

## Immune Modulation by Polysaccharide against Asthma

Xiaoqiang Qi<sup>1,2</sup> and Sathisha Upparahalli Venkateshaiah<sup>1,2\*</sup>

<sup>1</sup>Department of Surgery, University of Missouri-Columbia, Columbia, Missouri, USA

<sup>2</sup>Ellis Fischel Cancer Center, University of Missouri-Columbia, Columbia, Missouri, USA

**\*Corresponding Author:** Sathisha Upparahalli Venkateshaiah, Department of Surgery and Ellis Fischel Cancer Center, University of Missouri-Columbia, Columbia, Missouri, USA.

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Asthma, a chronic inflammatory lung disease which is characterized by airway inflammation, bronchial hyper responsiveness and reversible airflow obstruction, impaired more than 300 million patients all over the world [1]. As far, it still is a challenge to cure asthma. Clinically standard treatment mainly based on immunosuppressive and bronchodilator drugs which produce short term symptom relief only, however there are still patients who don't respond to conventional treatment. It's urgent to explore curative innovative drugs against asthma.

With expanding knowledge of innate and adoptive immune responses at molecular level, the immune modulation therapy has emerged as the most promising treatment against asthma [2]. Contrary to anti-tumor immunotherapy which aims to stimulate and boost immune responses to tumor cell [3-5], immunomodulation against asthma aims to decrease pathologic immune responses, most of drugs undergoing human clinical trials in treatment of asthma are developed to reduce T-helper 2 immune responses [6]. Recently, polysaccharides have gained more interest as immune modulators in activation of T cells. Polysaccharides are important component of microbial pathogens, which could modulate immune system and inflammatory reaction [7-11]. One group of bacterial polysaccharides, ZPSs, were identified by Dennis Kasper lab with activity to activate T cell [12-15]. Due to unique structure, ZPSs have immunomodulatory activities to prevent abscess induction as subcutaneous vaccinations [16]. It's also reported that polysaccharides could function on prevention of allergies and asthma [14,17]. Thanks to overusing of antibiotics and improved sanitation which eliminate many of commensal and microbial flora in gut, more people within developed nations become more susceptible to immune system disorder disease including asthma, because those microbiota plays critical roles in shaping our immune systems. Polysaccharides has been shown to attenuate the defective T-helper 2 biased immune system in germfree mice [14]. Polysaccharides-based immune modulation might provide a new strategy for asthma prevention and curative therapy.

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