LUC2™)

Human CD19 scFV CAR-T cell

Human CD20 scFV CAR-T cell

Human Her2 scFV CAR-T cell

**Figure 4: CAR-T Target Luciferase Reporter Cells.** Schematic showing CAR-T target cells with expression of CD19+ WIL2-S-Luc2 and Raji-Luc2, CD20+Daudi-Luc2 and Farage-Luc2, and HER2+BT-474-Luc2 being surrounded and attacked by CD19-, CD20-, and HER2-targeting CAR-T cells, respectively.
Figure 5: CAR-T Target Luciferase Reporter Cells can be incorporated into multiple CAR-T efficacy assays. (A) CD19 expressing Raji-Luc2 cells (B) or WIL2-S-Luc2 cells were used as target cells for either CD19 CAR-T or Mock CAR-T (control) effector cells from the same donor at the indicated effector to target cell ratios. A luciferase assay substrate was added, and the luminescence signal was detected. Loss of signal indicates cell death; the dose-dependent specific killing via CD19-targeting CAR-T cells was greater than the non-specific killing observed with the mock CAR-T cells. Additionally, Raji-Luc2 cells were stained with a cell labeling dye and then real-time fluorescent imaging was measured during co-culture with CD19 CAR-T effector cells. (C) Raji-Luc2 cells (Green) are surrounded by effector T cells, resulting in a decrease of fluorescence as compared to co-cultures with Mock-CAR-T cells. (D) After 6 and 24 hours of co-culture with CD19 CAR-T effector cells, we observed a decrease in the number of fluorescent cells; however, in a co-culture with Mock CAR-T cells numerous Raji-LUC2 cells were present. These results indicate that the ATCC CAR-T Target Luciferase Reporter Cells can be used to evaluate the potency of CAR-T cells in bioluminescence assays and live cell imaging in real time.

FOR MORE INFORMATION VISIT WWW.ATCC.ORG/CAR-T_TARGET
THP-1 REPORTER CELLS

The lack of stable and sensitive advanced immunology cell-based models to evaluate immune activation has hindered immune-oncology research and development for decades. To address this need, ATCC introduced luciferase reporters containing the response element of immunologically important transcription factors into the THP-1 cell line. The THP-1 LUC2 cell lines provide a means to confidently measure immune modulation for all your drug discovery and development efforts. Originating from a spontaneously immortalized human monocyte-like cell line that naturally expresses many pattern-recognition and cytokine receptors, ATCC THP-1 LUC2 cells represent the most physiologically relevant model to aid advancements in immuno-oncology and immune disorders.

Table 8: Features and Benefits of THP-1 Reporter Cells

<table>
<thead>
<tr>
<th>Key Features</th>
<th>Key Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully authenticated parental THP-1 cell line</td>
<td>No concerns about cross-contamination and misidentification, saves time and money</td>
</tr>
<tr>
<td>High signal-to-noise ratio</td>
<td>Clear and more intense results, straightforward data analysis</td>
</tr>
<tr>
<td>Verified, characterized stable expression</td>
<td>Reduced variability, reproducible results</td>
</tr>
<tr>
<td>Easy to culture, robust, and highly sensitive</td>
<td>Ease of use, customer convenience</td>
</tr>
<tr>
<td>Amenable to complex experimentation (combinatorial stimulation, co-culture)</td>
<td>Versatile and compatible with multiple platforms</td>
</tr>
<tr>
<td>High density cryopreservation</td>
<td>More viable cells post-thaw</td>
</tr>
</tbody>
</table>

Figure 6: Quantitation of immunomodulation made easy. To use THP-1 LUC2 cells, simply seed in a 96-well plate. Stimulate the cells overnight with your compound of interest, then incubate the cells using a luciferase assay system and read the bioluminescence signals using a luminometer. Your immunomodulation data will be bigger, brighter, better.

