Comparison of Nickel Chelator to Current Standard Triple Antibiotic Therapy to Treat Helicobacter pylori Infection

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Helicobacter pylori is a gram-negative bacterium responsible for multiple gastrointestinal diseases, including gastritis, peptic ulcer, gastric carcinoma and lymphoma. About 2/3 of the world population is currently infected with this bacterium, with higher prevalence in the developing world. Current standard therapy utilizes two antibiotics (clarithromycin and amoxicillin) and a proton-pump inhibitor. In the last ten years, H. pylori resistance to clarithromycin increased from 9.9% to 28%. Rising antibiotic resistance and noncompliance due to side-effects result in a 20% failure rate of current regimens and raise the need for alternative treatment strategies. This study compared the efficacy of nickel chelator (targeting H. pylori urease enzyme acid-defense mechanisms) to current standard therapy. Six samples were prepared with gastric juice, H. pylori, nickel, urea and each of the interventions (clarithromycin & amoxicillin [control], clarithromycin, amoxicillin, chelator, chelator & clarithromycin, chelator & amoxicillin). These samples were plated on Columbia blood agars and set aside for 90 minutes (simulating gastric emptying time). The CFU counts were recorded after incubating the samples in microaerophilic conditions for 2-3 days. The experiment was repeated multiple times to ensure internal reliability of results. A one-way analysis of variance was performed to compare the means of the different interventions. Sample containing chelator and amoxicillin showed a statistically significant (p-value<0.001) inhibition effect on H. pylori when compared to the control. Of all the samples, amoxicillin with chelator was most effective. Further experimentation with an in-vivo mice model showed amoxicillin and chelator combination to be safe and have inhibitory potential.

Awards Won:
Third Award of $1,000