

## Correct answers for Lab Quiz #5

1. The transfer of DNA from dead donor cells to living recipient cells is called **transformation** or **DNA-mediated transformation**.
2. When *E. coli* cells are grown to mid-log phase and treated with ice-cold CaCl<sub>2</sub> they can be made **competent**. Competent cells are able to take up DNA from the environment.
3. Which of the plates shown here (identified by letter) contains a medium selective for bacteria carrying marker genes?  
The image shows two plates, with plate “A” being TSA and plate “B” being TSA-AMP (as indicated on the plate labels). The TSA-AMP is selective for bacteria carrying the marker gene “Bla” (encoding β-lactamase), therefore **the correct answer is “B”**.
4. The plasmids pUC19, pGEM and pGLO all carry marker genes. What is the name of the gene product?  
The image shows representations of the three plasmids. The gene product is **β-lactamase**, the enzyme encoded by the Bla gene.
5. What is the name of the plasmid carried by the colony indicated at the pointer tip? Look carefully at this image before answering.  
The image shows two TSA-AMP-Arabinose plates, one exposed to room light and the other exposed to ultra-violet light. The colony at the pointer tip is not expressing green fluorescent protein so the cells are carrying **the plasmid pGEM**.
6. Expression of the GFP gene requires that an inducer inactivate the repressor encoded by AraC. What is the inducer?  
The image shown is the same one used for question #5. **The inducer is arabinose**. That is why the GFP gene product is only visible if *E. coli* are grown on TSA-AMP-Arabinose plates.
7. A virus that can infect bacteria and cause cell lysis is called a what?  
The image shows an illustration of a T-even coliphage. A virus that can infect bacteria and cause cell lysis is called a **cytolytic bacteriophage**. If you answered “bacteriophage” your answer is only half right because some bacteriophages are temperate (asymptomatic or avirulent) and do not cause cell lysis.
8. Phage typing is a method involving the use of known types of virus to identify unknown types of what?  
The image shown is an *E. coli* lawn culture with multiple plaques present. Phage typing is used to identify **unknown types of bacteria**.
9. The cleared areas visible on this plate are called \_\_\_\_\_ and represent what?  
The image is the same as that used for question #8. The cleared areas are called **plaques** and represent regions where the ***E. coli* cells have been killed by a cytolytic coliphage** (in this case the phage X-174). The formation of plaques indicates the bacteria population has been infected by the virus and portions of the population are being killed.
10. If this plate contains a 10 to the minus 5 dilution of phage X-174 (10<sup>-5</sup>), and there are 45 clear areas, what was the concentration of free virions in the KCl broth being tested? Be sure to include unit values in your answer.

The image is still the same one used for questions #8 and #9.

Because the plaque number and the dilution factor are given, you are not required to count the plaques present. To calculate the free virion concentration in the KCl broth, multiply the plaque number times the dilution factor. When you do this, the minus sign goes away. Then you must express the number in correct scientific notation and include the units. The correct answer is  **$4.5 \times 10^6$  pfu/mL**. Plaque forming units are not colony forming units.

11. The plate shown here contains some colonies that are fluorescent. What other optical character was demonstrated during the laboratory activity on transformation?  
The image shows *E.coli* colonies on a TSA-AMP-Arabinose plate exposed to ultra violet light.

During the transformation exercise we observed *E. coli* colonies expressing green fluorescent protein (initially obtained from a jellyfish). The second optical character we observed was **bioluminescence**.