FGFR1 Kinase Assay

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Scientific Background:

FGFR1 (also known as FLT2) is a member of the Fibroblast Growth Factor Receptor family that constitute a family of four membrane-spanning tyrosine kinases (FGFR1-4) which serve as high-affinity receptors for 17 growth factors (FGF1-17). The FGF Receptor family plays an important role in multiple biological processes, including mesoderm induction and patterning, cell growth and migration, organ formation and bone growth (1). FGFR1 is alternatively spliced generating multiple splice variants that are differentially expressed during embryo development and in the adult body (2).

1. Xu, X. et al: Fibroblast growth factor receptors (FGFRs) and their roles in limb development. Cell Tissue Res. 1999 Apr;296(1):33-43.

2. Groth, C. et al: The structure and function of vertebrate fibroblast growth factor receptor 1. Int J Dev Biol. 2002;46(4):393-400.

ADP-Glo™ Kinase Assay

Description

ADP-Glo™ Kinase Assay is a luminescent kinase assay that measures ADP formed from a kinase reaction; ADP is converted into ATP, which is converted into light by Ultra-Glo™ Luciferase (Fig. 1). The luminescent signal positively correlates with ADP amount (Fig. 2) and kinase activity (Fig. 3A). The assay is well suited for measuring the effects chemical compounds have on the activity of a broad range of purified kinases—making it ideal for both primary screening as well as kinase selectivity profiling (Fig. 3B). The ADP-Glo™ Kinase Assay can be used to monitor the activity of virtually any ADP-generating enzyme (e.g., kinase or ATPase) using up to 1mM ATP.

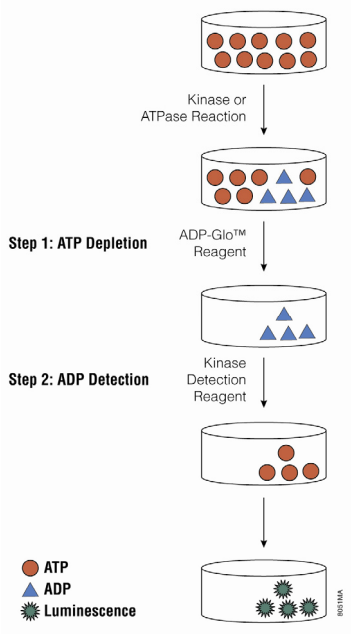

Figure 1. Principle of the ADP-Glo™ Kinase Assay. The ATP remaining after completion of the kinase reaction is depleted prior to an ADP to ATP conversion step and quantitation of the newly synthesized ATP using luciferase/luciferin reaction.

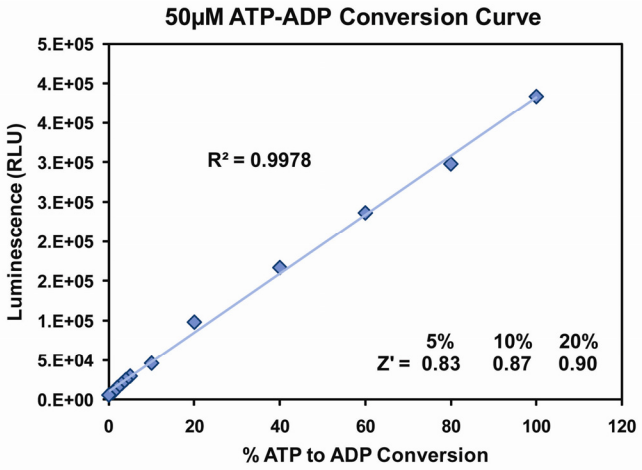

Figure 2. Linearity of the ADP-Glo Kinase Assay. ATP-to-ADP conversion curve was prepared at 50µM ATP+ADP concentration range. This standard curve is used to calculate the amount of ADP formed in the kinase reaction. Z' factors were determined using 192 replicates of each of the % conversions shown.

For detailed protocols on conversion curves, kinase assays and inhibitor screening, see *The ADP-Glo™ Kinase Assay* Technical Manual #TM313, available at www.promega.com/tbs/tm313/tm313.html

Protocol

- Dilute enzyme, substrate, ATP and inhibitors in Kinase Buffer.
- Add to the wells of 384 low volume plate:
  1 µl of inhibitor or (5% DMSO)
  2 µl of enzyme (defined from table 1)
  2 µl of substrate/ATP mix
- Incubate at room temperature for 60 minutes.
- Add 5 µl of ADP-Glo™ Reagent
- Incubate at room temperature for 40 minutes.
- Add 10 µl of Kinase Detection Reagent
- Incubate at room temperature for 30 minutes.
- Record luminescence (Integration time 0.5-1second).

