Blocking the Binding of Bacterial Lipid Droplets to Phage DNA

Bei, Zhilei (School: The High School Affiliated to Renmin University of China)

Previous studies have shown that bacterial lipid droplets can bind to and protect DNA through MLDS proteins. The purpose of this study is to explore the binding ability of T4 phage DNA to lipid droplets and find substances that can block this binding process in order to protect bacteria by preventing bacteriophages from using lipid droplets to protect their own DNA and thus helping bacteria clear out phage DNA. An in vitro experiment was conducted using artificial lipid droplets to simulate bacterial lipid droplets, and using the recombinant plasmid of essential genes of T4 Phage DNA to stimulate the invading phage DNA. In this study, the quantity of lipid droplet-bound DNA was determined, and the binding curve of DNA to lipid droplet was plotted. It showed that lipid-droplet-bound DNA decreased significantly when 2 mg/ml sodium carbonate solution was added. It suggested that 2 mg/ml sodium carbonate solution has blocking effect on the binding of Lipid droplets to DNA. This study also provided a feasible method for further screening of blockers, and in the future, mature methods can be established to screen a variety of blockers and try to reduce the side effects of these blockers on bacteria.

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