

**Description**

The Chemi-Verse™ FAK Kinase Assay Kit is designed to measure FAK (focal adhesion kinase) tyrosine kinase activity for screening and profiling applications using ADP-Glo™ as a detection reagent. The assay kit comes in a convenient 96-well format, with enough purified recombinant FAK kinase (amino acids 411-686), kinase substrate, ATP and kinase assay buffer for 100 enzyme reactions.

**Background**

FAK (focal adhesion kinase) is a non-receptor tyrosine kinase present in the cytoplasm and involved in crucial cellular functions, such as adhesion, proliferation and survival. It works as a mediator of signals between the ECM (extracellular matrix) and the cytoplasm, and when activated can have kinase-dependent and kinase-independent activity. It is found at high levels in many cancer types, including breast and ovarian cancer. For instance, in breast cancer cells, it was found that disruption of the FAK-mediated signaling pathways can result in increased FADD (Fas-associated death domain) and caspase-8 activity and apoptosis. In addition to its role in apoptosis, it is also involved in EMT (epithelial-mesenchymal transition), cell migration, and regulation of the TME (tumor microenvironment). Its importance in cancer development makes it an attractive target in cancer therapy, with multiple inhibitors undergoing clinical and pre-clinical studies. The use of combination therapy of inhibitors for FAK with immune checkpoint inhibitors like PD-L1, chemotherapy, and radiotherapy, may lead to better outcomes than individual approaches and may open new therapeutic avenues in cancer.

**Application(s)**

- Study enzyme kinetics and screen small molecular inhibitors for drug discovery and high throughput (HTS) applications.

**Supplied Materials**

Catalog #	Name	Amount	Storage
40420	FAK, GST-Tag*	10 µg	-80°C
79334	5x Kinase Assay Buffer 1	1.5 ml	-20°C
79686	500 µM ATP	50 µl	-20°C
40217	PTK Substrate Poly(Glu,Tyr 4:1)	50 µl	-20°C
79696	White 96-well plate	1	Room Temperature

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

**Materials Required but Not Supplied**

Name	Catalog #
ADP-Glo™ Kinase Assay	Promega #V6930
Microplate reader capable of reading luminescence	
Adjustable micropipettor and sterile tips	
30°C incubator	

**Storage Conditions**

This assay kit will perform optimally for up to **6 months** from date of receipt when the materials are stored as directed.

**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.

**Assay Principle**

The **ADP-Glo™ Kinase Assay (Promega #V6930)** quantifies the amount of ADP produced by a kinase upon phosphorylation of a substrate. First, addition of the ADP-Glo™ reagent terminates the reaction and quenches the remaining ATP. Second, addition of the Kinase Detection reagent converts the produced ADP to ATP. The new ATP is quantified by a luciferase reaction. The luminescent signal correlates with the amount of ADP generated by the kinase and is linear to 1 mM ATP.

**Contraindications**

The final concentration of DMSO in the assay should not exceed 1%.

**Assay Protocol**

- All samples and controls should be tested in duplicate.
- The assay should include “Blank”, “Positive Control” and “Test Inhibitor” conditions.
- We recommend maintaining the diluted protein on ice during use.
- For detailed information on protein handling please refer to Protein FAQs ([bpsbioscience.com](https://bpsbioscience.com)).
- We recommend using PND1186 (#82815) as internal control. If not running a dose response curve for the control inhibitor, we recommend running the control inhibitor at 0.1X, 1X and 10X the IC<sub>50</sub> value shown in the validation data below.
- For instructions on how to prepare reagent dilutions please refer to Serial Dilution Protocol ([bpsbioscience.com](https://bpsbioscience.com)).

1. Thaw **5x Kinase Assay Buffer 1**, **500 μM ATP**, and **PTK Substrate Poly(Glu,Tyr 4:1)**.
2. Prepare 3 ml of **1x Kinase Assay Buffer 1** by mixing 600 μl of **5x Kinase Assay Buffer 1** with 2,400 μl of distilled water.

*Note: Three (3ml) of **1x Kinase Assay Buffer 1** is sufficient for 100 reactions.*

3. Prepare a **Master Mix** (12.5 μl/well): N wells x (6 μl of 1x Kinase Assay Buffer 1 + 0.5 μl of 500 μM ATP + 0.5 μl of PTK Substrate Poly(Glu,Tyr 4:1) + 5.5 μl of distilled water).
4. Add 12.5 μl of Master Mix to every well.
5. Prepare the **Test Inhibitor** (2.5 μl/well): for a titration, prepare serial dilutions at concentrations 10-fold higher than the desired final concentrations. The final volume of the reaction is 25 μl.

5.1 If the Test Inhibitor is water-soluble: Prepare serial dilutions in 1x Kinase Assay Buffer 1, 10-fold more concentrated than the desired final concentrations.

For the positive and negative controls, use 1x Kinase Assay Buffer 1 (Diluent Solution).

