

Invasibility threshold and persistence of bacterial species

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ABSTRACT

The emergence of pathogenic bacteria has been a significant concern in a clinical setting. The rise of pathogenic bacteria after antibiotics exposure implies the vital role of the resident bacterial community for prevention of invasion and expansion of pathogenic bacterial species [1]. Although empirical evidence has accumulated to harness the resident population to prevent pathogen invasion, theoretical rationales underlying such prevention has not entirely been understood yet.

In this presentation, we construct a mathematical model describing population dynamics of resident and invasive bacterial species to investigate under what conditions invaded pathogens are successfully eliminated. The theory of uniform persistence [2] in combination with invasibility condition are utilized to derive mathematical conditions to ensure pathogen eradication and persistence [3]. We will also discuss a potential application of this work to a real dataset of bacterial community profiling (microbiome) for an elimination of enteropathogenic bacterial species via harnessing the resident gut microbial community.

REFERENCES

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