

**Description**

The PARP1 Homogeneous Assay Kit is designed to measure PARP1 activity for screening and profiling applications. PARP1 is known to catalyze the NAD-dependent addition of poly(ADP-ribose) to histones. The PARP1 Homogeneous Assay Kit comes in a convenient AlphaLISA® format, with biotinylated histone substrate, recombinant antibody (ADP-ribose binding reagent 1), PP-01 assay buffer, and purified PARP1 for 384 enzyme reactions. The key to the PARP1 Homogeneous Assay Kit is a highly specific antibody that recognizes PARylated substrate. With this kit, only three simple steps are required for PARP1 reactions. First, a sample containing PARP1 enzyme is incubated with biotinylated substrate and NAD for one hour. Next, acceptor beads and primary antibody are added, then donor beads, followed by reading the Alpha-counts.

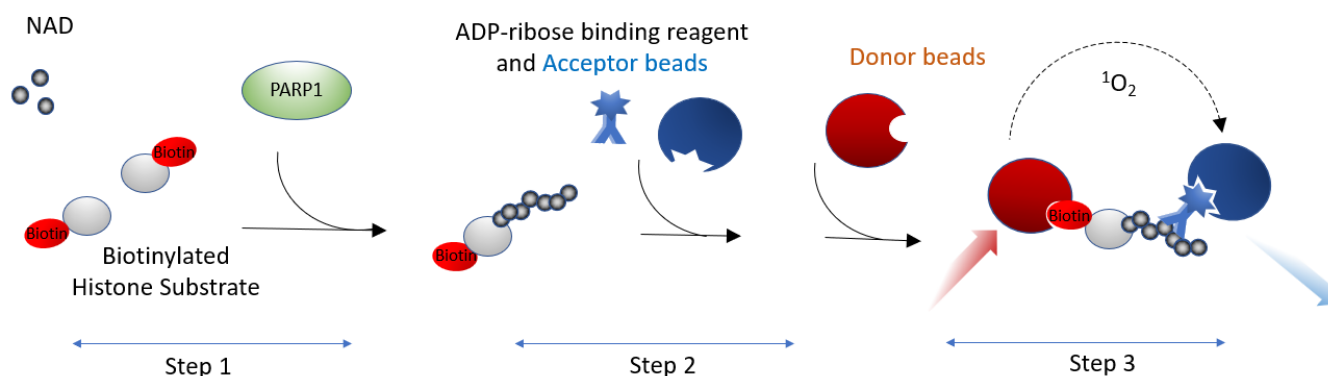


Figure 1. PARP1 Homogenous Assay Kit schematic

**Applications**

- Useful for screening molecules that inhibit PARP1 activity.

**Supplied Materials**

| Catalog # | Name                             | Amount   | Storage |  |
|-----------|----------------------------------|----------|---------|--|
| 80501     | PARP1*                           | 0.4 µg   | -80°C   | <b>Avoid multiple freeze/thaw cycles</b> |
|           | 5X PP-01 assay buffer            | 2 x 1 ml | -80°C   |  |
|           | Biotinylated histone substrate** | 500 rxns | -80°C   |  |
| 78311     | ADP-ribose binding reagent 1     | 10 µl    | -80°C   |  |
|           | NAD <sup>+</sup> (750 µM)        | 400 µl   | -80°C   |  |
| 52301     | 4X Detection buffer 1            | 2 ml     | -80°C   |  |

\*The initial concentration of enzyme is lot-specific and will be indicated on the tube containing the protein.

\*\*Reconstitute in 500 µl H<sub>2</sub>O

**Materials Required but Not Supplied**

| Name  | Catalog #              |
|---|------------------------|
| AlphaLISA anti-rabbit IgG acceptor beads        | Perkin Elmer #AL104C   |
| AlphaScreen Streptavidin-conjugated donor beads | Perkin Elmer #6760002S |
| Optiplate - 384                                 | Perkin Elmer #6007290  |
| AlphaScreen microplate reader                   |                        |
| 0.5 M DTT                                       |                        |

**Storage Conditions**

This assay kit will perform optimally for up to 6 months from date of receipt when the materials are stored as directed. **Avoid multiple freeze/thaw cycles!**

**Safety**

This product is for research purposes only and not for human or therapeutic use. This product should be considered hazardous and is harmful by inhalation, in contact with skin, eyes, clothing, and if swallowed. If contact occurs, wash thoroughly.

**Contraindications**

The PARP1 Homogenous Assay Kit is compatible with up to 1% final DMSO concentration.

We recommend preparing the inhibitor in no higher than 5% DMSO solution in buffer and using 3 µl per well.

