KITS

KITS FOR SCHOOL EXPERIMENTATION IN THE AREA OF LIFE SCIENCES

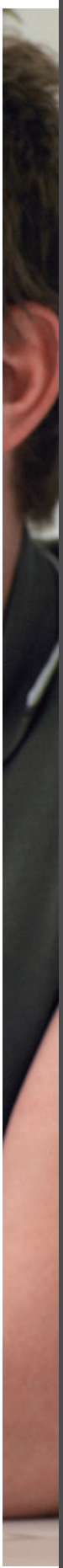
BIOTED

www.bioted.es

EXPERIMENT, LEARN AND HAVE FUN WITH THE LIFE SCIENCES.

BIOTED develop didactic products for teaching the basic techniques of Molecular Biology and Biotechnology.

BIOTED brings you to the different areas of Biology, offering you different kits with everything you need to develop educational experiments in Molecular Biology, Genetics, Microbiology, Biochemistry and Immunology.



1.1. EXTRACTION AND PURIFICATION OF NUCLEICS ACIDS.

BASIC LEVEL

DANAEXTRACTOR KIT

This practice is an introduction to molecular biology. This kit provides basic DNA extractions from animal tissues (chicken liver) and vegetables.

The kit includes everything you need so that each student can carry out an individual practice, in the classroom itself.

> **Any additional equipment or material is not required.**

PRODUCT:		
DANAEXTRACTOR:	1 practice	DNEI-1
DANAEXTRACTOR:	6 practices	DNEI-6
LYSIS SOLUTION:	200 ml	LS
SALINE SOLUTION:	100 ml	PPS
ISOPROPANOL:	150 ml	ISOP

INTERMEDIATE LEVEL

DANAEXTRACTOR SALIVA 2 Kit

This kit allows students make an extraction of their own DNA quickly and easily from a small sample of his saliva, a laboratory microcentrifuge is not needed.

To carry out this practice the laboratory has to have 20-200 microliters micropipettes and 100-1000 microliters micropipettes and their respective tips. This material also can be supplied by BIOTED.

The remaining material necessary to carry out the practice by each student individually is included in the kit.

The DNA appears as a strand in the solution that the student could take home.

DNES2-25 25 students

ADVANCED LEVEL

The extraction process involves cell lysis to release nucleic acids and the inactivation of cellular nucleases (DNases and RNases) to prevent degradation of nucleic acids.

The purification process is the separation of the nucleic acids from the other components.

There are different techniques for purification:

A. SALTING-OUT.

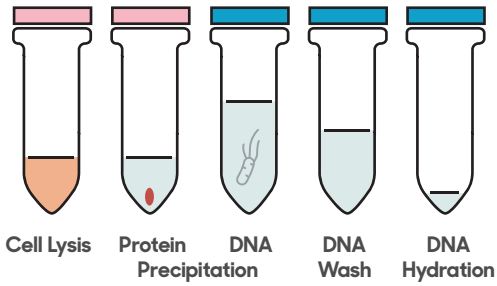
⊕ *Proteins precipitation with high salt concentrations.*

DANAGENE SALIVA KIT

This kit allows you to isolate DNA from a saliva sample of students to obtain a quality DNA for use in PCR.

0603.4 — 50 students

0603.41 — 160 students



> **Kit includes:**
Lysis solution, protein precipitation solution and DNA hydration solution.

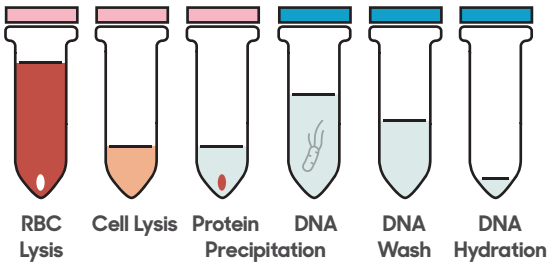
> **You need:**
Micropipettes, microtubes, microcentrifuge, isopropanol and 70% ethanol.

DANAGENE BLOOD DNA KIT

This kit allows you to isolate DNA from a blood sample to obtain a quality DNA for use in PCR.

0601 — 100 ml/blood

0602 — 200 ml/blood



> **Kit includes:**
RBC solution, lysis solution, proteins precipitation solution and DNA hydration solution.

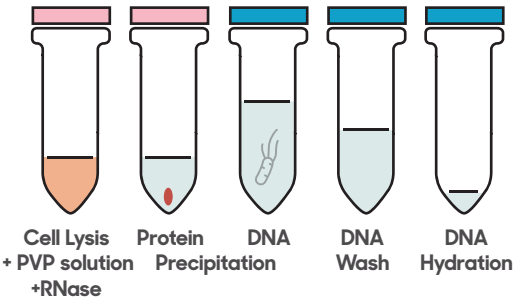
> **You need:**
Micropipettes, microtubes, microcentrifuge, isopropanol and 70% ethanol.

DANAGENE PLANT DNA KIT

This kit allows you to isolate DNA from different plants samples to obtain a quality DNA for use in PCR.

0604.1 — **50 extractions**

0604.2 — **200 extractions**



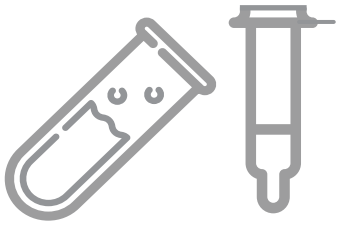
> **Kit includes:**
Extraction buffer, lysis solution, RNAse, PVP solution, protein precipitation solution and DNA hydration solution.

> **You need:**
Micropipettes, microtubes, microcentrifuge, isopropanol and 70% ethanol.

B. ADSORPTION CHROMATOGRAPHY.

It is based on the adsorption capacity of nucleic acids to the silica membrane in the presence of chaotropic salts which come in small columns. We have a wide range of kits that use columns, you can visit at **www.danagen.es.**

We propose the following kits at educational level:



DANAGENE SPIN GENOMIC DNA KIT

This kit is designed for a efficient and fast extraction of high quality genomic DNA from a wide variety of samples including blood, cultured cells, animal tissue, mouse tails, bacteria and yeast using for this MicroSpin columns with silica membranes which selectively bind DNA.

0605.1 — **50 extractions**

0605.2 — **250 extractions**

> **Kit includes:**
Tissues lysis buffer, lysis/binding buffer, proteinase K, desinhibition buffer, wash buffer, Elution Buffer, and microcolumns.

> **You need:**
Micropipettes, microtubes, microcentrifuge, incubation bath, isopropanol and 100% ethanol.

DANAGENE SPIN BLOOD DNA KIT

0606.1 — 50 extractions

0606.2 — 250 extractions

This kit is designed for a fast purification of pure genomic DNA from whole blood, serum, plasma, body fluids and "spots" dried blood using Microspin columns with silica membrane which selectively binds DNA. The kit uses a new formulated lysis/binding buffer specific to DNA extraction from blood samples.

> **Kit includes:**
RBC buffer, tissues lysis buffer, lysis/binding buffer, proteinase K, desinhibition buffer, wash buffer, Elution Buffer, and microcolumns.

> **You need:**
Micropipettes, microtubes, microcentrifuge, incubation bath, isopropanol and 100% ethanol.

DANAGENE FFPE DNA KIT

0610.1 — 50 extractions

This kit is optimized for a fast method of DNA extraction from paraffin-embedded and formalin-fixed (FFPE) tissues. The process omits the use of flammable and malodorous xylene and d-limonene commonly used for deparaffinization, instead own deparaffinization buffer is used for the complete dissolution of paraffin to release the tissue.

> **Kit includes:**
Deparaffinization buffer, tissues lysis buffer, lysis/binding buffer, proteinase K, desinhibition buffer, wash buffer, Elution Buffer, and microcolumns.

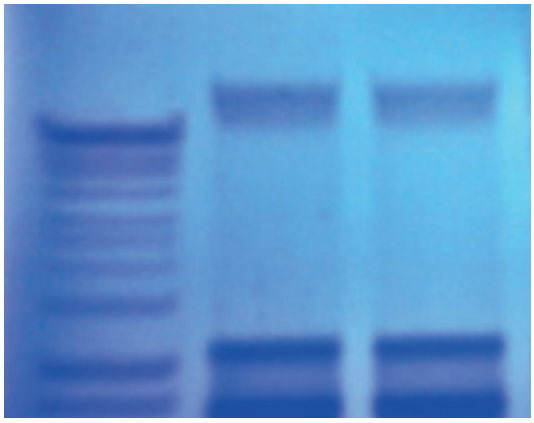
> **You need:**
Micropipettes, microtubes, microcentrifuge, incubation bath, isopropanol and 100% ethanol.

BACTERIAL DNA EXTRACTION KIT

ADNBACT — 25 extractions

The objective of this practice is to introduce the principles of extracting chromosomal DNA from E. coli bacterial cells.

Students learn the structure and function of nucleic acids containing a bacteria.



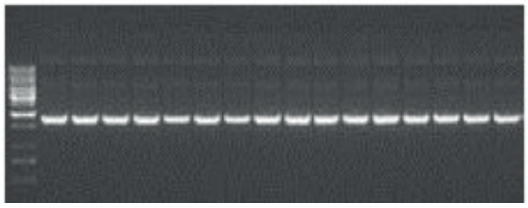
> **Kit includes:**
Bacterial pellets, lysis solution, proteins precipitation solution and DNA hydration solution.

> **You need:**
Micropipettes, microtubes, microcentrifuge, incubation bath, isopropanol and 100% ethanol.

PLASMID DNA EXTRACTION KIT

ADNPLASMIDO **25 extractions**

The objective of this practice is to introduce the principles of extracting plasmid DNA from bacterial cells. Students will learn the structure and function of DNA plasmids.



> **Kit includes:**
Bacterial pellet, resuspension buffer, lysis buffer, neutralization/ binding buffer, wash buffer, elution buffer and microcolumns.

> **You need:**
Micropipettes, microtubes, microcentrifuge and 100% ethanol.

1.2. HYBRIDAZATION TECHNIQUES.

SOUTHERN BLOT

SB1 **5 groups of students**

This experiment introduces your students to Southern blotting as a tool for "DNA Fingerprinting" in a hypothetical paternity determination.

DNA fragments are first separated by agarose gel electrophoresis, then transferred to a nylon membrane and finally visualized by staining.

