

MANUAL

Technology: HTRF™ Pathway Readout

HTRF Human and Mouse Phospho-RNA Pol II (Ser5) Detection Kit

Part number	64RNAP2S5PEG	64RNAP2S5PEH
Test size	500 tests	10,000 tests

Storage: ≤-60°C

Version: 01 Date: October 2024

ASSAY PRINCIPLE

This assay is intended for the simple, rapid and direct detection of endogenous levels of RNA Pol II in cells, only when phosphorylated at Ser5. Upon activation, RNA Pol II is phosphorylated and after lysis of the cell membrane, phospho- RNA Pol II (Ser5) can be detected using the kit reagents.

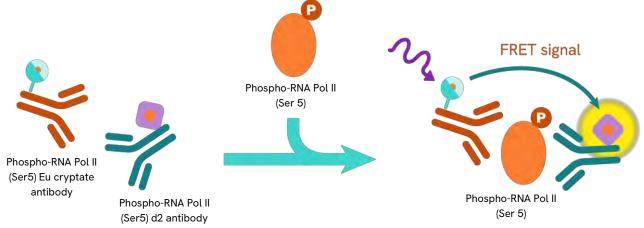


Figure 1: Principle of HTRF sandwich assay.

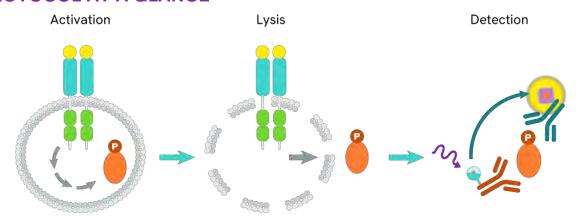
As shown here, phospho-RNA Pol II (Ser5) is detected in a sandwich assay format using 2 different specific antibodies, one labelled with Eu³⁺-Cryptate (donor) and the second with d2 (acceptor). **Both antibodies** are selected for their specific binding to the phosphorylated motif on the protein.

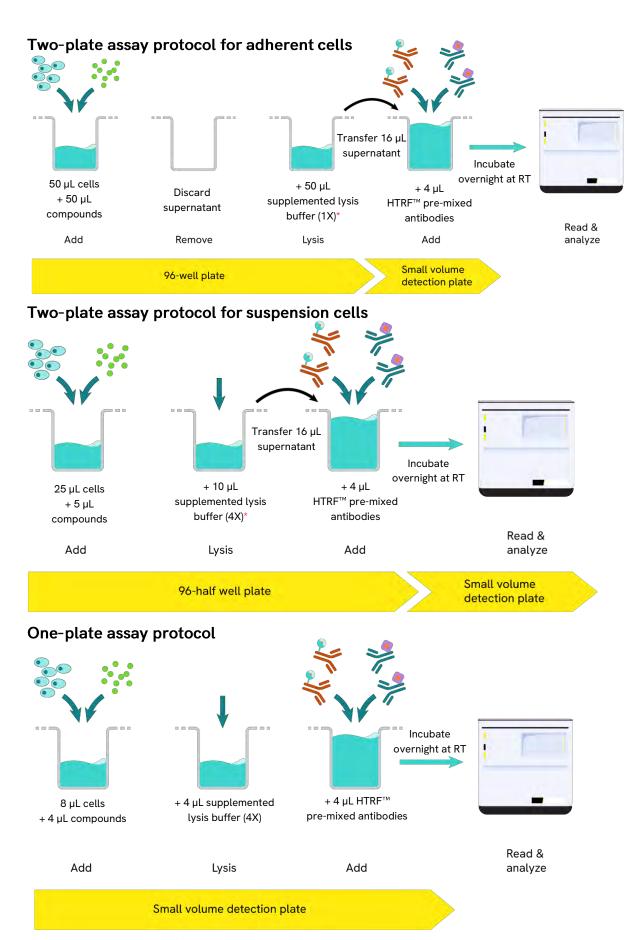
When the dyes are in close proximity, the excitation of the donor with a light source (laser or flash lamp) triggers a Fluorescence Resonance Energy Transfer (FRET) towards the acceptor, which in turn fluoresces at a specific wavelength (665 nm). The specific signal modulates positively in proportion to phospho-RNA Pol II (Ser5).

