

# Alpha SureFire® Ultra™ Multiplex

## Phospho (Eu) + Total (Tb) Target Assay Kit

### Manual

| Assay Points | Catalog #       |
|--------------|-----------------|
| 500          | MPSU-XXXX-X500  |
| 10 000       | MPSU- XXXX-X10K |
| 50 000       | MPSU- XXXX-X50K |

This Manual is a generic manual for the Alpha SureFire® Ultra™ Multiplex Phospho + Total kits. Note that this manual does not apply to the current MPSU-PTERK and MPSU-PTAKT kits, which have specific manuals and slightly different protocol.

For target-specific information, relating to Kit Specificity, Control Lysates and Representative Data, please refer to the Technical Data Sheet of the kit, also available from [www.perkinelmer.com](http://www.perkinelmer.com)

For Research Use Only. Not for use in Diagnostic Procedures.

**Note: See important kit disposal information on page 3 of this manual**

**For an electronic version of this manual, please go to:**

[www.perkinelmer.com/category/alpha-surefire-kits](http://www.perkinelmer.com/category/alpha-surefire-kits)

# Alpha SureFire® Ultra™ Multiplex

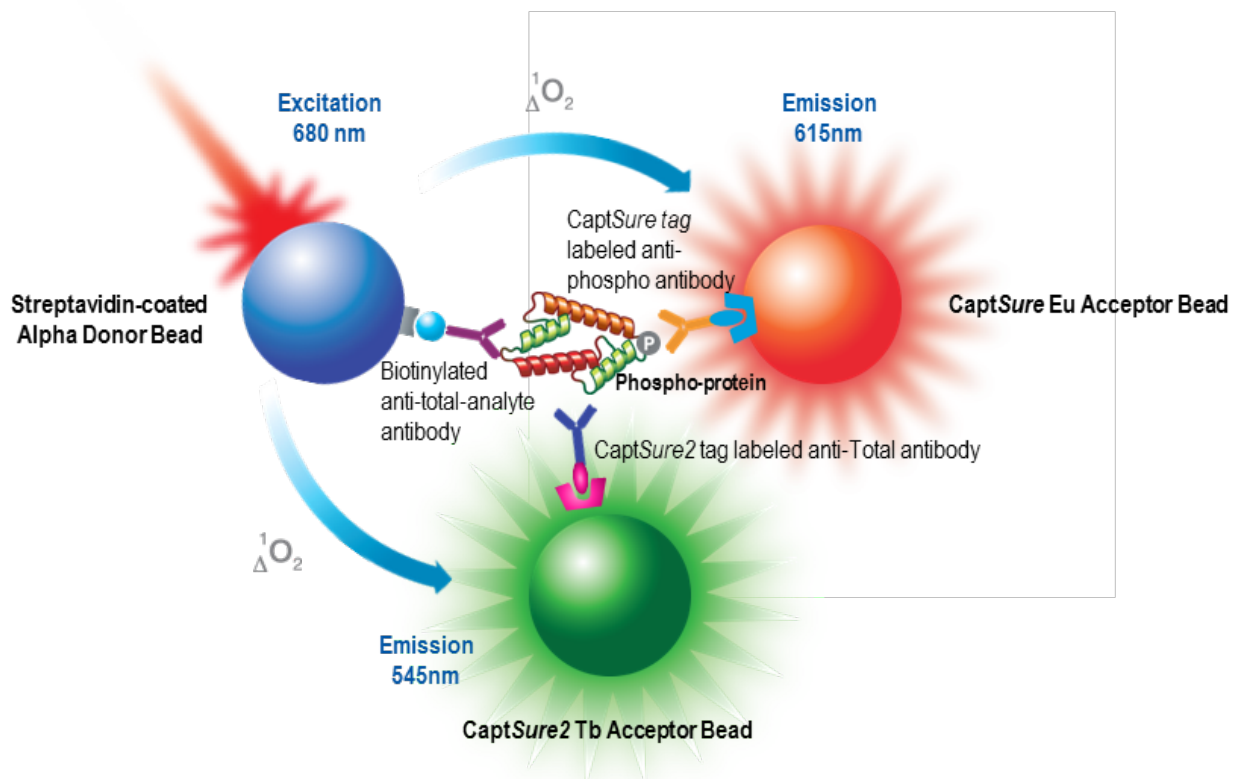
## Assay Principle

The Alpha SureFire Ultra Multiplex Phospho + Total assay kits allow the rapid, sensitive, and quantitative detection of phosphoproteins from cells, combined with the measurement of the total amount of the same protein. This Alpha Multiplex measurement is carried out in the same assay plate well from a single sample of cell lysate, and is achieved by the use of two types of Alpha Acceptor beads that emit at distinct wavelengths (545nm and 615nm).

