

BREAKTHROUGH RESEARCH SUGGESTS A WAY TO FIGHT BACTERIA WITHOUT ANTIBIOTICS

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Bacteria community (Illustration photo)

In research conducted at the Hebrew University, a method for controlling bacterial activity without antibiotics was developed. The research showed how it is possible to interfere with the communication of groups of bacteria thus enabling new ways of fighting bacterial infections and disease caused by germs as well as ways to help beneficial bacteria to multiply.

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Many human and animal diseases are caused by germs. Bacteria live in large "communities," called biofilms that attach themselves to many surfaces, such as live tissues, implants and teeth. Biofilm can also be found on artificial surfaces such as water pipes or air-conditioning ducts. Only recently has it been discovered that the bacteria assembled in biofilms have a network of communication between them called "quorum sensing" which controls their collective activity (or lack thereof). A boron-based molecule that is produced by these bacteria, called auto inducer-2, controls the signals in this quorum sensing process.



Adel Jabbour

A young doctoral student from the Hebrew University named

Adel Jabbour has recently succeeded in synthesizing a modified chemical compound,

resembling the structure of the natural auto inducer-2 that can disrupt the signaling between groups of bacteria. By altering the molecular structure in this compound, Jabbour was able to show that it is possible to control the quorum sensing responses in order to "deceive" the bacteria. The modified compounds distort the signaling that sets off the bacterial changes, making it possible to seriously hamper the bacterial action, or, if so desired, even enhance it (in those cases where the bacteria are beneficial).

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Control over quorum sensing provides a promising avenue for future treatment of bacterial pathogenic activity without having to resort to antibiotic drugs with their accompanying disadvantages. It will also allow a safer way to fight bacteria which developed resistance to common types of antibiotics. These kinds of bacteria are currently one of the main reasons for the ongoing effort to restrict the use of antibiotics. On the other hand, enhancing quorum sensing could prove useful in agriculture, biotechnology and the food industry, where increasing bacterial activity would be beneficiary.

Jabbour was born thirty two years ago in Upper Nazareth and is currently a resident of Hadassah University Hospital-Ein Kerem where he performed his study. Jabbour is now in the last stages of his Ph.D. studies at the School of Pharmacy and the Institute of Dental Sciences at the university under the supervision of Professors Morris Srebnik and Doron Steinberg. He also received the Kaye Innovation Award in the 68th meeting of the Hebrew University Board of Governors.

A U.S. patent has been filed based on the compound developed by Jabbour, and further commercialization is being negotiated through the Hebrew University's Yissum Research Development Company.

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