



University of Dayton

The Impact of Nitric Oxide on the Growth and Proliferation of *Listeria monocytogenes*

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Introduction

Listeria monocytogenes is a facultative anaerobic bacterium. *Listeria* causes listeriosis, a serious foodborne illness. Listeriosis greatly impacts pregnant women, the elderly and other immunocompromised individuals. Nitric oxide (NO) is an extremely common molecule throughout the body which plays various roles, notably in the inflammatory response of the immune system. The release of nitric oxide activates various pathways, relaxes endothelial cells and acts as a toxin against many pathogens.

Listeria Pathogenesis

Upon consumption of foods contaminated with *Listeria*, the pathogen will travel through the digestive tract where it is exposed to varying physiological conditions. *Listeria* infections utilize actin polymerization for cell-cell spread. Phagocytic macrophage cells are activated upon recognition of *Listeria*.

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Big Picture Interactions

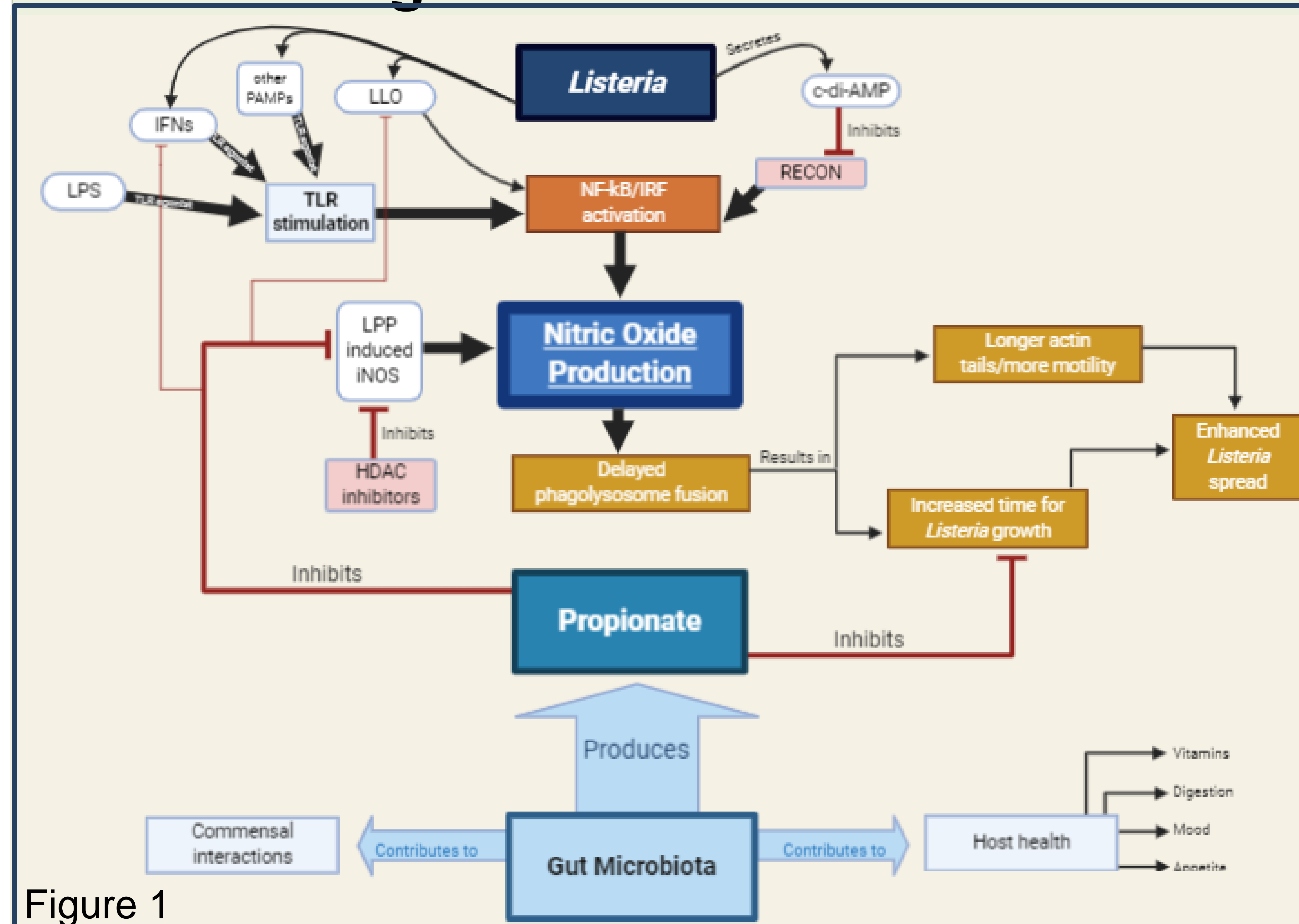


Figure 1

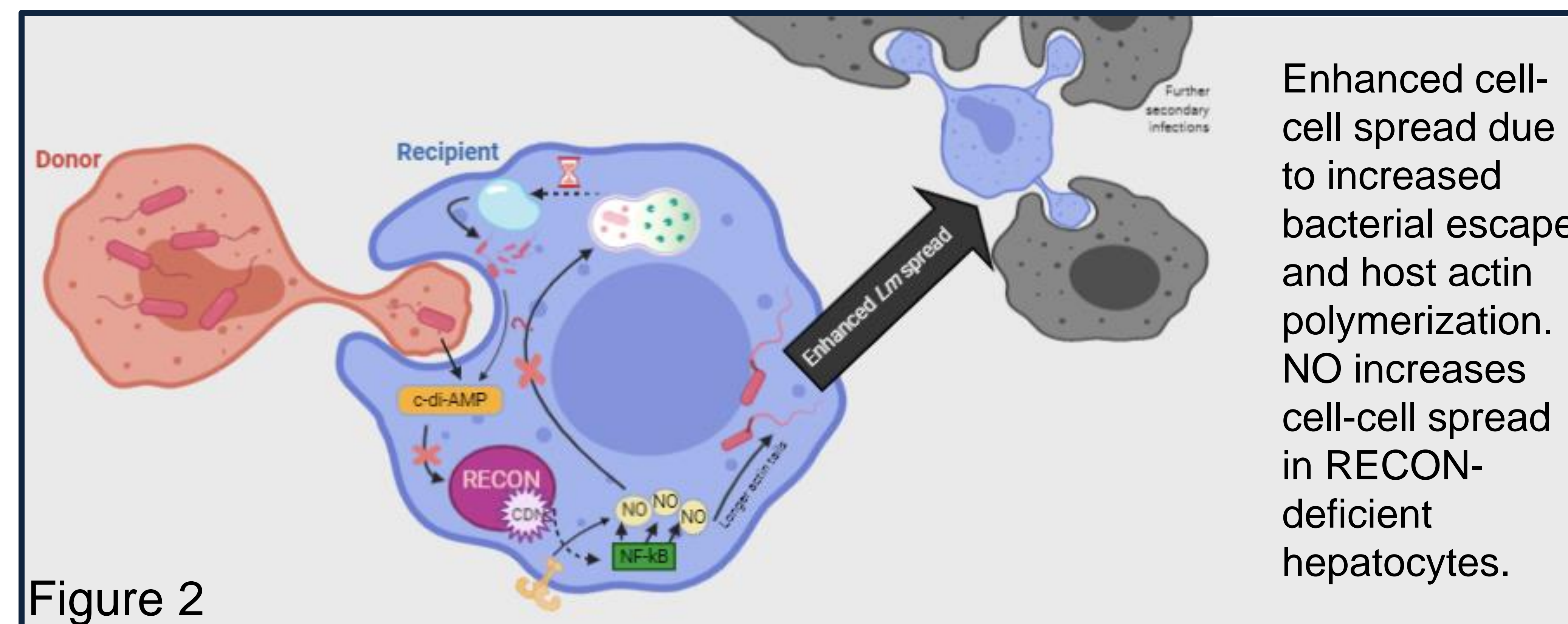


Figure 2

Nitric Oxide

Macrophages infected with *Listeria* release NO as part of an immune response to prevent further infection. However, many studies suggest *Listeria* is unusually resistant to the antimicrobial properties of NO and that NO actually enhances its later cell-to-cell spread. In this secondary infection, *Listeria* appears to have developed resistance to the bactericidal characteristics of NO through delayed phagolysosome maturation and enhanced host actin polymerization, ultimately resulting in increased cell-cell spread. TLR stimulation also results in increased inflammatory response and NO production, further proliferating infection.

Conclusion

Investigating the role of nitric oxide may illuminate new treatments and therapies in many infections, including those of pathogens such as *Listeria*.

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