**An Investigation into Bacterial Transformation**

Alex Yeoh

**Introduction**

This report explores the process of chemically induced bacterial transformation. In this report, bacterial transformation will be understood as the transfer of genetic information via extracellular DNA (Krane, 2019). This report specifically deals with chemical induced transformation which is bacterial transformation where cations, like Ca2+, and heat makes the bacterial cell susceptible to transformation (Asif, 2017).

In this experiment, E. Coli was transformed with CaCl2 to acquire ampicillin resistance and florescence under UV light (Krane, 2019). The hypothesis is, only bacteria that have transformed to have ampicillin resistance can survive in the agar plates that has the Luria broth with ampicillin while all the bacteria can survive in the agar plates with only Luria broth.

**Methods**

The experiments were conducted following the procedures on pages 153-155 of the Bio 1120 laboratory manual (Krane, 2019) with some changes to the procedure. On step one part two, there were no special sterile methods to pipetting the cold CaCl2. On step one part three, the inoculating loop did not need to be headed under the flame of a Bunsen burner as sterile plastic ones were given. On step one part five, the agar plates were already labeled. On step one part ten, sterile plastic spreading rods were given which did not need to be sterilized again.

**Results**

Table 13.1 Bacterial colonies resistant to the antibiotic-ampicillin.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | LB- | LB+ | LB/amp- | LB/amp+ |
| Colonies | >10,000 | >10,000 | 0 | 3 |

Figures 13.1 – 13.5 Bacterial colonies after overnight incubation.

A picture containing cup, indoor, table

Description automatically generated

A close up of a sign

Description automatically generatedA close up of a purple sign

Description automatically generated

A picture containing indoor, sitting, monitor, object

Description automatically generatedA picture containing indoor, monitor, sitting

Description automatically generated

**Conclusion**

The results agree with the hypothesis of the lab as only the bacteria that had transformed to glow under UV light and ampicillin resistance survived in the agar plate that contained ampicillin. This is expected because the bacteria that do not have ampicillin resistance in the agar plate with ampicillin die due to ampicillin. It should also be noticed that there is a great difference in colony numbers between the agar plate with ampicillin and transformed bacteria and the agar plate without ampicillin that still had the transformed bacteria; there are many more colonies in agar plate without ampicillin because all the bacteria could survive while in the other plate, only the transformed bacteria could survive. This also shows that transformation is not very effective and is probably not very common in nature unless it is absolutely necessary for survival. It should also be noticed that the agar plate without ampicillin that had transformed bacteria had few if any transformed colonies suggesting that the only way to be certain that the bacteria transformed and remain transformed is to grow them in a medium containing ampicillin.

**References**

Krane, D. (2019). *Bio 1120: A Laboratory Perspective*. Cincinnati, OH: Van-Griner Publishing.

Asif A, Mohsin H, Tanvir R, Rehman Y. Revisiting the Mechanisms Involved in Calcium Chloride Induced Bacterial Transformation. *Front Microbiol*. 2017;8:2169. Published 2017 Nov 7. doi:10.3389/fmicb.2017.02169