

# Certificate of Analysis

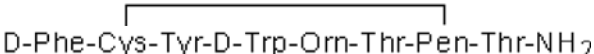
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**Product Name:** CTOP  
**CAS Number:** 103429-31-8

**Catalog No.:** 1578      **Batch No.:** 13

## 1. PHYSICAL AND CHEMICAL PROPERTIES

**Batch Molecular Formula:** C<sub>50</sub>H<sub>67</sub>N<sub>11</sub>O<sub>11</sub>S<sub>2</sub>  
**Batch Molecular Weight:** 1062.28  
**Physical Appearance:** White lyophilised solid  
**Net Peptide Content:** 76%  
**Counter Ion:** TFA  
**Solubility:** Soluble to 1 mg/ml in water  
**Storage:** Desiccate at -20°C  
**Peptide Sequence:**


  
 D-Phe-Cys-Tyr-D-Trp-Orn-Thr-Pen-Thr-NH<sub>2</sub>

## 2. ANALYTICAL DATA

**HPLC:** Shows 97.9% purity  
**Mass Spectrum:** Consistent with structure

## 3. AMINO ACID ANALYSIS DATA

Amino Acid Theoretical		Actual		Amino Acid Theoretical		Actual	
Ala				Lys			
Arg				Met			
Asx				Phe	1.00		1.02
Cys	1.00		0.29	Pro			
Glx				Ser			
Gly				Thr	2.00		1.09
His				Trp	1.00		Detected
Ile				Tyr	1.00		0.98
Leu				Val			

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

**bio-techne.com**  
 info@bio-techne.com  
 techsupport@bio-techne.com

**North America**  
 Tel: (800) 343 7475

**China**  
 info.cn@bio-techne.com  
 Tel: +86 (21) 52380373

**Europe Middle East Africa**  
 Tel: +44 (0)1235 529449

**Rest of World**  
[www.tocris.com/distributors](http://www.tocris.com/distributors)  
 Tel: +1 612 379 2956

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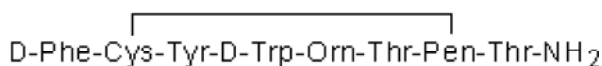
**Description:**

Potent and selective  $\mu$  opioid receptor antagonist ( $K_i$  values are 0.96 and >10,000 nM for  $\mu$  and  $\delta$  receptors respectively). Causes behavioral effects on central administration in vivo. Also increases  $K^+$  currents in rat locus ceruleus neurons in vitro via a  $\mu$  receptor independent mechanism.

**Physical and Chemical Properties:**

Batch Molecular Formula:  $C_{50}H_{67}N_{11}O_{11}S_2$   
Batch Molecular Weight: 1062.28  
Physical Appearance: White lyophilised solid

**Peptide Sequence:**



**Storage:** Desiccate at -20°C

**Solubility & Usage Info:**

Soluble to 1 mg/ml in water  
This product is supplied as a lyophilized solid and may be very hard to visualize. Solutions should be made by adding solvent directly to the vial. The vial should then be vortexed vigorously to ensure the product has completely dissolved.

**Net Peptide Content:** 76% (Remaining weight made up of counterions and residual water).

**Counter Ion:** TFA

**Stability and Solubility Advice:**

Some solutions can be difficult to obtain and can be encouraged by rapid stirring, sonication or gentle warming (in a 45-60°C water bath).

Peptides in solution are much less stable than in lyophilized form. This is especially true for peptides whose sequences contain amino acids such as Cys, Met, Trp, Asn, Gln, and N-terminal Glu.

Therefore we recommend storing peptides in solution for as short a time as possible. Avoid repeated freeze thaw cycles by dividing the peptide solution into aliquots and storing the aliquots at -20°C. Any portion of an aliquot unused after thawing should be discarded.

Peptides stored in solution can occasionally be susceptible to bacterial degradation. We recommend using sterile solutions or passing the peptide solution through a 0.2  $\mu$ m filter to remove potential bacterial contamination whenever possible.

**References:**

**Chieng et al** (1996) The  $\mu$ -opioid receptor antagonist D-Phe-Cys-Tyr-D-Trp-Orn-Thr-Pen-Thr-NH<sub>2</sub> (CTOP) [but not D-Phe-Cys-Tyr-D-Trp-Arg-Thr-Pen-Thr-NH<sub>2</sub> (CTAP)] produces a nonopioid receptor-mediated increase in  $K^+$  conductance of rat locus ceruleus neurons. *Mol.Pharmacol.* **50** 650. PMID: 8794906.

**Badiani et al** (1995) Intra-VTA injections of the  $\mu$ -opioid antagonist CTOP enhance locomotor activity. *Brain Res.* **690** 112. PMID: 7496796.

**Hawkins et al** (1989) [<sup>3</sup>H]-[H-D-Phe-Cys-Tyr-D-Trp-Orn-Thr-Pen-Thr-NH<sub>2</sub>] ([<sup>3</sup>H]CTOP), a potent and highly selective peptide for  $\mu$  opioid receptors in rat brain. *J.Pharmacol.Exp.Ther.* **248** 73. PMID: 2563293.

**Gulya et al** (1988) Central effects of the potent and highly selective  $\mu$  opioid antagonist D-Phe-Cys-Tyr-D-Trp-Orn-Thr-Pen-Thr-NH<sub>2</sub> (CTOP) in mice. *Eur.J.Pharmacol.* **150** 355. PMID: 2901358.

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