
MATHEMATICAL MODELING OF BACTERIAL RESPONSE TO ANTIBIOTIC STRESS

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ABSTRACT

In this session, we try to understand how bacteria respond to antibiotic stress through mathematical analysis and modeling. Initially, we introduce a comprehensive set of ordinary differential equations that accurately illustrate the dynamics of bacterial growth and decay in response to antibiotic exposure. Subsequently, we explore another differential equations system designed to capture the interactions between antibiotics and nutritional factors. Finally, in the conclusion, we go over and discuss some computer simulations.

Keywords Antibiotic stress · Mathematical modeling · Computer simulations

References

- [1] Cogan NG, Cortez R, Fauci L. Modeling physiological resistance in bacterial biofilms. *Bull Math Biol.* 2005;67(4):831-853. doi:10.1016/j.bulm.2004.11.001
- [2] Grant SS, Hung DT. Persistent bacterial infections, antibiotic tolerance, and the oxidative stress response. *Virulence.* 2013;4(4):273-283. doi:10.4161/viru.23987
- [3] Levin BR, Udekwu KI. Population dynamics of antibiotic treatment: a mathematical model and hypotheses for time-kill and continuous-culture experiments. *Antimicrob Agents Chemother.* 2010;54(8):3414-3426. doi:10.1128/AAC.00381-10

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