C-ID Descriptor
Methods in Eukaryotic Cell Culture Techniques

Descriptor Details

- **Descriptor Title**: Methods in Eukaryotic Cell Culture Techniques
- **C-ID Number**: 230
- **Suffix**:
  - Community College Use Only (X)
- **Units**: 2
- **Hours**: 0000
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General Description

Student will learn mammalian cell culture techniques that include working under aseptic conditions, sterile techniques, media preparation, quantification and passage of cell lines. Laboratory experience prepares students for work in industry.

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

- Principles behind cell culture techniques and how cells are used in biotechnology.
- Basic theories of cell culture, including cell biology and cell cycle
- Sources and types of cells
- Primary cell lines versus continuous cell lines
- Microscopy (compound, inverted, phase-contrast)
- Biosafety cabinet and aseptic techniques, preventing contamination
- Equipment and vessels used in cell culture (Including CO_2 incubator, water baths)
- Cell counting and assessment of cell culture health
- Calculations relating to cell concentrations, plating efficiency, cell density, and growth curves
- Survival and cytotoxicity - including stains and data analysis techniques
- Transfection
- Analysis or verification of cell identity
- Principles of stem cell biology and differentiation
- Induction of differentiation
- Assay design
- Cryopreservation and resuscitation
- Documentation, observation and analysis of experimental results

Lab Activities

- Proper use and care of laboratory equipment for cell culture (microscopes, centrifuges, incubators, laminar flow hood, hemocytometers)
- Proper handling of cell cultures using aseptic techniques
- Maintain viable cell cultures via passaging, freezing, and subculturing

- Monitor gauges and recording instruments to ensure that specified Conditions are maintained
- Thaw or begin fresh cultures from stock
- Monitor cell growth & assessment of health (be able to identify contamination)
- Feed, passage/transfer cells
- Maintain suitable environmental conditions for cell growth
- Count cells using hemocytometer or similar device
- Prepare cells for storage (suitable media/freeze etc.)
- Maintain laboratory notebook and associated documentation
- Order, verify, store, obtain & handle raw materials according to procedures
- Discard outdated materials according to procedures
- Clean and /or sterilize laboratory and supplies

Objectives

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

- Explain the purpose of and prepare media using various components
- Describe basic theory of cell culture
- Demonstrate ability to prepare and maintain cells in culture employing aseptic technique in a laminar flow hood
- Properly operate and care for laboratory equipment for cell culture
- Count cells, perform calculations, and analyze data related to cell growth and survival
- Keep an industry-standard scientific notebook

Evaluation Methods

At least three of the following:

- Examinations with objective and written components.
- Lab practical examinations.
- Assess lab notebook
- Written reports on experiments
- Oral presentation or group discussion of experiments

Textbooks

A.R. Ian Freshney. Culture of Animal Cells: A manual of basic technique. 6th edition. John Wiley and Sons, 2010.

Alberts et al. Essential Cell Biology –4th edition. Garland Science. 2013