

# Bioluminescence in Transformed Bacterial Cells

*Carole Corsby*

General Biology Program, Auburn University  
Auburn University, Alabama 36849-5508  
(205) 844-3925, corsbca@mail.auburn.edu

*E. coli* cells can be transformed with a plasmid incorporating a gene for bioluminescence. This causes the cells to glow in the dark. Students who perform this transformation exercise are invariably fascinated with the phenomenon, and even more intrigued when they learn that the *lux* genes were isolated originally from a bacterium found in a fish. The *lux* gene plasmid was produced by my colleague, Dr. Joseph J. Shaw, while working at the University of California at Davis.

Students work in teams of six to transform competent *E. coli* cells with two different plasmids to obtain cells of two phenotypes which are then compared to control (untransformed) cells. Each team is given three tubes of competent *E. coli* cells. One tube is labeled “control”, and receives no plasmids. The second tube is labeled “plasmid #1”; #1 plasmids, which confer resistance to the antibiotic ampicillin, are added to this tube. The third tube is labeled “plasmid #2”; #2 plasmids, which carry genes for both ampicillin resistance and bioluminescence, are added to this tube. All tubes are then taken through the transformation procedure.

Students then transfer half of the cells from each tube onto plates of plain agar and the other half onto plates of agar containing ampicillin. The cells are allowed to grow overnight at 37°C. These plates are observed first in a dark room to determine which of them exhibit bioluminescence and then visually to determine which plates have colonies that are ampicillin resistant.

This simple yet stimulating experiment provides beginning students with an easily understood introduction to molecular genetics. Further information, a full description of the exercise, and/or stabs of the needed cells are available upon request from the author.