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G-Biosciences ♦ 1-800-628-7730 ♦ 1-314-991-6034 ♦ technical@GBiosciences.com

A Geno Technology, Inc. (USA) brand name

DNA Strands Revealed

Teacher's Guidebook

(Cat. # BE-105)



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MATERIALS INCLUDED

This kit has enough materials and reagents for 30 students (six groups of five students.)

- 6 vials Bac: E.C. Cell Pellet
- 1 vial Cell Suspension Solution
- 1 bottle DNA Release Buffer
- 1 bottle Precipitation Solution
- 10 Large Transfer Pipettes
- 6 Spooling Rods
- 6 Glass Test Tubes (10ml)

SPECIAL HANDLING INSTRUCTIONS

- All reagents can be stored at room temperature

The majority of reagents and components supplied in the *BioScience Excellence™* kits are non toxic and are safe to handle, however good laboratory procedures should be used at all times. This includes wearing lab coats, gloves and safety goggles.

For further details on reagents please review the Material Safety Data Sheets (MSDS).

The following items need to be used with particular caution.

Part #	Name	Hazard
344P	Precipitation Solution	Flammable

ADDITIONAL EQUIPMENT

- Waterbath or beaker and thermometer

TIME REQUIRED

- **Day 1:** 2 hours

OBJECTIVES

- Isolate bacterial genomic DNA.
- Visualize DNA by spooling.

BACKGROUND

DNA, deoxyribonucleic acid, is the molecule of life. Every living organism has DNA in each cell of the organism and each molecule of DNA carries the blueprint for that organism. The DNA molecule is also responsible for heredity, passing on genetic information from parents to child.

DNA molecules are large strands or chains of small molecules known as nucleic acids, which are localized in the nucleus of a cell. This kit allows students to break open bacterial cells and their nuclei to release the genomic DNA. Once released, the genomic DNA is visualized by the addition of a precipitating buffer, a buffer that causes the DNA to solidify and become visible. Students can then wind, or spool, the long strands of genomic DNA onto the spooling rods for easy visualization.

PRE EXPERIMENT SET UP

1. A waterbath or heating block at 65°C is required for efficient release of the genomic DNA.
2. Tube racks for the test tubes are also required.
3. If extra vials are available, aliquot the reagents for each group as indicated in the following section.
4. For improved efficiency, store the Precipitation Solution in a fridge (4°C) until required.

MATERIALS FOR EACH GROUP

- 1 vial Bac: E.C. Cell Pellet
- 2ml Cell Suspension Solution
- 0.5ml DNA Release Buffer
- 4ml Precipitation Solution (Store at 4°C)
- 1 Large Transfer Pipette
- 1 Spooling Rod
- 1 Glass Test Tube

PROCEDURE

1. Label the glass test tube with your group name.
2. Using the Large Transfer Pipette, transfer the Cell Suspension Solution to the Bac: E.C. Cell Pellet. Fill the tube to the 2ml-graduated mark. Seal the vial and leave on your bench for 2 minutes. Vigorously shake and flick the vial until the Cell Pellet has completely broken down and no large lumps are visible.
The cell pellet consists of bacteria.
3. Transfer the Bacterial Suspension to the glass test tube.
4. Add 0.25 volumes (0.5ml) of DNA Release Buffer to the glass test tube containing the Bacterial Suspension. Swirl the tube slowly to mix. The DNA Release Buffer breaks open the bacterial cells and nuclei releasing the DNA.
5. Place the glass test tube into a 65°C waterbath for 30 minutes. After incubation, allow to cool to room temperature.
6. Place the spooling rod into the tube. Tilt the tube to a 45° angle. Using the large transfer pipette, *slowly* add an equal volume (~4ml) of cold Precipitation Solution to precipitate the DNA. Allow the Precipitation Solution to run down the side of the tube. This is to prevent the solutions mixing and the formation of an interface.
7. Keeping the glass test tube at a 45° angle, slowly rotate the rod in the same place over and over, until a visible sample is on the rod. Remove the rod from the sample and examine the sample. This is the genomic DNA.

RESULTS, ANALYSIS & ASSESSMENT

What is the role of the DNA release buffer?

The DNA Release Buffer is responsible for breaking open the bacterial cells and the bacterial nuclei to release the genomic DNA into the solution.

Describe the genomic DNA:

The genomic DNA is clear and viscous (sticky) and appears to be one long strand. The long strand is millions of DNA strands combined together.

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OBJECTIVES

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RESULTS, ANALYSIS & ASSESSMENT

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Describe the genomic DNA:

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