



# HTRF® SIRT6 HISTONE H3K9 DEACETYLATION ASSAY

## APPLICATION NOTE

**ABSTRACT** SIRT6 Histone H3K9 deacetylation assay that measures the deacetylation of a biotinylated histone H3(1-21) peptide at lysine 9.

The HTRF SIRT6 Histone H3K9 deacetylation assay uses a H3(1-21) lysine 9 acetylated biotinylated peptide (substrate), a Eu<sup>3+</sup>-cryptate labeled anti-H3K9me0 detection antibody and XL665-conjugated Streptavidin (SA-XL665).

The assay is performed in a single well and run in two steps: the enzymatic step and the detection step. HTRF signal is proportional to the concentration of Unacetylated H3(1-21) peptide. The assays within this technical note were performed in a 384-well plate in a 20 µL final volume.

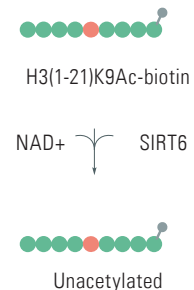
Enzyme	SIRT6
Substrate	H3(1-21)K9Ac-biotin ARTKQTAR-K(Ac)-STGG- KAPRKQLA-GGK(Biotin)
Detection Antibody	Anti-H3K9me0-Eu(K)

## SIRT6 HISTONE H3K9 DEACETYLATION ASSAY AND REAGENTS

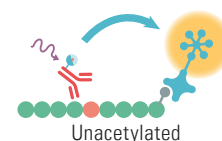
H3K9me0-Eu(K) Ab.	Cisbio Bioassays	# 61KB0KAE
Streptavidin XL-665	Cisbio Bioassays	# 610SAXLA
Detection buffer	Cisbio Bioassays	# 62SDBRDD
SIRT6	Cyclex	# CY-E1156
Histone H3(1-21) lysine 9 acetylated biotinylated peptide	AnaSpec	# AS-64361
Nicotinamide	Sigma	# N3376
NAD	Sigma	# N1636
Enzymatic buffer	50 mM HEPES pH7.0, 137 mM NaCl, 2.7 mM KCl, 1 mM MgCl <sub>2</sub> , 0.01% Tween20	

Data shown on this application note has been obtained using Greiner # 784075, 384-well white microplates. For more information on the white plates we recommend, please visit [www.cisbio.com/htrf-microplate-recommendations](http://www.cisbio.com/htrf-microplate-recommendations).

### Enzymatic step



### Detection step



## ASSAY PROTOCOL

### ENZYMATIC STEP

- Prepare working solutions of enzyme, peptide substrate, cofactors and inhibitor in enzymatic buffer just prior to use.
- Add to a 384-well small volume plate in the following order:
  - 4  $\mu$ L of inhibitor (2.5X) or enzymatic buffer
  - 2  $\mu$ L of SIRT6 enzyme (5X)
  - Incubate for 5 min at room temperature
  - 4  $\mu$ L of H3(1-21)K9Ac-biotin peptide / NAD<sup>+</sup> mixture (2.5X)
- Cover the plate with a plate sealer and incubate at room temperature.