The two distinct Alpha Acceptor beads report their binding to a distinct antigen through their association with specific assay antibodies, as indicated below.

### Single target – Phospho + Total Assay kits

The Alpha 615 Acceptor bead is coated with the CaptSure™ antibody, which binds the CaptSure-tagged anti-phospho target antibody. The Alpha 545 Acceptor bead is coated with the CaptSure2 antibody, which binds the CaptSure2 tagged anti-total target protein antibody. The Alpha Donor bead binds the biotinylated anti-total target protein antibody.



## General Information on the Alpha SureFire® Ultra™ Multiplex assays

The Alpha SureFire Ultra Multiplex assay kits are used to measure both the phosphorylation and total levels of endogenous signaling proteins in cellular lysates. The assay is an ideal system for the screening of modulators of receptor activation (e.g. agonists and antagonists) as well as agents acting intracellularly, such as small molecule inhibitors of signal transduction. The assay will measure full length recombinant or endogenous proteins, and can be applied to primary cells.

The 615nm (Eu) signal corresponds to the phosphorylated protein analysis and the 545nm (Tb) signal corresponds to the total protein analysis.

This kit has been formulated to provide improved signal:background (i.e. S:B) assay windows, and to perform without interference in the presence of extraneous antibodies.

The assay utilizes the bead-based Alpha Technology, and requires an Alpha Technology-compatible plate reader capable of reading dual emission wavelengths. See [www.perkinelmer.com/AlphaPlex](http://www.perkinelmer.com/AlphaPlex) for more information about the AlphaPlex technology and download the “AlphaPlex Quick Start Guide” and the “AlphaPlex Assay Development Guide” to find guidance about filters and mirrors selection, instrument protocol and channels crosstalk correction. It is to be noted that, as the analytes recognized by both assays (i.e. the phosphorylated protein and the total protein) cannot be dissociated, it is not possible to omit one or the other analyte for the establishment of the channels crosstalk correction, but one or the other type of acceptor beads needs to be omitted instead. i.e. all the assay components but the Alpha 615 beads must be assembled to establish the crosstalk of the Alpha 545 beads into the 615 nm channel, and all the assay components but the Alpha 545 beads must be assembled to establish the crosstalk of the Alpha 615 beads into the 545 nm channel.

## Kit-Specificity Information / Control Lysate Information / Representative Data

See Technical Data Sheet included in assay kit box.  
Technical Data Sheets are also available as pdf file from  
[www.perkinelmer.com/category/alpha-surefire-kits](http://www.perkinelmer.com/category/alpha-surefire-kits)

## Important disposal information

The Lysis Buffer (5X) – Ultra in this kit contains Triton X-100, otherwise known as p-tert-octylphenol ethoxylate.