**OR**

5.2 If the Test inhibitor is soluble in DMSO: Prepare the test inhibitor at 100-fold the highest desired concentration in 100% DMSO, then dilute the inhibitor 10-fold in 1x Kinase Assay Buffer 1 to prepare the highest concentration of the 10-fold intermediate dilutions. The concentration of DMSO is now 10%.

Prepare serial dilutions of the Test Inhibitor at 10-fold the desired final concentrations using 10% DMSO in 1x Kinase Assay Buffer 1 to keep the concentration of DMSO constant.

For positive and negative controls, prepare 10% DMSO in Kinase Assay Buffer 1 (vol/vol) so that all wells contain the same amount of DMSO (Diluent Solution).

*Note: The final concentration of DMSO should not exceed 1%.*

6. Add 2.5 µl of Test Inhibitor to each well labeled "Test Inhibitor".
7. Add 2.5 µl of Diluent Solution to the "Positive Control" and "Blank" wells.
8. Add 10 µl of 1x Kinase Assay Buffer 1 to the "Blank" wells.
9. Thaw **FAK kinase** on ice. Briefly spin the tube to recover its full content.
10. Dilute the protein kinase (10 µl/well) to 10 ng/µl using 1x Kinase Assay Buffer 1.
11. Initiate the reaction by adding 10 µl of diluted kinase to the wells designated "Positive Control" and "Test Inhibitor".

Component	Blank	Positive Control	Test Inhibitor
Master Mix	12.5 µl	12.5 µl	12.5 µl
Test Inhibitor	-	-	2.5 µl
Diluent Solution	2.5 µl	2.5 µl	-
1x Kinase Assay Buffer 1	10 µl	-	-
Diluted FAK (10 ng/µl)	-	10 µl	10 µl
<b>Total</b>	<b>25 µl</b>	<b>25 µl</b>	<b>25 µl</b>

12. Incubate at 30°C for 45 minutes.

13. Thaw the ADP-Glo™ reagent.

14. At the end of the 45-minute reaction, add 25 µl of ADP-Glo™ reagent to each well.
15. Cover the plate with aluminum foil and incubate at Room Temperature (RT) for 45 minutes.
16. Thaw the Kinase Detection Reagent.
17. Add 50 µl of Kinase Detection reagent to each well.
18. Cover the plate with aluminum foil and incubate at RT for another 45 minutes.
19. Immediately read in a luminometer or a microplate reader capable of reading luminescence.
20. The “Blank” value should be subtracted from all other readings.

### Reading Luminescence

Luminescence is the emission of light resulting from a chemical reaction. The detection of luminescence requires no wavelength selection because the method used is emission photometry and not emission spectrophotometry.

To properly read luminescence, make sure the plate reader is set for LUMINESCENCE mode. Typical integration time is 1 second, delay after plate movement is 100 msec. Do not use a filter when measuring light emission. Typical settings for the Synergy 2 BioTek plate reader: use the “hole” position on the filter wheel; Optics position: Top; Read type: endpoint. Sensitivity may be adjusted based on the luminescence of a control assay without enzyme (typically we set this value as 100).

## Example Results

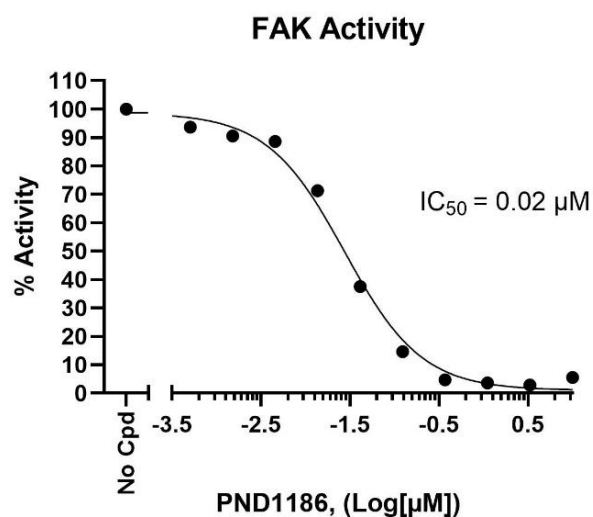


Figure 1: Inhibition of FAK kinase activity by PND1186.

The inhibition of FAK kinase activity was measured in the presence of increasing concentrations of PND1186 (#82815). The "Blank" value was subtracted from all other values. Results are expressed as the percent of control (kinase activity in the absence of inhibitor, set at 100%).

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)

## References

Tan X., et al., 2023 *Experimental Hematology & Oncology* 12:83.

## Related Products

Products	Catalog #	Size
Caspase-8 Homogeneous Assay Kit	80704	96 reactions
Caspase8, His-tag Recombinant	80114	10 μg/ 50 μg
Ac-DEVD-CMK	27315	5 mg

Version 010925