MINDS-ON 3: Banana DNA Extraction

Suggested Timing: 30 minutes

Students will perform a banana DNA extraction laboratory activity in order to gain a basic understanding of how DNA can be extracted from tissues and cells.

Prior Knowledge and Skills

- Understanding of cellular structure (i.e., cell and nuclear membranes, DNA, proteins)

Success Criteria

- Observation of group work during the laboratory activity
- Completion of questions on BLM

BLM M4: Banana DNA Extraction
Backgrounder: DNA Extraction
Banana DNA Extraction - Answer Page (for teacher use)

Tools and Materials

Safety goggles – 1 per student
1 sandwich-sized resealable bag
1 pair of scissors
3 - 500 mL (16 ounce) plastic cups
1 - 5 mL (1 tsp) measuring spoon
1 - 1.25 mL (1/4 tsp) measuring spoon
1 - 15 mL (1 tbsp) measuring spoon
1 plastic spoon
1 coffee filter (cone type) - #4 size works well
1 wooden stir stick
1 - 4 cm long piece of ripe banana
5 mL (1 tsp) liquid dish detergent (e.g., Sunlight®)
1.25 mL (1/4 tsp) table salt
62.5 mL (1/4 cup) plus 30 mL (2 tbsp) distilled or tap water
62.5 mL (1/4 cup) Isopropyl (rubbing) alcohol (90% works best)

- Review the instructions for the activity with the students.
  Note: ensure that students follow the warnings on the side of the bottle of isopropyl alcohol – in particular, it should be used in a well-ventilated area. It is flammable and should be kept away from open flames. It is also poisonous, so should not be ingested or otherwise consumed.
- Hand out materials to each group. Have students follow the instructions on the **BLM M4: Banana DNA Extraction**. Walk around as students complete the extraction, answering questions and guiding as necessary.
- Students can use the **Backgrounder: DNA Extraction** or do other research in order to answer the questions on the second page.

Extensions and Implementation Options

- Students can place a small amount of the extracted DNA on a dry slide. They should not attempt to make a wet slide as the DNA will go into solution and will not be visible. Have the students observe the DNA at various levels of magnification and make notes and drawings.
- DNA can also be obtained from other types of fruit and vegetables, such as strawberries, spinach, kiwi, raspberries and onions. Different groups of students could try different fruits and vegetables.
- If students are unable to do a physical laboratory activity, they could do the virtual lab described in the Additional Information section below.

ADDITIONAL INFORMATION

- http://learn.genetics.utah.edu/content/labs/extraction/ (Accessed Sept. 9, 2016)

  The Genetic Science Learning Center from the University of Utah has a DNA extraction virtual lab in which you extract DNA from a cheek swab. They also have their own protocol for DNA extraction on the How to Extract DNA from Any Living Thing page.

- http://www.stevespanglerscience.com/lab/experiments/strawberry-dna (Accessed Sept. 9, 2016)

  This page from Steve Spangler Science has a good description including photographs for extracting DNA from strawberries.