SIGNALCHEM

Catalog #	Aliquot Size
L01-20U -20	20 000 U
L01-20U -100	100 000 U

Lambda Protein Phosphatase

Recombinant *Bacteriophage lambda* protein expressed in *E. coli*

Catalog # L01-20U

Lot # E4320-1

Product Description

Recombinant full-length untagged *Bacteriophage lambda* Lambda Protein Phosphatase was expressed in *E. coli*. The gene accession number is P03772.1

Alternative name (s)

Lambda PP, Serine/Threonine-protein phosphatase

Formulation

Recombinant protein stored in 50mM sodium phosphate, pH 7.5, 300mM NaCl, 1mM DTT, 10% glycerol.

Storage and Stability

Store product at –70°C. For optimal storage, aliquot target into smaller quantities after centrifugation and store at recommended temperature. For most favorable performance, avoid repeated handling and multiple freeze/thaw cycles.

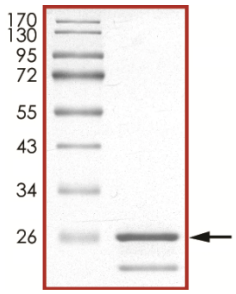
Scientific Background

Lambda Protein Phosphatase (lambda PP) is a Mn 2-dependent protein phosphatase composed of 221 amino acids and is encoded on ORF211 of bacteriophage lambda (1). Lambda PP has activity towards phosphorylated serine, threonine, tyrosine and histidine residues (2). It can be inhibited by vanadate ions (3).

References

1. Cohen, P.T.W., and Cohen, P. 1989. Discovery of a protein phosphatase activity encoded in the genome of bacteriophage lambda. Probable identity with open reading frame 221. Biochem. J. 260, 931-934.
2. Zhuo S et al. 1993. Expression, purification, crystallization, and biochemical characterization of recombinant protein phosphatase. J. Biol. Chem. 268:17754-17761.
3. Gordon JA. 1991. Use of vanadate as protein-phosphotyrosine phosphatase inhibitor. Methods Enzymol. 201:477-82.

Purity



The purity of Lambda Protein Phosphatase was determined to be **>70%** by densitometry. Observed MW **~27 kDa.** Calculated MW **25.2 kDa**

Specific Activity

The specific activity of endonuclease was determined to be **613,000 Units/ml** as per the activity assay protocol.

Unit Definition:

One unit is defined as the amount of enzyme that hydrolyzes 1 nmol of p-Nitrophenyl Phosphate (50mM) in 1 minute at 30°C in a total reaction volume of 50µl.

Lambda Protein Phosphatase

Recombinant *Bacteriophage lambda* protein expressed in *E. coli*

Catalog #	L01-20U
Lot #	E4320-1
Purity	>70%
Concentration	613,000 U/ml
Stability	1yr at –70°C from date of shipment
Storage & Shipping	Store product at –70°C. For optimal storage, aliquot target into smaller quantities after centrifugation and store at recommended temperature. For most favorable performance, avoid repeated handling and multiple freeze/thaw cycles. Product shipped on dry ice.

To place your order, please contact us by phone 1-(604)-232-4600, fax 1-604-232-4601
or by email: orders@signalchem.com or info@signalchem.com - www.signalchem.com

Protein Phosphatase Assay Protocol

Reaction Components

Active Phosphatase (Catalog #: L01-20U)

Active lambda protein phosphatase analyzed as outlined in the sample spectrophotometric assay. (Note: these are suggested working dilutions and it is recommended that the researcher perform a serial dilution of active lambda protein phosphatase for optimal results).

500mM p-Nitrophenyl Phosphate (User Prepared)

Protein MetalloPhosphatase Buffer (10X) (P24-09)

Buffer components: 500mM HEPES, 1M NaCl, 20mM DTT, 0.1% Brij 35, pH 7.5 @25°C

10mM $MnCl_2$ Solution (M40-09B)

0.5M EDTA (User Prepared)

Assay Protocol

The lambda protein phosphatase activity is determined using a single-point spectrophotometric assay. Lambda protein phosphatase catalyzes the hydrolysis of p-nitrophenyl phosphate to p-nitrophenol, a chromogenic product with an absorbance at 405 nm.

Step 1. Thaw the Active Lambda Protein Phosphatase, 10X Reaction Buffer, Substrate, and $MnCl_2$ on ice.

Step 2. In an Eppendorf tube, add the following reaction components:

- **Component 1.** 5µl of 10X Reaction Buffer
- **Component 2.** 5µl of 500mM p-Nitrophenyl Phosphate
- **Component 3.** 5µl of 10mM $MnCl_2$
- **Component 4.** 30µl of MilliQ water

Step 3. Equilibrate the above reaction in a 30°C water bath for 5 minutes.