**p-tert-octylphenol ethoxylate must be disposed of as Controlled Waste in accordance with Local Regulations.**

## Kit Contents

|   | Kit Size   |               |               |
|---|--|---------------|---------------|
|   | 500 points   | 10,000 points | 50,000 points |
| Lysis Buffer (5X) - <i>Ultra</i>  | 1 x 12 mL  | 4 x 60 mL     | 3 x 400 mL    |
| Activation Buffer - <i>Ultra</i>  | 1 x 0.8 mL   | 1 x 10 mL     | 1 x 50 mL     |
| Reaction Buffer 1 – MPSU<br>( <i>Biotinylated anti-Total antibody</i> )       | 1 x 1.0 mL   | 1 x 20 mL     | 1 x 100 mL    |
| Reaction Buffer 2 – MPSU<br>( <i>CaptSure™ tagged anti-phospho antibody</i> ) | 1 x 1.0 mL   | 1 x 20 mL     | 1 x 100 mL    |
| Reaction Buffer 3 – MPSU<br>( <i>CaptSure2™ tagged anti-Total antibody</i> )  | 1 x 1.0 mL   | 1 x 20 mL     | 1 x 100 mL    |
| Dilution Buffer - <i>Ultra</i>  | 1 x 3 mL   | 1 x 60 mL     | 2 x 150 mL    |
| Alpha 615 CaptSure™ Acceptor Beads<br>(2mg/mL in PBS plus 0.05% Proclin-300)  | 1 x 0.06 mL  | 1 x 1.1 mL    | 1 x 5.5 mL    |
| Alpha 545 CaptSure2™ Acceptor Beads<br>(2mg/mL in PBS plus 0.05% Proclin-300) | 1 x 0.06 mL  | 1 x 1.1 mL    | 1 x 5.5 mL    |
| Alpha Streptavidin Donor Beads<br>(2mg/mL in PBS plus 0.05% Proclin-300)      | 1 x 0.06 mL  | 1 x 1.1 mL    | 1 x 5.5 mL    |
| Positive Control Lysate   | 1 lyophilized tube to be re-dissolved in 250 µL H <sub>2</sub> O |               |               |

The above volumes supplied are in excess to the actual volume required to perform assay.

The **Lysis Buffer (5X) - *Ultra*** is a proprietary mixture of buffers, detergents, and generic phosphatase inhibitors (Orthovanadate, Pyrophosphate and NaF), optimized for lysis of a broad range of cells without releasing nuclear DNA. It does not contain protease inhibitors. Additives can be supplemented to the Lysis Buffer as required for particular cells, and may include excipients such as protease inhibitors or extra detergents. These will need to be tested on a case-by-case basis.

All Alpha SureFire® *Ultra™* Multiplex kits contain the same formulations of **Lysis Buffer (5X) - *Ultra***, **Dilution Buffer - *Ultra***, **Activation Buffer – *Ultra***, **Acceptor** and **Donor Beads** and are interchangeable between kits. The **Reaction Buffers** contain assay-specific antibodies and the **Lysates** are assay specific and are not interchangeable.

The Alpha SureFire® *Ultra™* Multiplex kit components (buffers, beads and lysates) are different formulations to the AlphaScreen® SureFire® kits and are not interchangeable.

## Storage Conditions (See kit box label for Expiry Date)

|                         |   |   |
|-------------------------|---|---|
| Unopened kit            | Store at 4°C. DO NOT freeze the kit. The Reaction Buffer contains antibodies and freeze/thaw cycles can lead to a loss of activity. |   |
| Opened                  | Reaction Buffer 1 - MPSU  | Store at 4°C  |
|                         | Reaction Buffer 2 - MPSU  |   |
|                         | Reaction Buffer 3 - MPSU  |   |
|                         | Lysis Buffer (5X) - <i>Ultra</i>  |   |
|                         | Dilution Buffer - <i>Ultra</i>  |   |
|                         | Acceptor/ Donor Beads   | Store at 4°C, in dark zip lock bag.   |
|                         | Activation Buffer - <i>Ultra</i>  | Precipitates at 4°C. To re-dissolve, warm to 37°C and mix before each use. Alternatively, can be stored at room temperature with no loss in activity. |
| Positive Control Lysate | Store at 4°C or for long term storage at -80°C  |   |

## Materials Required But Not Provided

| Item  | Suggested source | Catalog # | Size    |
|---|------------------|-----------|---------|
| Optiplate-384, White Opaque assay plate <sup>(1)</sup>                              | PerkinElmer Inc. | 6007290   | 50/box  |
| AlphaPlate-384, Light Gray Opaque assay plate <sup>(2)</sup>                        | PerkinElmer Inc. | 6005350   | 50/box  |
| CulturPlate-384, White Opaque, Sterile, TC-Treated <sup>(3)</sup>                   | PerkinElmer Inc. | 6007680   | 50/box  |
| ViewPlate-384, White with clear bottom, Sterile, TC-Treated <sup>(4)</sup>          | PerkinElmer Inc. | 6007480   | 40/box  |
| White adhesive seal for the bottom of microplates <sup>(5)</sup> .                  | PerkinElmer Inc. | 6005199   | 1X55    |
| Spectraplate-96, Clear, sterile TC-treated plate <sup>(6)</sup>                     | PerkinElmer Inc. | 6005650   | 50/box  |
| TopSeal-A 384, clear adhesive sealing film  | PerkinElmer Inc. | 6050185   | 100/box |
| Envision® or Enight™ Alpha-reader with adequate AlphaPlex filters (see table below) | PerkinElmer Inc. | -         | -       |

