BASIC TECHNIQUES IN MOLECULAR BIOLOGY STEFAN SURZYCKI pdf

1: Basic Techniques in Molecular Biology: Stefan Surzycki | NHBS Book Shop

This laboratory manual gives a thorough introduction to basic techniques in Molecular Biology, which can find application in many different fields. It is the result of practical experience, with each protocol having been used extensively in undergraduate courses or tested in the authors laboratory.

Ads Book Preface The recent completion of the human genome-sequencing project is an important development in the history of biological sciences. It will not only promote the understanding of the human genome, but will also profoundly change the discipline of molecular biology and affect medical practices. The human genome is of great interest and is the subject of intensive basic and applied research. The molecular biology techniques used in this research are highly advanced and unique. Learning these techniques will permit students to learn the basic principles of molecular biology and will prepare them to work with the human genome. These skills are in great demand by biotechnology, forensic laboratories, and pharmaceutical companies. This laboratory manual provides the student with basic experience in and an understanding of cutting-edge techniques in molecular biology. In addition, the experiments described in this manual will provide students with an opportunity for analyzing and studying their own genes. The goal of this laboratory manual is not only to teach basic molecular biology techniques, but also to convey the excitement of performing experiments and comparing the results to a large body of data collected about the human genome. These topics include eight exercises. Preparation of genomic DNA. Cheek cells are the source of this DNA. Collecting these cells is a non-invasive procedure that makes it possible to use DNA purification in a classroom situation. The techniques that are used in the course of this experiment are large-scale purification of DNA, spectroscopic analysis of DNA, and determination of DNA concentration and purity. DNA fingerprinting using multi-locus analysis with a human variable number tandem repeat probe. Students use their own DNA for this analysis. In this procedure students learn the techniques of Southern blot transfer, preparation of non-radioactive probes, hybridization, and chemiluminescent autoradiography. Use of a non-radioactive probe removes the difficulties of working with radioactive materials in the class environment. It also eliminates the problem of disposing of a large quantity of radioactive waste that will invariably be generated when working with a large class. Moreover, the non-radioactive procedure is a more advanced technique that has recently been finding general acceptance in basic research and industry. DNA fingerprinting with a single-locus probe. This technique is used in standard forensic analysis. The probe used is the standard forensic D2S44 probe. It represents a tandem repeat region that is present on human chromosome 2. Students will learn methods of forensic profiling and analyze data using a fixed bins database of allele frequencies prepared for this probe by the FBI. This experiment is based on the paper of Tishkoff et al. The authors introduced this innovative technique in determining a common and recent African origin for all non-African human populations. Analysis of the data consists of the calculation of linkage disequilibrium for the entire class. The results are compared to the disequilibrium found in different world populations. During the course of this experiment, students learn how to perform PCR polymerase chain reactions , use the thermal cycler, and analyze products using high-resolution agarose gel electrophoresis. The goal of this experiment is to sequence human DNA using the same procedures employed in large sequencing projects. The techniques used in the course of this experiment are preparation of a random sequencing library by nebulization, cloning DNA fragments into a sequencing plasmid, transformation of Escherichia coli cells by electroporation, preparation of plasmid DNA for sequencing, and PCR cycle sequencing. Computer analysis of sequencing data. Determination of human telomere length. In the course of this experiment, students determine the telomere length of their DNA. The techniques used are multi-enzyme digestion of genomic DNA, turbo-blot transfer, hybridization using an oligonucleotide probe, and computer determination of average telomere length. Analysis of the expression of the b-actin gene in human cheek cells. Students carry out isolation of total RNA from cheek cells, determine its purity and concentration, perform RT-PCR reactions, and analyze the results by gel electrophoresis. The manual is an outgrowth of a semester course taught each year to undergraduate students at Indiana University. Each of the eight experiments constitutes an integrated unit performed in one

or more laboratory sessions. The laboratory sessions are designed to meet twice a week for 4 hours and are designed for a limit of 20 students per class. Occasionally students or instructors will need to spend additional time in the laboratory in order to finish experiments or to collect results. These times are indicated in the outline for each procedure. The descriptions of the laboratory procedures assume that students will perform all the steps of the procedure. However, at the discretion of the instructor, pre-preparing some materials e.

2: Human Molecular Biology Laboratory Manual - PDF Book

This laboratory manual gives a thorough introduction to basic techniques. It is the result of practical experience, with each protocol having been used extensively in undergraduate courses or tested in the authors laboratory. In addition to detailed protocols and practical notes, each technique.

3: Basic Techniques in Molecular Biology by Stefan Surzycki

Dr. Surzycki has been teaching undergraduate courses and leading workshops in introductory Molecular Biology for many years, during which time he has extensively modified and refined the techniques he has described in this manual.

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This laboratory manual gives a thorough introduction to basic techniques. It is the result of practical experience, with each protocol having been used extensively in undergraduate courses or tested in the authors laboratory.

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