The assume that the colonies of these cells

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The introduction of pGLO plasmid does have an effect on GFP gene transformation and ampicillin resistance in E. coli bacteria. The results support the proposed hypothesis that the addition of pGLO along with LB/amp/ara will result in transformed E.

coli that will reproduce and glow. Therefore, the success of E. coli transformation and reproduction is dependant on the presence of pGLO and LB/amp/ara. The hypothesis is supported through the observations made of each plate. For example, the first agar plate, +pGLO LB/amp, was observed to have approximately nine colonies of grey bacteria. Due to the following observations, we can assume that the colonies of these cells successfully took up the pGLO plasmid.

The E. coli bacteria were observed to take up the pGLO plasmid and were observed to reproduce which means the E. coli were able to successfully express the ampicillin resistance gene. As a result, the colonies were given the ability to flourish on plates that contained ampicillin. However, no fluorescence was observed on the first agar plate under UV light.

This is because of the absence of arabinose, a sugar required to turn on the expression of the GFP gene. As a result these cells were not entirely transformed. On the second agar plate, approximately nine distinct colonies were observed and appeared grey under normal light conditions. Upon the exposure to UV light, the second agar plate, +pGLO LB/amp/ara, was the only plate observed to fluoresce green under the UV light. The E. coli bacteria on the second plate successfully took up the pGLO plasmid and

glowed because of the presence of arabinose sugar that turned on the expression of the GFP gene.

Like the first agar plate, the colonies on the second agar plate were ampicillin resistant and therefore were given the ability to reproduce additional transformed cells. On the third plate, -pGLO LB/amp, no growth was observed. This was due to the lack of pGLO which provides the ampicillin resistance gene. The lack of pGLO provided no resistance against the antibiotic ampicillin and no colonies of E. coli bacteria had the ability to grow.

Lastly, on the fourth agar plate, -pGLO LB was observed to have a grey growth lawn of bacteria. The antibiotic ampicillin was not present so colonies of E. coli were able to reproduce normally. All the observations for this plate indicate that the E. coli bacteria grew without the influence of pGLO plasmid DNA, ampicillin, and other inhibiting factors.

Despite the proposed hypothesis aligning with the observed results, variations among the results compared to other lab groups may be due to multiple sources of experimental error. One experimental error could be mislabeling and/or mixing of agar plates with their appropriate contents. Another possible source of error could be improper preparation of pGLO/E. coli solutions and/or methods used to transfer the E.

coli bacteria onto the agar plates. Lastly, a source of experimental error that may cause variation in the results could be incorrect following of procedures during any part of the experiment (Weedman 2016). The results from this experiment support are supported by results from previous areas of work on

this topic. For example, in 2008 a journal published by the US National Library of Medicine focused on the transfer of antibiotic resistance genes in bacteria through the process of genetic transformation using plasmids. More specifically, this experiment studied the phenomenon of bacterial resistance to antibiotics used to treat human illnesses and how to minimize the resistance of bacteria to antibiotics in the future.

The experiment also explored the isolation and capture of antibiotic resistant genes in bacteria. Lastly, this study discussed how antibiotic resistance is the most serious concern to modern medicine today. Our experiment and results connect to Bennett’s work in one significant way. The way our experiment connects to this previous experiment is through the results we observed through antibiotic resistance.

In our experiment, the pGLO plasmid contained the GFP gene and the gene for ampicillin resistance. Therefore, when the pGLO plasmid was successfully taken up by the E. coli bacteria, colonies were able to flourish because of the antibiotic resistance gene present in the plasmid that had been turned on. In this previous study, similar experiments were conducted to observe the behavior of bacteria and antibiotic resistant plasmids (Bennett 2008). Among our methods of experimental setup and data collection there are multiple weaknesses that should be noted. In regards to experimental set-up, there were three main weaknesses that may contribute to errors or inconsistencies among our results. First, our method of collecting E. coli from the colonies on agar plates given in class may have been contaminated.

Each lab group in the class was collecting E. coli from the same plate, increasing the possibility of contamination. Additionally, the exact times for incubation and heat shock of the microcentrifuge tubes may have not been exact.

The entire class timed their incubation and heat shock periods at the same time which could cause inconsistency depending on when the tubes were actually available to be take out of incubation or heat shock. Lastly, the possibility of contaminated micropipette tips is a concern when performing the experiment. The contamination of a used micropipette tip could interfere with accurate results such as if a +pGLO tip was used to add solution to a -pGLO tube.

During data collection, one weakness is the subjectivity of the amount of bacterial growth on each of the agar plates. The amount of agar surface covered by bacterial colonies was required to be estimated and could therefore interfere with the interpretation of the success of growth of colonies. However, during our experiment no problems arose during data collection and only one potential problem while completing procedures may have affected the results we obtained.

Like mentioned earlier, the possible inconsistency of incubation and heat shock timing may have skewed the results obtained. For example, if the tubes were heat shocked for longer than fifty seconds, a smaller success ratio of E. coli colonies may have been observed than other groups who properly heat shocked and incubated their microcentrifuge tubes (Weedman 2016). In conclusion, the parameters required for the success of pGLO

plasmid containing the GFP and ampicillin resistance gene to transform E. coli bacteria is supported by the evidence and results of the four nutrient agar plates obtained from this experiment. As observed in the experiment, the success of the transform of E.

coli bacteria was dependent on the presence of the pGLO plasmid and arabinose sugar to activate the gene. If successful, the plasmid was expressed by the E. coli in the form of fluorescence under UV light and reproduction in the presence of the antibiotic ampicillin.