

## Activity Assay for Mouse tPA

For Research Use Only

---

### INTRODUCTION

Tissue-type Plasminogen Activator (tPA) is a member of the serine proteinase family. tPA functions to lyse fibrin clots into soluble plasmin fragments. tPA is active in two forms, single chain and two-chain. The two-chain tPA is created via interaction with the plasmin product cleaving the single chain. This two-chain form is regarded as the more active form.

Both single chain and two-chain tPA are complexable with PAI-1. PAI-1 acts as an inhibitor for tPA by binding to the tPA and thus stifling its ability to lyse fibrin.

tPA can serve as an indicator of both myocardial infarction for patients with impaired fibrinolytic systems as well as a marker for type-II diabetes.

---

### PRINCIPLES OF PROCEDURE

This is an ELISA (Enzyme-Linked Immunosorbent Assay) for the quantitative analysis of active tPA levels in biological fluid. This test kit operates on the basis of sandwich ELISA where free active tPA enzyme complexes with PAI-1 and is quantitated with the use of an HRP labeled secondary antibody.

First the biotinylated PAI-1 binds to the avidin coated wells. Next, active tPA present in the standard or unknown, complexes with PAI-1. Inactive or complexed tPA is removed in a subsequent wash step. A primary antibody specific for tPA is then added to each well followed by the HRP conjugated secondary antibody. The bound conjugated secondary antibody is detected by the addition of substrate, which generates an optimal color after 10 minutes. Quantitative test results may be obtained by the measure and comparison of the sample and standard absorbance readings when read with a microplate reader at 450 nm.

---

### MATERIALS PROVIDED

Component	Contents	Quantity	Storage	Cat. No.
<b>Coated Plate</b>	Avidin coated 96-well plate	1 plate	4°C	PA92a
<b>Standard</b>	Mouse tPA activity standard	1 vial	4°C	PA92b
<b>Biotinylated PAI-1</b>	Biotinylated PAI-1 (lyophilized)	1 vial	4°C	PA92c
<b>Primary Antibody</b>	Anti-mouse tPA monoclonal antibody (lyophilized)	1 vial	4°C	PA92d
<b>Wash Buffer</b>	10x solution for washing plate	50 mL	4°C	PA92e
<b>Substrate</b>	TMB Substrate	10 mL	4°C	PA92f
<b>Secondary Antibody</b>	Anti-mouse HRP conjugated antibody	1 vial	4°C	PA92g
<b>10x TBS Solution</b>	Tris Buffered Saline pH 7.4	5 mL	4°C	PA92h

---

**MATERIALS NEEDED BUT NOT PROVIDED**

---

1. 1 N H<sub>2</sub>SO<sub>4</sub>
2. DI Water
3. Bovine Serum Albumin Fraction V (BSA)
4. Microplate reader with 450 nm filter
5. Microplate shaker with uniform horizontal circular movement up to 300 rpm
6. Precision pipettes that range from 10 µL-1000 µL and disposable tips

---

**STORAGE**

---

1. Store the kit and all of its components at 4°C before use.
2. If not using the entire plate at once, prepare only the appropriate amount of Primary Antibody and PAI-1 Standard. The remaining stock solutions should be frozen and stored at -70°C. Primary Antibody should be used within two weeks. All other components should remain refrigerated.
3. Store the reconstituted Biotinylated PAI-1 at 4°C. Use within two weeks.
4. Store unused portions of the microplate in a pouch with a desiccant at 4°C.

---

**PROCEDURAL NOTES**

---

1. This assay should be run at room temperature.
2. Use aseptic technique when opening and dispensing reagents.
3. This kit is designed to work properly as provided and instructed. Additions, deletions or substitutions to the procedure or reagents are not recommended, as they may be detrimental to the assay.
4. To minimize error due to handling, wipe the exterior bottom of the microplate wells with a lint-free paper towel.

