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Effect of Oxygen Concentration on Susceptibility of *Neisseria* Species to Resazomycins

A growing number of human pathogens are becoming resistant to most common antibiotics. Each year, antibiotic-resistant infections are responsible for 23,000 deaths in the United States and billions of dollars in health care costs. To prevent the loss of additional lives from once “curable” diseases, new antibiotics must be developed. We recently identified a novel family of resazurin-based compounds, resazomycins, which exhibit antimicrobial activity against various *Neisseria* species including the human pathogen *N. gonorrhoeae* in vitro. However, when these compounds were tested in a mouse model of gonorrhea, few resazomycins exhibited any therapeutic effect. These differences in in vitro and in vivo therapeutic efficacy may be due to differences in oxygen concentration. Most mammalian tissues exist at oxygen concentrations well below atmospheric levels, typically 3-5% instead of 20%. Therefore, we hypothesized that decreased oxygen levels may confer resistance to resazomycins. To test this hypothesis, we cultivated the avirulent *Neisseria* strain, *N. sicca*, under atmospheric (20%) and physiologic (2-3%) oxygen conditions and then measured the susceptibility of the bacteria to various resazomycins. To date, more *N. sicca* growth was observed following exposure to resazurin and resorufin under physiologic oxygen than atmospheric oxygen suggesting oxygen levels effect susceptibility to resazomycins. Further investigation is needed to determine the precise mechanism by which *N. sicca* is becoming resistant to resazomycins under low oxygen conditions.