> **Kit includes:**
DNA samples, practice gel loading solution, agarose, electrophoresis buffer, pipettes, 5 pre-cut nylon membranes, 5 pre-cut blotting filter papers, stain method.

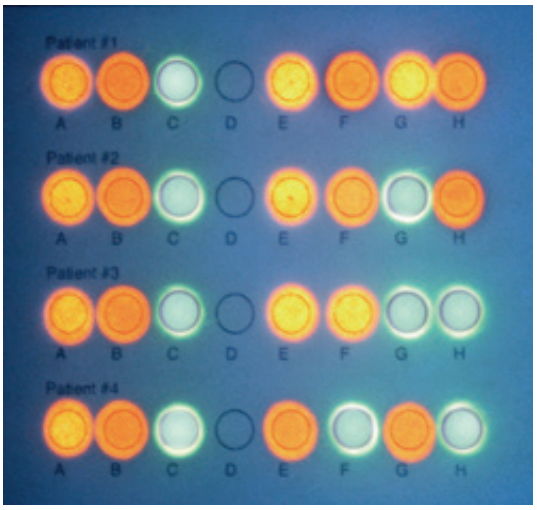
> **You need:**
Electrophoresis apparatus, power supply, 65°C Waterbath, DNA visualization system, staining net and tray, micropipettes, lab glassware, microwave, distilled water, NaCl, NaOH, concentrated HCl, plastic wrap, forceps.

DNA/RNA MICROARRAYS

MICRO-1 **10 groups of students**

Membrane microarray technology is enabling scientists to screen large numbers of samples in one assay. This technology has led to cost savings by reducing the sample size, while saving time and yielding accurate results.

Students will apply simulated DNA and RNA samples to a membrane to screen for positive and negative samples.



> **Kit includes:**
Simulated patient DNA and RNA samples, controls, microarray cards, plastic bags to incubate membrane, microtest tubes, and pipettes.

> **You need:**
Micropipettes and tips, distilled water, beakers or flasks.

1.3. PCR TECHNIQUES.

We present a series of kits for carrying out various practical applications of the PCR technique, each kit consists of a theoretical part that the teacher work with students and a practical part consisting in PCR and results.

⊕ The kits include reagents for conducting electrophoresis and staining (DANABLUE-FlashBlue or GELSAFE, if it is available a transilluminator).

You must have a thermal cycler to carry out these practices.

We can supply the EDVOTEK's thermal cycler, firm that we represent.

STUDY OF VNTR HUMAN POLYMORPHISMS BY PCR

The DNA sequences that vary between individuals are known as polymorphisms. Students will prepare their own DNA from their mouth cells to be used for PCR and study the DS180 locus VNTR polymorphism.

> **Kit includes:**
MIX PCR, positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

 **PCR1**

 **25 students**

DETERMINING Rh FACTOR BY PCR

Students will prepare their own DNA from their buccal cells to be used for PCR. In a second session, the amplified DNA is analyzed by electrophoresis and it is determinated the Rh factor.

> **Kit includes:**
MIX PCR, positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

 **PCR2**

 **25 students**

PCR FROM HUMAN 18S rRNA GENE

This kit includes all material you need for the amplification of a fragment of the human 18S rRNA gene using the PCR technique. It is not necessary the students isolate their DNA, the kit is provided with a sample of human DNA to perform the amplifications.

> **Kit includes:**
MIX PCR, positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

PCR5 **25 students**

STUDY OF ALU HUMAN POLYMORPHISMS BY PCR

The DNA sequences that vary between individuals are known as polymorphisms. Students will prepare their own DNA from their buccal cells to be used for PCR and study the presence or absence Alu insertion at the palsminogen activator locus.

> **Kit includes:**
MIX PCR, positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

PCR3 **25 students**

GENETICALLY MODIFIED CORN DETECTION

This kit includes all material you need for the detection of transgenic Bt corn using the PCR technique. The kit is provided with several samples of corn powder and the material to the extraction of DNA from these samples and other possible chosen by the students.

> **Kit includes:**
Corn powder sample, MIX PCR, normal DNA positive control, transgenic DNA positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

PCR6 **25 students**

PCR FROM BACTERIAL 16S rRNA GEN

This kit includes all material you need for the amplification of a fragment of the bacterial 16S rRNA gene using the PCR technique. It is not necessary to isolate bacterial DNA, the kit is provided with a sample of bacterial DNA to perform the amplifications.

> **Kit includes:**
MIX PCR, positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

PCR4 **25 students**

GENETICALLY MODIFIED SOYBEAN DETECTION

This kit includes all material you need for the detection of transgenic soybean Roundup using the PCR technique. The kit is provided with several samples of soy powder and the material to the extraction of DNA from these samples and other possible chosen by the students.

> **Kit includes:**
Soybean powder sample, MIX PCR, normal DNA positive control, transgenic DNA positive control, agarose, TAE and DANABLUE-FlashBlue or GELSAFE (if it is available a transilluminator).

> **You need:**
Micropipettes, PCR, microtubes, and thermal cycler.

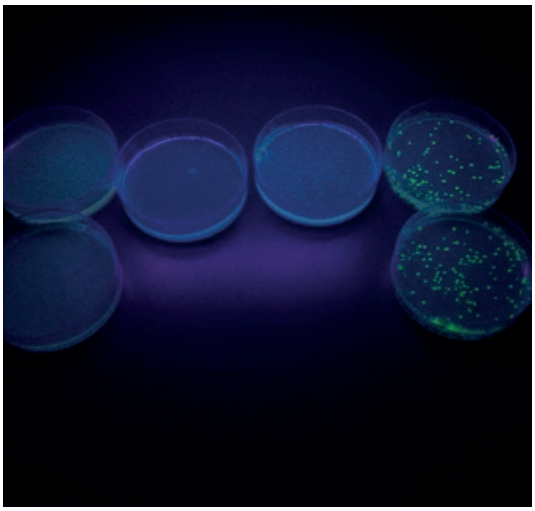
PCR7 **25 students**

1.4. CLONING NUCLEIC ACIDS.

TRANSFORMATION OF E.COLI WITH GREEN FLUORESCENT PROTEIN (GFP)

TRANS2 10 groups of students

In this experiment, students will explore the biological process of bacterial transformation using E. coli and plasmid DNA. At the end of the activity, students will have experience observing and analyzing acquired traits (ampicillin resistance and fluorescence) as exhibited by transformed bacterial cells.



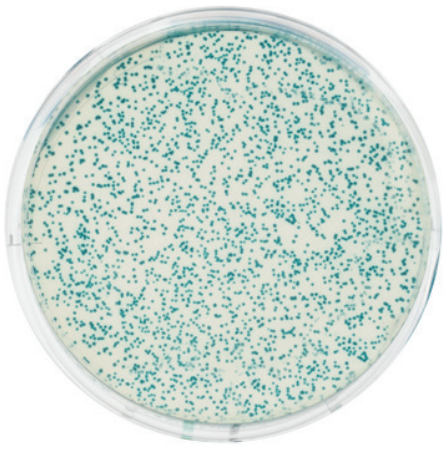
> **Kit includes:**
BactoBeads™ E. coli GFP Host, supercoiled pFluoroGreen™ plasmid DNA, ampicillin, IPTG, CaCl2, Growth Additive, Broth Agar, Broth Medium for Recovery, petri plates, plastic microtipped transfer pipets, wrapped 10 ml pipette, toothpicks, inoculating loops, microcentrifuge tubes.

> **You need:**
Automatic micropipette (5-50 µl) and tips, two waterbaths (37°C and 42°C), thermometer, incubation oven (37°C), pipette pumps, ice, marking pens, bunsen burner, microwave, hot gloves, long wave UV light.

TRANSFORMATION OF E.COLI WITH pGAL (Blue Colony)

TRANS1 10 groups of students

In this experiment, students will develop an understanding of bacterial transformation by plasmid DNA by introducing an opportunity to observe an acquired phenotypic trait of the transformed bacterial cells. The presence of blue bacterial colonies visually demonstrates the expression of a specific gene for the Lac+ phenotype.

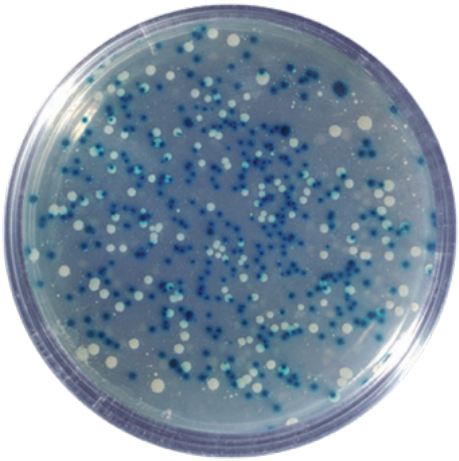


> **Kit includes:**
BactoBeads™, plasmid DNA, buffer, media, ampicillin, X-Gal, agar, petri dishes, sterile pipettes, loops and microtubes.

> **You need:**
Automatic micropipette (5-50µl) and tips, two water baths (37°C and 42°C), incubation oven, thermometer, pipette pumps or bulbs, ice, marking pens, bunsen burner, hot plate or microwave oven, and hot gloves.

BLUE/WHITE CLONING OF A DNA FRAGMENT & ASSAY OF β-GALACTOSIDASE

ED-300 **5 groups of students**



When DNA is subcloned in the pUC polylinker region, β-galactosidase production is interrupted, resulting in the inability of cells to hydrolyze X-Gal.

This experiment provides a DNA fragment together with a linear plasmid and T4 DNA Ligase. Following the ligation to synthesize the recombinant plasmid, competent E. coli cells are transformed and the numbers of recombinant antibiotic resistant white and blue colonies are counted.

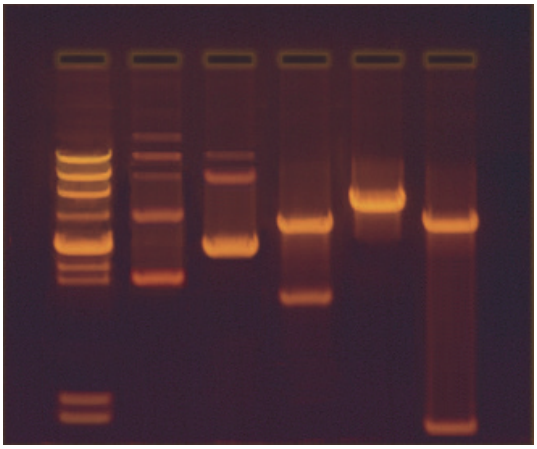
Finally β-galactosidase activity is assayed from blue and white bacterial cells. This experiment can be broken down into three modules: ligation, transformation, and assay of β-galactosidase.

