AlphaScreen® *SureFire*®
Topoisomerase IIα (p-Thr1343) Assay Kits

Manual

Assay Points	Catalog #
500	TGRT2AS500
10 000	TGRT2AS10K
50 000	TGRT2AS50K

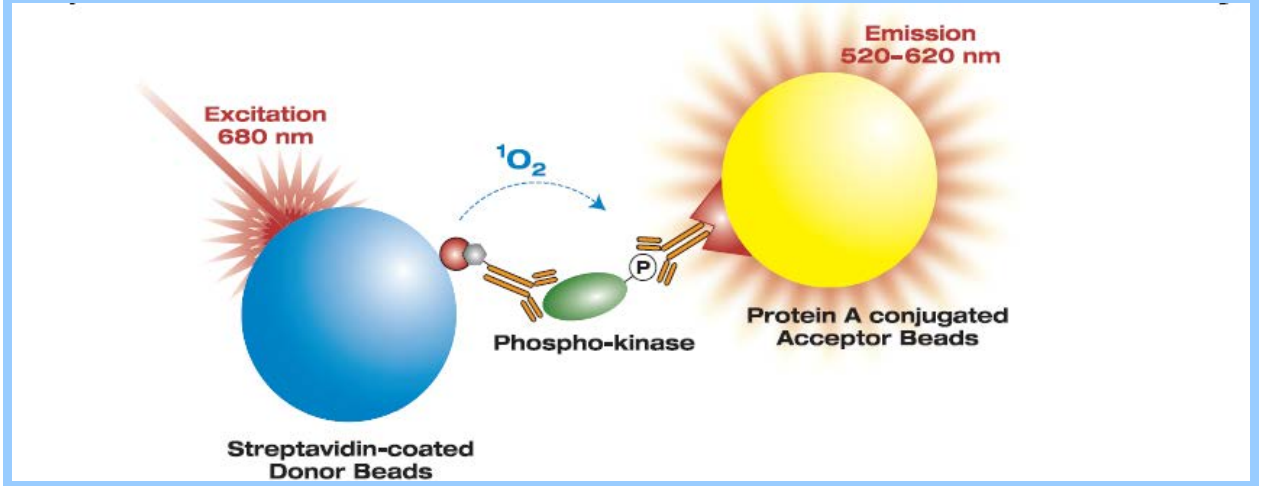
For Research Use Only
Research Reagents for Research Purposes Only

General Information on the AlphaScreen® *SureFire*® Topoisomerase IIα p-T1343 assay

The AlphaScreen® *SureFire*® Topoisomerase IIα p-T1343 assay is used to measure the phosphorylation of endogenous Topoisomerase IIα p-T1343 in cellular lysates. The assay is an ideal system for the screening of both modulators of receptor activation (e.g. agonists and antagonists) as well as agents acting intracellularly, such as small molecule inhibitors of upstream events. The assay will measure Topoisomerase IIα p-T1343 by either cloned or endogenous receptors, and can be applied to primary cells.

This assay eliminates the need for laborious techniques, such as Western blotting or conventional ELISA. It is a homogeneous assay, in that no sample washing steps are required, which allows for minimal handling, short assay times, and robotic operation if desired. The assay utilizes the bead-based Alpha Technology, and requires an Alpha Technology-compatible plate reader.

Alpha Technology AlphaScreen® *SureFire*® Assay Principle



AlphaScreen® *SureFire*® technology allows the detection of phosphorylated proteins in cellular lysates in a highly sensitive, quantitative and user friendly assay. In these assays, sandwich antibody complexes, which are only formed in the presence of analyte, are captured by AlphaScreen donor and acceptor beads, bringing them into close proximity. The excitation of the donor bead provokes the release of singlet oxygen molecules that triggers a cascade of energy transfer in the Acceptor beads, resulting in the emission of light at 520-620nm.

Kit-Specificity information

This assay kit contains antibodies which recognize two distal epitopes, on Topoisomerase IIα. The protein detected by this kit corresponds to GenBank Accession NP_001058.2. Also known as TOP2; TP2A; TOP2A. These antibodies recognize Topoisomerase IIα of human origin. No signal was detected in the three mouse cell lines tested (see fig on page 7), and as S1106 is replaced by an asparagine in the rat TOPOIIα sequence, we do not expect phosphorylation of the rat protein at this position. Other species should be tested on a case-by-case basis.