The assay can be run under a two-plate assay protocol, where cells are plated, stimulated and lysed in the same culture plate. Lysates are then transferred to the assay plate for the detection of phospho-RNA Pol II (Ser5) by HTRF™ reagents. This protocol gives the cells viability and confluence to be monitored. It can also be further streamlined to a one-plate assay protocol. Detection of phospho-RNA Pol II (Ser5) with HTRF™ reagents is performed in a single plate used for plating, stimulation and detection. No washing steps are required. This protocol, HTS designed, allows miniaturization while maintaining HTRF™ quality.

For tissue derived samples, please refer to the technical note: "Optimize your HTRF™ cell signaling assays on tissues". Technical support team can help you to set-up this protocol or another one. Please contact us.

PROTOCOL AT A GLANCE





For HTRF certified reader

For more information about HTRF™ compatible readers and for set-up recommendations, please visit our website.

MATERIAL PROVIDED

KIT COMPONENTS	STORAGE	500 TESTS			10,000 TESTS		
Control lysate (ready-to-use)	≤-60°C		green cap	1 vial-150 μL		green cap	2 vials-150 μL
Phospho-RNA Pol II (Ser5) Eu cryptate antibody	≤-16°C		red cap 1 vial-50 μL			red cap	1 vial-1 mL
Phospho-RNA Pol II (Ser5) d2 antibody	≤-16°C		blue cap 1 vial-50 μL		I	blue cap	1 vial-1 mL
Blocking reagent* (stock solution 100X)	≤-16°C	Ī	purple cap 1 vial-300 μL			purple cap	3 vials-2 mL
Lysis buffer * #1 (stock solution 4X)	≤-16°C		transparent cap 4 vials-2 mL			white cap	1 vial-130 mL
Detection buffer** (ready-to-use)	≤-16°C		orange cap	2 vials-2 mL		red cap	1 vial-50 mL

^{*} Amounts of reagents provided are sufficient for generating 50 µL of cell lysate per well.

Purchase separately

96-well or 384-well small volume (SV) detection microplates - For more information about microplate recommendations, please visit our website.

STORAGE AND STABILITY

Storage upon reception:

Store the kit at -60°C or below until the expiration date indicated on the package.

Storage and stability of thawed material:

When you are ready to use the kit, take the reagents out and prepare them following the protocol provided in this document. Unused thawed reagents can be stored and conserved for future use. Refer to the table below for storage options and corresponding shelf life.

	STORAGE AFTER THAWING/RECONSTITUTION
Lysis Buffer / Blocking Reagent / Detection buffer	2-8°C until the expiration date indicated on the package
Antibodies*	2-8°C for 48h or freeze at -16°C or below until the expiration date indicated on the package for long term storage
Protein/standard/Control Lysate*	freeze at -60°C or below until the expiration date indicated on the package for long term storage

^{*}For Antibodies, Protein, Standard & control lysate, Stock solutions may be thawed and frozen only once. Freeze in aliquots to avoid multiple freeze/thaw cycles (once aliquoted, single use of the reagent).

Volume of antibodies aliquots should not be under $10\mu L$. Volume of Protein, Standard & control lysate aliquots should not be under $20\mu L$.

^{**} The Detection Buffer is used to prepare working solutions of acceptor and donor reagents.

REAGENT PREPARATION

Allow all reagents to thaw before use. We recommend centrifuging the vials gently after thawing, before pipetting the stock solutions. Prepare the working solutions from stock solutions by following the instructions below.

