

## TccCas13a, Active

Recombinant protein expressed in *E. coli* cells

Catalog # CS13A-E314H

Lot # E4380-2

### Product Description

Recombinant full-length *Thermoclostridium caenicola* TccCas13a protein with a His tag expressed in *E. coli*.

Accession number: [WP\\_149678719.1](https://www.ncbi.nlm.nih.gov/nuccore/WP_149678719.1)

### Alternative name (s)

Type VI-A CRISPR-associated RNA-guided ribonuclease Cas13a

### Formulation

Recombinant protein stored in 50mM sodium phosphate pH 7.5, 150mM imidazole, 1mM DTT, 10% glycerol.

### Storage and Stability

Store at -70°C. To avoid repeated handling and multiple freeze/thaw cycles aliquot product into smaller quantities.

**Always include RNase inhibitor at manufacturer recommended concentrations in Cas enzyme reactions.**

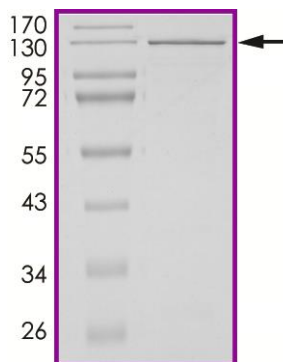
### Scientific Background

Cas13a is an RNA-guided RNA endonuclease belonging to the class 2 type VI CRISPR-Cas system (1). It possesses both RNA recognition and cleavage activities (2). Activated Cas13a also induces collateral cleavage of nearby non-targeted RNAs in a nonspecific manner (3). This property of the enzyme has been leveraged for the development of robust nucleic acid detection tools with applications in basic research and therapeutics development (4). TccCas13a is thermostable and exhibits robust *cis* and *trans* catalytic activities over a broad range of temperatures from 37°C to 70 °C (5).

### References

- East-Seletsky A, et al. 2016. Two distinct RNase activities of CRISPR-C2c2 enable guide-RNA processing and RNA detection. *Nature*. 538:270-3. 2.
- Abudayyeh O, et al. 2016. C2c2 is a single-component programmable RNA-guided RNA-targeting CRISPR effector. *Science*. 353:5573 3.
- Zhang J, You Y. 2020. CRISPR-Cas13a system: A novel approach to precision oncology. *Cancer Biol Med*. 17(1):6-8.
- Patchsung M, et al. 2020. Clinical validation of a Cas13-based assay for the detection of SARS-CoV-2 RNA. *Nat Biomed Eng*. 4(12):1140-1149.
- Mahas A, et al. 2022. Characterization of a thermostable Cas13 enzyme for one-pot detection of SARS-CoV-2. *Proc Natl Acad Sci U S A*. 119(28):e2118260119.

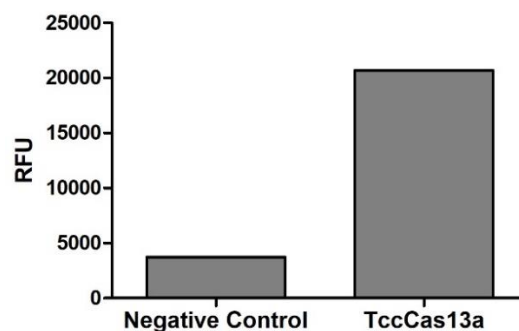
### Purity



#### SDS-PAGE gel image

The purity of TccCas13a, Active was determined to be >95% by densitometry. Calculated MW: 144.7 kDa  
Observed MW: ~130 kDa

### Activity



TccCas13a collateral RNA cleavage activity assayed using a fluorogenic substrate and 100nM of enzyme as per the Cas13 Activity Assay Protocol provided below. RNP = Cas13-sgRNA ribonucleoprotein complex. TR = target ssRNA.

## TccCas13a, Active

Recombinant protein expressed in *E. coli* cells

Catalog #	CS13A-E314H
Lot #	E4380-2
Purity	>95%
Concentration	0.2 µg/µl 6.91 pmol/µg
Stability	1yr at -70°C from date of shipment
Storage & Shipping	Store at -70°C. To avoid repeated handling and multiple freeze/thaw cycles aliquot product into smaller quantities. Product shipped on dry ice.

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# Cas13 Activity Assay Protocol

## Reaction Components

### Active Cas13

It is recommended that the researcher perform a serial dilution of Active Cas13 diluted with 1X Reaction Buffer for optimal results.

### Cas13 Reaction Buffer (10x) (Cat #: CS13-09)

Buffer components: 200 mM HEPES pH 7.0, 500 mM KCl, 50 mM MgCl<sub>2</sub>, 1 mg/mL BSA.

### CRISPR RNA

Single guide RNA containing a target-specific spacer sequence and a scaffold sequence responsible for recruiting the Cas enzyme.

### Target RNA

An RNA oligo that contains the complementary sequence to the crRNA.

### Reporter Substrate

A synthetic RNA oligonucleotide labeled with a fluorophore and a quencher on the two termini.