Kit Contents

	Kit Size		
	500 points	**10,000 points**	**50,000 points**
Lysis buffer (5X)	1 x 10 mL	4 x 60 mL	3 x 400 mL
Activation buffer	1 x 2 mL	1 x 60 mL	1 x 300 mL
Reaction buffer	1 x 2.6 mL	1 x 45 mL	1 x 225 mL
Dilution buffer	1 x 1.5 mL	1 x 25 mL	2 x 60 mL
Positive Control Lysate	1 tube to be re-dissolved in 250 µL H_2O		
Negative Control Lysate	1 tube to be re-dissolved in 250 µL H_2O		

Storage conditions upon receipt

The kit buffers e.g. 5X Lysis buffer, Activation buffer and Reaction buffer should be stored at 4°C. DO NOT freeze the kit buffers – the Reaction buffer contains antibodies and freeze/thaw cycles can lead to a loss of activity.

Materials Required But Not Provided

The AlphaScreen *SureFire* assay kits are optimized to work with AlphaScreen Protein A general IgG detection beads. These are available separately from PerkinElmer. The AlphaScreen Protein A general IgG detection kits contain a biotinylated rabbit IgG control, which can be used to test the instrument settings and bead performance.

Item	**Suggested source**	**Catalog #**	**Size**
Protein A general IgG detection kit (contains the Acceptor and Donor Beads)	PerkinElmer Inc.	6760617C 6760617M 6760617R	500 pt 10,000 pt 50,000 pt
Proxiplate™-384 Plus, white, shallow well assay plate	PerkinElmer Inc.	6008280 6008289	50/box 200/box
Optiplate™-384 Plus, white, assay plate	PerkinElmer Inc.	6007290 6007299	50/box 200/box
TopSeal-A 384, clear adhesive sealing film	PerkinElmer Inc.	6050185	100/box
Envision® or Enspire® Alpha-reader	PerkinElmer Inc.	-	-

Buffer preparation and subsequent storage conditions

5X Lysis buffer	Store 5X Lysis buffer at 4°C. For assay, dilute **5-fold** in water immediately prior to use. Discard unused buffer.
Activation buffer	Precipitation will occur during storage 4°C. To re-dissolve, warm to 37°C and mix. Alternatively, Activation buffer can be stored at room temperature with no loss in activity.
Reaction buffer*	Keep on ice while in use. Do not freeze. Once diluted discard unused reaction buffer.
AlphaScreen® Protein A IgG Kit	Store at 4°C in the dark.
Acceptor Mix (Reaction buffer + Activation buffer + AlphaScreen® Acceptor beads)	Immediately prior to use, dilute Activation buffer **5-fold** in Reaction buffer (e.g. take 98 µL Activation buffer and dilute in 392 µL Reaction buffer). Dilute Acceptor beads **50-fold** in Acceptor mix (e.g. add 10 µL Acceptor beads to 490 µL of premixed Reaction buffer + Activation buffer). The Acceptor mix should be used immediately for best results. Excess mix should be discarded.
Donor Mix** (Dilution buffer + AlphaScreen® Donor beads)	Immediately prior to use, dilute Donor beads **20-fold** in Dilution buffer (e.g. add 10 µL Donor beads to 190 µL Dilution buffer). The Donor mix should be used immediately for best results. Excess mix should be discarded.
Assay Control lysate	After reconstitution in 250 µL water, lysates should be frozen at -20°C in single use aliquots and used within 1 month.

* Do not vortex the Reaction buffer, as vigorous mixing can damage some antibodies.

** Prepare and use Donor Mix under low-light conditions.

Control Lysate information

Control lysates are prepared from flasks of HeLa cells (ATCC #CCL-2) at a concentration of approx. 1.0 mg/mL. The controls are supplied lyophilized, and should be reconstituted in either dd H_2O or MilliQ® H_2O. Once reconstituted, lysates should be stored frozen in single use aliquots.

Positive Lysate: Prepared from sub-confluent flasks of HeLa cells, treated with 10 µM Nocodazole for 30 minutes.

Negative Lysate: Prepared from sub-confluent flasks of HeLa cells.

Topoisomerase IIα p-T1343 AlphaScreen® *SureFire*® Assay Protocols

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

Cell Seeding

1. Seed cells (200 µL of cells for 96 well plates, 50 µL 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 µL agonists prepared in serum-free media (25 µL for 384-well plates). (*If testing antagonists, prior to stimulation remove culture medium and replace with 50 µL serum-free media containing antagonists (25 µL for 384-well plates)).* Return cells to 37°C incubator for desired time. 1 hour is often sufficient for signal transduction inhibitors, and 5 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% IgG free BSA - Jackson Immunoresearch Cat #001-000-161).

Lysate Preparation

5. To lyse cells, remove medium from wells, and add freshly prepared 1X Lysis Buffer (50-100 µL for a 96 well plate, 25 µL for a 384 well plate). Agitate on a plate shaker (~350 rpm) for 10 minutes at room temperature.

6. Take 4 µL of the lysate and transfer to a 384-well Proxiplate™ for assay. (*Add 4 µL Control lysates to separate wells if required*).