(1) Plates used for the immunoassay or for the one-plate protocol (from cell seeding to immunoassay) using suspension cells; (2) Same as (1) but optimal if cross-talk needs to be reduced; (3) Plates for assays run in a 1-plate protocol (from cell seeding to immunoassay) using adherent cells; (4) Same as (3) but with the possibility to check cells by microscopy, in this case a white adhesive seal should be stuck to the bottom of the plate before plate reading; (5) This seal can be used to turn the clear bottom of microplates opaque; (6) Plates used to seed and stimulate cells before Lysis and transfer of lysate in an immunoassay plate. For more assay plates options, please go to [www.perkinelmer.com/microplates](http://www.perkinelmer.com/microplates)

**Table :** AlphaPlex Optics for EnVision Multilabel Reader – for complete information about how to set an AlphaPlex reading, please refer to the AlphaPlex Guides available at [www.perkinelmer.com/AlphaPlex](http://www.perkinelmer.com/AlphaPlex)

|         | Description                  | Catalog # | Barcode | Recommendations   |
|---------|------------------------------|-----------|---------|---|
| Mirrors | AlphaScreen                  | 2101-4010 | 444     | For Tb and Eu single and sequential reading ; not for Sm    |
|         | AlphaPlex Single<br>Tb-Eu-Sm | 2102-5910 | 605     | Preferred mirror for all sequential AlphaPlex applications  |
|         | AlphaPlex Dual<br>Tb-Eu      | 2102-5900 | 653     | For <b>simultaneous</b> duplexing of Tb with Eu             |
| Filters | AlphaScreen                  | 2100-5710 | 244     | Suitable for AlphaPlex single plexing, not for multiplexing |
|         | Resorufine/<br>Amplex Red    | 2100-5570 | 124     | Suitable for Tb single plexing and Tb/Eu duplexing.         |
|         | Europium                     | 2100-5090 | 203     | Preferred filter for all Eu applications and multiplexing   |
|         | AlphaPlex Tb                 | 2100-5930 | 701     | Preferred filter for all Tb applications and multiplexing   |

## Buffer Preparation and Subsequent Storage Conditions

|   |  |
|---|--|
| <p><b>1X Lysis Buffer</b></p>   | <p>Dilute Lysis buffer (5X) - Ultra in MilliQ water to a final concentration of 1X</p> <p>For example: for 10 mL of 1X Lysis Buffer, add:<br/>2 mL of 5X Lysis Buffer – <i>Ultra</i> to 8 mL MilliQ water.<br/>Discard unused 1X buffer.</p>   |
| <p><b>Acceptor Mix</b></p> <p>Reaction Buffer 1 - MPSU<br/>(31 parts or 31%) +<br/>Reaction Buffer 2 – MPSU<br/>(31 parts or 31%) +<br/>Reaction Buffer 3 – MPSU<br/>(31 parts or 31%) +<br/>Activation Buffer - <i>Ultra</i><br/>(4 parts or 4%) +<br/>Alpha 615 CaptSure™ Acceptor beads<br/>(2 parts or 2%) +<br/>Alpha 545 CaptSure2™ Acceptor beads<br/>(2 parts or 2%)</p> <p>See flowchart for table</p> | <p>Mix equal volumes of Reaction Buffers 1, 2 and 3.<br/>Dilute Activation Buffer <b>25-fold</b> in combined Reaction Buffer 1 + Reaction buffer 2 + Reaction buffer 3.<br/>Dilute each Acceptor bead <b>50-fold</b> in combined Reaction Buffers plus Activation Buffer.</p> <p><u>For example: for 324 µL of Acceptor Mix:</u><br/>Combine 100µL Reaction buffer 1, 100µL of Reaction buffer 2 and 100µL of Reaction buffer 3, and to this add 12µL Activation Buffer and 6µL Acceptor Bead 615 and 6µL Acceptor Bead 545.</p> <p>The Acceptor mix should be made up and used within 30min for best results. Excess mix should be discarded.</p> |
| <p><b>Donor Mix*</b></p> <p>Dilution buffer - <i>Ultra</i><br/>(98 parts or 98%) +<br/>Alpha Streptavidin Donor beads<br/>(2 parts or 2%)</p> <p>See flowchart for table<br/>* Prepare and use under low-light conditions.</p>  | <p>Dilute Donor beads <b>50-fold</b> in Dilution buffer</p> <p><u>For example: for 300 µL of Donor Mix, add:</u><br/>6 µL Donor Beads to 294 µL of Dilution Buffer</p> <p>The Donor mix should be made up and used within 30min for best results. Excess mix should be discarded.</p>  |
| <p><b>Positive control lysate</b></p>   | <p>Reconstitute with 250µL water. Store at -20°C in single use aliquots and use within 3 months. Dilute as required.</p>   |