Table 9: Available THP-1 LUC2 reporter cell lines

<table>
<thead>
<tr>
<th>Response Element</th>
<th>ATCC No.</th>
<th>Signaling Pathway</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFkB</td>
<td>TIB-202-NFkB-LUC2™</td>
<td>NFkB</td>
<td>Pivotal mediator of inflammatory response</td>
</tr>
<tr>
<td>GAS</td>
<td>TIB-202-GAS-LUC2™</td>
<td>JAK-STAT (Type II)</td>
<td>Initiates immune cell activation and recruitment</td>
</tr>
<tr>
<td>CRE</td>
<td>TIB-202-CRE-LUC2™</td>
<td>cAMP/PKA</td>
<td>Inflammatory mediator and phagocytosis modulator</td>
</tr>
<tr>
<td>ISRE</td>
<td>TIB-202-ISRE-LUC2™</td>
<td>JAK-STAT (Type I)</td>
<td>Initiates immune cell activation and recruitment</td>
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<tr>
<td>AP1</td>
<td>TIB-202-AP1-LUC2™</td>
<td>MAPK/ERK</td>
<td>Regulates innate and adaptive immune response</td>
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<tr>
<td>NFAT</td>
<td>TIB-202-NFAT-LUC2™</td>
<td>Calcineurin-NFAT</td>
<td>Mediates adaptive T and B cell activation</td>
</tr>
</tbody>
</table>

These high-quality cell lines are well suited to study the role of proteins involved in signaling cascades activated by immunomodulators, to optimize the MoA, pharmaceutical potency, and/or toxicological profile of leading drug candidates, and to evaluate the efficacy or toxicity of promising drug compounds in vitro assays.
Figure 7: Comparison of luminescence and in vitro quantification of luciferase activity of THP-1 LUC2 and competitor reporter cell lines. Cells were seeded in a 96-well plate. After overnight stimulation with the appropriate interferons, bioluminescence signals were detected using a commercially available luciferase assay kit and a luminometer. Error bars show standard deviation (n=3). Panel (A) shows ATCC® THP-1 GAS-Luc2 (orange bar), THP-1 ISRE-Luc2 (yellow bar), or competitor immune regulator expression cells (green bar) stimulated with the indicated interferons and assessed for bioluminescence. Panel (B) shows ATCC® THP-1 NFkB-Luc2 (orange bar) or competitor immune regulator expression cells (green bar) treated with the indicated toll-like receptor agonists and assessed for bioluminescence intensity. In both studies, THP-1 luciferase-expressing cells exhibited enhanced bioluminescence signal compared to the competitor cells.

LEARN MORE AT WWW.ATCC.ORG/ADVANCEDIMMUNOLOGY
LUCIFERASE CELL LINES

Imprecise in vivo animal models are a daily reality for cancer biologists. They cloud the results of biological mechanism studies and drug development work because it is often difficult to image and quantify engrafted tumors. Luciferase reporter cell lines provide a relatively simple, robust, and highly sensitive means to measure biological processes and to assess drug efficacy in animal models through bioluminescence imaging. They offer new tools for both in vitro luminescent assays and in vivo live animal bioluminescent imaging.

- Used to establish in vivo tumor models
- Quantifiable luciferase expression
- Verified Luc2 expression stability
- Derived from commonly used human and mouse cell lines
- Developed by single cell cloning
- High signal/background ratio

Figure 8: Luciferase-expressing reporter cell lines can be used in in vivo animal bioluminescent imaging. IDH1 Mutant U-87 Isogenic-Luc2 cells (3 x 10⁶) were injected subcutaneously into the dorsal region near the thigh of female nude mice. Tumor growth was monitored weekly using an optical bioluminescence imaging system. In vivo bioluminescence imaging demonstrated the progression of tumors, and the utility of luciferase-expressing reporter cell lines (here IDH1 Mutant U-87 Isogenic-Luc2) in xenograft animal model studies.

LEARN MORE AT WWW.ATCC.ORG/LUCIFERASE
Figure 9: Luciferase-expressing reporter cells demonstrate linear, quantifiable signal in in vitro bioluminescence studies. IDH1 mutant-U-87 Isogenic-Luc2 were seeded in a 96-well plate at indicated cell numbers per well, and commercially prepared luciferase substrate preparation was added to the indicated wells. The luminescence of the plate was read within 10 minutes using a luminescence plate reader (A) and determined to have a linear correlation of bioluminescence intensity with cell numbers. (B) The plate was imaged using in vivo optical imaging system to quantify that photons emitted per cell. The resulting bioluminescence curves indicate that the luciferase-expressing reporter cells can be used to assess cell viability in live, unfixed cells.

LUCIFERASE-LABELED CELL LINES

ATCC maintains luciferase-expressing reporter cell lines derived from the most commonly used cells in molecular imaging studies. The addition of the luciferase reporter to these cell lines increases their utility by allowing for real-time imaging of the tumors.

