4-Methylumbelliferyl-7-(6-sulfo-2-acetamido-2-deoxy-β-D-glucopyranoside) sodium salt

Product Number  M 0662
Storage Temperature  -0 °C

Product Description
Molecular Formula: C_{18}H_{20}NNaO_{11}S
Molecular Weight: 481.4
CAS Number: 142439-99-4
Specific Rotation: -30° (0.5% (w/v) in water)
Extinction Coefficient: E^\text{nm} = 13.5 (316 nm, water)
Synonyms: MUGS; 4MUGS

MUGS is a sensitive, fluorogenic substrate for β-D-N-acetylglcosaminidase isozyme A activity.¹ The β-hexosaminidases (Hex, EC 3.2.1.52) are lysosomal hydrolases that catalyze the cleavage of terminal β-N-acetylglucosamine or β-N-galactosamine residues on a broad spectrum of glycoconjugates. The major Hex isozymes in humans are: Hex A, a heterodimer composed of one α and one β subunit and Hex B, a homodimer of two β subunits.² Both Hex A and Hex B hydrolyze the neutral substrate, 4-Methylumbelliferyl N-acetyl-β-D-glucosaminide, (M 2133). Before the development of MUGS, the assay to differentiate Hex A from Hex B was based on fact that Hex A is more heat labile than Hex B. The Hex A is almost totally inactivated at 50 °C, whereas Hex B is stable at this temperature.³ Hex A is able to hydrolyze both neutral and charged substrates. Hex A is approximately 100 times more active toward MUGS than Hex B.¹ Only Hex A is able to hydrolyze the most important endogenous substrate, the acidic glycolipid GM₂ ganglioside. Mutations in the HEXA gene cause Tay-Sachs disease, a GM₂ ganglioside storage disorder.²,⁴

For maximum selectivity of Hex A determination using MUGS substrate, a buffer at pH 4.2 was used.¹ The product of the enzymatic reaction (4-Methylumbelliflorone) is measured at pH 10.2.¹ 4-Methylumbelliflorone has an excitation at 365 nm with emission at 448 nm.³

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

Preparation Instructions
This product is soluble in water (50 mg/ml), yielding a clear, colorless solution. For enzyme assays, it is dissolved at 6 mM (3 mg/ml) in water.

References

MES/JRC 1/04