HEK-Blue™ IL-7 Cells
Interleukin-7 reporter cells
Catalog code: hkb-il7
https://www.invivogen.com/hek-blue-il7

For research use only
Version 22D01-MM

PRODUCT INFORMATION
Contents
• 3-7 x 10⁶ HEK-Blue™ IL-7 cells in a cryovial or shipping flask.
  IMPORTANT: If cells provided in a cryovial are not frozen upon arrival, contact InvivoGen immediately.
• 2 x 1 ml of HEK-Blue™ Selection (250X concentrate), a solution containing several selection antibiotics. Store at 4 °C or at -20 °C.
• 1 ml of Puromycin (10 mg/ml), store at 4°C or at -20°C.
• 1 ml of Normocin™ (50 mg/ml), a formulation of three antibiotics active against mycoplasmas, bacteria and fungi. Store at -20°C.*
  *The expiry date is specified on the product label.
• 1 ml of QB reagent and 1 ml of QB buffer (sufficient to prepare 100 ml of QUANTI-Blue™ Solution, a SEAP detection reagent). QB reagent and QB buffer are stable for 1 year at -20°C. QUANTI-Blue™ Solution is stable for 2 weeks at 4°C and for 2 months at -20°C. 
  Note: Data sheets for all components are available on our website.

Handling Frozen Cells Upon Arrival
Cells must be thawed immediately upon receipt and grown according to handling procedures (as described on the next page) to ensure the best cell viability and proper assay performance. 
  Note: Avoid freezing cells upon receipt as it may result in irreversible damage to the cell line.
    Disclaimer: We cannot guarantee cell viability if the cells are not thawed immediately upon receipt and grown according to handling procedures.
    IMPORTANT: For cells that arrive in a shipping flask please refer to the enclosed ‘cell recovery procedure’.

Cell Line Stability
Cells will undergo genotypic changes resulting in reduced responsiveness over time in normal cell culture conditions. Genetic instability is a biological phenomenon that occurs in all stably transfected cells. Therefore, it is critical to prepare an adequate number of frozen stocks at early passages. HEK-Blue™ IL-7 cells should not be passaged more than 20 times to remain fully efficient.

Quality Control
• SEAP reporter activity in response to human and murine IL-7 has been validated using functional assays.
• The expression of human IL-7Ra (CD127) has been confirmed using fluorescence-activated cell sorting (FACS).*
• The stability for 20 passages following thawing has been verified.
• These cells are guaranteed mycoplasma-free.

USE RESTRICTIONS
These cells are distributed for research purposes only.
This product is covered by a Limited Use License. By use of this product, the buyer agrees to the terms and conditions of all applicable Limited Use Label Licenses. For non-research use, such as screening, quality control or clinical development, contact info@invivogen.com.

BACKGROUND
Interleukin 7 (IL-7) is a secreted cytokine that plays an essential role in B-cell and T-cell development and function. IL-7 signals through the heterodimeric cell surface IL-7 receptor (IL-7R), consisting of IL-7Ra (also called CD127) and IL-2Rγ, (also called the common γ-chain or CD132). The binding of IL-7 to its receptor triggers three main signaling pathways: JAK/STAT, PI3K, and MAPK/ERK. Of note, IL-7R-mediated signaling triggers proliferative and anti-apoptotic signals mainly by activating the JAK/STAT pathway. IL-7/IL-7R signaling, which regulates lymphocyte growth and survival, has been implicated in the development of malignancies and autoimmune diseases.

PRODUCT DESCRIPTION
HEK-Blue™ IL-7 cells were engineered from the human embryonic kidney HEK293 cell line to detect bioactive human and murine IL-7 by monitoring the activation of the JAK/STAT pathway. These cells can also be used for screening anti-IL-7R and anti-IL-7 antibodies. HEK-Blue™ IL-7 cells were generated by stable overexpression of the human IL-7Ra, human IL-2Rγ, human JAK3, human STAT5b, and a STAT5-inducible secreted embryonic alkaline phosphatase (SEAP) reporter.

Binding of IL-7 to its receptor on the surface of HEK-Blue™ IL-7 cells triggers a signaling cascade leading to the activation of STAT5 and production of SEAP. This can be readily assessed using QUANTI-Blue™ Solution. Of note, HEK-Blue™ IL-7 cells produce SEAP in response to human type I interferons (IFN-α). However, they do not respond to human type I IFNs (IFN-α/IFN-β), as they are knock-out for IFNAR2.

HEK-Blue™ IL-7 cells are resistant to Blasticidin, Hygromycin B, Puromycin, and Zeocin®.