ISOGENIC LUCIFERASE-LABELED CELL LINES

By utilizing the CRISPR/Cas9 gene editing, ATCC offers isogenic cell models harboring critical drug-resistant or -sensitive mutations that also express the luciferase reporter. These advanced models can be used in in vivo studies to identify novel, personalized treatment regimens.
### Table 10: Luciferase-Labeled Human Cell Lines

<table>
<thead>
<tr>
<th>ATCC® No.</th>
<th>Designation</th>
<th>Disease</th>
<th>Tissue</th>
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<tbody>
<tr>
<td>CCL-240-LUC2™</td>
<td>HL-60-Luc2</td>
<td>Leukemia</td>
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<td>K-562-Luc2</td>
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<td>U-2 OS-Luc2</td>
<td>Osteosarcoma</td>
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<td>TF-1-Luc2</td>
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<td>U-87MG-Luc2</td>
<td>Glioma</td>
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<td>MCF7-Luc2</td>
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<td>CCL-225-LUC2™</td>
<td>HCT-15-Luc2</td>
<td>Human Dukes' type C, colorectal adenocarcinoma</td>
<td>Colon</td>
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<tr>
<td>CCL-228-LUC2™</td>
<td>SW480-Luc2</td>
<td>Human Dukes' type B, colorectal adenocarcinoma</td>
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<td>CCL-185IG-LUC2™</td>
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<td>PANC-1-Luc2</td>
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<td>PC-3-Luc2</td>
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<td>CRL-1619IG-2-LUC2™</td>
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<td>AGS-Luc2</td>
<td>Human Gastric Adenocarcinoma</td>
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### Table 11: Luciferase-Labeled Mouse Cell Lines

<table>
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<th>Designation</th>
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<th>Tissue</th>
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<td>TIB-39-LUC2™</td>
<td>EL4-Luc2</td>
<td>Lymphoma</td>
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<td>CRL-2539-LUC2™</td>
<td>4T1-Luc2</td>
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<td>CRL-1642-LUC2™</td>
<td>LL/2-Luc2</td>
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<tr>
<td>CRL-6323-LUC2™</td>
<td>B16-F1-Luc2</td>
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<td>CRL-6475-LUC2™</td>
<td>B16-F10-Luc2</td>
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<td>Skin</td>
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</table>

LEARN MORE AT WWW.ATCC.ORG/LUCIFERASE
HUMAN CANCER MODELS INITIATIVE

PATIENT-DERIVED CANCER MODELS

As part of our pledge to elevate biological models, ATCC is collaborating with the Human Cancer Models Initiative (HCMI) to offer scientists a wide variety of next-generation 2-D and 3-D patient-derived in vitro cancer models, including organoids and conditionally reprogrammed cells (CRCs). ATCC is committed to making available a growing collection of models generated by the HCMI, which will include both common as well as rare and understudied examples of cancer from numerous tissues. These HCMI models are valuable tools to study cancer, identify and target novel therapies, and facilitate translational cancer research.

To enhance their clinical relevance, the sequence data and patient clinical information for each model is available to the research community.

Various types of 2-D and 3-D models

- All models are human patient-derived
- Diverse genetic backgrounds
- Advanced models such as organoids
- Clinical and sequencing data available via the HCMI portal

Patient-derived cancer models of the following physiological systems will be available:

- Circulatory System
- Digestive System
- Excretory System
- Integumentary System
- Musculo-skeletal System
- Nervous System
- Reproductive System
- Respiratory System

NEXT-GENERATION CANCER MODELS

ORGANOIDS

Organoids are complex, self-organizing microtissues grown embedded within 3-D extracellular matrix. Primary patient-derived organoids have been described for various tissues, healthy and cancerous, including colon, intestine, stomach, breast, esophagus, lung, liver, prostate, and pancreas. Organoids are invaluable pre-clinical models for studying cancer and offer many advantages over existing human or non-human animal cancer models.

- May contain multiple differentiated cell types
- Exhibit cellular polarization
- Often possess a central lumen or other in vivo–like architecture
- Can remain phenotypically and genotypically stable after long term expansion

CONDITIONALLY REPROGRAMMED CELLS (CRCS) AND OTHER NON-ORGANOID MODELS

Conditional reprogramming is a cell culture technique that can be used to rapidly and efficiently establish patient-derived cell cultures from both normal and tumor cells. A major advantage of this system is that it:

- Eliminates the need for immortalization via transduction of viral or cellular genes
- Allows the expansion of a patient’s tumor cells
- Reverts to differentiated phenotype in physiological culture conditions
- Makes it possible to identify the specific mutations in these cells and to screen the cells for sensitivity to drugs

In addition to CRCs, various other 2-D and 3-D model types, such as neurosphere models, are among the next-generation cancer models offered by the HCMI.
ABOUT HUMAN CANCER MODELS INITIATIVE (HCMI)