> **Kit includes:**
Linearized pUC plasmid & DNA fragment, T4 Ligase, BactoBeads™ for transformation, reconstitution buffer, XGal in solvent, IPTG, calcium chloride, antibiotic, Broth Agar, broth media for recovery, growth media, assay components, plastic supplies.

> **You need:**
Incubation oven, two waterbaths, shaking incubator or shaking waterbath, microwave or hot plate, micropipette and tips, spectrophotometer, balance, centrifuge, microcentrifuge, glassware and cuvettes, distilled water, ice.

CONSTRUCTION AND CLONING OF A DNA RECOMBINANT

ED-301 **5 groups of students**



Cloning is frequently performed to study gene structure and function, and to enhance gene expression. This experiment is divided into five modules. Clones are constructed by ligation of a vector and a fragment insert. The constructs are then transformed into competent cells and the cells are grown and selected for resistance to an antibiotic.

Plasmid DNA is then isolated from the transformants, cleaved with restriction enzymes, and analyzed by agarose gel electrophoresis.

> **Kit includes:**
BactoBeads™, enzymes, plasmid DNA, restriction enzyme dilution buffer, enzyme grade water, standard DNA fragments, restriction enzyme reaction buffer, gel loading solution, agarose powder, electrophoresis buffer, stains, and calibrated pipette.

> **You need:**
Electrophoresis apparatus and power supply, automatic micropipet with tips, balance, microwave or hot plate, waterbath, large weigh boats for staining, UV transilluminator, floating racks for microtest tubes, pipette pump, 5 or 10 ml pipettes, laboratory glassware, metric rulers, distilled water, ice.

1.5. IMPLEMENTATION OF MOLECULAR BIOLOGY TECHNIQUES.

Here's a series of kits that consist of two parts, the first one theoretical and the second practical.

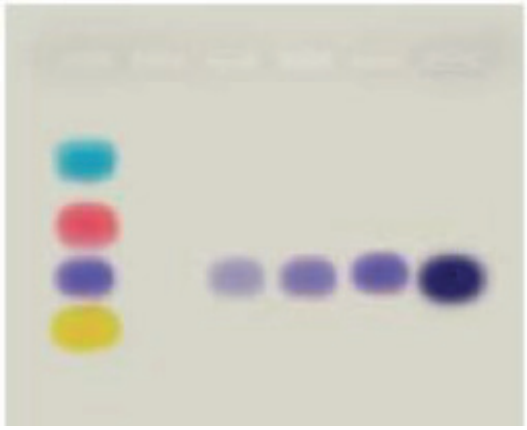
In the first part the teacher can explain to students what is the PCR technique and its potential biomedical applications, all these forensic and biomedical applications that are not treated in the normal agenda could be treated in depth as biomedical seminars.

And the practical part where the students can simulate the results of a traditional PCR by agarose gel electrophoresis.

PCR SIMULATION

PCRSIMULADA **4 practices**

This kit lets you show what is the PCR, how it works and its practical applications without having a PCR machine. To do this are used dye solutions which simulate the DNA fragment. These solutions migrate in the agarose gel and intensify its color in each PCR cycle simulating an increase in the amount of DNA. As in actual PCR cycles, a greater numbers of cycles give more DNA amplified, showing it as greater intensity of the bands.



> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

CSI TEST

PCRDETECTIVES **4 practices**

This experiment introduces students in the techniques in which are used DNA and PCR for identification of a criminal from samples of hair or saliva.

In this practice the students perform a electrophoresis to simulate the result of a PCR sample. A simulation is performed using dye solutions which make the role of DNA fragment. Each student has to identify the suspect who has been at the crime scene.

> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

PATERNITY TEST

PCRPATERNIDAD **4 practices**

This experiment introduces students in the techniques in which are used DNA and PCR for a paternity test.

A simulation is performed using dye solutions which make the role of DNA fragment. Each student has to identify the possible father in a paternity suit.

> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

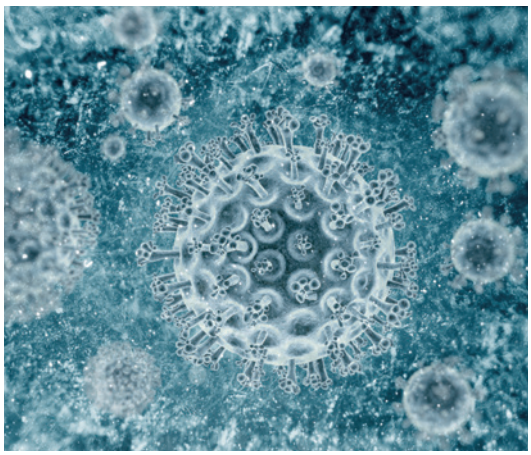
DETECTION OF HEPATITIS B VIRUS BY PCR

PCRVHB

4 practices

The aim of this experiment is to introduce students to the principles and practice of Polymerase Chain Reaction (PCR) as a tool for the detection of hepatitis B virus by PCR.

Students will acquire basic knowledge about the HBV disease and how it produces hepatitis B.



> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

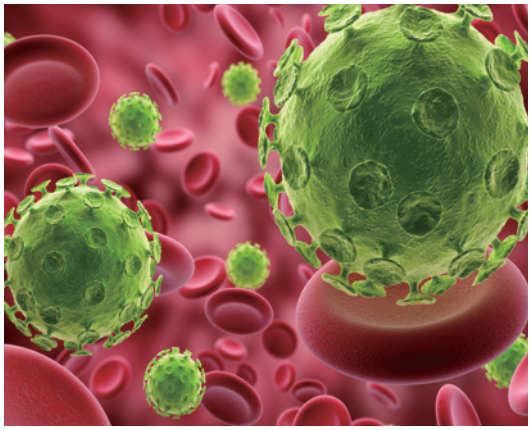
DETECTION HIV BY RT-PCR

PCRHIV

4 practices

The aim of this experiment is to introduce students to the principles and practice of Polymerase Chain Reaction (PCR) as a tool for the detection of HIV by PCR.

Students will acquire basic knowledge about the HIV disease and that causes AIDS.



> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

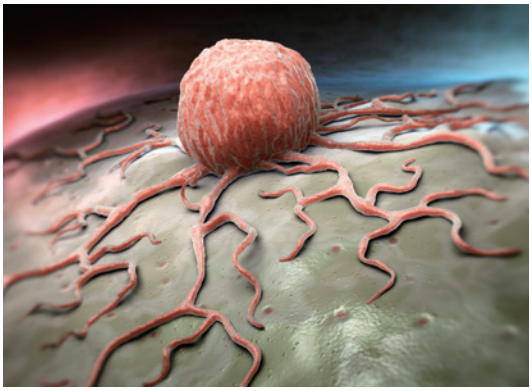
> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

GENETIC DIAGNOSIS OF CANCER HEREDITARY

PCRCAN

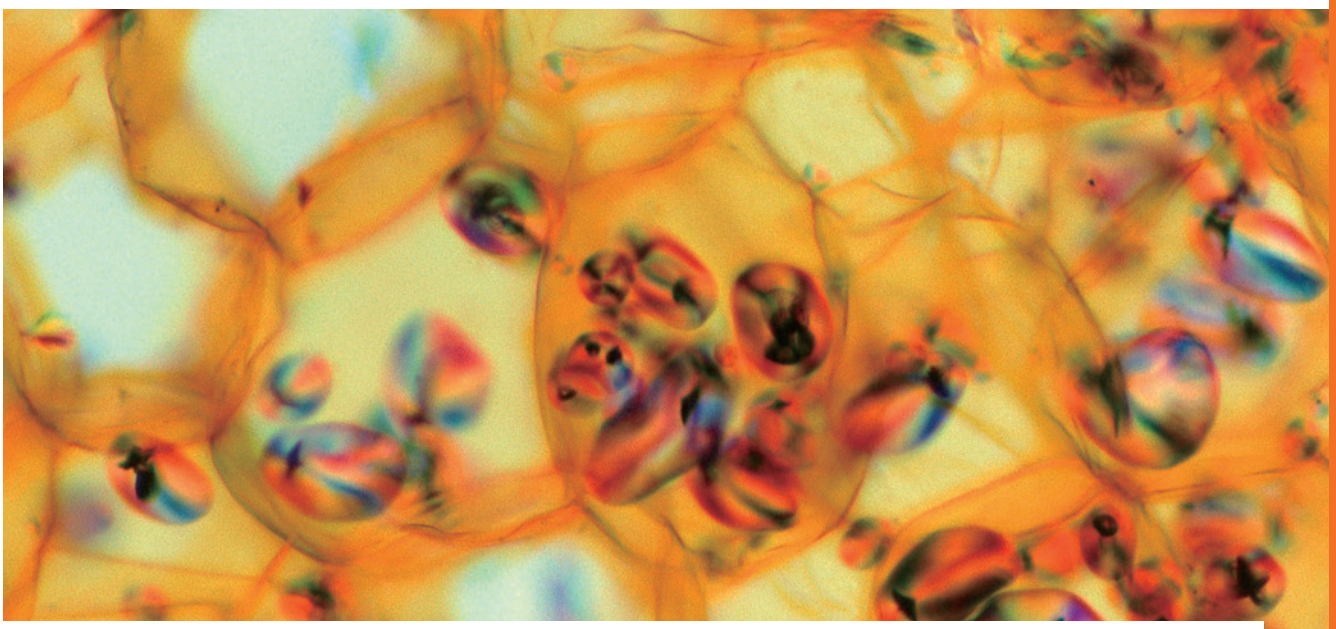
4 practices

The objective of this experiment is to introduce students to the principles and practice of Polymerase Chain Reaction (PCR) as a tool for genetic diagnosis of cancers with a hereditary component. Students will acquire basic knowledge about the molecular biology of cancer by studying the case of a tumor suppressor gene such as p53.



> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.



