



Cost-Effective Isobaric Tandem Mass Tags for High Throughput Quantitative Proteomics and Peptidomics

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods of tagging peptides and other molecules using novel eight- and 16-plex isobaric reagents that work more efficiently and are easier to produce.

Overview

Mass spectrometry (MS) is a vital tool for identifying and tallying the different proteins, peptides and other molecules in a sample. To determine relative abundance, reagent tags are used to label the different molecules, which then are analyzed by comparing peak intensities.

The iTRAQ reagent brand, for example, enables analysis of proteins present in four or eight different biological states at the same time (four- or eight-plex quantitation). In the process, each isobaric tagging reagent is used to label a sample from a different biological state. The reagents have the same molecular weight but carry reporter groups with different isotopic mass. Upon MS/MS fragmentation, each labeled sample gives rise to a unique reporter ion along with sequence information needed for identification.

The high cost of these reagents is a barrier to their routine use. Despite advances, production still is complicated by numerous synthetic steps and low yields. To empower accurate and less expensive experimentation, new isobaric MS/MS tags need to be simpler to make, highly efficient and more stable than current products.

The Invention

UW–Madison researchers have designed and synthesized novel N,N-dimethylated amino acid eight- and 16-plex isobaric MS/MS tagging reagents.

The reagents consist of a reporter group and a balancing group that are isotopically coded to provide eight compounds with equal molecular weights. The balancing group is designed to provide eight isotopic combinations. The reagents feature an amine reactive group capable of reacting with the molecule to be tagged. Compared to iTRAQ reagents, the eight-plex dimethyl leucine reagents also give rise to high intensity parent and reporter ions, offering enhanced sensitivity and dynamic range for detection and quantitation of low-abundance analytes.

Applications

- Peptide, protein and small molecule quantitation
- Enhanced *de novo* peptide sequencing

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Key Benefits

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- Increased throughput (eight- and 16-plex options)
- Reduced costs
- Increased accuracy and dynamic range
- Mitigation of interference from adjacent isotopic peaks
- Synthetic simplicity
- Improved labeling and fragmentation efficiency

Additional Information

For More Information About the Inventors

- [Lingjun Li](#)

Related Technologies

- [WARF reference number P06069US describes inexpensive, ionizable labeling reagents.](#)

Related Intellectual Property

- [View Divisional Patent in PDF format.](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Mass spectrometry.](#)
- [Research Tools : Genomics & proteomics](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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