Integrin β3 plays a novel role in innate immunity in the silkworm (*Bombyx mori*)

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Abstract

Integrins are transmembrane receptors that play essential roles in many physiological and pathological processes through cell-to-cell and cell-to-extracellular matrix (ECM) interactions. In the current study, a 2653-bp full-length cDNA of a novel integrin β subunit (designated *Bmintegrin β3*) was obtained from silkworm hemocytes. Bmintegrin β3 has the typical conserved structure of the integrin β family. The qRT-PCR results showed that *Bmintegrin β3* was specifically expressed in the hematological system and that its expression was significantly increased after challenge with different types of PAMPs and bacteria. The recombinant Bmintegrin β3 protein displayed increased aggregation with *S. aureus*, suggesting that Bmintegrin β3 might directly bind to PAMPs. Interestingly, *Bmintegrin β3* knockdown promoted PPO1, PPO2, BAEE, SPH78, SPH125, and SPH127 expression and accelerated the melanization process. Unexpectedly, the expression of genes related to phagocytosis, the Toll pathway, and the IMD pathway was also up-regulated after *Bmintegrin β3* knockdown. Thus, Bmintegrin β3 might be a pattern recognition protein (PRP) for PAMPs and might directly bind to bacteria and enhance the phagocytosis activity of hemocytes. Moreover, Bmintegrin β3 and its ligand might negatively regulate the expression of immune-related genes through an unknown mechanism. In summary, our studies provide new insights into the immune functions of *Bmintegrin β3* from the silkworm, *Bombyx mori*.

Keywords

*BmIntegrin β3*, Hemocytes, Melanization, Innate immunity, *Bombyx mori*