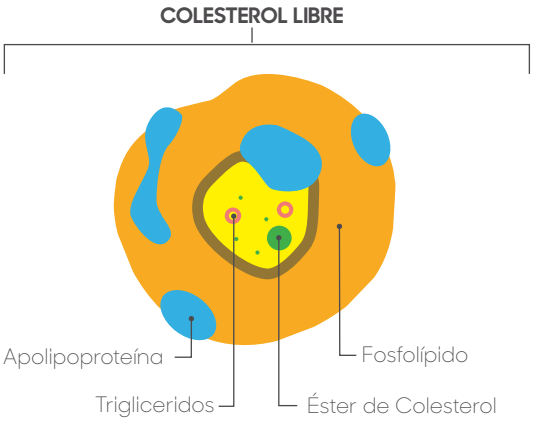
GENETIC DIAGNOSIS OF HYPERCHOLESTEROLAEMIA BY RFLP

PCRCOL

4 practices

The objective of this experiment is to introduce students to the principles and practice of Polymerase Chain Reaction (PCR) as a tool for genetic diagnosis related to cholesterol metabolism diseases.

Students will acquire basic knowledge about the cholesterol molecule and any associated cardiovascular disease.



> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

DETECTION OF GMO BY PCR

PCROMG

4 practices

The aim of this experiment is to introduce students to the principles and practice of Polymerase Chain Reaction (PCR) as a tool for the detection of genetically modified organisms.

Students will acquire basic knowledge about the molecular biology of the obtaining process a GMO.

> **Kit includes:**
Samples, 10x TAE, agarose, micropipette and tips.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

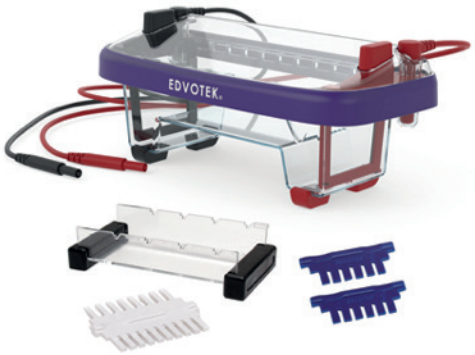
1.6. MOLECULAR BIOLOGY LABORATORY.

DNA ELECTROPHORESIS

To carry out agarose gel electrophoresis who allows separating by sizes the nucleic acid molecules and analyzing PCR amplified products.

☀ **Unit M6:** **500**
> **Kit includes:** A gel tray to do gels (7 x 10 cm) and two different combs.

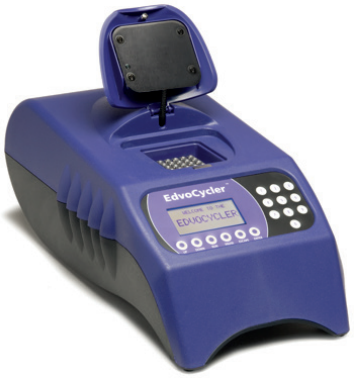
☀ **Unit M12:** **502**
> **Kit includes:** A gel tray to do gels (7 x 14 cm) and three different combs.



THERMAL CYCLER

This is the apparatus to perform the PCR. It can hold 25 microtubes of 0.2 ml.

541



PROTEINS ELECTROPHORESIS

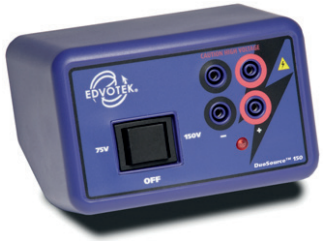
This apparatus perform the gel polyacrylamide electrophoresis for separating proteins of different sizes.

581
> **Allows:** It allows contain polyacrylamide gels (9 x 10 cm) ready.

POWER SUPPLY

The DuoSource TM 150 unit supplies electrical power to the horizontal and vertical continuous chambers. You can select the voltage to 75 or 150 volts.

509



WATERBATHS AND SHAKERS

3 liters waterbath with adjustable temperature, it is basic for all kinds of incubations, digests and enzymatic treatments.

3 liters waterbath: **50601003**

Vortex is to homogenize samples and reagents.

Vortex: **VORX-005-001**

MICROCENTRIFUGE

The centrifugal high speed mini Microspin 12 is a compact desktop centrifuge designed for biomedical laboratories.

The microspin 12 is used for extracting samples of DNA / RNA, biological components sedimentation and for biochemical and chemical analysis microcuvette.

MCEN-15K-001

INCUBATION OVEN

Economic bacteria incubation oven with digital temperature control in a range of +1 to 60°C.

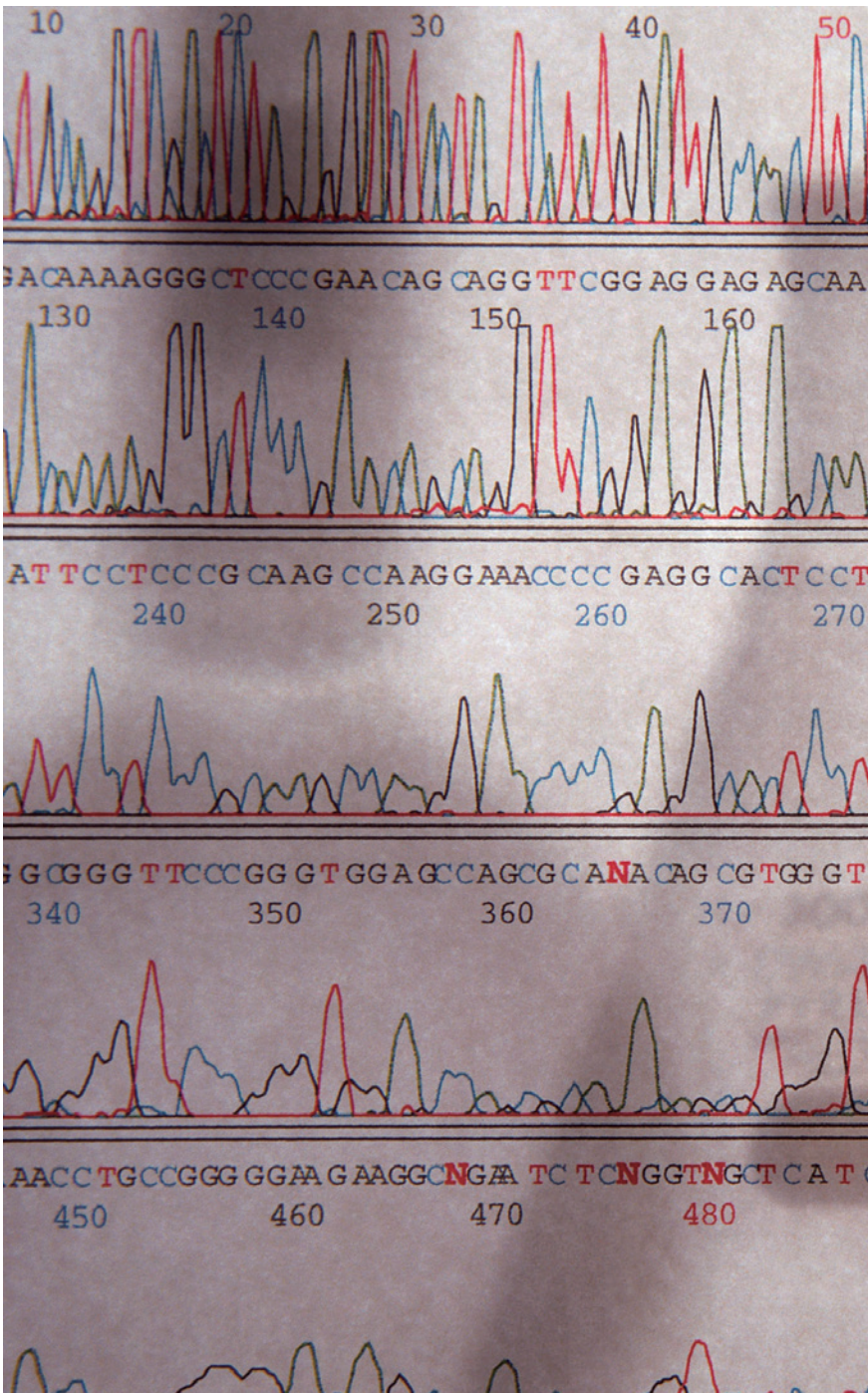
It is ideal to grow bacteria on agar plates at 37°C or Southern and Western Blot analysis at 60°C.

INCUB

MICROPIPPETES AND TIPS

We can supply variable volume micropipettes different games to have differentiated equipment for extraction and PCR equipment and corresponding filter tips to avoid aerosols contaminating the body of the pipette.

1.7. NUCLEIC ACID SEQUENCING.



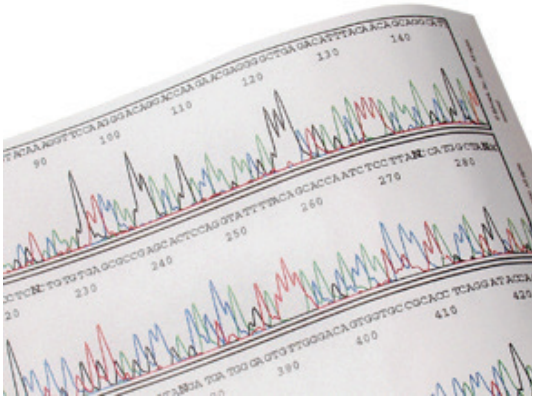
It's the process to determining the nucleotide sequence comprising a DNA or RNA molecule and which is represented by the initials of the nitrogenous bases they carry.

SEQUENCING THE HUMAN GENOME

SEQ1 **10 groups of students**

Actual data representing important genes from automated DNA Sequencers are provided.

Students will determine the DNA sequence, compare and extrapolate database information and identify the gene product and other closely related proteins.



> **Kit includes:**
Automated sequencing printouts.

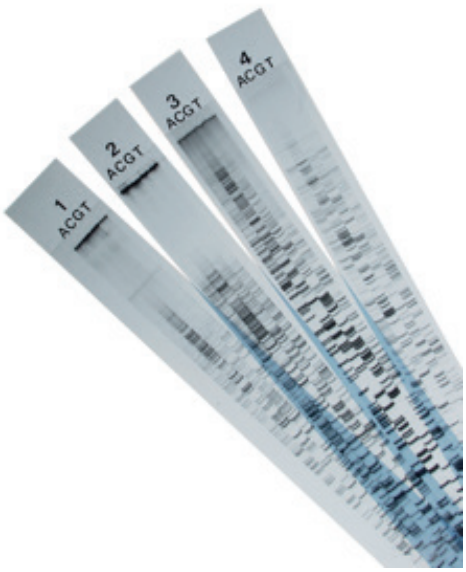
> **You need:**
Computer access to the internet.