### Precautions

Only the Alpha Donor beads are light-sensitive. All the other assay reagents can be used under normal light conditions. All Alpha assays using the Donor beads should be performed under subdued laboratory lighting (< 100 lux). Green filters (filter 090 from LEE Filters (preferred) or Roscolux filters #389 from Rosco, or the equivalent) can be applied to light fixtures.

The Donor beads should NOT be used under red/orange light as can be found in photographic work darkrooms, as red light (680nm) excites the beads.

## Alpha SureFire® Ultra™ Multiplex Phospho + Total protein Assay Protocol

### A. 2-Plate Assay - assay protocol for adherent cells

#### Cell Seeding

1. Seed cells (200  $\mu$ L of cells for 96 well plates, 50  $\mu$ L for 384 well plates) in tissue culture plates. Incubate at 37°C overnight in serum-containing media.

#### Cell Treatment

2. Remove culture media, and stimulate the cells with 50  $\mu$ L agonists prepared in serum-free media (25  $\mu$ L for 384-well plates). (*If testing antagonists, prior to stimulation remove culture medium and replace with 50  $\mu$ L serum-free media containing antagonists (25  $\mu$ L for 384-well plates)*). Return cells to 37°C incubator for desired time. 1 hour is often sufficient for signal transduction inhibitors, and 5-20 minutes for receptor agonists.

**Note:** Peptidic agonists and antagonists can often stick to plastic surfaces. To minimize this effect, dilute in serum-free media containing a suitable carrier protein (e.g. 0.1% BSA)

#### Lysate Preparation

3. To lyse cells, remove medium from wells, and add freshly prepared 1X Lysis Buffer - *Ultra* (50-100  $\mu$ L for a 96 well plate, 25  $\mu$ L for a 384 well plate). Agitate on a plate shaker (~350 rpm) for 10 minutes at room temperature.
4. Take 10  $\mu$ L of the lysate and transfer to a 384-well Optiplate™ for assay. *Add 10  $\mu$ L of Control lysates to separate wells. We recommend testing a serial dilution of Control lysate (eg 100, 50, 25, 12.5, 6.25 and 0% diluted in 1X Lysis Buffer).*

#### Alpha SureFire Ultra Multiplex Assay

5. Add 5  $\mu$ L of Acceptor Mix to wells. Seal plate with Topseal-A adhesive film. Incubate for 1 hour at room temperature.
6. Add 5  $\mu$ L of Donor Mix to wells under subdued light. Seal plate with Topseal-A adhesive film, and cover plate with foil. Incubate for 1 hour at room temperature in the dark.

