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2016

May 21st, 3:10 PM - 3:30 PM

Bistable dynamics between primed and tolerant states following challenge with exdotoxin

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Presenter Information
Mirjam Sarah Kadelka, Brittany Boribong, Liwu Li, and Stanca Ciupe

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Bistable dynamics between primed and tolerant states following challenge with exdotoxin

Biological experiments have shown different molecular dynamics after challenge and boosting with different doses of endotoxin, with high-high challenge leading to a tolerant state and low-high challenge leading to a primed state. To provide insight into the relationship between dose and dynamics, we developed a mathematical model of molecular interactions within a pathway. We analyzed the model using asymptotic stability and bifurcation techniques. Our model exhibits bistable dynamics between a tolerant and a primed state. We used the model to determine the feedback mechanisms needed for bistability and determined the relationship between our results and the experimental data.