To prepare working control lysate solution

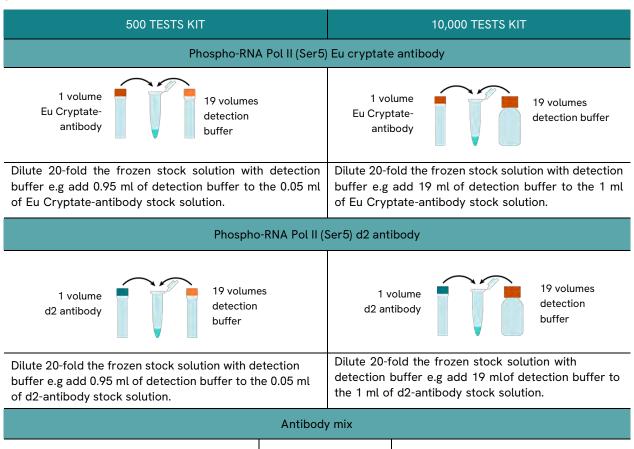
The control lysate is only provided as an internal assay control to check the quality of the results obtained. The window between control lysate and negative control should be greater than 2.

Thaw the control lysate. Mix gently, the control lysate is ready to use.

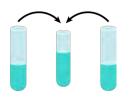
To prepare working antibody solutions

HTRF™ reagent concentrations have been set for optimal assay performances. Note that any dilution or improper use of the d2 and Eu Cryptate-antibodies will impair the assay's quality. Be careful, as working solution preparation for antibodies may differ between the 500 and 10,000 tests data point kit.

Antibody working solutions are stable for 2 days at 2-8°C. Dilute the antibodies with detection buffer. In practice:



It is possible to pre-mix the two ready-touse antibody solutions just prior to dispensing the reagents by adding 1 volume of d2-antibody solution to 1 volume of Eu Cryptate-antibody solution.



It is possible to pre-mix the two readyto-use antibody solutions just prior to dispensing the reagents by adding 1 volume of d2-antibody solution to 1 volume of Eu Cryptate-antibody solution.

To prepare supplemented lysis buffer

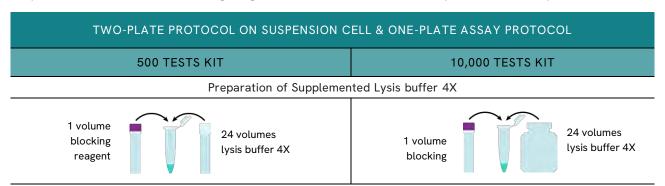
Make sure that the lysate has been generated by using the kit reagents.

Supplemented lysis buffer differs between the protocols. Make sure to use the appropriate supplemented lysis buffer depending on the chosen protocol's specification.

Prepare the required amount of supplement lysis buffer before running the assay, working solutions are stable for 2 days at 2-8°C.

Supplemented Lysis buffer 4X for two-plate assay protocol on suspension cells & one-plate assay protocol

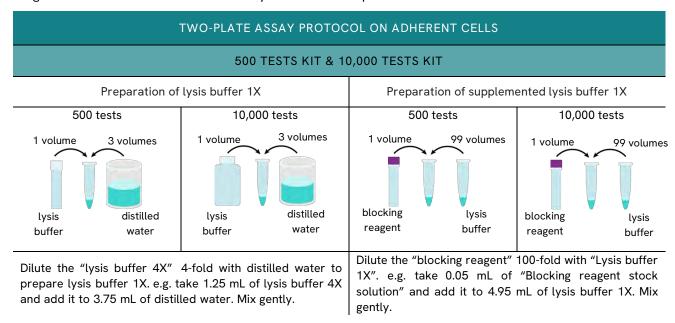
Determine the amount of supplemented lysis buffer needed for the experiment. Each well requires 4 μ L of supplemented lysis buffer for one-plate assay protocol and 10 μ L for two-plate assay protocol on suspension cells. Dilute the blocking reagent stock solution 25-fold with lysis buffer 4X. In practice:



Dilute the "blocking reagent stock solution" 25-fold with "lysis buffer 4X" e.g take 0.1 ml of "Blocking reagent stock solution" and add it to 2.4 ml of lysis buffer 4X. Mix gently.

