

EDITORIAL

Antimicrobial peptides (AMPs) are ubiquitous molecules as they are found in microorganisms as well as in plants, invertebrates and also vertebrates. They represent the first line of defense against pathogens acting as effector molecules of innate immunity. The emergence of resistance to commonly used antibiotics has stimulated the search for new naturally occurring bactericidal and fungicidal agents that may have clinical utility. Nowadays databases contain more than 800 sequences of AMPs from different sources and many studies are in progress in order to evaluate the potential clinical applications of these peptides. This issue of *Protein and Peptide Letters* contains seven manuscripts which describe research on antimicrobial peptides, highlighting the amazing growth of this field during the last few years. In the opening article, Bulet and Stöcklin focus on the structures and biological properties of AMPs from insects. They also discuss the transduction signalling pathways controlling AMPs gene expression and explore the example of *Drosophila* that may discriminate between bacterial and fungal infections. In the second paper, Castro and Fontes present the events involved in plant defense and also describe the major groups of plant AMPs: thionins, plant defensins and lipid transfer proteins. The review by Patrzykat and Douglas summarizes the diversity of AMPs focusing on their biological activities against bacteria and in the host. Dennison *et al.* present the first systematic analysis of the presence of oblique oriented α -helices in AMPs that might be used in their antimicrobial action. In the next article, Dennison *et al.* thoroughly review the involvement of amphiphilic α -helical structure in the mechanisms of action of AMPs. They discuss potential mechanisms by which AMPs are able to induce the destabilization of biological membranes and the structural features (influence of amino acid composition, sequence length, molecular mass, pI) which are required for function. The review by Cole presents an interesting uptake on the development of topical microbicides for sexually transmitted diseases, with particular emphasis on α -defensins, protegrins, tachyplesins and polyphemusins as examples of minidefensins that might be used as templates for microbicide development. In the last manuscript, Yount and Yeaman describe the recent advances in the mechanisms of action of AMPs and in understanding pathogen resistance to antimicrobial peptides through constitutive or inducible mechanisms. Finally, I hope that readers enjoy this issue and that the concepts and information available here contribute to their own studies on this challenging area of peptide research.

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