



C-ID Descriptor

Methods in Protein Purification

Descriptor Details

- **Descriptor Title:** Methods in Protein Purification
- **C-ID Number:** 220
- **Suffix:**
 - Community College Use Only (X)
- **Units:** 2
- **Hours:** 0000
- **Date of Last Revision:** 10/12/2017 11:44:12 PM GMT+0000

General Description

This course is an introduction to protein purification techniques including sample preparation, protein separation and purification, column chromatography, large-scale recovery, and use of assays for recovery analysis. It provides hands-on training with chromatography systems and assays used in industry and research laboratories. Application of current Good Manufacturing Process (cGMP), Good Laboratory Practice (GLP), and Standard Operating Procedures (SOP's) in relation to these techniques will be addressed. This course covers methods utilized for eukaryotic cell culture protein purification.

Prerequisites

No information provided

Corequisites

None

Advisories

One or more of the following: Non-majors general biology course with lab, Molecular and Cellular Biology (C-ID BIOL 190), Chemistry (C-ID CHEM 120S), Introductory Biotechnology with Lab (C-ID BIOT 101), Applied Biotechnology with Lab (C-ID BIOT 150B)

Content

Lecture:

- Protein structure, cloning strategies for inducible protein expression
- Concentration and dilution calculations, standard curve generation, preparation of buffers resins, and reagents used in protein purification
- Correct use of equipment used for protein purification techniques
- Basic column Chromatographic methods
- Quantitative analysis of chromatographic fractions and purified protein (e.g., SDS-PAGE, activity assay, or western blot)
- GLP (Good Laboratory Practice), cGMP (Current Good Manufacturing Practice), SOP's (Standard Operating Procedures), use of Lab Notebooks or other documentation
- Principles of separation methods including centrifugation, chromatography (e.g., ion exchange, size exclusion, hydrophobic interaction, affinity), electrophoresis and filtration as related to protein purification and product analysis
- Sample preparation (harvest, cell disruption, etc.)
- Purification strategy design and data analysis
- Contaminants and impurities

Lab Activities

- Prepare solutions for protein purification
- Prepare samples for protein purification
- Purify protein using chromatography and other separation methods
- Analyze yield and purity of purified protein
- Perform calculations for solution preparation, separation methods, and data analysis

Objectives

At the conclusion of this course, the student should be able to:

- Demonstrate facility with laboratory calculations
- Demonstrate correct usage of precision measuring devices
- Demonstrate an understanding of the principles of commonly used protein assays
- Demonstrate understanding of the use of chromatography and other separation methods for protein purification
- Describe and/or demonstrate techniques for isolation of proteins from cells and tissue
- Perform standard column chromatography techniques
- Demonstrate correct record keeping and/or maintenance of a laboratory notebook.
- Demonstrate an understanding of biological concepts related to basic DNA recombinant and protein isolation and analysis that are routinely used in the biotechnology laboratory.
- Use purification analysis data to improve purification procedure

Evaluation Methods

- Examinations with objective and written components.
- Lab practical examinations.
- Assess lab notebook and/or similar documentation

Textbooks

Moorpark College and Industry Partners . Industrial Biotechnology: A Training Manual. Cengage Learning, 2001.

Ninfa, Alexander and David P. Ballou. Fundamental Laboratory Approaches for Biochemistry and Biotechnology. Wiley, 2009.

Flickinger, Michael, ed. Industrial Biotechnology: Recovery and Purification. Wiley, 2013.

Seidman, Lisa A., Kraus, Mary Ellen, Brandner, Diana L. and Mowery, Jeanette. Laboratory Manual for Biotechnology and Laboratory Science The Basics. Pearson, 2011.

Seidman, Lisa A. and Moore, Cynthia J. Basic Laboratory Methods for Biotechnology. Pearson, 2008 ISBN 978-0321570147

BioRad. Biotechnology: A Laboratory Skills Course. ISBN 978-0-9832396-0-4.

Northeast Biomanufacturing Center and Collaborative. Biomanufacturing Laboratory Manual. NBC2, 2012.