HCMI is an international consortium that is dedicated to generating novel human tumor-derived culture models with associated genomic and clinical data. The HCMI consortium comprises funding agencies and cancer model development institutions. The consortium’s funding agencies include:

- National Cancer Institute (NCI)
- Cancer Research UK (CRUK)
- Hubrecht Organoid Technology (HUB)
- Wellcome Sanger Institute (WSI)

NCI-funded model development institutions include the Broad Institute and the Cold Spring Harbor Laboratory. CRUK and WSI co-fund organoid development in the United Kingdom, CRUK provides the patient samples, while WSI derives and sequences the organoid models. The foundation HUB is a Netherlands-based not-for-profit organization that derives and sequences organoid models. ATCC was selected as the sole distributor for the HCMI models. At ATCC the models are authenticated, expanded, preserved, and made available for global distribution. The HCMI model data is provided as an open source to the research community.

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<tr>
<th>Tissue of Origin</th>
<th>Morphology</th>
<th>Disease</th>
<th>ATCC® No.</th>
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</thead>
<tbody>
<tr>
<td>Ampulla Of Vater</td>
<td>Organoid</td>
<td>Cancer</td>
<td>PDM-369™</td>
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<tr>
<td>Ampulla Of Vater</td>
<td>Organoid</td>
<td>Carcinoma</td>
<td>PDM-218™, PDM-102™</td>
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<tr>
<td>Bone</td>
<td>2-D adherent</td>
<td>Osteosarcoma</td>
<td>PDM-114™</td>
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<tr>
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<td>2-D adherent</td>
<td>Metastatic: bone cancer</td>
<td>PDM-227™</td>
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<tr>
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<td>Ewing sarcoma</td>
<td>PDM-125™</td>
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<tr>
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<td>Mixed adherent and suspension</td>
<td>Ewing sarcoma</td>
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<tr>
<td>Brain</td>
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<td>Glioblastoma</td>
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<td>Glioblastoma</td>
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<td>Adenocarcinoma</td>
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<td>Adenoma</td>
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<td>Cancer</td>
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<td>Disease</td>
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<td>Cancer</td>
<td>PDM-158™</td>
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<td>PDM-273™</td>
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<td>Cholangiocarcinoma</td>
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<td>Cancer</td>
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<td>PDM-368™</td>
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<td>Small Intestine</td>
<td>Organoid</td>
<td>Cancer</td>
<td>PDM-272™</td>
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<tr>
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<td>suspension</td>
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<td>Cancer</td>
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<td>Organoid</td>
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<td>Stomach; Metastatic Site: Pleural Cavity</td>
<td>Organoid</td>
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<td>Stomach; Metastatic Site: Pleural Cavity</td>
<td>Mixed: adherent and</td>
<td>Cancer</td>
<td>PDM-163™</td>
</tr>
</tbody>
</table>

Page 20  Order online at www.atcc.org, call 800.638.6597, 703.365.2700, or contact your local distributor.
Organoids are valuable tools to study cancer, identify and target novel therapies, and facilitate translational cancer research. These 3-D models are becoming more relevant because they are predictive of the in vivo tumor microenvironment. In efforts to simplify Organoid culture, ATCC has developed Organoid Growth Kits which are comprised of single-use supplements created to streamline media preparation. These kits contain the most costly and cumbersome supplements and reagents, reducing the time and effort required to prepare media and ensuring the successful growth of your organoids.

### ORGANOID GROWTH KITS

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<tr>
<th>ATCC® No.</th>
<th>Growth Kit Name</th>
<th>Applicable Organoid ATCC® No.</th>
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<tr>
<td>ACS-7102™</td>
<td>Organoid Growth Kit 1C</td>
<td>PDM-3™</td>
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<td>ACS-7105™</td>
<td>Organoid Growth Kit 1F</td>
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<td>ACS-7106™</td>
<td>Organoid Growth Kit 1G</td>
<td>PDM-37™, PDM-102™</td>
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</table>

Order online at www.atcc.org, call 800.638.6597, 703.365.2700, or contact your local distributor.
TUMOR/NORMAL MATCHED CELL LINE PAIRS

Tumor-derived cell lines matched to either normal or metastatic cell lines obtained from the same patient provide a valuable resource for cancer studies. The availability of such models allows researchers to analyze cancer-specific mutations, monitor the behavior and chemical sensitivity of tumor lines based on their normal counterparts, and develop drugs or therapies to target specific cancers or cancer mutations.