Supplemented Lysis buffer 1X for two-plate assay protocol on adherent cells

Determine the amount of supplemented lysis buffer needed for the experiment. Each well requires generally $50\,\mu\text{L}$ of supplemented lysis buffer. Prepare a lysis buffer solution 1X and then dilute the blocking reagent stock solution 100-fold with this lysis buffer 1X. In practice:



TWO-PLATE ASSAY PROTOCOL

	GENERAL LAB WORK PRIOR USING HTRF KIT: CELLS PREPARATION					
	FOR ADHERENT CELLS	FOR SUSPENSION CELLS				
1	Plate 50 µL of cells in 96-well tissue- culture treated plate in appropriate growth medium and incubate overnight, at 37°C in CO2 atmosphere.	Plate 25 µL of cells in 96 half-well plate in yourappropriate medium.				
	Cell seeding densities of 10-100K cells/we lines, but optimization of cell seeding dens Depending on receptor a starving step with	sities is recommended.	96-well culture plate			
2	Dispense 50 µL of compound (2X) diluted in cellculture serum-free medium.	Dispense 5 µL of compound (6X), diluted in yourappropriate medium.	100			
	For most compound, incubation time is be We recommend a time course study to de		96-well culture plate			
3	Remove carefully cell supernatant either by aspirating supernatant or by flicking the plate.	Do not remove your appropriate medium.	Discard supernatant (for adherent cells) 96-well culture plate			
	PHOSPI	HO- RNA Pol II (Ser5) DETECTION USING I	HTRF KIT			
	FOR ADHERENT CELLS	FOR SUSPENSION CELLS				
4	Immediately add 50 µL of supplemented lysis buffer(1X) and incubate for at least 30 minutes at room temperature under shaking.	Immediately add 10 µL of supplemented lysis buffer(4X) and incubate for at least 30 minutes at room temperature under shaking.				
	Use the appropriate supplemented lysis be with shaking. Lysis incubation time may be down to $25~\mu L$.	uffer and incubate at room temperature optimized. Lysis volume can be decreased	96-well culture plate			
5	After homogenization by pipeting up and of 96-well cell-culture plate to a small volum Depending on cell lines used, it can be necessarples are within theassay linear range		96-well culture plate SV detection plate			
6	Add 4 µL of premixed antibody solutions (Cover the plate with a plate sealer. Incub Set up your reader for Eu ³⁺ Cryptate and different wavelengths (665nm and 620nm)	SV detection plate				

Standard protocol for two-plate assay protocol in $20\mu L$ final volume (after lysis step)

	NON TREATED CELL LYSATE		TREATED CELL LYSATE	CONTROL LYSATE	NEGATIVE CONTROL		
Step 1		Dispense 16 µL of non treated cell lysate	Dispense 16 µL of treated cell lysate	Dispense 16 µL of control lysate	Dispense 16 µL of supplemented lysis buffer(1X)		
Step 2		Add 2 µL of	Add 2 μL of Phospho- RNA Pol II d2 antibody working solution to all wells				
Step 3		Add 2 µL of Phospho-RNA Pol II Eu cryptate antibody working solution to all wells					
Step 4	&	Cover the plate with a plate sealer. Incubate overnight at room temperature.					
Step 5		Remove the plate sealer and read on an HTRF compatible reader					

The Negative control is used to check the non-specific signal. The ratio between control lysate signal / non-specific signal should be greater than 2.

ONE PLATE ASSAY PROTOCOL

	GENERAL LAB WORK PRIOR USING HTRF KIT: CELLS	PREPARATION
1	Plate 8 µL of cells in a small volume (SV) white detection plate in your appropriate medium. Cell seeding densities of 10-100K cells/well are generally sufficient for most cell lines, but optimization of cell seeding densities is recommended. Depending on receptor a starving step with serum-free medium can be included.	96-well culture plate
2	Dispense 4 µL of compounds (3X) diluted in your appropriate medium. For most compound, incubation time is between 1 and 20 hours at 37°C. We recommend a time course study to determine the optimal stimulation time.	96-well culture plate
	PHOSPHO- RNA Pol II (Ser5) DETECTION USING	HTRF KIT
3	Add 4 µL of supplemented lysis buffer (4X). Use the appropriate supplemented lysis buffer and incubate for at least 30 minutes at room temperature under shaking. Lysis incubation time may be optimized.	96-well culture plate
4	Add 4 µL of premixed antibody solutions (vol/vol) prepared in the detection buffer. Cover the plate with a plate sealer. Incubate overnight at room temperature. Set up your reader for Eu3+ Cryptate and read the fluorescence emission at two different wavelengths (665nm and 620nm) on a compatible HTRF TM reader.	SV detection plate

