Playing God: A College Student's Guide to GMOs

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Plant Biology

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The most common storage of plant genetic material is through seed. Seeds have a shelf life of several years depending on species and storage habits, and can then be regrown when they need to be studied. Although poplar trees (which my lab is studying) produce viable seedlings for up to 3 years, their embryos will be dead before being fully formed. Many genes being studied in my lab are lethal at the embryo stage, meaning they cannot be stored in seed form. To store and study these genetic lines, the plants in my lab are preserved in vitro. The plants are grown on a gel in a process called micropropagation, ensuring the plant never produces offspring and is maintained through asexual reproduction. To study gene functions, an "on" version of the gene is synthesized and inserted randomly into a plant's genome. Depending on the placement of the gene varying levels of gene expression are observed.

Site Information:

Plant Science Building

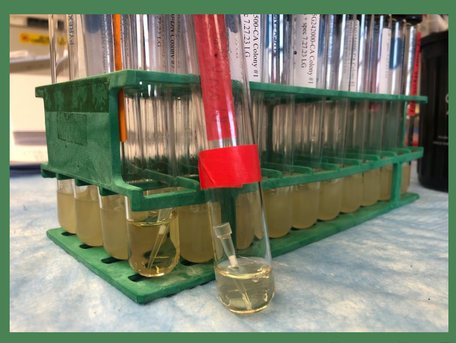
4291 Fieldhouse Dr., College Park, MD 20742

Dr. Gary D. Coleman, Dr. Reuben Tayengwa

Mission: To study specific genes' plant-nutrient interaction through greenhouse and lab experimentation.

Step 1: DNA was prepared in a sterile environment. The Samples were centrifuged, suspended in filtered water, and stored at 20 degrees C. Culture plates were prepared for E. Coli cultures. The E. coli culture was grown overnight at 37 degrees C.

Step 2: The sterilized DNA was tested to determine the concentration of each sample. The E. coli was grown in a liquid culture.



Step 3: The E. Coli's plasmids were isolated and stored in the freezer.

Step 4: LR Reaction was run overnight. This reaction inserts the synthesized DNA into the isolated plasmids.

Step 5: Create Liquid culture of LR sample

Step 6: Transform the sample into chemically competent cells and plate

Step 7: Select 3 colonies for overnight culture

Step 8: Send plasmids in for sequencing

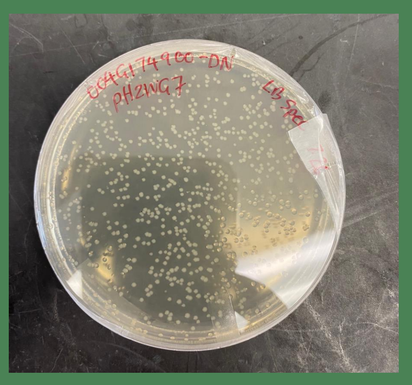
Step 9: Grow agrobacterium cultures

Step 10: Transform Agrobacterium into chemically competent cells.

Step 11: Transform the poplar plant.

Results and Discussion:

To confirm that any genes have been successfully inserted in the plant genome, they are grown on gel media with antibiotics. The inserted gene has a marker gene that gives the plants immunity to specific antibiotics. Therefore, any plants that have not been transformed will die. After the ROP genes have been inserted into the lab's poplar plants, they must be multiplied in order to conduct experiments. This will take several months as after each transfer; the plants must be allowed to grow for at least a month so they can root. Transfers must happen several times to have enough plants. Once there are enough plants, they will be transferred to the greenhouse to grow with non-altered plants to observe any phenotypic trait changes. Additionally, due to the nature of ROP genes (impacting plasmid formation), leaf cutouts will be taken to determine chlorophyll content.



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