Detection range for human and murine IL-7: 100 pg/ml - 100 ng/ml
SAFETY CONSIDERATIONS

Biosafety level 2
HEK-Blue™ IL-7 cells were derived from HEK293 cells (transformed with adenovirus 5 DNA) that require Biosafety level 2 according to the American Center for Disease Control and Prevention (CDC) guidelines. The biosafety level may vary depending on the country. For example, in Germany HEK293 cell lines are designated Biosafety Level 1 according to the Central Committee of Biological Safety, Zentrale Kommission für die Biologische Sicherheit (ZKBS). Please check with your country’s regulatory authority regarding the use of these cells.

HANDLING PROCEDURES

Required Cell Culture Medium
- **Growth Medium**: DMEM, 4.5 g/l glucose, 2 mM L-glutamine, 10% (v/v) heat-inactivated fetal bovine serum (FBS), 30 min at 56 °C, Pen-Strep (100 U/ml - 100 µg/ml), 100 µg/ml Normocin™
- **Freezing Medium**: DMEM, 20% (v/v) FBS, 10% (v/v) DMSO
- **Test Medium**: DMEM, 4.5 g/l glucose, 2 mM L-glutamine, 10% (v/v) heat-inactivated FBS, Pen-Strep (100 U/ml - 100 µg/ml), without HEK-Blue™ Selection, Puromycin, and Normocin™

**Note**: Some FBS may contain alkaline phosphatases that can interfere with SEAP quantification. We recommend to use heat-inactivated FBS to inactivate these thermosensitive enzymes.

Required Selection Antibiotic(s)
- **HEK-Blue™ Selection** and Puromycin

Initial Culture Procedure
The first propagation of cells should be for generating stocks for future use. This ensures the stability and performance of the cells for subsequent experiments.
1. Thaw the vial by gentle agitation in a 37 °C water bath. To reduce the possibility of contamination, keep the O-ring and cap out of the water. Thawing should be rapid.
2. Remove the vial from the water bath as soon as the contents are thawed, and decontaminate by dipping in or spraying with 70% (v/v) ethanol.

**Note**: All steps from this point should be carried out under strict aseptic conditions.
3. Transfer cells in a larger vial containing 15 ml of pre-warmed growth medium. Do not add selection antibiotics until the cells have been passaged twice.
4. Centrifuge vial at 300 x g (RCF) for 5 min.
5. Remove supernatant containing the cryoprotective agent and resuspend cells with 1 ml of growth medium without selection antibiotics.
6. Transfer the vial contents to a T-25 culture flask containing 5 ml of growth medium.

**Note**: To avoid excessive alkalinity of the medium during recovery of the cells, place the tissue culture flask containing the growth medium into the incubator for at least 15 min prior to the addition of the vial contents.
7. Place the culture at 37 °C in 5% CO₂.

Frozen Stock Preparation
1. Resuspend cells at a density of 3-5 x 10⁶ cells/ml in freshly prepared freezing medium with cold DMEM.

**Note**: A T-75 culture flask typically yields enough cells for preparing 3-4 frozen vials.
2. Aliquot 1 ml cells into cryogenic vials.
3. Place vials in a freezing container and store at -80 °C overnight.
4. Transfer vials to liquid nitrogen for long term storage.

**Note**: If properly stored, cells should remain stable for years.

DETECTION OF IL-7

**Day 1**
1. Prepare HEK-Blue™ IL-7 cell suspension: gently rinse cells twice with pre-warmed PBS, detach the cells using trypsin for 2-3 min at RT, resuspend cells in fresh, pre-warmed test medium (containing heat-inactivated FBS) and prepare a cell suspension at 2.77 x 10⁵ cells/ml.

**Note**: The response of HEK-Blue™ IL-7 cells can be altered by the prolonged action of trypsin. Do not incubate with trypsin at 37 °C and for no longer than 2-3 min.
2. Add 20 µl of sample per well of a flat-bottom 96-well plate.
3. In separate wells, add 20 µl of a positive control, such as recombinant human IL-7 (final concentration 1 ng/ml), and 20 µl of a negative control, such as recombinant human IFN-α2b (final concentration 10⁵ IU/ml).
4. Add 180 µl of HEK-Blue™ IL-7 cell suspension (~5 x 10⁶ cells) per well.
5. Incubate overnight at 37 °C in 5% CO₂.

**Day 2**
6. Prepare QUANTI-Blue™ Solution following the instructions on the enclosed product data sheet.
7. Add 20 µl of induced HEK-Blue™ IL-7 cell supernatant.
8. Add 180 µl of resuspended QUANTI-Blue™ Solution per well of a flat-bottom 96-well plate.
9. Incubate the plate at 37 °C for 30 min to 3 hours.
10. Determine SEAP levels using a spectrophotometer at 620-655 nm.

