

Lab 7: Genetics and Biotechnology

Objectives

By the end of lab, students should be able to ...

- Complete Punnett squares and pedigrees related to human blood type
- Analyze blood typing tests
- Explain the outcomes of genetic testing involving restriction enzymes, polymerase chain reaction, and gel electrophoresis
- Analyze DNA fingerprints to determine genetic relationship between parents and offspring

Introduction

The world of genetics is vast and complex. Genes come in different versions, known as alleles. Eukaryotic organisms, such as plants, fungi, humans, and other animals are diploid, meaning that most of the cells contain two copies of each chromosome and therefore two alleles for each gene.

For example, in humans the gene for eye colour can come in a variety of forms (alleles). There are alleles for blue eyes, brown eyes, grey eyes, green eyes, hazel eyes and so on. If a person has two identical alleles for one gene they are said to be **homozygous** for that gene. If a person has two different alleles for one gene they are said to be **heterozygous** for that gene.

DNA for all humans is 99.5% the same from any one person to the next. No two people have exactly the same DNA (except for identical twins). However, the miniscule genetic difference between humans allows for great phenotypic diversity. Using a variety of genetic tools, these differences can be detected using various forms of biotechnology. Detecting differences in human DNA can be used for an array of purposes including, medical testing, paternity testing, and criminal investigations.

In today's lab we will explore several aspects of genetics and applications of biotechnology.

Exercises to Complete

Exercise 1: The Genetics of Human Blood and Blood Typing – Page 2

Exercise 2: Restriction Enzymes, Polymerase Chain Reaction and Gel Electrophoresis – Page 6

Exercise 3: Hospital Baby Shuffle – Page 13

Exercise 4: Pigeonetics (part 2) – Page 18

Assessment

- After completing each exercise, answer the associated questions. You do not need to submit these tables but will refer to them to answer the questions on the Lab 7 quiz.
- Open up the Lab 7 quiz on BlackBoard and answer the questions. Don't forget to press the submit link at the bottom of the page when you are done.

Forensics Biotechnology Lab 7 Answers

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Forensics and Biotechnology, 2004 Features 10 investigations that use biotechnology techniques to solve real world problems Lab activities emphasize the use of scientific inquiry as a way of thinking and problem solving while relating scientific processes to technological and societal issues **Addison-Wesley Biology** Addison Wesley, 1996-04

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