The Effect of Vitamin D3 and Vitamin D3+ on the Resistance of Various Antibiotics to Gram-Negative and Gram-Positive Bacteria

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The overuse of antibiotics has led to the development of antibiotic-resistant bacteria, which has caused a public health crisis. This project seeks to determine whether Vitamin D3 and Vitamin D3+, when combined with antibiotics, can improve the effectiveness of treating dangerous bacteria strains. As predictive health becomes an important factor in improving public health, these findings could be an important data point in determining outcomes for treating health issues relating to antibiotic-resistant bacteria. It was hypothesized that Vitamin D3 and Vitamin D3+ could improve the effectiveness of treating bacteria when combined with various antibiotics in certain circumstances. The were seven different antibiotics tested in the form of E-strips. The bacteria used were Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus, and Streptococcus viridans. To obtain the correct concentration of Vitamin D3 and Vitamin D3+ needed for experimentation, a Minimum Inhibitory Concentration Test was performed. Fifty-six petri-dishes containing Mueller Hinton Agar were enhanced with a .00001% concentration (the MIC) of Vitamin D3 and Vitamin D3+. After the 24 hour incubation period, the enhanced petri-dishes and controls were read. The percent change was calculated to see what effect Vitamin D3 and Vitamin D3+ had on combating antibiotic resistance. The final results demonstrated three outcomes: decreased antibiotic resistance, increased resistance and no change in resistance. In many cases, antibiotic resistance was decreased. Although further testing is needed, and several factors must be evaluated to determine medical effectiveness, this may prove to be a useful and cost-effective treatment option.

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