Alanine exerts immunomodulatory functions by promoting phagocytosis but limiting tissue injury

Bo Peng

Sun Yat-sen University, China

Statement of the Problem: Many infectious pathogens are susceptible to killing by antibiotics; however, mechanisms exist whereby susceptible pathogens as well as commensal bacteria can acquire resistance to antibiotics, especially after long-term, high-dose or otherwise inappropriate exposure to one or more growth inhibiting or cytotoxic drugs. This is the rational explanation for the recent surge in appearance of multidrug-resistant (MDR) bacterial strains, especially in the hospital environment, leading to increased human mortality. Therefore, new drugs and/or approaches are needed for treating such infections in the clinic. One possible approach would be to enhance the innate immune response of the infected host by recruiting endogenous host defense mechanisms to kill bacterial pathogens in a relatively risk-free manner.

Methodology & Theoretical Orientation: A system biological approach was used to examine the host-bacterium interaction with the goal of identifying agents that could enhance the innate response to pathogens but limit tissue injury.

Findings: High levels of L-alanine promote phagocytosis of clinically relevant pathogens and more importantly, the downstream catabolite palmitic acid could attenuate the tissue injury by excessive immune response through down regulating pyroptosis.

Conclusion & Significance: Host clearance of multidrug resistant microbes is strongly associated with metabolic states and that specific metabolic profiles are correlating with certain host defense strategy. Our study proposed a novel approach to identify metabolic modulator through investigation of metabolomics by which crucial modulators can be used for therapeutic purpose.

pengb26@mail.sysu.edu.cn