Table 1. FGFR1 Enzyme Titration. Data are shown as relative light units (RLU) that directly correlate to the amount of ADP produced. The correlation between the % of ATP converted to ADP and corresponding signal to background ratio is indicated for each kinase amount.

FGFR1, ng	100	50	25	12.5	6.3	3.1	1.6	0.8	0.4	0
Luminescence	487118	450379	417533	389271	335034	258101	187946	89305	34272	6877
S/B	70.8	65.5	60.7	56.6	48.7	37.5	27.3	13.0	5.0	1
% Conversion	92.4	85.2	78.9	73.4	62.8	47.9	34.2	15.1	4.4	0

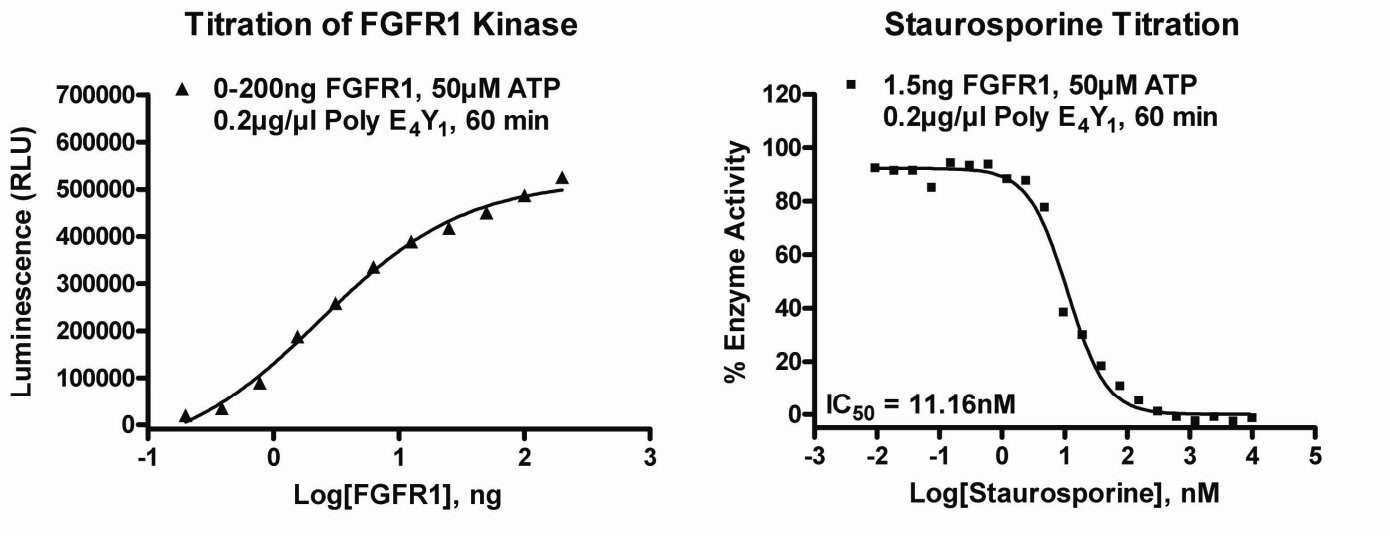

Figure 3. FGFR1 Kinase Assay Development: (A) FGFR1 enzyme was titrated using 50µM ATP and the luminescence signal generated from each of the amounts of the enzyme is shown. (B) Staurosporine dose response was created using 1.5ng of FGFR1 to determine the potency of the inhibitor (IC_{50}).

Assay Components and Ordering Information:

Products	Company	Cat.#
ADP-Glo™ Kinase Assay	Promega	V9101
FGFR1 Kinase Enzyme System	Promega	V2991
ADP-Glo + FGFR1 Kinase Enzyme System	Promega	V9321

FGFR1 Kinase Buffer: 40mM Tris,7.5; 20mM $MgCl_2$; 0.1mg/ml BSA; 50µM DTT.