### DETECTION STEP

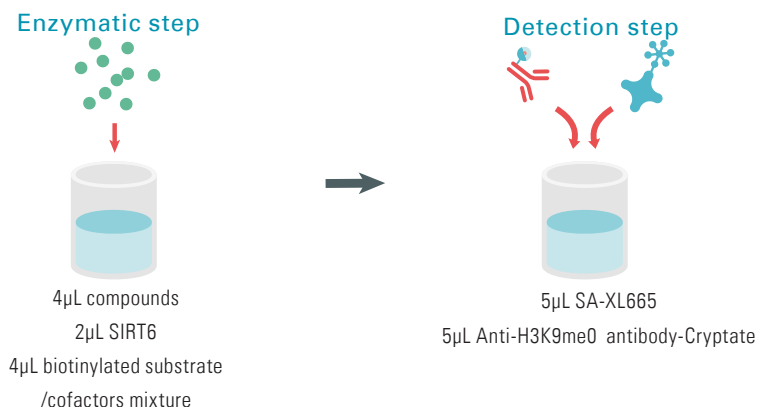
- The peptide-biotin / streptavidin-XL665 ratio must be equal to 4/1 final in the well (e.g. if peptide-biotin used at 4 nM final in the well, SA-XL665 must be used at 1 nM final in the well)
- Prepare detection mixture containing the anti-H3K9me0-Eu(K) 2X according to the product datasheet recommended final concentration and SA-XL665 at 2X the final concentration (hence 0.5X the final concentration of peptide-biotin in the well) in Detection buffer supplemented with 20mM Nicotinamide.
- Caution: Adjust SA-XL665 concentration according to peptide-biotin concentration used.
- Add 10  $\mu$ L of detection mixture (2X) to the plate.
- Cover the plate with a plate sealer and incubate 1h at room temperature.
- Remove plate sealer and read fluorescence emission at 665nm and 620nm wavelengths on an HTRF compatible reader.

$$\text{HTRF Ratio} = (665\text{nm}/620\text{nm}) \times 10^4$$

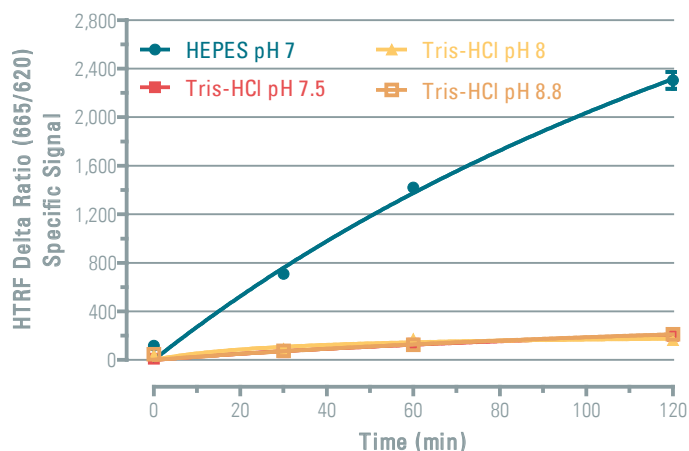
$$\text{Delta Ratio} = \text{Sample Ratio} - \text{Ratio negative}$$

### DISTRIBUTION: ENZYME INHIBITION STUDY

	ENZYMATIC STEP				DETECTION STEP	
	ENZYMATIC BUFFER	INHIBITOR	SIRT6	COFACTOR/SUBSTRATE MIXTURE	CRYPTATE-Ab	SA-XL 665
<b>SAMPLE</b>	-	4 $\mu$ L	2 $\mu$ L	4 $\mu$ L	5 $\mu$ L	5 $\mu$ L
<b>POSITIVE CONTROL</b>	4 $\mu$ L	-	2 $\mu$ L	4 $\mu$ L	5 $\mu$ L	5 $\mu$ L
<b>NEGATIVE CONTROL</b>	6 $\mu$ L	-	-	4 $\mu$ L	5 $\mu$ L	5 $\mu$ L

