#5303 Store at –20°C

PathScan® Multiplex Western Cocktail III:
Phospho-Stat1, Phospho-SAPK/JNK, Phospho-S6 Ribosomal Protein and Phospho-HSP27 Detection Cocktail III

☑ 250 µl
(5 Western mini-blots)

Cell Signaling TECHNOLOGY®

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rev. 01/29/16

For Research Use Only. Not For Use In Diagnostic Procedures.

Applications	Species Cross-Reactivity*	Source
W Endogenous	H	Rabbit**

Antibody Cocktail Components and Molecular Weights

No.	Antibody	Molecular Weight
9167	Phospho-Stat1 (Tyr701) (58D6) Rabbit mAb	84, 91 kDa
4668	Phospho-SAPK/JNK (Thr183/Tyr185) (81E11) Rabbit mAb	46, 54 kDa
4858	Phospho-S6 Ribosomal Protein (Ser235/236) (D57.2.2E) XP® Rabbit mAb	32 kDa
2406	Phospho-HSP27 (Ser82) Antibody II	27 kDa
3722	Pin1 Antibody	18 kDa

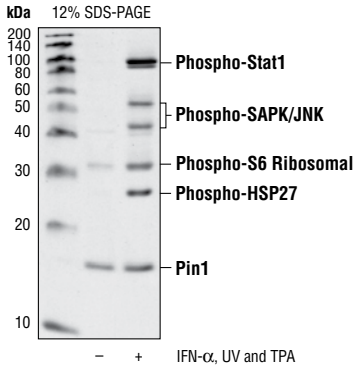
Description: The PathScan® Multiplex Western Cocktail III offers a unique method to assay the activation of multiple pathways on one membrane without stripping and reprobing. This method saves the user valuable time, while increasing accuracy and minimizing reagent waste. The system allows the user to simultaneously detect levels of phospho-Stat1, phospho-SAPK/JNK, phospho-S6 ribosomal protein and phospho-HSP27. The cocktail also includes Pin1 antibody to control protein loading.

Background: Stat1, while activated in response to a large number of ligands, appears to be essential for responsiveness to IFN-α and IFN-γ (1–3).

Phosphorylation of Stat1 at Tyr701 induces Stat1 dimerization, nuclear translocation and DNA binding (4). Stat1 has been found to be inappropriately activated in many tumors (5).

The stress-activated protein kinase/Jun-terminal kinase SAPK/JNK is potently and preferentially activated by a variety of environmental stresses, including UV and γ radiation, ceramides, inflammatory cytokines and, in some instances, by growth factors and GPCR agonists (6,7). SAPK/JNK, when active as a dimer, can translocate to the nucleus where it regulates transcription through its effects on c-Jun, ATF-2 and other transcription factors (8).

To effectively promote growth and cell division in a sustained manner, growth factors and mitogens must upregulate translation (9,10). Growth factors and mitogens induce the activation of p70 S6 kinase, which in turn phosphorylate the S6 ribosomal protein. Phosphorylation of S6 correlates with an increase in translation, particularly of mRNAs with an oligopyrimidine tract in their 5' untranslated regions (10). This group of mRNAs (5'TOP) encodes proteins involved in cell cycle progression and proteins that are part of the translational machinery, such as ribosomal proteins and elongation factors (10,11).



Western blot analysis of HeLa cells untreated or treated with IFN-α, UV and TPA, using PathScan® Multiplex Western Cocktail III to detect the phosphorylation of Stat1, SAPK/JNK, S6 ribosomal protein and HSP27.

Heat shock protein (HSP) 27 is one of the small HSPs, regulated at both the transcriptional and posttranslational levels (12). In response to stress, the expression level of HSP27 increases several-fold to confer cellular resistance to the adverse environmental change. HSP27 is also phosphorylated at serines 15, 78 and 82 by MAPKAP kinase 2 as a result of p38 MAP kinase pathway activation (13,14).

Specificity/Sensitivity: Each phospho-antibody in this cocktail recognizes endogenous levels of only the phosphorylated form of its specific target. The Pin1 antibody detects endogenous levels of its target protein and is provided to control for protein loading. All the antibodies in this cocktail detect endogenous levels of target proteins.