Avoid green and blue dyes that absorb light in the AlphaScreen signal emission range (520-620 nm), such as Trypan Blue. Avoid the use of the potent singlet oxygen quenchers such as sodium azide (NaN<sub>3</sub>) or metal ions (Fe<sup>2+</sup>, Fe<sup>3+</sup>, Cu<sup>2+</sup>, Zn<sup>2+</sup> and Ni<sup>2+</sup>). The presence of >1% RPMI 1640 culture medium leads to a signal reduction due to the presence of excess biotin and iron in this medium. MEM, which lacks these components, does not affect AlphaScreen assays.

**Assay Protocol**

- All samples and controls should be performed in triplicates
- The assay should include a “Blank”, a “Positive control”, and a “Test inhibitor”

**Reagent Preparation**

1. Reconstitute biotinylated histone substrate in 500 µl distilled water. Aliquot biotinylated histone substrate into single use aliquots. Store aliquots at -80°C.
2. Thaw 5X PP-01 assay buffer. Add 0.5 M DTT to 5X PP-01 assay buffer for a final concentration of 10 mM DTT.

*Note: DTT should be added just before use. Prepare only enough DTT-containing buffer as required for the assay. Store the remaining assay buffer at -20°C.*

3. Prepare 1X PP-01 assay buffer by adding 1 part of 5X PP-01 assay buffer (**with DTT**) to 4 parts distilled water.

## 4. Prepare the compound solution.

- a. If the compound is dissolved in DMSO, make a 100-fold higher concentration of the compound in DMSO than the highest concentration you want to test in the assay. Then dilute 20-fold in water.

*Note: To run an  $IC_{50}$  or test lower concentrations of the compound, prepare serial dilutions using water containing 5% DMSO, so the final concentration of DMSO will be 1% in all samples.*

- b. If the compound is soluble in water, prepare a solution of the compound in water that is 5-fold higher than the final assay concentration.

**Reaction Setup**

1. Make the master mixture: N wells  $\times$  (1  $\mu$ l of **Biotinylated histone substrate** + 1  $\mu$ l of **NAD<sup>+</sup> (750  $\mu$ M)** + 2  $\mu$ l of **5x stock assay buffer** and + 3  $\mu$ l of **water**).
2. Add 7  $\mu$ l of master mixture to each well.
3. To the wells designated as “Blank”, add 5  $\mu$ l of **1X PP-01 assay buffer** and 3  $\mu$ l of **diluent solution without inhibitor** (for example DMSO 5%).

| Component                        | Blank                       |
|----------------------------------|-----------------------------|
| Master Mix                       | 7 $\mu$ l                   |
| Diluent solution* (no inhibitor) | 3 $\mu$ l                   |
| 1X assay buffer                  | 5 $\mu$ l                   |
| <b>Total</b>                     | <b>15 <math>\mu</math>l</b> |

\*The diluent solution contains the water with the same concentration of solvent (e.g. DMSO) as the test compound solution.

## 4. Thaw PARP1 on ice.

- a. Upon first thaw, briefly spin tube containing enzyme to recover full content of the tube.
- b. Aliquot PARP1 enzyme into single-use aliquots. Store remaining undiluted enzyme at -80°C.



*PARP1 is sensitive to freeze/thaw cycles. Do not re-use thawed aliquots or diluted enzyme.*

5. Dilute PARP1 in 1X PP-01 assay buffer (**with DTT**) to 0.2 ng/ $\mu$ l (1 ng/5  $\mu$ l). Keep diluted enzyme on ice until use. Discard any unused diluted enzyme after use.
6. Add 3  $\mu$ l of inhibitor solution to each well designated “Test Inhibitor”. To “Positive Control” add 3  $\mu$ l of the diluent solution without inhibitor.
7. Initiate the reaction by adding 5  $\mu$ l of **PARP1** to the wells labeled “Positive Control” and “Test Inhibitor”.

| Component                        | Test Inhibitor              | Positive Control            |
|----------------------------------|-----------------------------|-----------------------------|
| Master Mix                       | 7 $\mu$ l                   | 7 $\mu$ l                   |
| Test compound                    | 3 $\mu$ l                   | –                           |
| Diluent solution* (no inhibitor) | –                           | 3 $\mu$ l                   |
| PARP1 (0.2 ng/ $\mu$ l)          | 5 $\mu$ l                   | 5 $\mu$ l                   |
| <b>Total</b>                     | <b>15 <math>\mu</math>l</b> | <b>15 <math>\mu</math>l</b> |

\*The diluent solution contains water with the same concentration of solvent (e.g. DMSO) as the test compound solution.

- Once the reaction mixture (15  $\mu$ l) is added to 384-well plate, incubate at room temperature for 1 hour with slow shaking.

#### Reaction Detection and Reading Results



Protect your samples from direct exposure to light. Photobleaching will occur.