DNA-BIOINFORMATICS

SEQ2 **12 groups of students**

DNA sequence information is being compiled by various genome initiatives and numerous research groups around the world. The management of this data is known as bioinformatics. This information is stored in various DNA sequence databases which can be readily accessed via the internet.

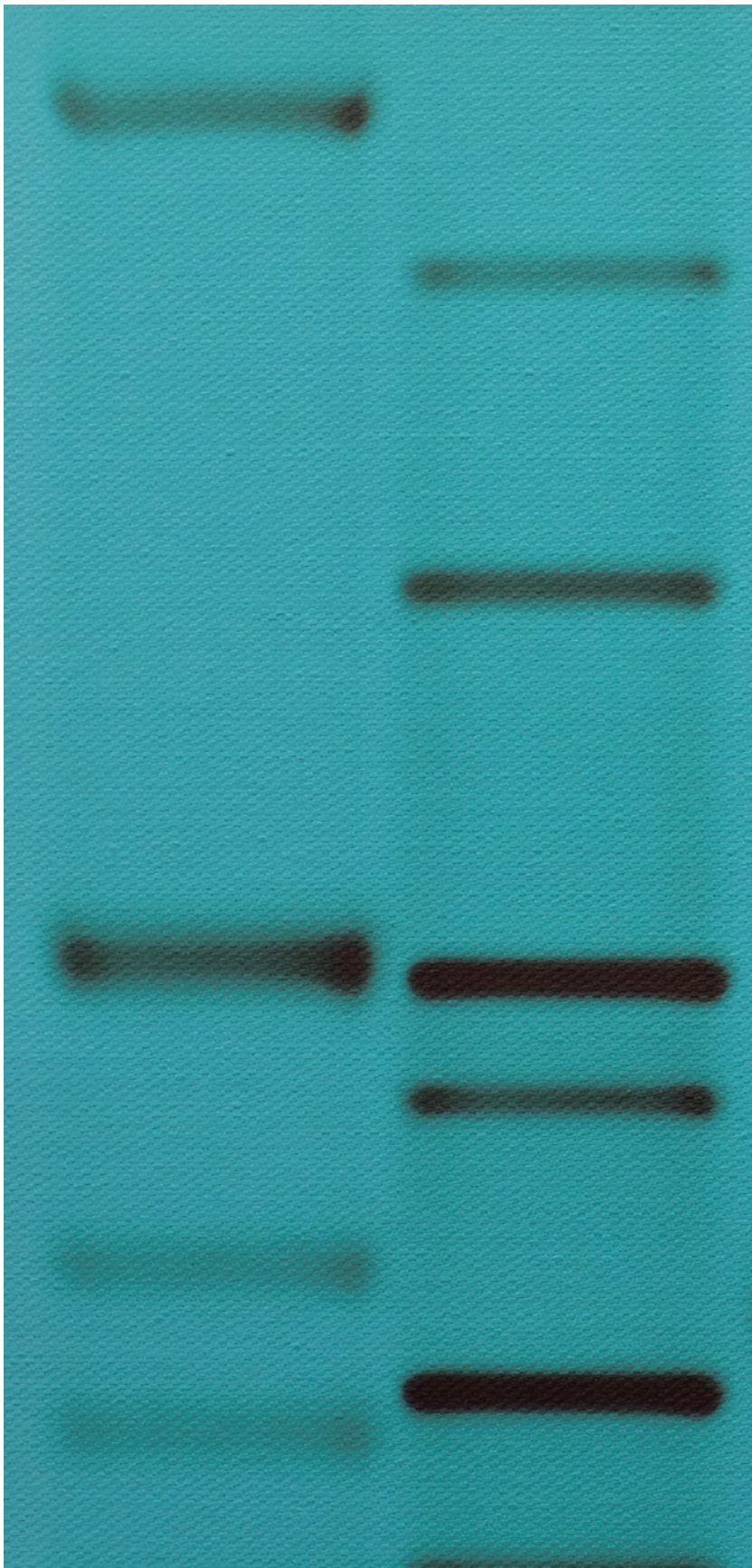
In this experiment, students read autoradiographs containing DNA sequences which represent segments of important cellular genes. Using bioinformatics databases, students compare and extrapolate database information and identify the gene product.



> **Kit includes:**
3 sets of 4 autoradiograms.

> **You need:**
White light visualization system, computer access to the internet.

2.1. DNA ELECTROPHOREIS



This kit includes all material you need to conduct practice 4 times with different groups or classes. It includes introduction to the technical, practice material and teaching guide for the teacher.

To carry out these practices is necessary to have a BASIC electrophoresis system not included in the practices kits.

ELECTROPHORESIS BASIC KIT

(Electrophoresis Apparatus And Power Supply)

ELECTROFORESIS

The electrophoresis basic equipment consists of a gel chamber (7 x 10 cm) and power supply.

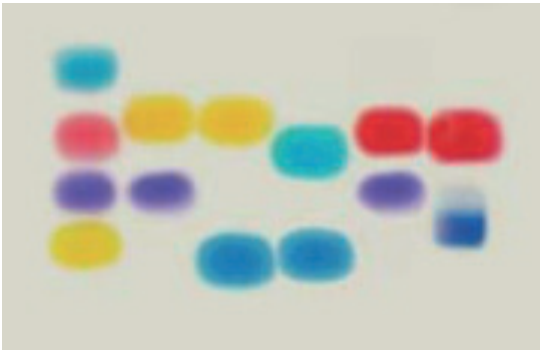
By purchasing, is given away any of our kits for electrophoresis practices or of implementation to molecular biology techniques.

AGAROSE GEL ELECTROPHORESIS. BASIC PRINCIPLES AND PRACTICE.

ELECBASICA **4 practices**

Simple practice to demonstrate the separation of molecules using agarose gel electrophoresis.

A simulation using dye solutions as DNA fragments that migrate in the agarose gel due to applied potential difference is performed.



> **Kit includes:**
Samples, TAE, agarose and micropipette and tips.

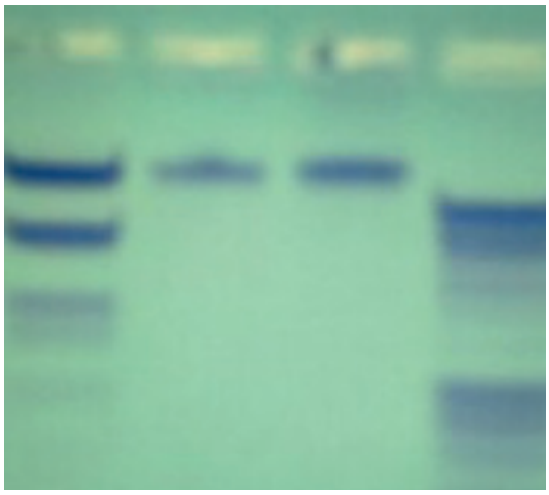
> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

AGAROSE GEL ELECTROPHORESIS. ADVANCED PRINCIPLES AND PRACTICE.

ELECTAVANZADA **4 practices**

Simple practice to demonstrate the separation of DNA fragments (molecular weight markers and genomic DNA) using agarose gel electrophoresis and subsequent staining DNA **with a nontoxic method.**

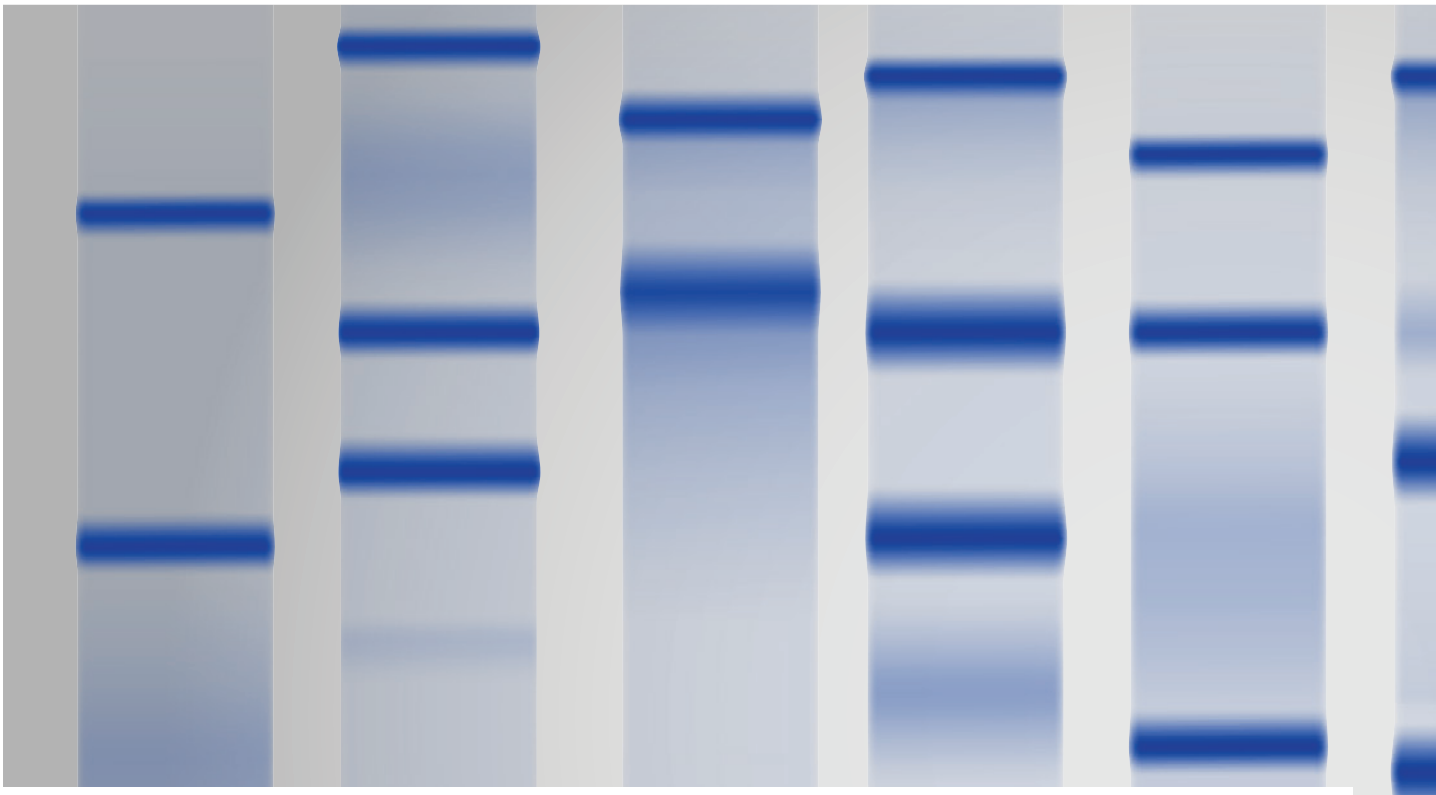
This electrophoresis is similar to that is possible to do at any research laboratory.



