

Connecting Genotypes and Phenotypes using Transformed Bacteria in a Wet Lab Setting

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Taught as separate courses, a major difficulty in introductory biology courses is making the connection between Mendelian genetics and molecular biology. To help students better understand and integrate these concepts, Louisiana State University offer hands-on, inquiry-based lab exercises. Freshman biology students first plate *Escherichia coli* strains (A, B, and C) that were transformed by three different plasmids and expose them each to three treatments: the antibiotics tetracycline and ampicillin and ultra-violet light. At the second meeting, students perform gel electrophoresis with the three plasmids (1, 2, and 3) used to transform the bacteria and analyze bacterial growth after 24 hours of incubation. By understanding the role of restriction enzymes and how to analyze plasmid maps, students are tasked with identifying plasmids 1, 2, and 3 by interpreting the gel fragment patterns. Students are then challenged to draw connections between the plasmid genotypes and the resulting bacterial phenotypes using a student guide to piece together which plasmids transformed the bacteria.

Keywords: transformed bacteria, plasmids, restriction enzymes, gel electrophoresis

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