## Assay Protocol

The RNA trans-cleavage activity of Cas13 is detected in a CRISPR-based fluorescent reporter assay. RNA-guided RNA binding to Cas13 activates the enzyme, inducing target RNA cutting as well as collateral RNase activity. The latter leads to the degradation of the reporter substrate that emits a light signal on cleavage.

- Step 1.** Thaw the active Cas13 on ice. Prepare 1X Reaction Buffer. Equilibrate the buffer, guide RNA, target RNA, and reporter substrate to ambient temperature.
- Step 2.** Prepare the following working solutions with 1X Reaction Buffer:
  - 4X final concentration of Active Cas13
  - 4X final concentration of guide RNA
  - 2X final concentration of activator/reporter mix containing the RNA activator and reporter substrate.
- Step 3.** In a half-area solid black 96-well plate, add the following components and pre-incubate at room temperature for 10 minutes;
  - Component 1.** 10 µL of 4X Active Cas13
  - Component 2.** 10 µL of 4X guide RNA

*Note: A blank control can be set up as outlined in step 3 by replacing the enzyme working solution with an equal volume of the assay buffer.*
- Step 4.** To each assay well, add 20 µL of the 2X activator/reporter mix. Shake the plate for 1 minute on a tabletop orbital shaker. Seal the assay wells with microplate sealing tape and incubate at 37°C for 15-30 minutes.
- Step 5.** Equilibrate the plate to ambient temperature and then remove microplate sealing tape. Read fluorescence on a microplate reader.

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# SAFETY DATA SHEET

## Article 1 - Product Identification

**Product Name: TccCas13a, Active****Catalog # CS13A-E314H**

*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.*

Supplier of Datasheet: SignalChem Diagnostics Inc.  
Street Address: 190-13160 Vanier Place  
City, Prov. Postal Code: Richmond, BC, V6V 2J2  
Country: Canada  
Emergency Phone: 1-888-606-3424 (Toll free)  
1-778-326-0223 (local)

## Article 2 - Hazard Identification

- **WHMIS Classification:** Not WHMIS controlled.
- **GHS classification:** Not classified.
- **Hazard Pictograms:** None.
- **Signal words:** None.
- **Hazard statements:** None.
- **Precautionary statements:** None.
- **Other hazards:** None known.

## Article 3 - Composition/Information on Ingredients

**Chemical Characterization:** Mixture.

**Description:** This product consists of the substances listed below.

Common name	Chemical name	CAS-No.	Concentration
Glycerol	Glycerol	56-81-5	10%
Na <sub>2</sub> HPO <sub>4</sub>	Sodium Phosphate, Dibasic Heptahydrate	7782-85-6	1.3%
Imidazole	1,3-Diaza-2,4-cyclopentadiene	288-32-4	1.0%
DTT	1,4-Dithio-DL-threitol	3483-12-3	0.02%
Protein	N/A	N/A	≤0.01%

## Article 4 - First-aid Measures

- **General information:** Consult a physician by providing the SDS.
- **After inhalation:** Breathe in fresh air. If casualty 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. Remove contact lenses, if present and easy to do so. Consult a physician.
- **After swallowing:** Not expected to present a significant ingestion hazard under anticipated conditions of normal use. If you feel unwell, seek medical advice.

## 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.

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# SAFETY DATA SHEET

## 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.

## 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 according to product label instructions. Keep container upright and tightly closed.

## Article 8 - Exposure Controls/Personal Protection

- **Components with limit monitoring values at workplace:**  
NA
- **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

<b>Appearance:</b> Colorless fluid.	<b>Danger of explosion:</b> Product does not present an explosion hazard.
<b>Odour/Odour Threshold:</b> Not determined.	<b>Explosion limits:</b> Not available.
<b>pH:</b> Not available.	<b>Decomposition temperature:</b> Not available.
<b>Melting point/freezing point:</b> Not determined.	<b>Vapor pressure at 20 °C:</b> Not available.
<b>Boiling point/Boiling range:</b> Not determined.	<b>Density:</b> Not determined.
<b>Flash point:</b> Not determined.	<b>Relative density:</b> Not determined.
<b>Flammability (solid, gaseous):</b> Not determined.	<b>Vapor density:</b> Not determined.
<b>Ignition temperature:</b> Not determined.	<b>Evaporation rate:</b> Not determined.
<b>Auto-igniting:</b> Product is not self-igniting.	<b>Solubility in / Miscibility with Water:</b> 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:** Not determined.
- **Hazardous decomposition products:** Not determined.

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# SAFETY DATA SHEET

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## Article 11 - Toxicological Information

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- **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: No data available
  - Ingestion: No data available
  - Skin: No data available
  - Eyes: No data available
- **Signs and Symptoms of Exposure:** No data available
- **Synergistic effects:** Not available.

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## Article 12 - Ecological Information

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- **Eco-toxicity:** No data available.
- **Biodegradability:** Not applicable.
- **Bio-accumulative potential:** Not applicable.
- **Mobility in soil:** Not applicable.
- **PBT and vPvB assessment:** Not applicable.
- **Other adverse effects:** Not applicable.

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## Article 13 - Disposal Considerations

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- **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.

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## Article 14 - Transport Information

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

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## Article 15 - Regulatory Information

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

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## Article 16 - Other Information

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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.

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