Standard protocol for one-plate assay protocol in 20 µL final volume

			NON TREATED CELL LYSATE	TREATED CELL LYSATE	NEGATIVE CONTROL	CONTROL LYSATE		
General lab	Step 1		Dispense 8 μ	L of cells		-		
work	Step 2		Add 4 µL of your Add 4 µL of compound(3X)		Add 12 µL of your appropriate medium	Dispense 16 µL of controllysate		
	Step 3		Add 4 μL of supplemented lysis buffer (4X) - 30 min/RT					
Phospho- RNA	Step 4		Add 2 µL of Phospho-RNA Pol II d2 antibody solution to all wells Add 2 µL of Phospho-RNA Pol II Eu cryptate antibody solution to all wells					
Pol II (Ser5) Detection	Step 5							
Steps	Step 6	(Cover the plate with a plate sealer. Incubate overnight at room temperature.					
	Step 7		Remove the plate sealer and read on an HTRF compatible reader					

Negative control is used to check the non-specific signal. The ratio between control lysate signal / non-specific signal should be greater than 2.

DATA REDUCTION & INTERPRETATION

1) Calculate the ratio of the acceptor and donor emission signals for each individual well.

Ratio =
$$\frac{\text{Signal 665 nm}}{\text{Signal 620 nm}} \times 10^4$$

2) Calculate the % CVs. The mean and standard deviation can then be worked out from ratio replicates.

$$CV (\%) = \frac{Standard deviation}{Mean Ratio} \times 100$$

For more information about data reduction, please visit our website.

RESULTS

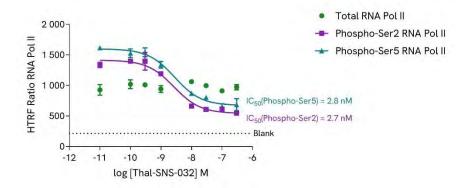
These data should be considered only as an example. Results may vary from one HTRF $^{\text{\tiny TM}}$ compatible reader to another. The curves are drawn up by plotting HTRF $^{\text{\tiny TM}}$ Ratio versus the log [compound] concentrations.

Results on HEK293 cells (50,000 cells/well), using the two-plate assay protocol for adherent cells.

Cells were treated with increasing concentrations of Thal-SNS-032, a selective CDK9 degrader, for 4 h. Cells were then lysed with supplemented lysis buffer #1 (1X) for 30 minutes at room temperature.

16 μ L of lysates were transferred in a first plate to detect Phospho-RNA Pol II (Ser5), and 16 μ L of lysates were transferred in two others plates to detect Phospho-RNA Pol II (Ser2) and Total- RNA Pol II, using, respectively, HTRF Phospho-RNA Pol II (Ser2) assay - Cat #64RNAP2S2PEG/H/Y and the HTRF Total- RNA Pol II assay - Cat #64RNAP2TPEG/H/Y.

		Total RNA Pol II		Phospho- RNA Pol II (Ser2)		Phospho- RNA Pol II (Ser5)	
[Thal-SNS- 032] (µM)	Log [Thal- SNS-032] (M)	Mean HTRF Ratio	CV%	Mean HTRF Ratio	CV%	Mean HTRF Ratio	CV%
0.3	-6.5	973	4.5	545	6.7	685	14.3
0.1	-7.0	913	1.1	614	5.4	652	7.6
0.03	-7.5	998	2.2	607	1.7	804	1.3
0.01	-8.0	1063	0.2	662	2.6	869	1.7
0.001	-9.0	942	5.9	1193	1.8	1338	4.1
0.0003	-9.5	1010	0.5	1395	10.4	1543	4.7
0.0001	-10.0	1020	7.1	1398	1.3	1528	4.6
Untreated		928	9.5%	1336	3.1%	1615	1.4%
Nega	ative	220	1.6%	209	1.4%	214	4.2%
Control lysate		1347	4.7%	1530	1.0%	1452	5.6%