---

**SAMPLE COLLECTION, STORAGE, AND PREPARATION**

---

Samples should be collected using 0.1 M trisodium citrate or acidified citrate in a 1:10 ratio of collection media to blood. Immediately upon collection of blood, the samples should be centrifuged at 3000 x g for 15 minutes. This should ensure the removal of platelets as they can release PAI-1, that in turn complexes with tPA. The plasma should be transferred to a clean plastic tube to be kept on ice prior to analysis or stored frozen for up to one month. Samples are stable for approximately 24 hours when stored at 4°C or one month if stored at -20°C and thawed three times without loss of tPA activity.

**Note:** Detergents such as Triton X cause interference with the assay. If using detergent extracted samples, it is necessary to dialyze the samples overnight to remove the detergent.

---

**REAGENT PREPARATION**

---

1. **10x Wash Buffer:** Dilute the 50 mL of concentrate to 1x with 450 mL of DI water prior to use.
2. **10x TBS Buffer:** 0.1 M Tris, 0.15 M NaCl, pH 7.4. Dilute 5 mL of concentrate into 45 mL DI water.
3. **3% BSA Blocking Buffer:** 3% BSA in 1x TBS Buffer. Use 1.5 g BSA in 50 mL of 1x TBS.
4. **Biotinylated PAI-1:** Reconstitute with 10mL 3% BSA Blocking Buffer and vortex gently to mix. Prepare immediately prior to use.
5. **Standard:** Reconstitute with 1.0 mL 3% BSA Blocking Buffer immediately prior to use and vortex gently to mix. The vial is now 1,000 ng/mL tPA. Prepare the standards according to the Dilution Table below.
6. **Primary Antibody:** Reconstitute with 10 mL of 3% BSA Blocking Buffer and vortex gently to mix. Prepare immediately prior to use.
7. **Secondary Antibody:** Dilute 1.0 uL of conjugated secondary antibody with 10 mL of 3% BSA Blocking Buffer and vortex gently to mix. Prepare immediately prior to use.

---

**STANDARD PREPARATION**


---

Standard	tPA Concentration (ng/mL)	Blocking Buffer (μL)	Transfer Volume (μL)	Transfer Source	Final Volume (μL)
S <sub>10</sub>	50	950	50	Stock Vial	500
S <sub>9</sub>	25	500	500	S <sub>10</sub>	600
S <sub>8</sub>	10	600	400	S <sub>9</sub>	500
S <sub>7</sub>	5	500	500	S <sub>8</sub>	600
S <sub>6</sub>	2	600	400	S <sub>7</sub>	500
S <sub>5</sub>	1	500	500	S <sub>6</sub>	500
S <sub>4</sub>	0.5	500	500	S <sub>5</sub>	500
S <sub>3</sub>	0.25	500	500	S <sub>4</sub>	600
S <sub>2</sub>	0.1	600	400	S <sub>3</sub>	500
S <sub>1</sub>	0.05	500	500	S <sub>2</sub>	1,000
S <sub>0</sub>	0	500	---	---	500

---

**ASSAY PROCEDURE**


---

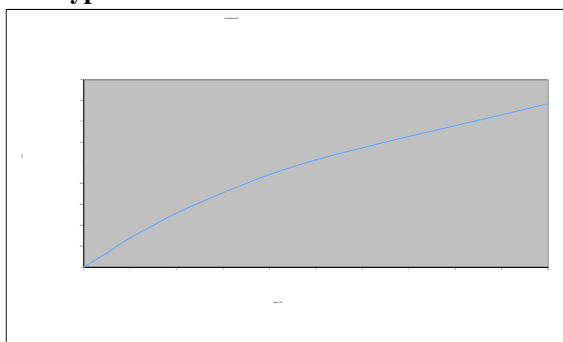
1. Add 100 μl of reconstituted Biotinylated PAI-1 to all of the wells. Shake the plate at 300 rpm for 30 minutes at room temperature (RT).
2. Wash the plate 3 times according to the following wash procedure:
  - a. Remove the contents of each well by inversion of the plate.
  - b. Tap out the remaining contents of the plate onto a lint free paper towel.
  - c. Add 300 μL of 1x Wash Buffer.
  - d. Let stand for 2-3 minutes.
  - e. Repeat procedure two more times, then proceed to step "f".
  - f. Remove the contents of each well by inversion of plate into an appropriate disposal device.
  - g. Tap out the remaining contents of the plate onto a lint free paper towel, then proceed to step 3.
3. Add 100 μl of the Standards and unknowns to the wells in duplicate.  
**NOTE:** If the pH of a sample is lower than 6.0, add 30 μL of the 10x TBS Solution to the well prior to adding the sample. This step is unnecessary if the pH is neutral.  
 For a suggested plate layout, see Scheme I below. Shake the plate at 300 rpm for 30 minutes at RT.
4. Wash the plate three times as in step 2.
5. Add 100 μl of the Primary Antibody to each well. Shake the plate at 300 rpm for 30 minutes at RT.
6. Wash the plate three times as in step 2.
7. Add 100 μl of the Secondary Antibody to each well. Shake the plate at 300rpm for 30 minutes at RT.
8. Wash the plate three times as in step 2.
9. Add 100 μl of TMB Substrate to each well. Shake the plate at 300 rpm for 1-5 minutes at RT for a sufficient blue color to develop.
10. Stop the reaction by adding 50 μl of 1N H<sub>2</sub>SO<sub>4</sub> to each well and read the plate at 450 nm.