Step 4. Add 5µL of diluted Active Lambda Protein Phosphatase (Catalog #: L01-20U) to the reaction and mix gently.

Step 5. Incubate the above reaction in a 30°C water bath for 5 minutes

Step 6. Add 1ml of 0.5M EDTA to stop the above reaction.

Step 7. Measure the absorbance in a spectrophotometer at 405nm.

Step 8. Set up the blank control as outlined in step 2 to step 7, excluding the addition of Active Lamba Protein Phosphatase. Replace the Lamba Protein Phosphatase with an equal volume of 1X Reaction Buffer.

Determine the corrected absorbance by removing the blank control value (see Step 8) for each sample and calculate the specific activity as outlined below.

Calculation of Activity of Lambda Protein Phosphatase

$$\text{Volume Activity (U/mL)} = \frac{\text{absorbance} \times Vt \times df}{0.016 \times 1.0 \times t \times Vs}$$

$$\text{Weight Activity (U/mg)} = (\text{U/mL}) \times (1/C)$$

Vt = Total Volume (1.05ml)
df = dilution factor
0.016 = nanomolar extinction coefficient of pNPP under the assay condition (cm^2/nanomole)
1.0 = light path length (cm)
t = reaction time (5 minutes)
Vs = Sample Volume (0.05ml)
C = lambda protein phosphatase concentration (mg/ml)

SAFETY DATA SHEET

Article 1 – Product Identification

Product Name: Lambda Protein Phosphatase **Catalog # L01-20U**

This product is sold only for research use by qualified laboratory personnel, and is not to be used as a drug, medical device, food additive, cosmetic, nor household chemical. It is not to be used in diagnostic, therapeutic, consumer, agricultural, nor pesticidal applications.

Manufacturer's Name:	SignalChem Biotech Inc.
Street Address:	*110-13120 Vanier Place*
City, Prov. Postal Code:	*Richmond, BC, V6V 2J2*
Fax:	604-232-4601
EMERGENCY PHONE:	604-232-4600

Article 2 - Hazard Identification

- **WHMIS Classification:** Not WHMIS controlled.
- **GHS classification:** Skin irritation (Category 3); Eye irritation (Category 2B).
- **Hazard Pictograms:** none.
- **Signal words:** Warning.
- **Hazard statements:** Causes mild skin irritation (H316); Causes eye irritation (H320).
- **Precautionary statements:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305 + P351 + P338).
- **Other hazards:** none known.

Article 3 – Composition/Information on Ingredients

Chemical Characterization: Mixtures.
Description: This product consists of the substances listed below.

Common name	Chemical name	CAS-No.	Concentration
Glycerol	Glycerol	56-81-5	≤10%
NaCl	Sodium chloride	7647-14-5	≤1.753 %
Tris-HCl; Tris (hydroxymethyl) aminomethane hydrochloride	2 – Amino – 2 - (hydroxymethyl) propane - 1, 3 - diol hydrochloride	1185-53-1	<0.8%
Protein		No data available	≤0.02%
DTT; Dithiothreitol	(R*,R*)-1,4-Dimercaptobutane-2,3-diol	3483-12-3	0.0154%

Article 4 – First-aid Measures

- **General information:** Consult a physician by providing the SDS.
- **After inhalation:** Breathe in fresh air. If cannot breathe, give artificial respiration and consult a physician.
- **After skin contact:** Immediately wash with soap and plenty of water and rinse thoroughly. Consult a physician.
- **After eye contact:** Rinse opened eyes with plenty of water for at least 15 minutes. Consult a physician.
- **After swallowing:** rinse the mouth with plenty of water and consult a physician.

Article 5 - Fire-fighting Measures

- **Suitable extinguishing media:** Use water spray, extinguishing powder, carbon dioxide, or other appropriate measure that is suitable to the environment.
- **Specific hazards arising from the substance or mixture:** None known.
- **Special protective equipment and precautions for fire-fighters:** Self-contained breathing apparatus if necessary.

Article 6 – Accidental Release Measures

- **Personal precautions, protective equipment and emergency procedures:** Apply standard laboratory practices and personal protective equipment. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation.
- **Environmental precautions:** Do not allow to enter drains.
- **Methods and materials for containment and cleaning up:** Absorb on sand or vermiculite and place in closed containers for disposal.

SAFETY DATA SHEET

Article 7 - Handling and Storage

- **Precautions for safe handling:** Wear chemical safety goggles and compatible chemical-resistant gloves. Avoid inhalation, contact with eyes, skin or clothing.
- **Conditions for safe storage:** Store in a dry and well-ventilated place in -70 °C. Keep container upright and tightly closed.

