

The effect of lysozyme on Escherichia coli bacteria.

Manar Hadi, Olla Azzam and Sara Babli.

The Jubilee School

This study aimed to examine the effectiveness of lysozyme as an antibiotic on E. coli bacteria; a gram-negative type of bacteria. The study methodology contained two phases. First, an extraction for the enzyme lysozyme from hen's egg white was done by centrifuging the purified egg white with the addition of sodium phosphate buffer with a pH 6.8. Second, the extraction of lysozyme was added to E. coli bacteria in a petri dish and left in an incubator (38) for 24 hours. An E. coli's cell wall as many other bacterial cell walls contains a layer of peptidoglycan, lysozyme works by targeting that specific site and breaking the chemical bonds in that layer, in more detail, the peptidoglycan layer contains alternating molecules called N-acetyl glucosamine and N-acetylmuramic acid, these molecules form a strong glycan chain that act as the backbone for the cell wall, when the link between the N-acetyl glucosamine and N-acetylmuramic acid is cleaved by lysozyme the chain will hopefully be broken down by lysozyme, which will result in bacterial death. After the addition of lysozyme to the E. coli bacteria the results were taken. Lysozyme was also added to Streptococci Bacteria as a control for the experiment, for Streptococci is a gram-positive bacterium and so lysozyme will be able to lyse the streptococci for sure. The results showed an empty region in both of the agar petri dishes (one dish containing E. coli and the other Streptococci) which shows that E. coli bacteria has been lysed successfully by lysozyme. The E. coli cells have died due to bursting, which was a result of osmosis into the bacterial cells, caused by the difference in water potential pressure that the bacteria were incapable of withstanding and so destruction of its cell wall took place leading to the death of the Bacteria. As a conclusion Lysozyme does act as an antibiotic.