

LABORATORY EXERCISE 10

Mendelian/Human Genetics

Introduction

Gregor Mendel is often considered the “father” of modern genetic analysis. His pioneering work with garden peas provided the evidence from which he deduced the primary modes of inheritance of individual genes, often called “Mendelian Genetics.” The primary hypotheses/ideas Mendel described are as follows:

- Genes exist in pairs in diploid organisms
 - The genes can contain different information called alleles (for example, an eye color gene may contain either a brown-eye allele or a blue-eye allele)
 - Of these allele pairs, some alleles are dominant and some are recessive
 - Alleles for the same gene segregate independently of each other during meiosis (this is Mendel’s **law of segregation**)
- When following the inheritance of the alleles of two different genes (for example, eye color and height), Mendel devised the **law of independent assortment**:
 - Alleles for different genes segregate independently of each other during meiosis

The study of genetics relies on a significant amount of vocabulary, and in order to understand and apply genetic principles, a detailed understanding of this vocabulary is required.

- Useful genetics vocabulary includes
 - Homozygous and heterozygous
 - Genotype and phenotype
 - Monohybrid and dihybrid crosses
 - Testcross

In addition, the use of the principles of simple probability can provide an extensive amount of information on how different traits are inherited. Comprehending genetics involves a basic understanding and appreciation of how genes regulate our various traits (dimples, hair color, blood types, for example). The **goal** of this lab is to provide a “**genetics sampler**” or **relatively simple introduction to heredity using common human traits**.

Learning Objectives

1. To define some genetic terms: allele, dominant, recessive, genotype, phenotype, heterozygous, and homozygous.
2. To gain practice working simple genetics problems, using a Punnett square.
3. To observe selected human phenotypes and determine their genotypes.

Materials

- PTC (phenylthiocarbamide) taste strips
- Sodium benzoate taste strips
- Chart for tabulation of class results of human phenotype/genotype determination.
- Blood typing supplies
 - Anti-A and Anti-B sera, slides, toothpicks, sterile lancet, wax pencils, alcohol swabs
 - Beaker containing 10% bleach solution
 - Disposable waste bags

Answers Laboratory Exercise Genetics

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Answers Laboratory Exercise Genetics:

Genetics Laboratory Exercises Eldon John Gardner, 1956 Laboratory Exercises in Microbiology Robert A. Pollack, Lorraine Findlay, Walter Mondschein, R. Ronald Modesto, 2018-07-11 The Laboratory Exercises in Microbiology 5e by Pollack et al presents exercises and experiments covered in a 1 or 2 semester undergraduate microbiology laboratory course for allied health students The labs are introduced in a clear and concise manner while maintaining a student friendly tone The manual contains a variety of interactive activities and experiments that teach students the basic concepts of microbiology The 5th edition contains new and updated labs that cover a wide array of topics including identification of microbes microbial biochemistry medical microbiology food microbiology and environmental microbiology Genetics Laboratory Exercises John Kuspira, George William Rutherford Walker, 1962 Laboratory Exercises in Genetics Louis Levine, Norman M. Schwartz, 1973 **Plant Pathology Concepts and Laboratory Exercises** Robert N. Trigiano, 2007-11-30 Revised and updated with new concepts case studies and laboratory exercises **Plant Pathology Concepts and Laboratory Exercises** Second Edition supplies highly detailed and accurate information in a well organized and accessible format New additions to the second edition include five new topic and exercise chapters on soilborne pathogens molecular tools biocontrol and plant fungal interactions information on in vitro pathology an appendix on plant pathology careers and how to use and care for the microscope An accompanying cd rom contains figures from the text as well as supplemental full color photos and PowerPoint slides Unique Learning Tools Retaining the informal style of the previous edition this volume begins each topic with a concept box to highlight important ideas Several laboratory exercises support each topic and cater to a wide range of skill sets from basic to complex Procedure boxes for the experimental exercises give detailed outlines and comments on the experiments step by step instruction anticipated results and thought provoking questions Case studies of specific diseases and processes are presented as a bulleted list supplying essential information at a glance Comprehensive Coverage Divided into six primary parts this valuable reference introduces basic concepts of plant pathology with historical perspectives fundamental ideas of disease and disease relationships with the environment It details various disease causing organisms including viruses prokaryotic organisms plant parasitic nematodes fungi plant parasitic seed plants and other biotic and abiotic diseases Exploring various plant pathogen interactions including treatments of molecular attack strategies extracellular enzymes host defenses and disruption of plant function the book presents the basic ideas of epidemiology control strategies and disease diagnosis **Laboratory Exercises in Plant Pathology: An Instructional Kit (Teachers Manual)** A.B.A.M. Baudoin, 2011-01-13 The Teacher s manual contains information designed to facilitate use of this kit by instructors and teaching assistants who may not be familiar with a particular plant pathogen system Included are additional back ground information for instructors sources of materials list of materials needed step wise preparation procedures suggested schedules for conducting the exercises including time required a discussion of expected