> **Kit includes:**
Samples, TAE, agarose, micropipette and tips, and stain method.

> **You need:**
Microwave or hot plate, horizontal electrophoresis system and balance.

2.2. RESTRICTION ENZYMES AND CLONING.



INTRODUCTION TO RESTRICTION ENZYMES

ER1 4 practices

This experiment's aim is to develop the knowledge of restriction enzymes and agarose gel electrophoresis. This kit includes all material you need to conduct practice 4 times with different groups or classes. It includes introduction to the technical, practice material and teaching guide for the teacher.

The digested phage lambda DNA is supplied.

> **Kit includes:**
Samples, TAE, agarose and staining method.

> **You need:**
Horizontal electrophoresis system, power supply, micropipet and tips, balance, microwave or hot plate, white light visualization system.

DIGESTION OF PHAGE LAMBDA WITH RESTRICTION ENZYMES

ER2 4 practices

This experiment's aim is to develop the knowledge **of bacteriophage lambda and agarose gel electrophoresis.** This kit includes all material you need to conduct practice 4 times with different groups or classes. It includes introduction to the technical, practice material and teaching guide for the teacher.

The phage lambda DNA and enzymes for digestion are provided. **These enzymes are special and allow digestions in just 10 minutes with what the practice can be done in a short time.**

> **Kit includes:**
Samples, TAE, agarose and staining method.

> **You need:**
Horizontal electrophoresis system, power supply, micropipette and tips, balance, microwave or hot plate, white light visualization system.

MAPPING OF RESTRICTION SITES ON PLASMID DNA

ER3 4 practices

This experiment's aim is to develop the DNA mapping knowledge determining cleavage sites of the restriction enzymes into a plasmid.

Plasmid DNA is cut by various combinations of restriction enzymes and resolved by agarose gel electrophoresis.

> **Kit includes:**
Restriction enzymes, DNA plasmid samples, agarose powder, molecular weight marker, electrophoresis buffer, staining method, calibrated pipette, and microtipped transfer pipettes.

> **You need:**
Horizontal electrophoresis system, power supply, micropipette and tips, balance, microwave or hot plate, white light visualization system.

PURIFICACTION OF THE RESTRICTION ENZYME Eco RI

ER4 4 practices

In this experiment, students actually purify the restriction enzyme, Eco RI. This procedure utilizes an ion exchange chromatography step for Eco RI purification.

Column fractions are assayed for the enzyme using Lambda DNA and digestion products are identified by agarose gel electrophoresis. Fractions that contain Eco RI are identified and pooled. The total and specific activities are calculated.

> **Kit includes:**
Ion exchange matrix, chromatography columns, E. coli cell extract, equilibration and elution buffer, Lambda DNA, Lambda/Eco RI Marker, KCl, glycerol, dilution and reaction buffers, agarose, electrophoresis buffer and staining method.

> **You need:**
Horizontal gel electrophoresis apparatus, power supply, UV visualization system, waterbath, microcentrifuge, microwave or hot plate, UV spectrophotometer and cuvettes, micropipette with tips, ring stands & clamps, 10 ml pipettes, lab glassware, ice and ice buckets.

2.3. ELECTROPHORESIS AND PURIFICATION OF PROTEINS.

PRECAST POLYACRYLAMIDE GELS

> **Compatible with our vertical chambers, have to be assessed with other chambers.**

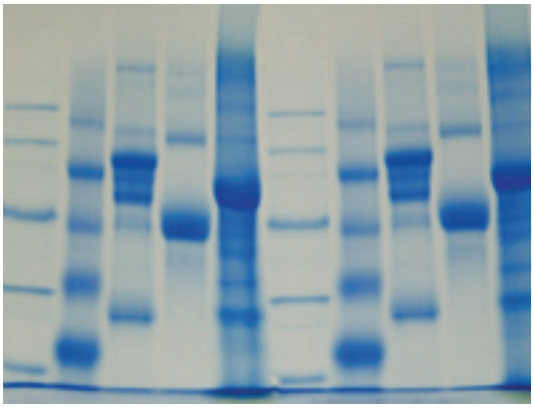
- 3 polyacrylamide gels (12%) ready for use. **GP3**
- 6 polyacrylamide gels (12%) ready for use. **GP6**

SURVEY OF PROTEIN DIVERSITY

ELECPROT1 **6 groups of students**

This experiment's aim is to learn the gel electrophoresis SDS-polyacrylamide use to understand the structure, function and diversity of proteins.

Your students will separate proteins from bacterial, plant, serum, and milk proteins alongside a standard protein marker.



> **Kit includes:**
Denatured protein samples, standard protein markers, gel loading solution, buffer, and staining method.

> **You need:**
3 polyacrylamide gels (12%), vertical gel electrophoresis apparatus, power supply, hot plate, white light visualization system, micropipette with fine tips, microtest tube holder, lab glassware, methanol, glacial acetic acid, and distilled water.

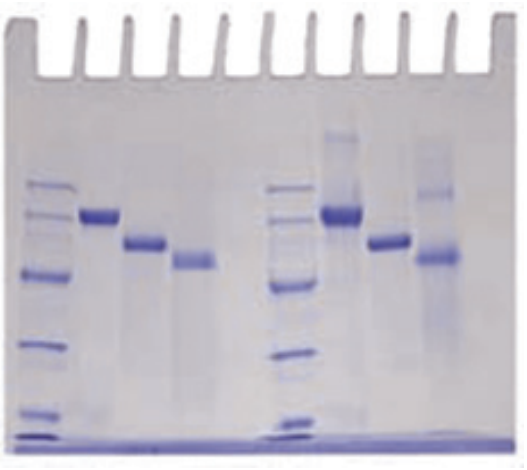
DETERMINATION OF PROTEIN MOLECULAR WEIGHT

ELECPROT2

6 groups of students

This experiment's aim is to learn the gel electrophoresis SDS-polyacrylamide use to understand the structure, function and diversity of proteins.

Pre-stained proteins with unknown molecular weights are assigned molecular weights based on the relative mobility of prestained standard protein markers.



> **Kit includes:**
Denatured protein samples, standard protein markers, gel loading solution, buffer, and a staining method.

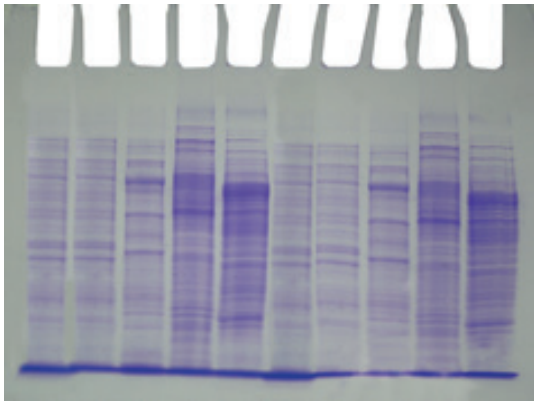
> **You need:**
3 polyacrylamide gels (12%), vertical gel electrophoresis apparatus, power supply, hot plate, white light visualization system, micropipette with fine tips, microtest tube holder, lab glassware, methanol, glacial acetic acid, and distilled water.

PURIFICATION AND ELECTROPHORESIS OF BACTERIAL PROTEINS (FINGERPRINTING)

ELECPROT3

6 groups of students

This experiment's aim is to develop the knowledge to prepare lysates of bacterial proteins from different species of bacteria and analyze their behavior by **denaturing SDS vertical polyacrylamide electrophoresis** to identify an unknown protein.



> **Kit includes:**
Bacterial cultures and reagents, lipoproteins, lysozyme, buffers, staining method, unknown proteins samples, agar and nutrient broth.

> **You need:**
3 polyacrylamide gels (12%), vertical gel electrophoresis apparatus, power supply, hot plate, white light visualization system, micropipette with fine tips, microtest tube holder, lab glassware, methanol, glacial acetic acid, and distilled water.

PURIFICATION AND SIZE DETERMINATION OF FLUORESCENT PROTEINS

PURFGFP

6 groups of students

In this experiment students will learn to purify partially green and blue fluorescent proteins. As an optional activity, students will determine the molecular weight of proteins by gel electrophoresis in denaturing polyacrylamide-SDS.

> **Kit includes:**
Columns and matrix, GFP and BFP extracts protein, buffers and reagents for electrophoresis.

> **You need:**
Waterbath, long wave UV lamp, ring stand, clamps, microtest tubes, micropipette and tips, vertical electrophoresis apparatus, power supply, hot plate, 3 polyacrylamide gels (12%).

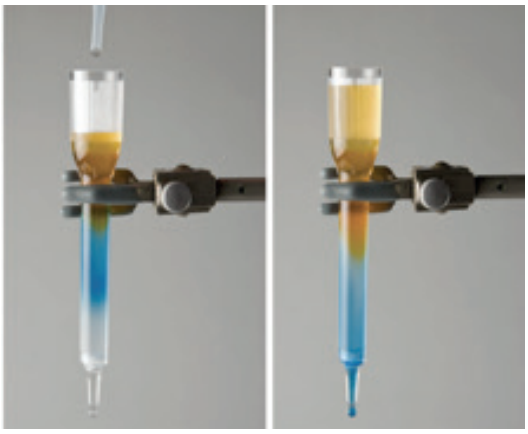
PRINCIPLES OF GEL FILTRATION CHROMATOGRAPHY

CRO1

10 groups of students

This experiment introduces chromatographic separation to your class and shows them how dyes of different colors separate on the basis of their size and shape.

This experiment contains materials for dye separation which include dye sample, elution buffer and plastic disposables. Columns may be rinsed and reused.



> **Kit includes:**
Sample mixture, chromatography columns, dry matrix, elution buffer, transfer pipettes, and microtest tubes.

