

Bicarbonate as a Modulator for Antibiotics



Using bicarbonate to modulate a microorganism's response to an antimicrobial agent

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Abstract

Over the past 20 years, there has been an explosion in the prevalence of antibiotic resistant bacterial infections, both in the hospital and in the general community. The ESKAPE pathogens (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter species) are responsible for a substantial percentage of nosocomial infections and present serious therapeutic challenges for physicians. Novel methods are needed to potentiate the response of a microorganism to antimicrobial agents, therefore allowing for either a greater response at a given concentration of the antimicrobial agent, or an increased response at a lower concentration of the antimicrobial agent.

McMaster researchers have developed a method for inhibiting the microbial growth by contact with an effective amount of bicarbonate and an antimicrobial agent. The discovery provides methods for treating or preventing microbial infections in medical and veterinary applications. The use of bicarbonate in modulating the activity of microorganisms has significant implications in the development of novel therapies for the future.

Applications

- Medical Applications
 - Broad-spectrum treatment of bacterial infections
 - Topical treatments, aerosolized formulations as well as ophthalmic indications
 - Infection treatment
- Veterinary Medicine

Advantages

- Therapeutic designs consist of a natural and innocuous additive (bicarbonate).
- Possible discovery of novel antibacterials not yet discovered in conventional screens in standard microbiological media.
- Preserve the efficacy of existing antibiotics that may work better in the host than originally thought
- Novel and alternate clinical indications in the presence of physiological concentrations of bicarbonate.