results answer to questions and additional references The listing of sources of material provided in case material is not available from a local source or regular supplier

40 Inquiry Exercises for the College Biology Lab A. Daniel Johnson, 2009 Drawing from the author's own work as a lab developer coordinator and instructor this one of a kind text for college biology teachers uses the inquiry method in presenting 40 different lab exercises that make complicated biology subjects accessible to major and nonmajors alike The volume offers a review of various aspects of inquiry including teaching techniques and covers 16 biology topics including DNA isolation and analysis properties of enzymes and metabolism and oxygen consumption Student and teacher pages are provided for each of the 16 topics

Molecular Genetic Technologist - Basics to Mastery DEAN STRATTON, This definitive guide equips current and aspiring bench professionals with the end to end skills to plan execute validate and report high confidence human DNA RNA tests across PCR Sanger microarray and next generation sequencing You'll move from fundamentals of nucleic acids and instrumentation to assay development method verification validation uncertainty analysis quality control A260 280 RIN Q30 coverage contamination mitigation LIMS traceability and variant interpretation using AMP ACMG frameworks Practical playbooks decision trees and job ready checklists are grounded in real world lab rhythms imagine you're on call and a sequencer flags low Q30 you'll triage library prep cluster density and indexing cross talk step by step then document corrective actions for CAP CLIA or ISO 15189 audits Worked examples mini vivas and scenario based reporting notes prepare you for competency assessments proficiency testing and day one impact on a high throughput clinical floor Wet lab to dry lab extraction quant qual library prep run setup primary tertiary analysis and clinical reporting Validation kits templates for precision accuracy reportable range LoD LoQ matrix effects and carryover studies QC dashboards practical thresholds e.g. Q30 insert size %PF coverage uniformity with troubleshooting trees Interpretation toolkit AMP ACMG classification population databases artifact filtering and confirmatory strategies Compliance ready CAP CLIA and ISO 15189 documentation flows risk management FMEA and audit hygiene Career focus competency checklists viva questions shift hand over scripts and certification exam practice

Science Education Peter Csermely, Korado Korlevic, Katalin Sulyok, 2007 Tells why to engage in scientific education of talented students as early as possible to develop the critical minds or scientific method judgments This book discusses the multitudes of initiatives all around the world stating that most of them work in isolation often struggling with lack of resources and stay unrecognized to the general public

Essentials of Medical Genomics Stuart M. Brown, John G. Hay, Harry Ostrer, 2008-12-29 Six new chapters on vital topics of interest such as multilocus SNP genotyping SNP chips RNAi ChIP chip and genomic tiling arrays New edition responds to reviewers and users desire for greater coverage now the most useful handbook on the market Practical concise summary of everything about genomics and emerging technologies a busy physician or medical student should know Covers concepts and techniques that are in use in medicine now as well as those on the cutting edge of science relevant to medicine from bioinformatics to DNA diagnostics and proteomics NEW Includes

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