RELATED PRODUCTS

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<tr>
<th>Product</th>
<th>Description</th>
<th>Cat. Code</th>
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<tr>
<td>HEK-Blue™ Selection</td>
<td>Selection antibiotic mix</td>
<td>hb-sel</td>
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<td>Normocin™</td>
<td>Antimicrobial reagent</td>
<td>ant-nr-1</td>
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<tr>
<td>Puromycin</td>
<td>Selection antibiotic</td>
<td>ant-pr-1</td>
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<tr>
<td>QUANTI-Blue™ Solution</td>
<td>SEAP detection medium</td>
<td>rep-qbs</td>
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<tr>
<td>Recombinant human IFN-α2b</td>
<td>Recombinant cytokine</td>
<td>rcyc-hifna2b</td>
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</tbody>
</table>

Cell Maintenance
1. HEK-Blue™ IL-7 cells grow as adherent cells. Detach the cells using trypsin for 2-3 min at room temperature (RT).

**Note**: The response of HEK-Blue™ IL-7 cells can be altered by the prolonged action of trypsin. Do not incubate with trypsin at 37 °C and for no longer than 2-3 min.
2. Maintain and subculture the cells in growth medium supplemented with 1X HEK-Blue™ Selection and 1 µg/ml Puromycin.
3. Renew growth medium twice a week.
4. Cells should be passaged when a 70-80% confluency is reached. Do not let the cells grow to 100% confluency.

**Note**: The average doubling time for the HEK-Blue™ IL-7 cells is ~24 hours using the conditions described above.
**QUANTI-Blue™ Solution**

Medium for detection and quantification of alkaline phosphatase in standard and HTS assays

Catalog code: rep-qbs, rep-qbs2, rep-qbs3

https://www.invivogen.com/quanti-blue

For research use only

Version 20C16-MM

**PRODUCT INFORMATION**

Contents: QUANTI-Blue™ Solution is available in three pack sizes

- **rep-qbs**: 5 x 1 ml of QB reagent and 5 x 1 ml QB buffer, sufficient to prepare QUANTI-Blue™ Solution for 25 x 96-well plates (500 ml using the standard procedure) or 20 x 1536-well plates (85 ml using the HTS screening procedure).

- **rep-qbs2**: 10 x 1 ml of QB reagent and 10 x 1 ml QB buffer, sufficient to prepare QUANTI-Blue™ Solution for 50 x 96-well plates (1 L using the standard procedure) or 40 x 1536-well plates (170 ml using the HTS screening procedure).

- **rep-qbs3**: 1 x 20 ml bottle of QB reagent and 1 x 20 ml bottle of QB buffer, sufficient to prepare QUANTI-Blue™ Solution for 100 x 96-well plates (2 L using the standard procedure) or 80 x 1536-well plates (340 ml using the HTS screening procedure).

**Required Material (not provided)**

- Sterile screw cap tube, glass bottle or flask
- Sterile water
- 20 ml bottles of QB reagent and QB buffer

**Storage and stability**

- Product is shipped at room temperature. Upon receipt, store QB reagent and QB buffer at -20°C. Product is stable for 1 year at -20°C when properly stored.

- The 20 ml bottles of QB reagent and QB buffer are designed for single use. If required, individual aliquots of QB reagent and QB buffer can be prepared upon receipt or following a single freeze-thaw cycle. Store aliquots at -20°C. Avoid repeated freeze-thaw cycles.

**Quality Control**

Each lot is thoroughly tested to ensure the absence of lot-to-lot variation.
- Physicochemical characterization (including pH, solubility).
- Functional assays using alkaline phosphatase or SEAP-expressing reporter cells.

**DESCRIPTION**

QUANTI-Blue™ is a colorimetric enzyme assay developed to determine any alkaline phosphatase activity (AP) in a biological sample, such as supernatants of cell cultures. QUANTI-Blue™ Solution changes from pink to a purple-blue color in the presence of AP. Secreted embryonic alkaline phosphatase (SEAP) is a widely used reporter gene. It is a truncated form of placental alkaline phosphatase, a glycosylphosphatidylinositol (GPI)-anchored protein. SEAP is secreted into the cell culture supernatant and therefore offers many advantages over intracellular reporters. QUANTI-Blue™ is highly sensitive for quantitative measurement. It has a higher saturation threshold than with pNPP (p-nitrophenyl phosphate) resulting in more significant differences between no, low or high AP activity. Another advantage of QUANTI-Blue™ is that it can determine secreted AP activity without disturbing cells, thus allowing the repeated sampling of cell cultures for kinetic studies.

**METHODS**

QUANTI-Blue™ Solution has been optimized for use in 96-well plates (standard procedure) and in 1536-well plates (high throughput screening procedure).

**A. Standard procedure**

1. In a sterile bottle or flask, prepare QUANTI-Blue™ Solution by adding:
   a. 1 ml of QB reagent and 1 ml QB buffer to 98 ml of sterile H2O
   OR
   b. 20 ml of QB reagent and 20 ml QB buffer to 1960 ml of sterile water.