GENERAL LAB WORK PRIOR USING HTRF KIT: CELLS AND LYSATE PREPARATION

Frequently asked questions/troubleshooting parameters

Using adherent cells, allow time for your cells to recover after plating	Allow cells to regain full signaling capacity by plating them at least 6 hours beforestarting the pharmacological treatment.
Depending on the pathway, a serum starving step could be essential toreduce the basal level activity. This step should be optimized case-by- case.	Advice on cell culture conditions prior using HTRF™ kit: For adherent cells Before treating the cells with compounds, remove culture media from the plate andreplace it with serum-free media before incubating from 2 hours up to overnight at 37°C. For suspension cells Starvation step should be carried out in the flask. Harvest cells by centrifugation and re-suspend cells at a suitable cell density in serum-free media, incubate from 2 hoursup to overnight at 37°C.
Generation of lysates	Ensure that the lysates used for the assay have been generated by using the HTRF™ lysis buffer supplemented with the HTRF™ blocking reagent, provided in the kit. Lysates generated with HTRF™ buffers can be used in other technologies, like Western-blot. The blocking reagent contains only phosphatase inhibitors that prevent dephosphorylation of phosphorylated proteins from active serine/threonine andtyrosine phosphatases The lysis buffer is effective for creating cell extract under non denaturing conditionsfrom both plated cells and cells pelleted from suspension cultures.
Using the two-plate assay protocol, a low signal can often be improvedby adjusting lysis volumes.	In most cases, a typical adherent cell line grown in 96-well plates is readily detected ina lysis volume of 50μL. However, the lysis volume can be adjusted from 25 μL to 200μL.
Using an improper cell density can induce poor sensitivity and low signal	Check that the cell density is correct. Too high or low cell numbers can affect assayperformances.
Parameters such as cell density, stimulation time and lysis incubationtime should be optimized for each cell line used.	The assay can be used for many adherent and non-adherent cell types, including transfected cell lines and primary cells. However, the expression and phosphorylation of the readout of interscan vary from one cell line to another. Depending on the type of treatment, and the temperature, the stimulation time can vary widely. Because of this, we recommend a time course study to determine the optimal compound incubation time. Depending of the nature of your cells, lysis time may vary from 30' to 1h. Because of this, we also recommend determination of the optimal time.
Fluorescence reading	Using an inappropriate set-up may seriously impair the results. For information about HTRF™ compatible readers and for set-up recommendations, please visit our website
Assaying for multiple targets from a single lysate.	The two-plate assay protocol indicates the use of 16µL of lysate per well, whereas the 96-well cell culture microplate would generate 50µL (or more) of lysate. Therefore, a typical cell lysate can be assayed for many targets, given that temporal and expression level constraints can vary from one target to another.
Batch production of cell lysates example of T175 flask	General lab work - prior using Phospho-RNA Pol II (Ser5) HTRF™ kit: Day1: Dispense 8 million cells in T175cm2, add 25 mL of cell culture complete medium and incubate 2 days at 37°C, 5% CO2. Day3: cell stimulation Remove cell culture medium by aspiration, wash once (do not detach the cells), add 5 mL of agonist (1x) diluted in FCS free medium and incubate at 37 ° C, 5% CO2, for the optimized time. Day3: cell lysis Remove stimulation medium, wash once (do not detach the cells), add 3 ml of 1X HTRF™ lysis buffer supplemented with the HTRF™ blocking reagent for 30 min at Room Temperature under orbital shaking. Transfer the cell lysate to a 15 mL vial, centrifuge 10 min, 2400 rcf at RT, recover cell lysate supernatant and store aliquots at -60°C or below. For long term conservation, aliquots should be stored in liquid nitrogen.

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