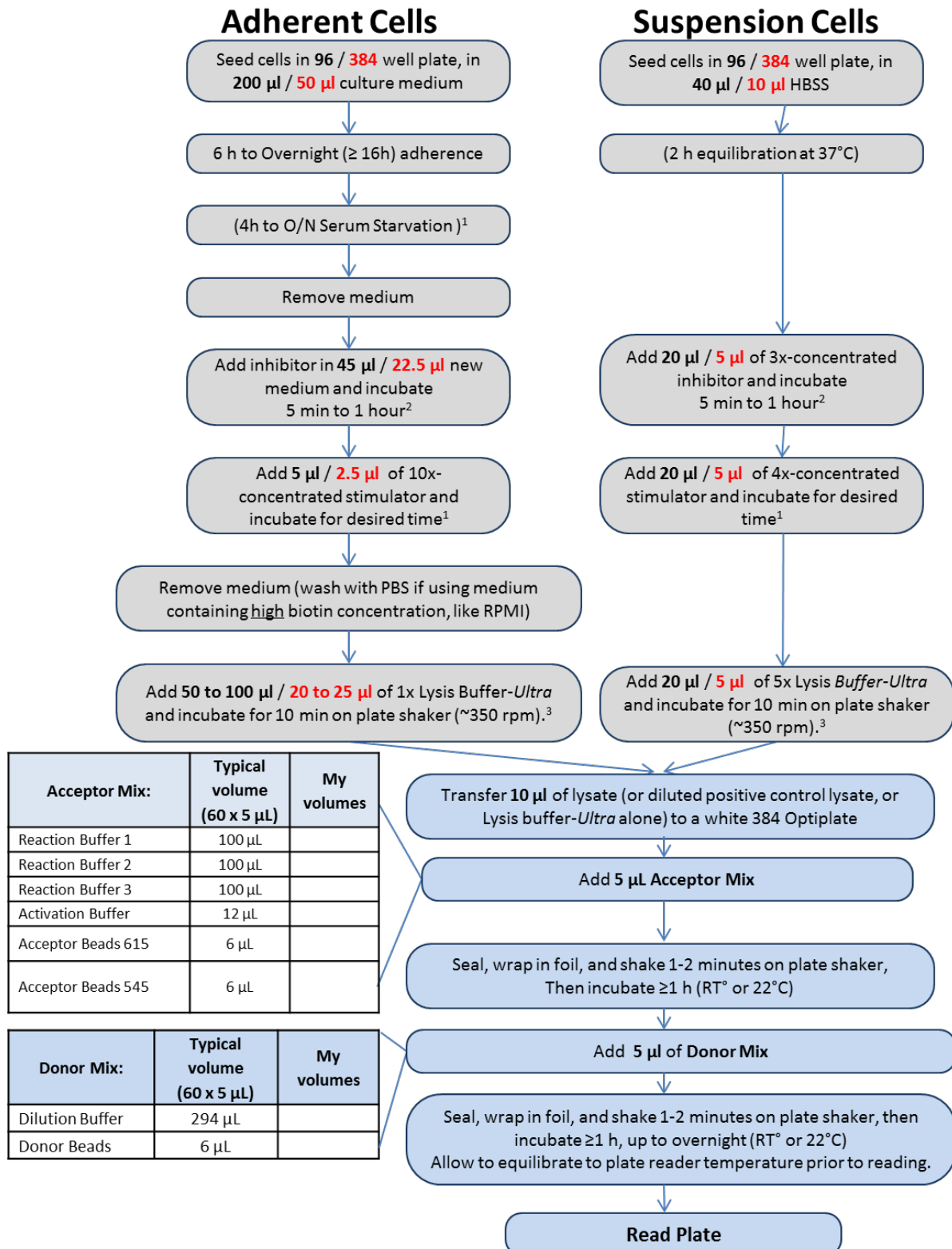
**Note:** Longer incubation may give greater sensitivity. Plates can be incubated overnight if required.

7. Read plate on an AlphaPlex Technology-compatible plate reader, using standard AlphaPlex settings (see above).



## Alpha SureFire® Ultra™ Multiplex: 2-plates / 2-incubation assay flowchart

### Single target – Phospho/Total



<sup>1</sup> Depending on cell type and pathway analyzed.

<sup>2</sup> Depending on type of inhibitor used: 5 min is generally enough for receptor antagonists; more time is needed to block intracellular targets.

<sup>3</sup> May stop and freeze lysates at -20°C if desired. If doing this, re-shake after thawing to ensure homogeneity of lysate before pipetting.

## Alpha SureFire® Ultra™ Multiplex Phospho + Total protein Assay Protocol

### B. 1 Plate Assay - assay protocol for non-adherent cells, and for high-throughput applications.

#### Cell Seeding

1. Harvest cells by centrifugation, and re-suspend cells in HBSS at a suitable cell density. We recommend  $10^7$  cells/mL as a starting point. Seed 4  $\mu$ L of cells/well into a 384-well white opaque culture plate (eg PerkinElmer Cat # 6007680).
2. If using test agents/inhibitors, add 2  $\mu$ L/well of 4X inhibitors prepared in HBSS.

**Note:** Peptidic agonists and antagonists can often stick to plastic surfaces. To minimize this effect, dilute in HBSS containing a suitable carrier protein (e.g. 0.1% BSA).

