

# Biology Pre-lab

## 1. (a) Describe very briefly the procedure of isolating intact living cells from a green leaf.

To isolate intact living cells from a green leaf, start by sterilizing the leaf with 70% ethanol and distilled water to remove any surface contaminants. Next, macerate the leaf in a buffer solution, such as phosphate buffer, using a mortar and pestle or blender to break down the tissue and release the cells. Then, filter the mixture through a cheesecloth or nylon mesh to remove any debris and excess tissue.

After filtering, centrifuge the filtrate to separate the cells from the liquid. The cells will form a pellet at the bottom of the centrifuge tube. Resuspend this pellet in a suitable medium, such as Murashige and Skoog medium, which provides the necessary nutrients for cell growth. If desired, enrich the cell suspension with additional nutrients and growth regulators to promote cell growth and division.

Finally, culture the cells in a controlled environment, such as a tissue culture chamber, where they can grow and thrive. This environment should provide optimal temperature, humidity, and light conditions for the specific type of cells being isolated. By following these steps, you can successfully isolate intact living cells from a green leaf.

## (b) Explain why the leaf tissue is kept at low temperature during cell isolation

During cell isolation, leaf tissue is typically kept at a low temperature (around 4°C) to:

1. **Slow down metabolic processes:** Low temperatures reduce cellular activity, minimizing changes in cellular composition and preventing degradation of organelles.
  2. **Inhibit enzyme activity:** Cold temperatures inhibit the activity of enzymes that might break down cellular components, ensuring the integrity of the cells and their organelles.
  3. **Reduce cell wall degradation:** Low temperatures prevent the breakdown of cell walls, making it easier to maintain cell structure and integrity during isolation.
  4. **Minimize oxidative stress:** Cold temperatures reduce the production of reactive oxygen species (ROS), which can damage cellular components and compromise cell viability.
  5. **Preserve cell membrane integrity:** Low temperatures help maintain the stability and integrity of cell membranes, reducing the likelihood of membrane damage and cell lysis.
- By keeping the leaf tissue at a low temperature, you can help preserve the cells' natural state, ensuring the isolation of healthy, intact cells.

## 2. (a) Name 3 method of disrupting cells before fractionation.

Here are three common methods of disrupting cells before fractionation:

1. **Mechanical disruption:** This involves physically breaking open cells using techniques such as:
  - Homogenization (e.g., using a blender or homogenizer)
  - Sonication (using high-frequency sound waves)
  - Grinding (using a mortar and pestle)
2. **Enzymatic disruption:** This method uses enzymes to break down cell components, such as:

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**Instructor's Manual for the Laboratory Manual for Starr and Taggart's Biology : The Unity and Diversity of Life and Starr's Biology Concepts and Applications** James W. [et. al]. Perry, 2002 Prentice Hall Miller Levine Biology Laboratory Manual a for Students Second Edition 2004 Kenneth Raymond Miller, Joseph S. Levine, Prentice-Hall Staff, 2003-02 Authors Kenneth Miller and Joseph Levine continue to set the standard for clear accessible writing and up to date content that engages student interest Prentice Hall Biology utilizes a student friendly approach that provides a powerful framework for connecting the key concepts a biology Students explore concepts through engaging narrative frequent use of analogies familiar examples and clear and instructional graphics Whether using the text alone or in tandem with exceptional ancillaries and technology teachers can meet the needs of every student at every learning level *Miller Levine Biology 1e Lab Manual a (Average Advanced) Student Edition 2002c* Prentice Hall Direct Education Staff, 2001-04 One program that ensures success for all students **Prentice Hall Biology, 2002** Irvine Welsh, Prentice-Hall Staff, 2001-04 One program that ensures success for all students Instructor's Manual for Perry and Morton's Laboratory Manual for Starr and Taggart's Biology, the Unity and Diversity of Life and Starr's Biology, Concepts and Applications Joy B. Perry, 1992 The Mouse in Biomedical Research , 2006-12-15 Normative Biology Husbandry and Models the third volume in the four volume set The Mouse in Biomedical Research encompasses 23 chapters whose contents provide a broad overview on the laboratory mouse s normative biology husbandry and its use as a model in biomedical research This consists of chapters on behavior physiology reproductive physiology anatomy endocrinology hematology and clinical chemistry Other chapters cover management as well as nutrition gnotobiotics and disease surveillance There are also individual chapters describing the mouse as a model for the study of aging eye research neurodegenerative diseases convulsive disorders diabetes and cardiovascular and skin diseases Chapters on imaging techniques and the use of the mouse in assays of biological products are also included **Biology 101** Gordon-Dickson, KENDALL HUNT PUB CO, Leon A. Dickson, Jr., William Gordon, 2011-08-27 **The Molecular Basis of Human Cancer** William B. Coleman, Gregory J. Tsongalis, 2016-11-11 This book covers the concepts of molecular medicine and personalized medicine Subsequent chapters cover the topics of genomics transcriptomics epigenomics and proteomics as the tools of molecular pathology and foundations of molecular medicine These chapters are followed by a series of chapters that provide overviews of molecular medicine as applied broadly to neoplastic genetic and infectious diseases as well as a chapter on molecular diagnostics The volume concludes with a chapter that delves into the promise of molecular medicine in the personalized treatment of patients with complex diseases along with a discussion of the challenges and obstacles to personalized patient care The Molecular Basis of Human Cancer Second Edition is a valuable resource for oncologists researchers and all medical professionals who work with cancer **British Books in Print** , 1970 **The Rhizosphere** Roberto Pinton, Zeno Varanini, Paolo Nannipieri, 2007-05-11 In the rhizosphere exudates from plants and microorganisms as

well as stable soil organic matter influence processes that can control plant growth microbial infections and nutrient uptake As the chemistry and biochemistry of these substances becomes more and more clear their study promises to shed light on the complex interactions between plant and soil [Resources in Education](#) ,1989 [The Mouse in Biomedical Research: Normative biology, husbandry, and models](#) James G. Fox,2007 Dedicated to the understanding of the mouse and its role in scientific research This valuable compendium serves as a standard reference source of information for students embarking on scientific careers specialists in laboratory animal science technicians in both animal care and research and the broad scientific community **Fundamentals of Computing I** Allen B. Tucker,1994-02 **Clinical Immunology and Serology** Chrstine Dorresteyn Stevens,Linda E Miller,2016-10-05 The perfect balance of theory and practice Here s the must have information you need to understand the essential principles of immunology and to master the serology techniques most commonly used in the laboratory Easy to read student friendly coverage focuses on the direct application of theory to clinical laboratory practice preparing you for the real world in which you will practice The 4th Edition of this popular text has been completely updated and revised throughout to reflect the latest advances in the field A brand new full color layout makes the content easier to understand than ever before *Research in Education* ,1973 **Biology 101 Lab Manual** William Gordon,Leon A. Dickson, Jr.,2015-01-13 **The Advisor, Teacher-course Evaluation** University of Illinois at Urbana-Champaign. Student Senate,1971 [Government Reports Announcements & Index](#) ,1990 [Resources in Education](#) ,1992 [Teacher](#) ,1972

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