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Abstract

Antimicrobial Peptides in Insect

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Abstract

Background and Aim: Antimicrobial resistance poses a significant global health threat, necessitating the exploration of innovative antibiotics. Antimicrobial peptides, naturally occurring across diverse life forms from bacteria to mammals, are integral to the immune system. These peptides exhibit broad-spectrum antimicrobial activities by targeting pathogen cell membranes or intracellular processes. Some can also enhance natural immunity. Insects, particularly in the Insecta class, serve as an abundant source of these peptides, synthesized in specialized cells or released into the hemolymph upon pathogen recognition. The first insect antimicrobial peptide, discovered in 1980 in Hyalophora cecropia (Lepidoptera), demonstrated potent antimicrobial efficacy against various bacteria. Subsequent findings expanded this phenomenon to other insect orders like Coleoptera and Diptera, revealing diverse peptide families such as defensins, cecropins, and melittin. Insect antimicrobial peptides exhibit immense potential across agriculture, biotechnology, pharmacology, medicine, and multidisciplinary research, offering promise in addressing the pressing global issue of antimicrobial resistance.

Method: Insect-derived antimicrobial peptides were identified, characterized, and evaluated for their antimicrobial efficacy. This review also investigated their mechanisms of action and potential applications.

Results: Insect antimicrobial peptides exhibited robust antimicrobial, antifungal, and antiviral properties. Their versatile applications span agriculture, biotechnology, pharmacology, medicine, and interdisciplinary research.

Conclusion: Insect-derived antimicrobial peptides offer promising solutions to the global challenge of antimicrobial resistance, presenting diverse applications and avenues to address this urgent 21st-century threat.

Keywords: *Antimicrobial resistance, Antimicrobial peptide, Insect*

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