**Scheme I:**

	1	2	3	4	5	6	7	8	9	10	11	12
A	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	U1
B	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	U1
C	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13
D	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13
E	U14	U15	U16	U17	U18	U19	U20	U21	U22	U23	U24	U25
F	U14	U15	U16	U17	U18	U19	U20	U21	U22	U23	U24	U25
G	U26	U27	U28	U29	U30	U31	U32	U33	U34	U35	U36	U37
H	U26	U27	U28	U29	U30	U31	U32	U33	U34	U35	U36	U37

**CALCULATIONS**

1. Average the O.D. values for each pair of duplicate wells.
2. Plot the  $A_{450}$  against the concentration of uPA in the standards.
3. Fit a straight line through the points using a linear fit procedure.
4. Calculate the uPA concentrations in the unknowns using the standard curve.

**Typical Standard Curve:****PERFORMANCE CHARACTERISTICS**

Assay Range: 0.1-50 ng/mL

Samples with tPA levels higher than 50 ng/mL should be diluted in similar media devoid of active tPA or 3% BSA Blocking Buffer.

**REFERENCES**

1. Thogersen A et al. (1998) Circulation 98: 2241-2247
2. Eliasson M et al. (2003) Cardiovascular Diabetology 2:19

**DISCLAIMER**

This information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. Oxford Biomedical Research, Inc. shall not be held liable for any damage resulting from handling or from contact with the above product. See catalog for additional terms and conditions of sale.

---

**ORDERING INFORMATION**

---

For additional kits or a complete catalog please call 1-800-692-4633.

---

**TECHNICAL SUPPORT**

---

If you need technical information or assistance with assay procedures, call our Technical Support Department at 800-692-4633 or 248-852-8815. Our staff will be happy to answer your questions about this or any other product in the Oxford Biomedical line.

---

**GUARANTEE AND LIMITATION OF REMEDY**

---

Oxford Biomedical Research, Inc. makes no guarantee of any kind, expressed or implied, which extends beyond the description of the material in this ELISA kit, except that these materials and this kit will meet our specifications at the time of delivery. Buyer's remedy and Oxford Biomedical Research, Inc.'s sole liability hereunder is limited to, at Oxford Biomedical Research, Inc.'s option, refund of the purchase price of, or the replacement of, material that does not meet our specification. By acceptance of our products, Buyer indemnifies and holds Oxford Biomedical Research, Inc. harmless against, assumes all liability for the consequence of its use or misuse by the Buyer, its employees, or others. Said refund or replacement is conditioned of Buyer notifying Oxford Biomedical Research, Inc. within (30) days of the receipt of product. Failure of Buyer to give said notice within said thirty (30) days shall constitute a waiver by the Buyer of all claims hereunder with respect to said material(s).

Oxford Biomedical Research, Inc.  
P.O. Box 522  
Oxford, MI 48371 U.S.A.

Orders: 800-692-4633  
Technical Service: 248-852-8815  
Fax: 248-852-4466  
E-mail: [info@oxfordbiomed.com](mailto:info@oxfordbiomed.com)  
Made in the U.S.A.