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Susceptibility of *Neisseria gonorrhoeae* to Resazomycins in Varying Oxygen Concentrations

Antibiotic resistance is a growing issue globally as many pathogenic bacterial species are becoming less susceptible to common antibiotic treatments. Antibiotic resistant pathogens are the cause of 23,000 deaths in the United States each year and increasing health care costs. It is imperative that new antibiotics be developed to combat this public health crisis. We recently identified a novel family of resazurin-based compounds, resazomycins, to have antimicrobial activity *in vitro* against *Neisseria gonorrhoeae*, a human pathogen. Resazomycins are capable of killing *N. gonorrhoeae* in broth culture as well as within human endometrial cells, HEC-1-B. However, when different resazomycins were tested in a mouse model of gonorrhea, none of the compounds were able to completely clear the infection. The difference between *in vitro* and *in vivo* antibacterial efficacy may be due to differences in oxygen concentration. Atmospheric oxygen levels are typically around 20% while the oxygen concentration of most mammalian tissues is around 3-5%. We hypothesize that the decreased oxygen concentration *in vivo* may affect the antimicrobial activity of resazomycins. To test this hypothesis, the susceptibility of different clinical isolates of *N. gonorrhoeae* to resazurin was measured under atmospheric (20%) and physiologic (2-3%) oxygen conditions. To date, certain strains of *N. gonorrhoeae* showed more growth following exposure to resazomycins under physiologic oxygen than atmospheric oxygen. This suggests *N. gonorrhoeae* is more resistant to resazomycins under low oxygen conditions. Further experimentation is needed to determine why certain *N. gonorrhoeae* strains are showing less susceptibility to resazomycins under physiologic oxygen conditions.