Table 1: Tumor and normal cell lines from the same individual

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<tr>
<th>Primary site of disease</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
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<td>NCI-H1395</td>
<td>CRL-5868™</td>
<td>Peripheral Blood</td>
<td>NCI-BL1395</td>
<td>CRL-5957™</td>
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<td>Adenocarcinoma</td>
<td>Lung</td>
<td>NCI-H1437</td>
<td>CRL-5872™</td>
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<td>NCI-BL1437</td>
<td>CRL-5958™</td>
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<td>Lung</td>
<td>NCI-H2009</td>
<td>CRL-5911™</td>
<td>Peripheral Blood</td>
<td>NCI-BL2009</td>
<td>CRL-5961™</td>
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<tr>
<td>Adenocarcinoma</td>
<td>Lung, lymph node (metastasis)</td>
<td>NCI-H2087</td>
<td>CRL-5922™</td>
<td>Peripheral Blood</td>
<td>NCI-BL2087</td>
<td>CRL-5965™</td>
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<td>Basal Cell Carcinoma</td>
<td>Skin</td>
<td>TE 354.T</td>
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<td>TE 353.Sk</td>
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<td>CRL-7444™</td>
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<td>Hs 925.Sk</td>
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<td>HCC1599</td>
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<td>HCC2218</td>
<td>CRL-2343™</td>
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<td>Scirrhous Adenocarcinoma</td>
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<td>CRL-5959™</td>
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<td>Small Cell Lung Cancer; Carcinoma</td>
<td>Lung, lymph node (metastasis)</td>
<td>NCI-H2126</td>
<td>CCL-256™</td>
<td>Peripheral Blood</td>
<td>NCI-BL2126</td>
<td>CCL-256.1™</td>
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<td>CRL-5949™</td>
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<td>Small Cell Lung Cancer; Carcinoma</td>
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<td>Bone marrow (metastasis)</td>
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<td>Peripheral Blood</td>
<td>NCI-BL2107</td>
<td>CRL-5966™</td>
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### Table 1: Tumor and normal cell lines from the same individual (continued)

<table>
<thead>
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<th>Cancer type</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
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</thead>
<tbody>
<tr>
<td>Small Cell Lung Cancer; Carcinoma</td>
<td>Lung, pleural effusion</td>
<td>NCI-H128</td>
<td><strong>HTB-120™</strong></td>
<td>Peripheral Blood</td>
<td>NCI-BL128</td>
<td><strong>CRL-5947™</strong></td>
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<tr>
<td>Small Cell Lung Cancer; Carcinoma</td>
<td>Bone marrow (metastasis)</td>
<td>NCI-H209</td>
<td><strong>HTB-172™</strong></td>
<td>Peripheral Blood</td>
<td>NCI-BL209</td>
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<td>Transitional Cell Carcinoma</td>
<td>Ureter</td>
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<td><strong>CRL-7886™</strong></td>
<td>Skin</td>
<td>Hs 789 Sk</td>
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### Table 2: Tumor and normal reference cell lines for detecting somatic mutations

<table>
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<th>Cancer type</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Ductal Carcinoma</td>
<td>Mammary gland; breast</td>
<td>HCC1395</td>
<td><strong>SC-CRL-2324™</strong></td>
<td>Peripheral Blood</td>
<td>HCC1395 BL</td>
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### Table 3: Primary and metastatic cell lines from the same individual

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<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
<th>Tissue source</th>
<th>Name</th>
<th>ATCC® No.</th>
</tr>
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<tr>
<td>Colorectal Adenocarcinoma</td>
<td>Colon</td>
<td>SW480</td>
<td><strong>CCL-228™</strong></td>
<td>Lymph Node</td>
<td>SW620</td>
<td><strong>CCL-227™</strong></td>
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<td>Melanoma</td>
<td>Skin</td>
<td>Hs 688(A).T</td>
<td><strong>CRL-7425™</strong></td>
<td>Lymph Node</td>
<td>Hs 688(B).T</td>
<td><strong>CRL-7426™</strong></td>
</tr>
</tbody>
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Don’t see a cell line or primary cell that you need? You can navigate to our website to search over 4,000 cell biology products for macrophages, lymphocytes, leukocytes, reporter-labeled cells, and tumor-derived cells by tissue/organ/species.

**EXPLORE ALL OF OUR CELLS AND CELL BIOLOGY RESOURCES AT [WWW.ATCC.ORG/CELLBIOLOGY](http://WWW.ATCC.ORG/CELLBIOLOGY)**