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Antivirulents vs Antibiotics

Antimicrobial resistance poses one of the most severe global challenges to public health. Increased resistance of pathogens to antibiotics coupled with the paucity of development of new antibiotics threatens to propel us back into the pre-antibiotic era when infectious diseases were the most frequent cause of death. The inherent problem with antibiotics is that sooner or later resistance emerges and the antibiotic becomes ineffective. Antivirulence agents represent an attractive alternative to antibiotics. These agents disarm the pathogen of its disease-causing toxins and virulence factors without killing the organism, thereby eliminating the selective pressure that frequently results in resistance. Indeed, emergence of resistance to an antivirulence agent has not been reported, to the best of my knowledge. Moreover, since antivirulence compounds do not kill the bacteria, this would also prevent the collateral damage caused by antibiotics to the beneficial commensals that colonize humans. Antivirulence treatment leaves the host immune system intact to carry out its

task of clearing an infection. However, for immunocompromised patients combination therapy with an antibiotic would be in order. Some antivirulence agents potentiate the efficacy of antibiotics, such that even obsolete antibiotics could be brought back into the clinic. Moreover, antivirulence agents have been shown to inhibit biofilm formation and promote wound healing. Thus, antivirulence agents may provide a solution to the global threat of antimicrobial resistance.

Speaker Biography

Menachem Shoham has received his PhD from the Weizmann Institute of Science in Israel and did Post-doctoral studies in Structural Biology at Yale University, USA. Following a sabbatical stint at Dupont in Wilmington, Delaware, he joined Case Western Reserve University, Department of Biochemistry in 1989 where he has been ever since. He has served on NIH study sections and he is serving as Editorial Boards for scientific journals. He is currently the Director of the Biochemistry undergraduate program at Case Western Reserve University.

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