



CIL

Cambridge Isotope Laboratories, Inc.
www.isotope.com

RESEARCH PRODUCTS

Custom Protein Production Capabilities

- Cell growth and protein expression testing
- Protein expression with isotope labeling (^{13}C , ^{15}N , D)
- Protein isolation and purification

Cambridge Isotope Laboratories, Inc.

has an exclusive collaboration with **PSF biotech AG** (Protein Structure Factory) to provide custom isotope labeled proteins and structural analyses.



Protein Expression in:

- *E. coli*
- Yeast (*Pichia*, *Saccharomyces*)
- Sf9 (baculovirus)
- Mammalian cell lines (only specific cases)

Methods of Protein Production

- Cell growth in labeled media from a cell line or a clone
- Introduction of virus into Sf9 cells followed by expression and isolation of protein
- Protein ligation techniques (replacing one branch of a protein with an isotope labeled segment)
- *In vitro* synthesis of proteins using cell free systems with isotope labeled and/or unlabeled amino acids to produce labeled proteins

Complete Structural Analysis

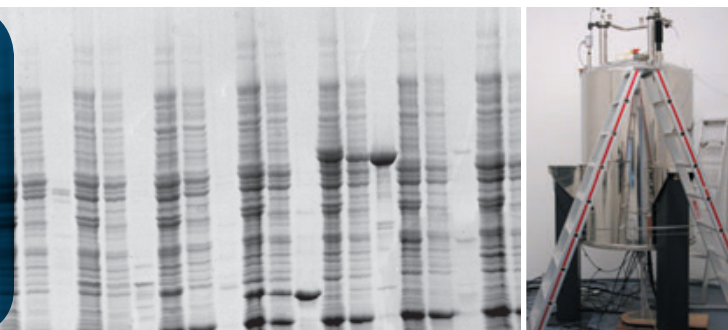
- By 600MHz cryoprobe and 750 MHz NMR
- By X-ray crystallography



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Custom Protein Production Capabilities



I. General Information:

In general, more information on a target protein is better in order to prepare a quotation on the preparation of a protein. Sequence, literature references, stability and solubility information, expression rates and yields, and pictures of gel plates showing the protein are very useful. Please provide as much of this information as possible to help us prepare a quotation.

II. Confidentiality:

All information supplied by customers is treated by CIL and PSF Biotech as strictly confidential. All materials supplied by customers will be used only as directed and will be returned or disposed of per customer request at the end of any growth or expression project. CIL and PSF Biotech will execute confidentiality agreements upon request.

III. Services Offered:

1. Growth and Expression Optimization Test: This is a trial growth done with a supplied *E. coli* or yeast cell line or with supplied clone (vector) for the appropriate protein to confirm that the desired protein is expressed in sufficient amounts. In this test, up to 96 different conditions for growth and expression are attempted in order to define the best conditions. Based on the results of this growth test, a quotation can be given for larger scale growth/expression or complete protein isolation.
2. Cell growth and Protein Expression/Purification: Based on results achieved in the Optimization Test (1), the cells may be grown and protein expressed on scale with isotopic labeling patterns, as needed. The product can be supplied as a frozen cell pellet (shipped in ice packs by air express) or supplied as a pure isolated protein (>95% pure as determined by HPLC). Quotations on growth expressions/purifications will not be issued until after an Optimization Test has been done.
3. Cloning Construct and Generation: When the desired protein is known (sequence, behavior, etc.) but only the DNA or an unchecked clone is available to work with, an effort must be made to develop the clone and construct and define the protein sequence and expression system.
4. Sf9 Proteins: Due to the complexity of working with Sf9 cells, quotes will be provided with a defined protein and a defined expression system. In this case, if the expression system (including virus and cells) can be supplied, the Growth and Expression Test can be done.
5. Proteins by Ligation: If a customer needs a particular section of a protein isotopically labeled or wants some portion of the protein replaced with a novel peptide with unnatural amino acids, then protein ligation is necessary.
6. Proteins via In Vitro Expression: In some cases, in vitro expression is the best way to produce a labeled (or unlabeled) protein. Depending on the protein in question, the amount desired and the isotope labeling requirements, in vitro expression will be reviewed and recommended as a method of choice.

IV. Structural Analysis:

Structural analysis can be done on the target protein by NMR. This is done after the appropriate isotope labeled proteins have been produced on scale and purified. The unlabeled version of a protein or its complexes can be subjected to analysis by synchrotron X-ray crystallography if it is possible to crystallize the protein in question.



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