2. Mix by vortexing and incubate at room temperature for 10 min before use.

3. Use QUANTI-Blue™ Solution immediately or store at 2-8°C or -20°C.

4. Dispense 180 μl of QUANTI-Blue™ Solution per well into a flat-bottom 96-well plate.

5. Incubate at 37°C for 15 min to 6 h.

6. Measure optical density (OD) at 620-655 nm using a microplate reader.

**Figure 1. Standard procedure using QUANTI-Blue™ Solution.**

The following protocol refers to the use of 96-well plates. Ensure QB reagent and QB buffer are completely thawed before use.

**Note:** For fast thawing, QB reagent and QB buffer can be placed at 37°C for 2 minutes. Ensure heating at 37°C does not exceed 5 minutes.

1. Add 1 ml QB reagent & 1 ml QB buffer to 98 ml sterile H2O
   OR
2. Add 20 ml QB reagent & 20 ml QB buffer to 1960 ml sterile H2O

   180 μl QUANTI-Blue™ Solution + 20 μl SN

3. Measure OD using a microplate reader

**Figure 1. Standard procedure using QUANTI-Blue™ Solution.**

The following protocol refers to the use of 96-well plates. Ensure QB reagent and QB buffer are completely thawed before use.

**Note:** For fast thawing, QB reagent and QB buffer can be placed at 37°C for 2 minutes. Ensure heating at 37°C does not exceed 5 minutes.

1. In a sterile bottle or flask, prepare QUANTI-Blue™ Solution by adding:
   a. 1 ml of QB reagent and 1 ml of QB buffer to 98 ml of sterile water.
   b. 20 ml of QB reagent and 20 ml of QB buffer to 1960 ml of sterile water.

2. Mix by vortexing and incubate at room temperature for 10 min before use.

3. Use QUANTI-Blue™ Solution immediately or store at 2-8°C or -20°C.

4. Dispense 180 μl of QUANTI-Blue™ Solution per well into a flat-bottom 96-well plate.

5. Add 20 μl of the sample (supernatant of SEAP-expressing cells) or negative control (cell culture medium).

6. Incubate at 37°C for 15 min to 6 h.

7. Measure optical density (OD) at 620-655 nm using a microplate reader.

**Note:** If the negative control turns purple/blue, it means the fetal bovine serum (FBS) contains alkaline phosphatase. We recommend heating FBS at 56°C for 30 min to inactivate the alkaline phosphatase activity.

For different cell culture plate formats, please refer to the table below:

<table>
<thead>
<tr>
<th></th>
<th>96-well plate</th>
<th>24-well plate</th>
<th>12-well plate</th>
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<tbody>
<tr>
<td>QUANTI-Blue™</td>
<td>180 μl</td>
<td>450 μl</td>
<td>900 μl</td>
</tr>
<tr>
<td>Supernatant</td>
<td>20 μl</td>
<td>50 μl</td>
<td>100 μl</td>
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</tbody>
</table>

**TECHNICAL SUPPORT**

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www.invivogen.com
B. High Throughput Screening (HTS) procedure

This procedure has been optimized for use in HTS screening procedures in 1536-well plates. QUANTI-Blue™ Solution is added directly to the cell suspension to reduce liquid handling. Ensure QB reagent and QB buffer are completely thawed before use. Note: For fast thawing, QB reagent and QB buffer can be placed at 37 °C for 2 minutes. Ensure heating at 37 °C does not exceed 5 minutes.

1. Dispense cell suspension and test compounds into a 1536-well plate in a volume that does not exceed 5 µl per well. Incubate cells with test compounds for the desired period of time.
2. Prepare QUANTI-Blue™ Solution by adding:
   a. 1 ml of QB reagent and 1 ml of QB buffer to 15 ml of sterile H2O OR
   b. 20 ml of QB reagent and 20 ml of QB buffer to 300 ml of sterile water in a sterile glass bottle or flask.
3. Mix well by vortexing and incubate at room temperature for 10 minutes before use.
4. Use QUANTI-Blue™ Solution immediately or store at 2-8 °C or -20 °C.
5. Dispense 2 µl of QUANTI-Blue™ Solution to the wells containing ≤5 µl of cell culture in a 1536-well plate.
6. Mix using a plate shaker.
7. Incubate at 37 °C for 15 min to 6 h.
8. Measure OD at 620-655 nm.

Note: If the negative control turns purple/blue, it means the fetal bovine serum (FBS) contains alkaline phosphatase. We recommend heating FBS at 56 °C for 30 min to inactivate the alkaline phosphatase activity.

Figure 2. High throughput screening procedure using QUANTI-Blue™ Solution.

RELATED PRODUCTS

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For a complete list of InvivoGen’s Reporter Cell Lines visit https://www.invivogen.com/reporter-cells