Source/Purification: Antibodies are produced by immunizing animals with synthetic peptides. Polyclonal antibodies are purified by protein A and peptide affinity chromatography.

Storage: Supplied in 10 mM sodium HEPES (pH 7.5), 150 mM NaCl, 100 µg/ml BSA and 50% glycerol. Store at –20°C. *Do not aliquot the antibody.*

***Species cross-reactivity is determined by western blot, using the individual antibody cocktail components.**

****Anti-rabbit secondary antibodies must be used to detect this antibody.**

Recommended Antibody Dilutions:
Western blotting 1:200

Background References:

(1) Heim, M.H. (1999) *J. Recept. Signal. Transduct. Res.* 19, 75–120.

(2) Durbin, J.E. et al. (1996) *Cell* 84, 443–450.

(3) Meraz, M.A. et al. (1996) *Cell* 84, 431–442.

(4) Ihle, J.N. et al. (1994) *Trends Biochem. Sci.* 19, 222–227.

(5) Frank, D.A. (1999) *Mol. Med.* 5, 432–456.

(6) Davis, R.J. (1999) *Biochem. Soc. Symp.* 64, 1–12.

(7) Kyriakis, J.M. and Avruch, J. (2001) *Phisiol. Rev.* 81, 807–869.

(8) Whitmarsh, A.J. and Davis, R.J. (1998) *Trends Biochem. Sci.* 23, 481–485.

(9) Dufner, A. and Thomas, G. (1999) *Exp. Cell. Res.* 253, 100–109.

(10) Peterson, R.T. and Schreiber, S.L. (1998) *Curr. Biol.* 8, R248–R250.

(11) Jefferies, H.B. et al. (1997) *EMBO J.* 16, 3693–3704.

(12) Arrigo, A.P. and Landry, J. (1994) *The Biology of Heat Shock Proteins and Molecular Chaperones. Cold Spring Harbor Laboratory Press, NY* 335–373.

(13) Landry, J. et al. (1992) *J. Biol. Chem.* 267, 794–803.

(14) Rouse, J. et al. (1994) *Cell* 78, 1027–1037.

IMPORTANT: For Western blots, incubate membrane with diluted antibody in 5% w/v BSA, 1X TBS, 0.1% Tween-20 at 4°C with gentle shaking, overnight.

Applications Key: **W**—Western **IP**—Immunoprecipitation **IHC**—Immunohistochemistry **ChIP**—Chromatin Immunoprecipitation **IF**—Immunofluorescence **F**—Flow cytometry **E-P**—ELISA-Peptide

Species Cross-Reactivity Key: **H**—human **M**—mouse **R**—rat **Hm**—hamster **Mk**—monkey **Mi**—mink **C**—chicken **Dm**—D. melanogaster **X**—Xenopus **Z**—zebrafish **B**—bovine **Dg**—dog **Pg**—pig **Sc**—S. cerevisiae **All**—all species expected Species enclosed in parentheses are predicted to react based on 100% homology.

#5303

Western Immunoblotting Protocol (Primary Antibody Incubation in BSA)

For Western blots, incubate membrane with diluted antibody in 5% w/v BSA, 1X TBS, 0.1% Tween-20 at 4°C with gentle shaking, overnight.

A Solutions and Reagents

NOTE: Prepare solutions with Milli-Q or equivalently purified water.

