2: Introduction

A novel matrix additive, ADHB, was synthesized for highly sensitive analysis of hydrophobic peptides. ADHB is a 2,5-dihydroxybenzoic acid (DHBA) derivative incorporating a hydrophilic side chain on the hydrophobic group and is expected to have affinity for hydrophobic peptides.

3: Methods

3-1: Peptides and Proteins

The peptides used were amyloid-β (Aβ) 1-42, 1-40, 1-37, and 1-43 synthesized for highly sensitive analysis of hydrophobic peptide ions. ADHB was more closely related to peptide sensitivity improvement compared with CHCA, CHCA + ADHB or CHCA alone.

3-2: Sample preparation

Samples were dissolved in 50 mM ammonium acetate buffer (pH 6.8). The peptide samples were mixed in ratios of 1:1 (v/v).

3-3: MALDI-TOF MS analysis

The peptide samples were analyzed by MALDI-TOF MS with the ADHB matrix and CHCA alone. The M. W. or the surface area of the MALDI-TOF MS analysis of peptides was derived from their affinity for CHCA alone or CHCA + ADHB.

4: Results

4-1: Optimization of ADHB Usage

Table 1 shows the optimized condition of ADHB for human amyloid-β peptides. The optimal condition of ADHB was found to be CHCA + ADHB at a ratio of 9:1. CHCA alone was not effective for the detection of amyloid-β peptides. ADHB was highly effective for the detection of amyloid-β peptides, which are very hydrophobic peptides.

4-2: Analysis of Hydrophobic and Hydrophilic Peptide Mixture

Table 2 shows the optimization of ADHB usage for human amyloid-β peptides. CHCA alone was not effective for the detection of amyloid-β peptides, but CHCA + ADHB was effective for the detection of amyloid-β peptides.

4-3: Sensitivity Improvement and Peptide Hydrophobity

Table 3 shows the optimization of ADHB usage for human amyloid-β peptides. CHCA alone was not effective for the detection of amyloid-β peptides, but CHCA + ADHB was effective for the detection of amyloid-β peptides.

4-4: Analysis of Phosphorylase b Digests

Table 4 shows the optimization of ADHB usage for human amyloid-β peptides. CHCA alone was not effective for the detection of amyloid-β peptides, but CHCA + ADHB was effective for the detection of amyloid-β peptides.

5: Conclusions

This research was supported by the Japan Society for the Promotion of Science (JSPS) through the Funding Program for Innovative Research on Science and Technology (FIRST Program) and by the Council for Science and Technology Policy (CSTP).

References


Acknowledgments

This research is supported by the Japan Society for the Promotion of Science (JSPS) through the Funding Program for Innovative Research on Science and Technology (FIRST Program) and by the Council for Science and Technology Policy (CSTP).