SureFire Assay

7. Add 5 µL of Acceptor Mix to wells. Seal plate with Topseal-A adhesive film, and incubate for 2 hours at room temperature.

8. Add 2 µL of Donor Mix to wells under subdued light. Seal plate with Topseal-A adhesive film, and cover plate with foil. Incubate for 2 hours at room temperature.

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

9. Read plate on an Alpha Technology-compatible plate reader, using standard AlphaScreen settings.

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

Note: the larger volumes required using this assay will result in achieving less assay points per kit.

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 µL of cells/well into a 384-well culture plate.

2. If using test agents/inhibitors, add 2 µL/well of 4X inhibitors prepared in HBSS.

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% IgG free BSA - Jackson Immunoresearch Cat #001-000-161).

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

Cell Treatment

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

Lysate Preparation

5. To lyse the cells, add 2 µL/well 5X Lysis buffer. (*Add 10 µL control lysates to separate wells if required*)

SureFire Assay

6. Add 8 µL of Acceptor Mix to wells. Seal plate with Topseal-A adhesive film, and incubate for 2 hours at room temperature.

7. Add 3 µL of Donor Mix to wells under subdued light. Seal plate with Topseal-A adhesive film, and cover plate with foil. Incubate for 2 hours at room temperature.

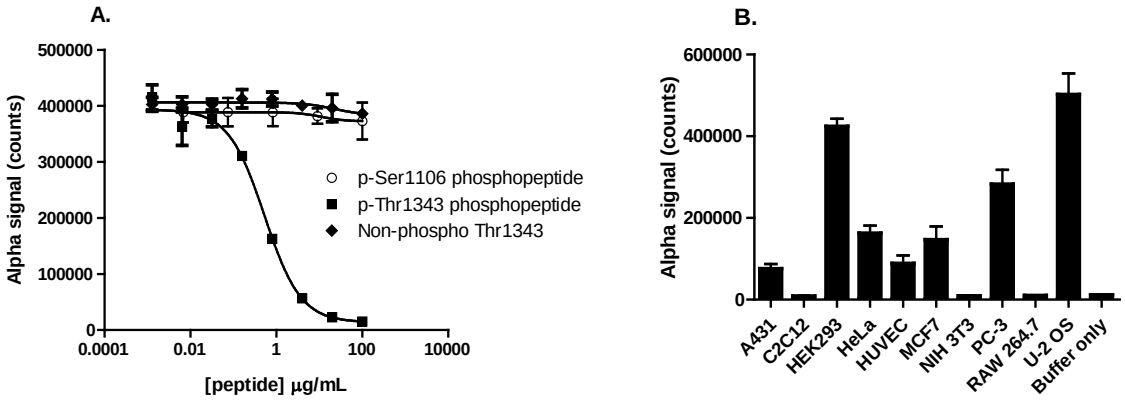
Note: Longer incubation may give greater sensitivity. Plates can be incubated overnight if required.

8. Read plate on an Alpha Technology-compatible plate reader, using standard AlphaScreen settings.

Representative Data

(A) Lysates containing phospho-topoisomerase IIα were prepared from 10 µM nocodazol-treated HeLa cells. Portions of the lysate were spiked with various concentrations of either a phosphopeptide corresponding to the Ser1106 epitope, the Thr1343 epitope, or the Thr1343 epitope synthesized without a phospho-moiety. The spiked lysates were transferred to a ProxiPlate, and analyzed for phospho-topoisomerase IIα (Thr1343), using the standard AlphaScreen SureFire protocol. While the p-Thr1343 phosphopeptide was able to efficiently inhibit the assay, non-phosphorylated peptide did not.

(B) Lysates were prepared from flasks of various cells, each at a concentration of approximately 1-2 mg protein/mL. A portion of lysate was transferred to a ProxiPlate, and analyzed for phospho-topoisomerase IIα (Thr1343), using the standard AlphaScreen SureFire protocol. Phospho-topoisomerase IIα (Thr1343) was readily detected in several human cell lines, but was not detected in mouse cell lines: C2C12, Raw264.7 or NIH3T3.



Frequently Asked Questions & Troubleshooting

For comprehensive information on assay optimization and troubleshooting, please refer to the following resources:

- Guide to AlphaScreen® *SureFire*® assay optimization
- AlphaScreen® *SureFire*® user guide

To download these resources, and other related technical information, visit
http://www.perkinelmer.com/category/alpha-surefire-kits
For general information on AlphaScreen® *SureFire*® assays, visit http://www.tgrbio.com

Customer Care

To contact the customer care team, please visit **www.perkinelmer.com/ServiceCall**

For more information regarding related AlphaScreen® *SureFire*® products and protocols refer to:

PerkinElmer web site: www.perkinelmer.com

TGR BioSciences website: www.tgrbio.com

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