Effect of Iron Treatments on the Bacteria Mycobacterium smegmatis and Escherichia coli and the Role of Escherichia coli FhuA Iron Uptake Receptor on Phage Infections

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Antibiotics are becoming less effective, due to their increased use, producing resistant bacteria. Phages, viruses that infect bacteria, can be researched to treat bacterial infections. One purpose of this study was to determine if iron has an effect on the number of phage infections in Mycobacterium smegmatis and Escherichia coli. M. smegmatis was grown in iron treatments and infected with the Yodasoda phage. This was replicated for E. coli with T4 phage. The null hypotheses were rejected. Plaque counts were higher in the bacteria grown in iron treatments. These data suggest that iron has an effect on the number of phage infections. A second purpose was to determine the role of the FhuA iron uptake receptor on T4 phage infections in E.coli. Knockout E.coli cells that lack the FhuA iron uptake receptor were grown overnight and infected with T4 phage. The data failed to reject the null hypothesis. Plaque counts were not significantly different in the knockout cells compared to the control. This indicates that the FhuA receptor alone does not play a role in T4 phage infection. The research done in this study can be used to further the advancement of phage therapy treatments for infections caused by antibiotic resistant bacteria.

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