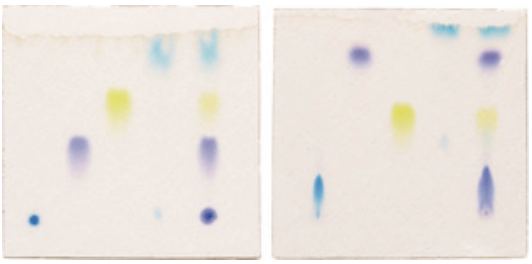
> **You need:**
50 or 100 ml beakers, 25 ml beaker or test tube, ring stands with clamps, and distilled water.

PRINCIPLES OF THIN LAYER CROMATOGRAPHY

CRO2

8 groups of students

This experiment introduces chromatographic theory and methods of thin layer chromatography. A mixture of dyes is separated on a cellulose-based TLC plate using two different solvent systems.



> **Kit includes:**
Samples, reagents and solvents, cellulose thin layer plate, and 5 µl glass capillary pipettes.

> **You need:**
250 ml beakers, metric rulers, pipette pump, 5 or 10 ml pipettes, and distilled water.

ION EXCHANGE CHROMATOGRAPHY

CRO3

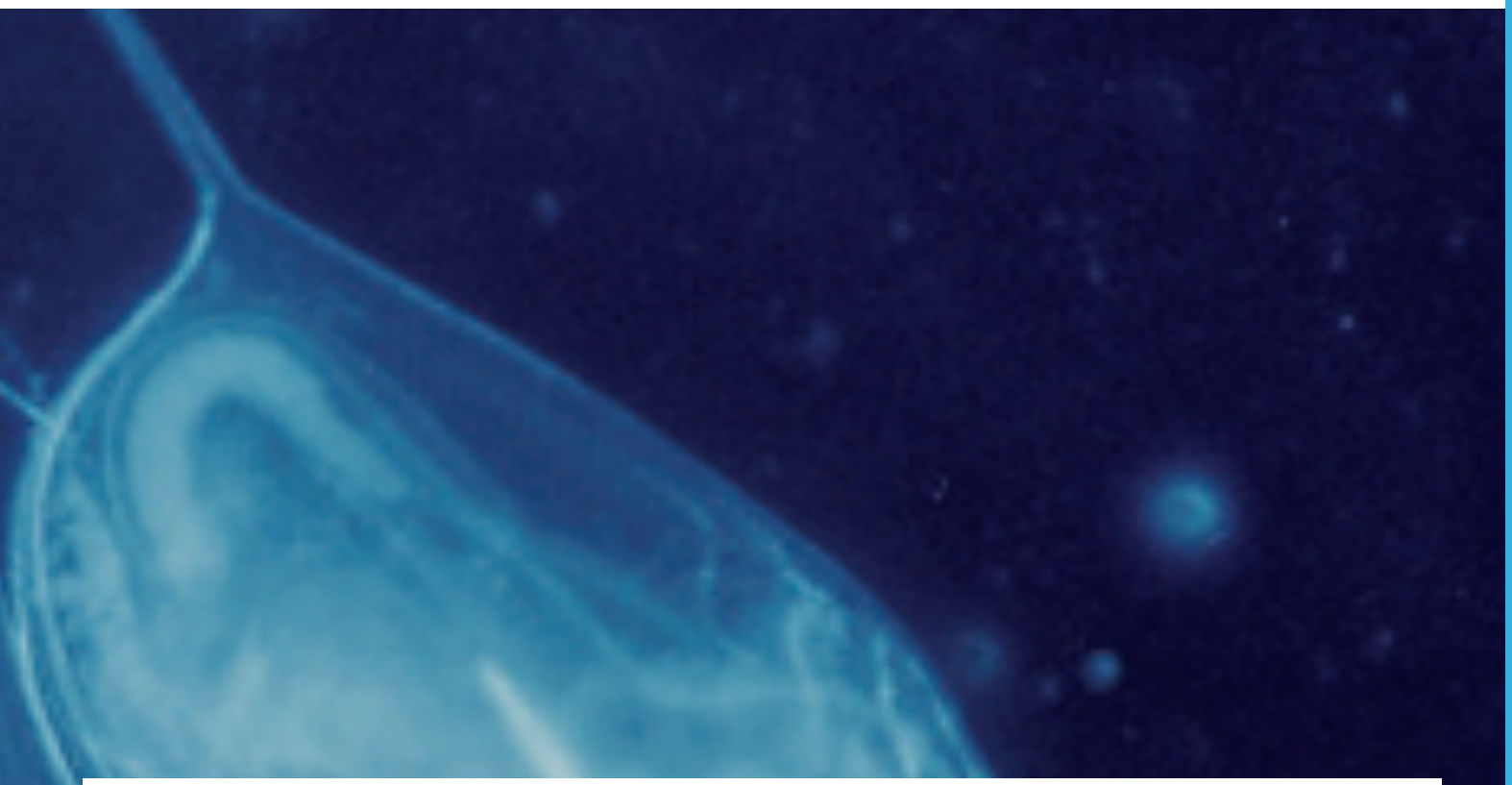
6 groups of students

Most molecules have a net charge within a pH range of 2 to 10. When the pH is altered, the net charge on molecules can change drastically. In this experiment, a mixture of two chemicals is absorbed onto a solid support ion-exchange column and separated during elution under conditions that influence their net charge.

> **Kit includes:**
Ion exchanger, chemical mixture, potassium acetate buffer, and chromatography columns.

> **You need:**
Spectrophotometer, cuvettes, ring stands and clamps, test tubes, lab glassware, distilled water, and 5 ml pipettes and pumps.

2.4. MUTAGENICITY TESTS.



TOXICITY DETECTION OF POLLUTANTS IN FRESHWATER

ED-954

5 groups of students

This experiment has been adapted from a freshwater quality test which uses Daphnia magna to determine toxicity levels of freshwater.

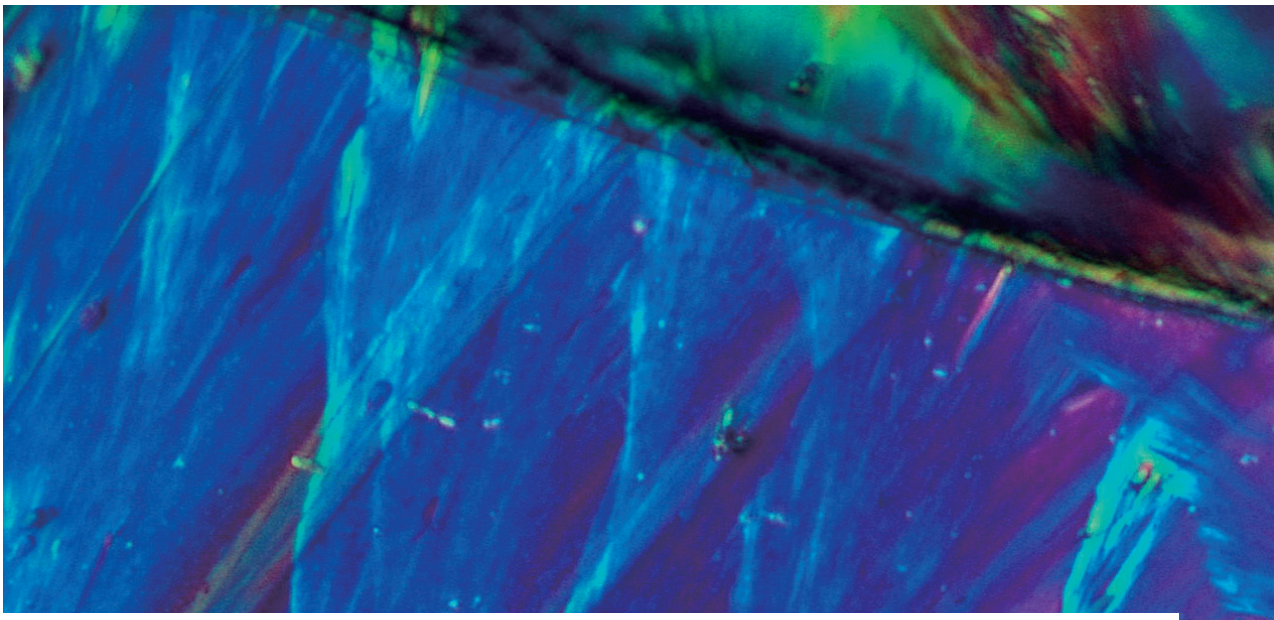
A simulated "toxicant" is provided to simulate environmental pollution in freshwater lakes, rivers and streams.

Hydrolysis of a fluorescent substrate by Daphnia is used to determine the level of toxicants. Results are observed by using long wave ultraviolet light. Calculations for lethal concentration are determined.

> **Kit includes:**
Fluorescent detection substrate, simulated toxicant concentrate, toxicity reduction reagent, 1 molded exposure chamber, wide bore transfer pipettes, and calibrated plastic pipettes.

> **You need:**
Daphnia magna, 4 additional molded exposure chambers (Ref. ED-965), long wave UV light, white light visualization system, microscope, large glass vessel, beakers, UV protective goggles, spring water, test tubes, 5 ml pipettes and pumps.

3. GENETICS AND CYTOGENETICS.



SYSTEM ABO-Rh DETERMINATION

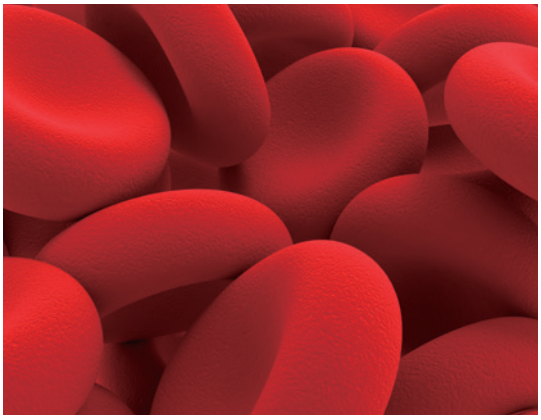
ABO-RH

12 students

In this experiment, students will learn the techniques used to determine the blood type and Rh.

The test procedure used in this kit is the same as used with real blood, with the only difference that this kit contains synthetic blood and synthetic antiserum eliminating any risk associated **with exposure to real blood or blood products.**

Each individual student has to indicate the blood group and Rh from 4 samples problems.