1. 1X Phosphate Buffered Saline (PBS)
2. **1X SDS Sample Buffer:** 62.5 mM Tris-HCl (pH 6.8 at 25°C), 2% w/v SDS, 10% glycerol, 50 mM DTT, 0.01% w/v bromophenol blue or phenol red
3. **Transfer Buffer:** 25 mM Tris base, 0.2 M glycine, 20% methanol (pH 8.5)
4. **10X Tris Buffered Saline (TBS):** To prepare 1 liter of 10X TBS: 24.2 g Tris base, 80 g NaCl; adjust pH to 7.6 with HCl (use at 1X).
5. Nonfat Dry Milk (weight to volume [w/v])
6. **Blocking Buffer:** 1X TBS, 0.1% Tween-20 with 5% w/v nonfat dry milk; for 150 ml, add 15 ml 10X TBS to 135 ml water, mix. Add 7.5 g nonfat dry milk and mix well. While stirring, add 0.15 ml Tween-20 (100%).
7. **Wash Buffer:** 1X TBS, 0.1% Tween-20 (TBS/T)
8. Bovine Serum Albumin (BSA)
9. **Primary Antibody Dilution Buffer:** 1X TBS, 0.1% Tween-20 with 5% BSA; for 20 ml, add 2 ml 10X TBS to 18 ml water, mix. Add 1.0 g BSA and mix well. While stirring, add 20 µl Tween-20 (100%).
10. **Phototope®-HRP Western Blot Detection System** #7071**:** Includes biotinylated protein ladder, secondary anti-rabbit (#7074) antibody conjugated to horseradish peroxidase (HRP), anti-biotin antibody conjugated to HRP, LumiGLO® chemiluminescent reagent and peroxide.
11. Prestained Protein Marker, Broad Range (Premixed Format) #7720
12. Biotinylated Protein Ladder Detection Pack #7727
13. **Blotting Membrane:** This protocol has been optimized for nitrocellulose membranes, which CST recommends. PVDF membranes may also be used.

B Protein Blotting

A general protocol for sample preparation is described below.

1. Treat cells by adding fresh media containing regulator for desired time.
2. Aspirate media from cultures; wash cells with 1X PBS; aspirate.
3. Lyse cells by adding 1X SDS sample buffer (100 µl per well of 6-well plate or 500 µl per plate of 10 cm diameter plate). Immediately scrape the cells off the plate and transfer the extract to a microcentrifuge tube. Keep on ice.
4. Sonicate for 10–15 seconds to shear DNA and reduce sample viscosity.
5. Heat a 20 µl sample to 95–100°C for 5 minutes; cool on ice.
6. Microcentrifuge for 5 minutes.
7. Load 20 µl onto SDS-PAGE gel (10 cm x 10 cm).

NOTE: CST recommends loading prestained molecular weight markers (#7720, 10 µl/lane) to verify electrotransfer and biotinylated protein ladder (#7727, 10 µl/lane) to determine molecular weights.

8. Electrotransfer to nitrocellulose or PVDF membrane.

C Membrane Blocking and Antibody Incubations

NOTE: Volumes are for 10 cm x 10 cm (100 cm^2) of membrane; for different sized membranes, adjust volumes accordingly.

1. (Optional) After transfer, wash nitrocellulose membrane with 25 ml TBS for 5 minutes at room temperature.
2. Incubate membrane in 25 ml of blocking buffer for 1 hour at room temperature.
3. Wash three times for 5 minutes each with 15 ml of TBS/T.
4. Incubate membrane and primary antibody (at the appropriate dilution) in 10 ml primary antibody dilution buffer with gentle agitation overnight at 4°C.
5. Wash three times for 5 minutes each with 15 ml of TBS/T.
6. Incubate membrane with HRP-conjugated secondary antibody (1:2000) and HRP-conjugated anti-biotin antibody (1:1000) to detect biotinylated protein markers in 10 ml of blocking buffer with gentle agitation for 1 hour at room temperature.
7. Wash three times for 5 minutes each with 15 ml of TBS/T.

D Detection of Proteins

1. Incubate membrane with 10 ml LumiGLO® (0.5 ml 20X LumiGLO®, 0.5 ml 20X Peroxide and 9.0 ml Milli-Q water) with gentle agitation for 1 minute at room temperature.

NOTE: LumiGLO® substrate can be further diluted if signal response is too fast.

2. Drain membrane of excess developing solution (do not let dry), wrap in plastic wrap and expose to x-ray film. An initial 10-second exposure should indicate the proper exposure time.

NOTE: Due to the kinetics of the detection reaction, signal is most intense immediately following LumiGLO® incubation and declines over the following 2 hours.

