The Key to Fighting Infections: The Development of an Antimicrobial Solution

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One in twenty-four post-surgery patients in the USA will develop a surgical site infection due to antibiotic-resistant bacteria and decreased wound protection. This project entails the invention and development of an antibacterial and antimicrobial mixture that prevents bacterial infection and is more effective than traditional methods. The antimicrobial mixture effectively produced an increased zone of inhibition when tested against bacteria swabbed from a school environment, as well as against pathogenic bacteria, i.e. Staphylococcus aureus, Serratia marcescens, and Pseudomonas aeruginosa. The antimicrobial mixture formed a 7.67 mm mean zone of inhibition against Staphylococcus aureus and 5.17 mm against Serratia marcescens, far surpassing the zone of inhibition produced by other tested agents. The development of increased zones of inhibition illustrates the potential for real-world application to prevent bacterial infections from wound entrance. To determine the most effective method of application, a variety of carriers were combined with the antimicrobial mixture, with cyanoacrylate and petroleum jelly providing the largest zones of inhibition. Further testing uncovered the antimicrobial mixture's ability to develop 16.02 mm zones against Staphylococcus aureus when combined with cyanoacrylate, as well as 13.15 mm zones against Serratia marcescens and 1.72 mm mean zones against Pseudomonas aeruginosa. In the future, the antimicrobial mixture could be applied to a convenient application method adapted to specific settings such as hospitals, war zones, athletic facilities, while remaining cost-effective and easily accessible. This project has the ability to revolutionize the medical industry by reducing potential infections on a global scale.

Awards Won:
Westlake University: A summer camp scholarship to Westlake University, covering the roundtrip international airfare, room and board, insurance, program fee, and excursions in Hangzhou, Beijing, and Shanghai