Journal of PeptideScience

Published online in Wiley Interscience:

(www.interscience.com) DOI 10.1002/psc.1163

Editorial

This Special Issue of the Journal of Peptide Science is dedicated to selected contributions from the *First Italy-Korea Symposium on Antimicrobial Peptides*, held at the Chosun University, Gwangju, Republic of Korea, on July 24–25, 2008. The symposium brought together about 150 participants and was organized by the Research Center for Proteineous Materials (Chosun University), the Department of Chemical Sciences and Technologies (University of Rome 'Tor Vergata'), the Institute of Medical Science (Chosun University), and the Biomaterial Research Center (Kookmin University), with the support of the Korean Science and Engineering Foundation, the Korean Foundation for International Cooperation of Science and Technology, the Korean Peptide and Protein Society, the Chosun University (Korea), the Italian Ministry for Foreign Affairs, and the Italian Embassy in Seoul.

The symposium was dedicated to antimicrobial peptides (AMPs), which are produced by virtually all organisms as part of their innate immune system, as a first defence line against pathogens. Their most common mechanism of bactericidal activity involves perturbation of membrane permeability [1], even though some AMPs act on intracellular targets [2,3]. AMPs are very diverse, with significant sequence variations even between orthologue genes [4]; however, usually they are short (less than 50 residues), and exhibit an amphipathic character and a positive charge, which appear to be the major determinants of their affinity and selectivity for bacterial membranes [2,4–6]. AMPs are active against bacteria, including drug-resistant and biofilm-forming strains [7], fungi [8], and even cancer cells. Due to their mechanism of action, they are attractive candidates for the development of new antibiotics to fight the insurgence of multidrug-resistant bacteria; several of them are already undergoing clinical trials, and some are starting to be used in veterinary and agricultural settings [9]. However, before they can find widespread application, several issues need to be addressed, such as their fast proteolytic degradation, cost of production, and possible toxicity against host cells. For this reason, a detailed understanding of the molecular details of the membrane perturbation process [1] is important for the rational design of new analogues with shorter sequences [2,3,5], increased resistance to proteolysis [10], and improved selectivity [2,3,5].

The papers presented in this issue give a good indication of the state of the art, showing in particular that it is now possible to design and synthesize AMPs as short as a few residues with minimal inhibitory concentrations (MICs) in the low micromolar range, high selectivity, and remarkable resistance to proteolysis. These articles also provide an overview of the ongoing collaborations between Italian and Korean scientists, combining the traditions of these two countries in the fields of peptide science and biotechnology.

The second edition of the symposium has already been scheduled to be held at the Conference Center of the University of Naples 'Federico II', Italy, during June 4–7, 2010, as a joint meeting with the 12th Naples Workshop on Bioactive Peptides. All readers are invited to participate in this forthcoming event.

Claudio Toniolo
University of Padova, Italy

Kyung-Soo Hahm
Chosun University, Korea

Lorenzo Stella
University of Rome 'Tor Vergata', Italy

Guest Editors

References

1 Bocchinfuso G, Palleschi A, Orioni B, Grande G, Formaggio F, Toniolo C, Park Y, Hahm KS, Stella L. Different mechanisms of action of antimicrobial peptides: insights from fluorescence spectroscopy experiments and molecular dynamics simulations. *J. Pept. Sci.* 2009; **15**: 550–558.
2 Shin S, Kim JK, Lee JY, Jung KW, Hwang JS, Lee J, Lee DG, Kim I, Shin SY, Kim Y. Design of potent 9-mer antimicrobial peptide analogs of protaetiamycine and investigation of mechanism of antimicrobial action. *J. Pept. Sci.* 2009; **15**: 559–568.
3 Zhu WL, Hahm KS, Shin SY. Cell selectivity and mechanism of action of short antimicrobial peptides designed from the cell-penetrating peptide Pep-1. *J. Pept. Sci.* 2009; **15**: 569–575.
4 Tomasinsig L, Morgera F, Antcheva N, Pacor S, Skerlavaj B, Zanetti M, Tossi A. Structure dependence of biological activities for primate cathelicidins. *J. Pept. Sci.* 2009; **15**: 576–582.
5 Kang SJ, Won HS, Choi WS, Lee BJ. *De novo* generation of antimicrobial LK peptides with a single tryptophan at the critical amphipathic interface. *J. Pept. Sci.* 2009; **15**: 583–588.
6 Gopal R., Park SC, Ha KJ, Cho SJ, Kim SW, Song PI, Nah JW, Park Y, Hahm KS. Effect of leucine and lysine substitution on the antimicrobial activity and mechanism of the HPA3NT3 analog peptide. *J. Pept. Sci.* 2009; **15**: 589–594.
7 Benincasa M, Mattiuzzo M, Herasimenka Y, Cescutti P, Rizzo R, Gennaro R. Activity of antimicrobial peptides in the presence of polysaccharides produced by pulmonary pathogens. *J. Pept. Sci.* 2009; **15**: 595–600.
8 Lee J, Park C, Park SC, Woo ER, Park Y, Hahm KS, Lee DG. Cell selectivity-membrane phospholipids relationship of the antimicrobial effects shown by pleurocidin enantiomeric peptides. *J. Pept. Sci.* 2009; **15**: 601–606.
9 Islas-Rodriguez AE, Marcellini L, Orioni B, Barra D, Stella L, Mangoni ML. Esculentin 1–21: a linear antimicrobial peptide from frog skin with inhibitory effect on bovine mastitis-causing bacteria. *J. Pept. Sci.* 2009; **15**: 607–614.
10 De Zotti M, Biondi B, Formaggio F, Toniolo C, Stella L, Park Y, Hahm KS. Trichogin GA IV: an antibacterial and protease-resistant peptide. *J. Pept. Sci.* 2009; **15**: 615–619.