3. Return cells to incubator at 37°C for 1-2 hours.

#### Cell Treatment

4. Stimulate cells with agonists by addition of 2  $\mu$ L/well of 4X agonist stock in HBSS containing 0.1% BSA. The final volume in the wells should be 8  $\mu$ L. (if no antagonists were used in step 2, stimulate the cells with 4  $\mu$ L/well of 2X agonist, to give a final volume in the wells of 8  $\mu$ L.)

#### Lysate Preparation

5. To lyse the cells, add 2  $\mu$ L/well of 5X Lysis Buffer - Ultra. Add 10  $\mu$ L of Control lysates to separate wells. We recommend testing a serial dilution of Control lysate (eg 100, 50, 25, 12.5, 6.25 and 0% diluted in 1X Lysis Buffer).

#### Alpha SureFire Ultra Multiplex Assay

6. Add 5  $\mu$ L of Acceptor Mix to wells. Seal plate with Topseal-A adhesive film. Incubate for 1 hour at room temperature.
7. Add 5  $\mu$ L of Donor Mix to wells under subdued light. Seal plate with Topseal-A adhesive film, and cover plate with foil. Incubate for 1 hour at room temperature in the dark.

**Note:** Longer incubation may give greater sensitivity. Plates can be incubated overnight if required.

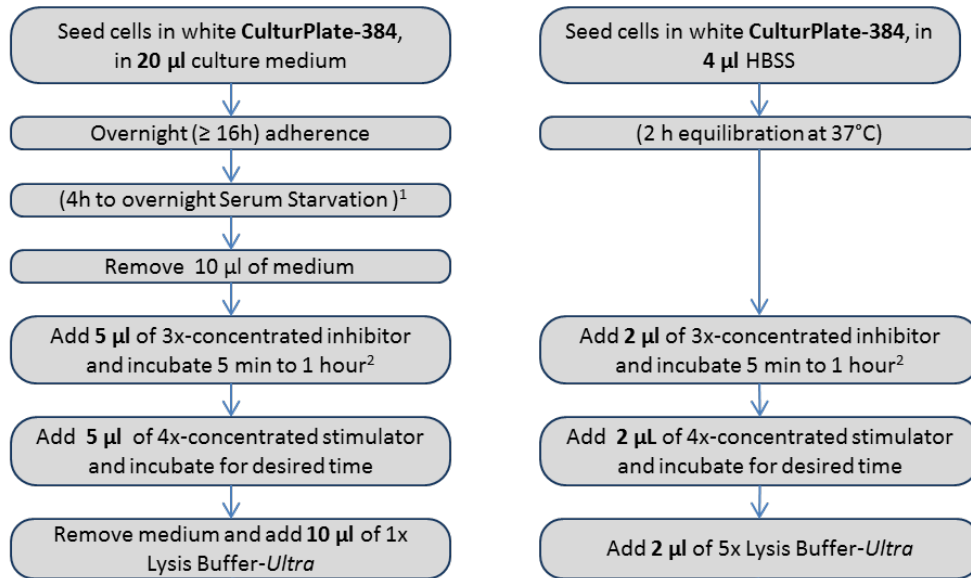
8. Read plate on an AlphaPlex Technology-compatible plate reader, using standard AlphaPlex settings (see above).

## Alpha SureFire® Ultra™ Multiplex: 1-plate / 2-incubation assay flowchart

### Single target – Phospho/Total

#### Adherent Cells

#### Suspension Cells



Seal and incubate for 10 min on plate shaker (~350 rpm).<sup>3</sup>

In control wells, add 10 µL positive control lysate dilution or Lysis Buffer-Ultra alone.

| Acceptor Mix:      | Typical volume (60 x 5 µL) | My volumes |
|--------------------|----------------------------|------------|
| Reaction Buffer 1  | 100 µL                     |            |
| Reaction Buffer 2  | 100 µL                     |            |
| Reaction Buffer 3  | 100 µL                     |            |
| Activation Buffer  | 12 µL                      |            |
| Acceptor Beads 615 | 6 µL                       |            |
| Acceptor Beads 545 | 6 µL                       |            |

| Donor Mix:      | Typical volume (60 x 5 µL) | My volumes |
|-----------------|----------------------------|------------|
| Dilution Buffer | 294 µL                     |            |
| Donor Beads     | 6 µL                       |            |

Add 5 µL Acceptor Mix

Seal, wrap in foil, and shake 1-2 minutes on plate shaker, Then incubate ≥1 h (RT° or 22°C)

Add 5 µl of Donor Mix

Seal, wrap in foil, and shake 1-2 minutes on plate shaker, then incubate ≥1 h, up to overnight (RT° or 22°C)  
Allow to equilibrate to plate reader temperature prior to reading.

