

## Effects and mechanism of rice hull polysaccharides in macrophages

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Innate immune response is the primary defense of pathogens invasion. Phagocytosis and phagolysosome formation of macrophages play a vital role in getting rid of microbes. Once receptors on cell surface identify pathogens associated molecular patterns or immune-stimulants, signals will be generated to trigger actin polymerization and rearrangement for phagocytosis. Numerous polysaccharides are regarded to enhance immunity. Our previous study shows that Rice hull polysaccharides (RHPS) derived from rice (*Oryza sativa*) hull have immunomodulatory ability in vivo and enhance phagocytosis in macrophages. However, the signal mechanisms of immune response induced by RHPS in macrophages is still unknown. This study was further designed to evaluate the signal-transduction mechanisms of RHPS induced phagocytosis in murine macrophage RAW 264.7 cell line. Specific antibodies were used to block the polysaccharide-related receptors and to clarify the correspondent receptor of RHPS. Moreover, the MAP kinase and NF- $\kappa$ B inhibitors were applied to understand the signal transduction pathway of RHPS in enhancing macrophages phagocytosis.

The results showed that RHPS could improve phagocytosis activities against *E. coli* through enhancing F/G actin ratio in RAW 264.7. TLR2 antibody, JNK inhibitor (SP600125) and NF- $\kappa$ B inhibitor (PDTC) could significant reduce the phagocytosis activity in RHPS treated macrophages. Collectively, our results indicated that RHPS-induced phagocytosis depended in activating TLR2-mediated phagocytosis via JNK and NF- $\kappa$ B signaling pathway and stimulate actin polymerization for improving phagocytosis response. This study demonstrated that RHPS was an effective inducer in innate immunity defense.