

## Isotope-Labeled acyl-CoA

A novel protocol to produce large quantities of nearly 100% homogenous heavy-labeled acyl-CoAs rapidly and inexpensively.

### Problem Solved by This Technology

Individual heavy atom-labeled acyl-CoAs are currently available made-to-order through several companies or are being generated in-house in labs as needed. The production of a full battery of acyl-CoAs is currently achieved using mammalian cells in a tedious and expensive process (that requires ~10 weeks and thousands of dollars in reagents). Researchers at the University of Rochester and the University of Pennsylvania have developed an alternative protocol using an engineered yeast strain to produce more inexpensively (only few hundred dollars of reagents) and rapidly (a single day) large quantities of near 100% homogenous heavy-labeled acyl-CoAs.

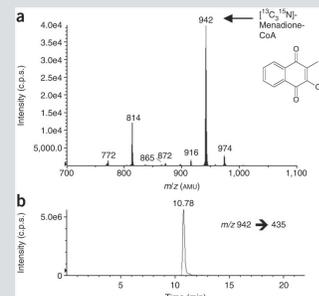
### Applications

HPLC coupled with tandem mass spectrometry (MS) is currently the optimal methodology to run high-throughput metabolomic and proteomic analyses. In order to quantitate endogenous metabolites in biological samples accurately, stable isotope (heavy atom) analogs are required as internal standards.

Various acyl-CoAs function at key positions in a diverse number of core metabolic pathways and number in the dozens in almost all living cells. In humans, the levels of various acyl-CoAs are diagnostic of both healthy and disease-states. MS quantification of acyl-CoA levels depends on the availability of pure heavy atom-labeled acyl-CoA internal standards.

The number of laboratories employing quantitative metabolomics is rapidly increasing because it is currently the best readout of a cell's physiological status. Having a readily available pool of heavy atom-labeled acyl-CoA derivatives will allow investigators to rapidly assess the metabolic states of any cell, tissue, or organ from any species – including bacteria, plant, and animal – in response to environmental cues or drug treatment. The production of other heavy atom-labeled metabolite standards may be achievable using analogous approaches.

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### Publication

Sankha S Basu & Ian A Blair. SILEC: a protocol for generating and using isotopically labeled coenzyme A mass spectrometry standards. Nature Protocols. 2011 Dec 8;7(1):1-12. [PMID:22157971](#).

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