Read Plate

<sup>1</sup> Depending on cell type and pathway analyzed.

<sup>2</sup> Depending on type of inhibitor used: 5 min is generally enough for receptor antagonists; more time is needed to block intracellular targets.

<sup>3</sup> May stop and freeze lysates at -20°C if desired. If doing this, re-shake after thawing to ensure homogeneity of lysate before pipetting.

## Supplementary Buffers and Beads

If using the standard protocol, sufficient amounts of buffers and beads are provided in the kit. However in case the standard protocol would be modified, more buffers or beads may be needed. In this case, you can order additional buffers and beads using the following catalog numbers:

| Item  | Suggested source | Catalog #        | Size  |
|---|------------------|------------------|-------|
| Lysis Buffer (5X) - <i>Ultra</i>                      | PerkinElmer Inc. | ALSU-LB-10mL     | 10mL  |
|   | PerkinElmer Inc. | ALSU-LB-100mL    | 100mL |
| Activation Buffer - <i>Ultra</i>                      | PerkinElmer Inc. | ALSU-AB-10mL     | 10mL  |
|   | PerkinElmer Inc. | ALSU-AB-100mL    | 100mL |
| Dilution Buffer - <i>Ultra</i>                        | PerkinElmer Inc. | ALSU-DB-10mL     | 10mL  |
|   | PerkinElmer Inc. | ALSU-DB-100mL    | 100mL |
| AlphaLISA® CaptSure™ Acceptor Beads<br>-2mg/ml        | PerkinElmer Inc. | ALSU-ACAB-0.06mL | 60µL  |
|   | PerkinElmer Inc. | ALSU-ACAB-1.2mL  | 1.2mL |
|   | PerkinElmer Inc. | ALSU-ACAB-6mL    | 6mL   |
| Alpha Streptavidin Donor Beads<br>-2mg/mL             | PerkinElmer Inc. | ALSU-ASDB-0.06mL | 60µL  |
|   | PerkinElmer Inc. | ALSU-ASDB-1.2mL  | 1.2mL |
|   | PerkinElmer Inc. | ALSU-ASDB-6mL    | 6mL   |
| Alpha 545 (Tb) CaptSure2 Acceptor<br>Beads<br>-2mg/mL | PerkinElmer Inc. | MPSU-CS2B-0.06mL | 60µL  |
|   | PerkinElmer Inc. | MPSU-CS2B -1.2mL | 1.2mL |
|   | PerkinElmer Inc. | MPSU-CS2B -6mL   | 6mL   |

## Useful Links

For FAQ and troubleshooting, please go to: [www.perkinelmer.com/SureFireFAQ](http://www.perkinelmer.com/SureFireFAQ)

or the following Application Notes:

[https://www.perkinelmer.com/lab-solutions/resources/docs/APP\\_SureFire\\_Multiplex\\_Cellular\\_Kinase.pdf](https://www.perkinelmer.com/lab-solutions/resources/docs/APP_SureFire_Multiplex_Cellular_Kinase.pdf)

[https://www.perkinelmer.com/lab-solutions/resources/docs/APP\\_Terbium\\_SureFire\\_Ultra\\_Multiplex.pdf](https://www.perkinelmer.com/lab-solutions/resources/docs/APP_Terbium_SureFire_Ultra_Multiplex.pdf)

For a complete list of AlphaLISA *SureFire Ultra* and Alpha *SureFire Ultra* Multiplex kits, please go to:

[www.perkinelmer.com/SureFire](http://www.perkinelmer.com/SureFire) or [www.tgrbio.com](http://www.tgrbio.com)

For technical support please go to: [www.perkinelmer.com/ASK](http://www.perkinelmer.com/ASK)

### **FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.**

**This product is not for resale or distribution except by authorized distributors.**

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