

Product Information

Melittin from honey bee venom

Product Number **M 2272**
Storage Temperature -0 °C

Product Description

Molecular Formula: C₁₃₁H₂₂₉N₃₉O₃₁¹
Molecular Weight: 2846.50¹
CAS Number: 37231-28-0
Specific Rotation: -89.52° (c = 0.409 g/100 ml, 21 °C)¹

Melittin is a strongly basic peptide that is the principal component of honey bee (*Apis mellifica*) venom. It comprises 40-50% of the dried venom and causes disruption of normal cellular activity and cell lysis.¹ Although it is a monomer with a molecular weight of 2817, solutions display molecular weights of 11.8 - 13.8 kDa, which suggests aggregation.²

Melittin has been used in affinity chromatography to purify calmodulin.³ The interaction of melittin with S100b protein in the presence and absence of calcium was studied by fluorescence polarization, UV difference spectroscopy, and sulfhydryl derivatization.⁴

Studies *in vitro* have shown that bee venom has anti-inflammatory activity similar to that of cyclophosphamide. Melittin appears to be the active constituent and seems to act by interfering with superoxide radical production from human leukocytes.⁵

Melittin is a hemolytic peptide and sphingomyelin (SM) is one of the main lipids in the external monolayer of the erythrocyte plasma membrane. A study of the effect of sphingomyelin on the ability of melittin to permeabilize liposomes supported the notion that SM may regulate the stability of size-defined melittin pores in natural membranes.⁶

Depending on the melittin/phospholipid ratio, melittin can either inhibit or activate secretory phospholipase A₂ type II when erythrocyte membranes served as a biologically relevant substrate.⁷

(Na⁺/K⁺) ATPase is inhibited by melittin. KCl and NaCl protect the enzyme from melittin inhibition. Analysis of the K⁺ and Na⁺ protection against melittin inhibition suggests a kinetic model which is consistent with slowly reversible melittin binding, and mutually exclusive binding of melittin with K⁺ and Na⁺.⁸

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

Melittin is soluble in water (50 mg/ml).

References

1. The Merck Index, 12th ed., Entry# 5867.
2. Gauldie, J., et al., The peptide components of bee venom. *Eur. J. Biochem.*, **61**, 369 (1976).
3. Kincaid, R. L., and Coulson, C. C., Rapid purification of calmodulin and S-100 protein by affinity chromatography with melittin immobilized to sepharose. *Biochem. Biophys. Res. Commun.*, **133(1)**, 256-264 (1985).
4. Baudier, J., et al., Comparison of S100b protein with calmodulin: interactions with melittin and microtubule-associated tau proteins and inhibition of phosphorylation of tau proteins by protein kinase C. *Biochemistry*, **26(10)**, 2886-2893 (1987).
5. Somerfield, S. D., Bee venom and arthritis: magic, myth or medicine? *N. Z. Med. J.*, **99(800)**, 281-283 (1986).
6. Gomara, M. J., et al., Effects of sphingomyelin on melittin pore formation. *Biochim. Biophys. Acta*, **1612(1)**, 83-89 (2003).
7. Koumanov, K., et al., Bimodal regulatory effect of melittin and phospholipase A(2)-activating protein on human type II secretory phospholipase A(2). *Cell Biol. Int.*, **27(10)**, 871-877 (2003).

8. Cuppoletti, J., and Abbott, A. J., Interaction of melittin with the (Na⁺/K⁺) ATPase: evidence for a melittin-induced conformational change. Arch. Biochem. Biophys., **283(2)**, 249-257 (1990).

HLD/NSB 12/03