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Antivirulence agents sensitize MRSA to beta-lactam antibiotics

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Resistance to antibiotics has created a severe public health problem worldwide. Thus, the development of novel antibacterial agents represents an urgent unmet medical need. An alternative approach to antibiotics is the use of antivirulence agents. These compounds do not kill bacteria as antibiotics do but inhibit the production of disease-causing toxins and other virulence factors that impair the ability of the immune system to fight the infection. Prevention of virulence factor secretion would disarm the pathogen of its deadly chemical weapons. However, antivirulence agents do not kill the pathogen. Thus, an infection might recur if the treatment is stopped. Therefore, it might be beneficial in some cases to employ a combination therapy with an antibiotic. Experiments in our laboratory indicate a synergism with beta-lactam antibiotics to which MRSA is resistant in mono therapy. Antivirulence agents sensitize MRSA to beta-lactam antibiotics. This finding opens the door to combination therapy of an antivirulence drug with “old” and inexpensive beta-lactam antibiotics. This approach has the potential to revolutionize the prevention and treatment of bacterial infections.

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