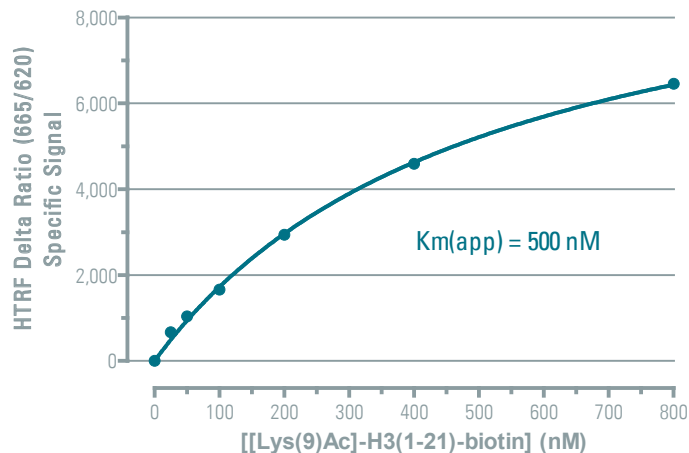


## 1. ENZYMATIC BUFFER OPTIMIZATION



This step allows the optimal enzymatic buffer pH to be determined. The assay was carried out with 33 ng/well SIRT6, 200 nM biotinylated H3(1-21)K9Ac peptide substrate and 500  $\mu$ M NAD<sup>+</sup>. The enzymatic reaction was carried out at RT and then stopped by adding H3K9me0-K Ab and SA-XL665 (detection reagents) after each time point (30, 60, 120 min). For further experiments 50 mM HEPES pH 7, 137 mM NaCl, 2.7 mM KCl, 1 mM MgCl<sub>2</sub>, 0.01% Tween20 buffer was selected.

## 2. PEPTIDE TITRATION



This step allows the determination of apparent  $K_m$  for peptide. The  $K_m$  value was determined with 33 ng/well SIRT6 and 500  $\mu$ M NAD<sup>+</sup> in the enzymatic step. We recommend testing biotinylated H3K9(1-21)Ac substrate concentrations ranging from 2,000 nM to 10 nM (serial dilutions). The streptavidin XL-665 concentration varies according to the peptide concentration keeping constant the ratio of 1/4 (Streptavidin XL-665 / peptide). For each concentration of peptide and streptavidin XL-665, a negative control is performed by removing the enzyme from the well. This negative control is used as non specific signal to calculate the HTRF delta ratio (hence specific signal). The enzyme reaction was stopped by adding the detection reagents at the optimal incubation period (RT, 120 min). The 500 nM apparent  $K_m$  value for peptide was determined from this experiment using a Michaelis-Menten plot.

For more information, please visit us at [www.cisbio.com/epigenetic-toolbox-reagents](http://www.cisbio.com/epigenetic-toolbox-reagents)

## RELATED ARTICLES

EPIgeneous™ Methyltransferase assay: a new HTRF Universal, SAH detection assay to assess methyltransferase activity.

*Roux T, Douayry N, Junique S, Sergeant L, Donsimoni G, Bourrier E, Trinquet E, LaRose R, Degorce F. - EpiCongress 2013, Boston, MA, USA.*

High-Throughput, Homogeneous Histone Demethylase JARID1A, and JARID1C Enzymatic applications with HTRF Technology.

*Adachi K, Tokuda C, Roux T, Trinquet E, Degorce F - Miptec 2013, Basel, Switzerland.*

High-Throughput, Homogeneous Histone H3 Methyltransferase, (HMT) and Demethylase (HDM) Enzyme Assays using HTRF®, Technology: G9a H3K27di-methylation assay example.

*Roux T, Adachi K, Tokuda C, Verdi J, Junique S, Trinquet E, Gonzalez-Moya A, Degorce F - SLAS 2013, Orlando, USA.*

High-Throughput, Homogeneous Histone H3 Methyltransferase (HMT) and Demethylase (HDM) Enzyme Assays using HTRF Technology.

*Adachi K, Tokuda C, Chevallier F, Roux T, Gonzalez-Moya A, Degorce F. - Discovery on Target 2012, Boston, MA, USA.*

Development of a panel of HTRF assay reagents for epigenetic targets.

*Chevallier F, Jean A, Raynaldy D, Romier M, Servent F, Tokuda C, Adachi K. - Miptec 2011, Basel, Switzerland.*

Development of G9a (Histone H3K9 methyltransferase) assay using HTRF technology.

*Adachi K, Tokuda C, Chevallier F, Preaudat M. - SBS 2011, Orlando, USA.*

### FOR MORE INFORMATION

Europe and other countries +33(0)466 796 705 U.S. and Canada 1-888-963-4567

China +86 10 8080 9288 Japan +81-(0)43-306-8712

Visit [www.cisbio.com](http://www.cisbio.com) to find a list of our regional distributors



cisbio