

# Certificate of Analysis

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

**Catalog No.:** 1578      **Batch No.:** 8

## 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:** 77%  
**Counter Ion:** Trifluoroacetate  
**Solubility:** Soluble to 1 mg/ml in water  
**Storage:** Store at -20°C  
**Peptide Sequence:** D-Phe-Cys-Tyr-D-Trp-Orn-Thr-Pen-Thr-NH<sub>2</sub>

## 2. ANALYTICAL DATA

**HPLC:** Shows >96% purity  
**Mass Spectrum:** Consistent with structure

## 3. AMINO ACID ANALYSIS DATA

Amino Acid Theoretical		Actual	
Ala		Lys	
Arg		Met	
Asx		Phe	1.00      0.97
Cys		Pro	
Glx		Ser	
Gly		Thr	
His		Trp	
Ile		Tyr	1.00      1.03
Leu		Val	

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**8**

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**Description:**

CTOP is a 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:**

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

**Storage:** Store at -20°C

**Solubility & Usage Info:**

Soluble to 1 mg/ml in water

This product is supplied in lyophilized form. It may appear as a solid, gel or film and 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:** 77% (Remaining weight made up of counterions and residual water).

**Counter Ion:** Trifluoroacetate

**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 no 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.

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