MSDS

Material Safety Data Sheet (MSDS) for Antibodies

Cell Signaling TECHNOLOGY®

rev. 08/09/07

I. Identification:

Product name: Antibodies
Product Catalog Number: Includes antibodies within the following range of catalog numbers: 2000-5999, 7000-7999 and 9000-9999.
CAS number: None

Manufacturer Supplier: Cell Signaling Technology
3 Trask Lane
Danvers, MA 01923 USA
1-978-867-2300 TEL
1-978-867-2400 FAX
1-978-578-6737 Emergency Phone

II. Composition/Information on Ingredients:

This product is composed of antibodies in aqueous buffer solution. According to 29 CFR 1910.1200(d), hazardous ingredients at less than <1% and carcinogens at less than < 0.1% are considered non-hazardous. Any hazardous or carcinogenic ingredients exceeding these criteria are listed below.

This product may contain the following hazardous ingredients.

Ingredient	CAS#	Percent
Glycerol	56-81-5	50%

III. Hazard Identification:

Emergency Overview of Hazardous ingredient: Glycerol (CAS# 56-81-5)
Caution: Avoid contact and inhalation.
Target Organ: Kidneys.

NFPA Rating:

Health Rating:	1
Flammability Rating:	0
Reactivity Rating:	0

IV. First Aid Measures:

Inhalation: If inhaled, remove to fresh air. If breathing is difficult, get medical attention.
Ingestion: If swallowed and person is conscious, rinse out mouth with water. Get medical attention.
Skin Exposure: In case of contact, wash skin with soap and water.
Eye Exposure: In case of contact with eyes, immediately flush eyes water for at least 15 minutes. Get medical attention.

V. Fire Fighting Measures:

Flash Point: Data not available.
Autoignition Temperature: Data not available.
Fire Extinguishing Media: Water spray, dry chemical, foam, or carbon dioxide.
Firefighting: Wear protective clothing and self-contained breathing apparatus to prevent contact with skin and eyes.

VI. Accidental Release Measures:

Absorb liquid with an absorbent material. Transfer contaminated absorbent to a chemical waste container for disposal.

VII. Handling And Storage:

Avoid inhalation and contact with eyes and skin. Avoid prolonged or repeated exposure. Store at –20°C in tightly closed container.

VIII. Exposure Controls/Personal

Engineering Controls: Maintain adequate ventilation, eye wash and quick-drench facilities in work area.
Personal Protective Equipment: Lab coat, chemical resistant gloves and chemical safety glasses.
Occupational Exposure Limits: Data not available.

IX. Exposure Controls/Personal Protection:

Physical State:	Colorless liquid.
Odor:	Odorless.
Boiling Point:	Data not available.
Melting Point:	Data not available.
Volatile Organic Compound:	Data not available.
Solubility in water:	Readily miscible in water.

X. Stability and Reactivity:

Stability: Stable.
Hazardous Decomposition: May form carbon dioxide and carbon monoxide.
Conditions to avoid: Strong oxidizing agents

XI. Toxicological Information:

May cause skin irritation.
May be toxic if absorbed through skin or ingested.
May cause eye irritation.

Target Organs: Kidneys
Prolonged exposure may cause nausea, headache, and vomiting.

XII. Ecological Information:

Data not available.

XIII. Disposal Considerations:

Dispose of in accordance with federal, state and local environmental regulations.

XIV. Transport Information:

D.O.T.: This substance is considered non-hazardous for transport.
IATA: This substance is considered non-hazardous for air transport.

XV. Regulatory Information:

EU Regulation/Classification/Labeling Information: Not available for this product.

Chemical Inventory Status:
SARA Listed Component: None.
TSCA Listed Component: None.
Canada (WHMIS): DSL No, NDSL No.

XVI. Other Information:

This compound is sold only for research use by personnel familiar with chemicals and who are well trained in good laboratory habits, such as avoiding spills, keeping hands clean at all times and not rubbing eyes with hands while working in the laboratory.

This solution is sold only in microliter quantities for use in life sciences research. No other use is intended, and any other use may involve substantive hazards.

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