Article 8 - Exposure Controls/Personal Protection

- **Components with limit monitoring values at workplace:**
  Glycerol (CAS-No: 56-81-5)

Values	Control parameters	Regulations
TWA	10 mg/m³ for mist	British Columbia, Canada
TWA	3 mg/m³ for respirable mist	British Columbia, Canada
TWA	10 mg/m³	Alberta, Canada
TWAEV	10 mg/m³	Ontario, Canada
TWAEV	10 mg/m³	Quebec, Canada
TWA	10 mg/m³	USA

- **Appropriate engineering controls:**
  Apply adequate ventilation including mechanical exhaust or laboratory fume hood. Follow standard laboratory practices.
- **Individual protection measures:**
  Respiratory protection:
  Use appropriate respirator if there is inadequate ventilation by following the government standards.
  Hand protection:
  Wear gloves and use proper glove removal technique to avoid skin contact. Discard gloves after use by following the applicable laboratory regulations. Wash and dry hands.
  Eye/face protection:
  Safety goggles with side-shields approved under appropriate government standards.
  Skin/body protection:
  Use appropriate clothing, footwear and any additional protection measures to protect from splashing or contamination.

Article 9 – Physical and Chemical Properties

Appearance: Colorless fluid.	**Danger of explosion:** Product does not present an explosion hazard.
Odour/Odour Threshold: Not determined.	**Explosion limits:** Lower: 0.9 Vol %; Upper: 0.0 Vol %.
pH: Not available.	**Decomposition temperature:** Not available.
Melting point/freezing point: Not determined.	**Vapor pressure at 20 °C:** 0.1 hPa
Boiling point/Boiling range: 100 °C.	**Density:** Not determined.
Flash point: > 100 °C.	**Relative density:** Not determined.
Flammability (solid, gaseous): Not determined.	**Vapor density:** Not determined.
Ignition temperature: 400 °C.	**Evaporation rate:** Not determined.
Auto-igniting: Product is not self-igniting.	**Solubility in / Miscibility with Water:** Fully miscible.

Article 10 - Stability and Reactivity

- **Reactivity:** Stable under recommended transport and storage conditions.
- **Chemical stability:** Stable under recommended transport and storage conditions.
- **Possible hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid:** Heat and moisture.
- **Incompatible materials:** Strong acids/bases, strong oxidizing/reducing agents.
- **Hazardous decomposition products:** Carbon oxides may formed under fire conditions; no known decomposition information for other decomposition products.

SAFETY DATA SHEET

Article 11 - Toxicological Information

- **Acute toxicity:** Not available.
- **LD/LC50:** Not available.
- **Skin corrosion/irritation:** Not available.
- **Serious eye damage/eye irritation:** Not available.
- **Respiratory or skin sensitization:** Not available.
- **Germ cell mutagenicity:** Not available.
- **Carcinogenicity:** No components are listed in IARC, or NTP, or OSHA, or ACGIH.
- **Reproductive toxicity:** Not available.
- **Teratogenicity:** Not available.
- **Specific target organ toxicity - single exposure/ - repeated exposure (GHS):** Not available.
- **Aspiration hazard:** Not available.
- **Potential health effects:**
  Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
  Ingestion: May be harmful if swallowed.
  Skin: May be harmful if absorbed through skin. May cause skin irritation.
  Eyes: May cause eye irritation.
- **Signs and Symptoms of Exposure:**
  Prolonged or repeated exposure can cause: Nausea, Dizziness.
- **Synergistic effects:** Not available.

Article 12 - Ecological Information

- **Eco-toxicity:** Not applicable.
- **Biodegradability:** Not applicable.
- **Bio-accumulative potential:** Not applicable.
- **Mobility in soil:** Not applicable.
- **PBT and vPvB assessment:** Not applicable.
- **Other adverse effects:** Not applicable.

Article 13 - Disposal Considerations

- **Disposal methods:** In accordance to applicable national, regional, or local laws and regulations. For additional handling information and protection of employees please refer to Article 7 and 8.
- **Contaminated packaging:** Disposal should be made in accordance to official regulations. Use water or cleansing agents to clean the area.

Article 14 - Transport Information

- **DOT:** Not dangerous goods.
- **IMDG:** Not dangerous goods.
- **IATA:** Not dangerous goods.

Article 15 – Regulatory Information

- **WHMIS Classification:** Non-hazardous.
- **GHS label elements:** Not applicable.
- **Signal word:** Not applicable.
- **Hazard statements:** Not applicable.

Article 16 - Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. SignalChem shall not be held liable for any damage resulting from handling or from contact with the above product. See the Technical Specification, Packing Slip, Invoice, and Product Catalog for additional terms and conditions of sale.