

Future alternative treatments to increasingly inefficient antibiotics

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Did you know that antibiotics will become inefficient in the near future? This due to the emergence and development of antibiotic resistance in the last decades. This resistance has arisen in bacteria as a consequence of for example mutations in the genetic information. Antibiotic resistance has developed into becoming a huge and serious problem in the world – up to 83,3 % of patients that gets infected by resistant bacteria will eventually die from the untreatable bacterial infection. So what is the reason this resistance has increased? The answer is a huge over- and inaccurate use of practically all present antibiotics. Because infections caused by resistant bacteria in both humans and animals are very difficult to treat, finding new alternative treatments to antibiotics is very important for the future.

New treatments

Lately, two methods including bacteriophages (or simply phages; viruses that attack bacteria) and antibacterial peptides (proteins with an antibacterial effect) have been found.

Phages – how can bacterial viruses be used in modern health care?

Viruses that infect and kill bacterial cells are known as phages. Since phages are host-specific (which means that they can only invade one or more bacterial strains), they can be applied as drugs for treating bacterial infections – without killing other cells in the body. Phages have been applied in several different ways. For instance, they are effective in destroying biofilms, which are layers of bacteria attached to living surfaces. Phages can also act by binding to specific pumps located in the very utmost layer of the bacterial cell (the cell membrane). The function of the pumps is to carry out antibiotics that have reached the inside of the cell, but the pumps are not functional when bacteriophages are present and bind to the pumps. Hence, as the antibiotics cannot be exported it will kill bacterial cell.

Antibacterial peptides – the medicine against brain infections?

In almost every cell one can find antibacterial peptides, which are proteins that protect the cell by interacting with incoming foreign genetic information. There are many different kinds of small peptides in human cells, but only a few have been investigated. Thus, it is still too early to determine whether these antibacterial peptides can be used as real drugs or not. However, several of the studied peptides have been found to have antibacterial activity. One kind of peptide has even been observed being able to reach the brain, which is unusual. As a result, this peptide is a potential future cure against bacterial infections in the brain.

In conclusion, if not alternative treatments will be explored, many people and animals will die due to inefficient antibiotics. Fortunately, we have discovered phages and antibacterial peptides and further research concerning these and other treatments are on the way.

Read more

Vickberg K. 2016. Bakteriofager och antibakteriella peptider som ersättning till antibiotika. Independent Project in Biology, Uppsala University.