> **Kit includes:**
50 slides, 150 sticks, 12 synthetic blood samples, 9 synthetic antiserum samples, and 12 micropipettes (1.2 ml).

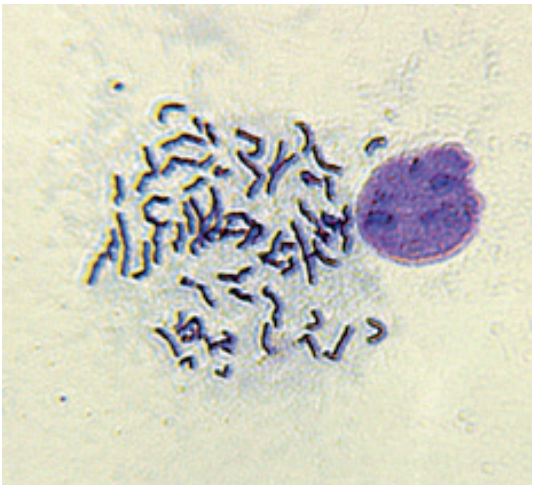
> **You need:**
All you need are included on the kit.

CHROMOSOME SPREAD (PRE-FIXED SLIDES)

CEL-1 6 groups of students

During mitosis, each of our chromosomes is duplicated. The chromosomes are then separated during mitosis, moving to opposite ends of the cell before cell division. In this experiment, cells have been arrested during metaphase and fixed to slides, allowing students to stain and observe the condensed chromosomes.

Students will develop an understanding of karyotyping and the association of chromosomal abnormalities with diseases.



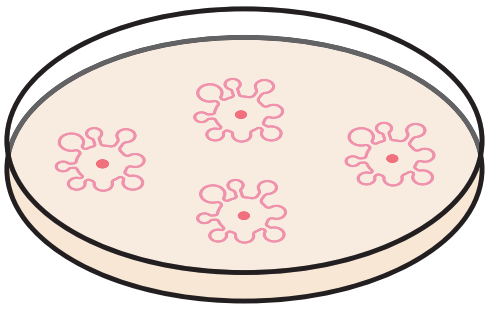
> **Kit includes:**
Pre-fixed chromosome spread slides, giemsa stain, mounting media, cover slips, transfer pipettes immersion troughs.

> **You need:**
A microscope with 400x magnification.

EUKARYOTIC CELL BIOLOGY

CEL-2 12 groups of students

Cell Culture is a vital technology used in life science research and in biotechnology laboratories. The study of basic cell biology, diseases and cancer, the development and testing of new therapeutics, and the production of new drugs relies on using the techniques introduced in this experiment. Students will learn how to grow eukaryotic cells in culture, basic cell staining and how to count cells. The techniques used in these experiments will provide the student with a skill set desired in both academic research and industry.



Kits contains LIVE materials which must be requested 2 weeks prior to day of the lab. Culturing of cells is required upon receipt. Additional medium may be required if culturing of cells or if the experiment is not performed within three days upon receipt.

> **Kit includes:**
Growth media, flasks, Giemsa stain, Trypan blue dye, sterile T25 flasks, sterile culture dishes, sterile large pipettes, small pipettes, cell counting chambers, Sf9 insect cells.

> **You need:**
Microscope, Spray bottle with 70% ethanol or methanol, pipette controller.

4. IMMUNOLOGY.

INTRODUCTION TO ELISA REACTION

ELISA1 10 groups of students

Your students will learn the basic principles of the Enzyme-linked Immunosorbent Assay (ELISA) in this precise and sensitive antibody-based detection kit.

Experiment components do not contain human serum.

> **Kit includes:**
Antigens, primary and secondary antibodies, peroxide co-substrate, hydrogen peroxide, ABTS substrate, phosphate buffered saline, tubes, plates, and transfer pipettes.

> **You need:**
Distilled water, 37° C incubation oven, automatic micropipettes with tips and laboratory glassware.

SIMULATION OF HIV DETECTION BY ELISA

ELISA2 10 groups of students

This experiment's aim is to provide students the molecular biology and pathogenesis basics of acquired immunodeficiency syndrome (AIDS).

An HIV test detects HIV infection indirectly using an ELISA test against HIV antibodies in the blood. The test works by taking antibodies from the patient's blood and adding them to a microtiter plate coated with HIV antigen. If HIV antibodies are present in the blood, they will bind to the antigens on the plate. This binding is detected with an enzyme-linked secondary antibody that causes a color change upon addition of substrate. In this experiment, students will perform an ELISA test by coating microtiter plate wells with simulated HIV antigen and then test simulated donor serum for anti-HIV antibodies.

> **Kit includes:**
Simulated HIV antigens, serum samples, antibodies, buffers, microtiter plates, assorted pipets and microtest tubes.

> **You need:**
Distilled water, 37° C incubation oven, automatic micropipettes with tips and laboratory glassware.

QUANTITATIVE ELISA

ELISA3 10 groups of students

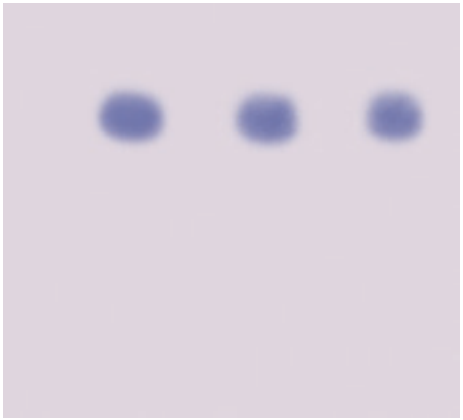
Antibodies are highly specific in their recognition of antigens. This ELISA experiment demonstrates the quantitation of varying concentrations of viral antigens as detected by the intensity of the color reaction due to the accumulation of products.

> **Kit includes:**
Antigens, primary and secondary antibodies, substrate solution, phosphate buffered saline, blocking agent, stop solution, tubes, plates, and transfer pipettes.

> **You need:**
Distilled water, 37° C incubation oven, micropipettes with tips,

SIMULATION OF HIV DETECTION BY WESTERN BLOT

ELISA4 6 groups of students



The second assay used to confirm a positive HIV ELISA result is the Western Blot. Students separate protein samples from hypothetical patients on agarose gels, transfer the samples to a membrane and detect the simulated HIV proteins. This kit is an introductory level experiment.

> **Kit includes:**
Samples, standard molecular weight markers, protein agarose, various buffers and reagents, PVDF membrane, filter paper, stain, 1 ml pipette, 100 ml graduated cylinder.

> **You need:**
Electrophoresis apparatus, power supply, micropipettes with tips, microwave, incubation oven, shaker platform, lab glassware, small plastic trays, microtest tubes, pipette pumps, metric rulers, distilled water, methanol, and glacial acetic acid.

5. REAGENTS.

BASIC ELECTROPHORESIS GEL KIT

The kit includes all the reagents you need for making 10 full electrophoresis and the DNA visualization (for 10×7 cm o 10×10 cm gels).

2 formats:

☀ **Ekitblue**: 10 full electrophoresis.
> **Kit includes:** 10 agarose pills, 150 ml 10x TAE, 500 µl loading buffer, 25 ml DANABLUE, 100 ml FLASHBLUE.

EKITBLUE

☀ **Ekitsafe**: 10 full electrophoresis.
> **Kit includes:** 10 agarose pills, 150 ml 10X TAE, 500 µl loading buffer, 25 µl GELSAFE Nucleic Acid Gel Stain (UV light transilluminator needed).

EKITSAFE

AGAROSE POWDER

- **100 gr agarose powder:** **DANAGAROSE100**
- **500 gr agarose powder:** **DANAGAROSE500**

10X TAE

Agarose electrophoresis buffer for nucleic acids, the working concentration is 1x TAE.

- **10X TAE:** 1 liter **TAE1L**
- **10X TAE:** 500 ml **TAE500ML**

DANABLUE-FLASHBLUE

NON TOXIC alternative for the nucleic acids detection. Nucleic acids are blue as electrophoresis occurs. UV light transilluminator is no needed to visualize correctly the DNA, but it requires a post-staining with FlashBlue.

> **Kit includes:** 25 ml DANABLUE, 100 ml FlashBlue.

DNB-100

GELSAFE Nucleic Acid Gel Stain

NON TOXIC alternative to the traditional ethidium bromide (EtBr) stain for detecting nucleic acid in agarose gels and with the same sensitivity. It needs a UV light transilluminator.

> **Kit includes:** 1 ml GELSAFE **GELSAFE**

DANAPOLYMERASE HOT START

HOT START Polymerase (2x) ready for use, it allows amplify any fragment so that the user only has to add water and primers. An activation step of 10 minutes at 95°C is required, in this way non-specific products as "primer-dimers" are removed. It also contains a red dye that allows direct seeding in the agarose gel without adding loading buffer.

> **Kit includes:** **1.25 ml POLYMERASE MIX**

1101

DANAMARKER BEETHOVEN

It contains 14 regularly spaced bands of 10,000 bp to 200 bp. Each band represents an exact amount of DNA, it allows DNA quantification. It is supplied in a format "ready to use", using 20 µl in each load.

> **Kit includes:** 1 ml

0405

SIZE (bp)	ng/BAND
10037	100
8000	80
6000	60
5000	50
4000	40
3000	30
2500	25
2000	20
150/1517	15/15
1000	100
800	80
600	60
400	40
200	20

DANAMARKER SCHUMANN

It contains 11 regularly spaced bands of 1,250 bp to 100 bp. Each band represents an exact amount of DNA, it allows DNA quantification. It is supplied in a format "ready to use", using 20 µl in each load.

> **Kit includes:** 1 ml

0406

SIZE (bp)	ng/BAND
1250	125
1000	100
900	90
800	80
700	70
600	60
500	50
400	40
300	60
200	60
100	50

DANAMARKER DEBUSSY

It is a mixture of 12 pre-stained proteins carefully selected to facilitate estimating molecular weight of the protein during SDS-polyacrylamide electrophoresis gel. This marker protein is ready to use and does not require previous preparations before being applied into the wells of a polyacrylamide gel.

> **Kit includes** 500 µl

0407

245
180
135
100
75
63
48
35
25
20
17
11

DANAGEN · BIOTED S.L

Avenida LLenguadoc, 53,
2a Planta · 08915 · Badalona

+34 620 876 118
info@bioted.es

www.bioted.es