- Prepare the 1X Detection buffer by adding 1-part 4X Detection buffer to 3 parts distilled water.
- Prepare a mixture in 1X Detection buffer containing:
  - anti-Rabbit Acceptor beads (Perkin Elmer #AL104C) diluted 250-fold
  - ADP-ribose binding reagent 1 diluted 400-fold
- Add 10  $\mu$ l of mixture from step 2 to each well then briefly shake plate.
- Dilute the Streptavidin-conjugated donor beads (PE #6760002S) 250-fold with 1x Detection buffer. Add 10  $\mu$ l per well. Incubate for at least 5-15 min at room temperature.
- Read Alpha-counts.

## Example Results

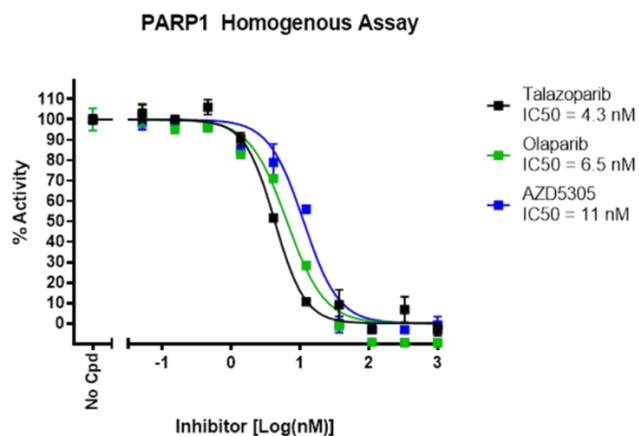


Figure 1: Inhibition of PARP1 activity by Talazoparib (Selleckchem), Olaparib (LC Laboratories) and AZD5305 (MedChemExpress), measured using the PARP1 Homogenous Assay Kit (BPS Bioscience #78438). Data shown is representative. For lot-specific information, please contact BPS Bioscience, Inc. at [support@bpsbioscience.com](mailto:support@bpsbioscience.com).

## Troubleshooting Guide

Visit [bpsbioscience.com/assay-kits-faq](https://bpsbioscience.com/assay-kits-faq) for detailed troubleshooting instructions. For all further questions, please email [support@bpsbioscience.com](mailto:support@bpsbioscience.com)

**Related Products**

| Products  | Catalog # | Size             |
|---|-----------|------------------|
| PARP1 Chemiluminescent Assay Kit  | 80551     | 96 rxns          |
| PARP1 Chemiluminescent Assay Kit (384-well)                             | 80569     | 384 rxns         |
| PARP1 Colorimetric Assay Kit  | 80580     | 96 rxns          |
| PARP1, FLAG-Avi-tag Recombinant   | 80521     | 20 µg            |
| PARP2 Chemiluminescent Assay Kit  | 80552     | 96 rxns/384 rxns |
| PARP2 Colorimetric Assay Kit  | 80581     | 96 rxns          |
| PARP2 Homogeneous Assay Kit   | 80702     | 384 rxns         |
| PARP3 Chemiluminescent Assay Kit  | 80553     | 96 rxns          |
| PARP6 Chemiluminescent Assay Kit  | 80556     | 96 rxns          |
| PARP10 Chemiluminescent Assay Kit                                       | 80560     | 96 rxns          |
| PARP10, FLAG-Strep-Tag Recombinant                                      | 80522     | 10 µg            |
| PARP11 Chemiluminescent Assay Kit                                       | 80561     | 96 rxns          |
| PARP14 Chemiluminescent Assay Kit                                       | 80568     | 96 rxns          |
| PARP15 Chemiluminescent Assay Kit                                       | 80567     | 96 rxns          |
| PARPtrap™ Assay Kit for PARP1   | 80584     | 96 rxns          |
| PARPtrap™ Assay Kit for PARP2   | 78296     | 96 rxns/384 rxns |
| PARPtrap™ Combo Assay Kit for PARP1 and PARP2                           | 78317     | 384 rxns         |
| TNKS1 (PARP5A) Chemiluminescent Assay Kit                               | 78405     | 96 rxns          |
| TNKS1 Histone Ribosylation Assay Kit (Biotin-labeled NAD <sup>+</sup> ) | 80579     | 384 rxns         |
| TNKS1 Histone Ribosylation Colorimetric Assay Kit                       | 80582     | 96 rxns          |
| TNKS2 (PARP5B) Chemiluminescent Assay Kit                               | 78406     | 96 rxns          |
| TNKS2 Histone Ribosylation Assay Kit (Biotin-labeled NAD <sup>+</sup> ) | 80572     | 384 rxns         |
| TNKS2 Histone Ribosylation Colorimetric Assay Kit                       | 80583     | 96 rxns          |
| Set of PARP Inhibitors (8 x 50 µl)                                      | 78318     | 8 x 50 µl        |
| Streptavidin-HRP (For PARP & Cytokine Assay Kits)                       | 80611     | 100 µl           |