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III ENCONTRO DE
BIOTECNOLOGIA
MEDICINAL

I IBERIAN CONGRESS ON
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BIOTECHNOLOGY

BOOK OF ABSTRACTS

ENCONTRO DE BIOTECNOLOGIA MEDICINAL

18 DE MAIO DE 2018

ESCOLA SUPERIOR DE SAÚDE
POLITÉCNICO DO PORTO

IBERIAN CONGRESS ON MEDICINAL BIOTECHNOLOGY

MAY 18TH, 2018

SCHOOL OF HEALTH
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ISBN: 978-989-20-8533-3

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Insights into the peptide hybrid constructs approach

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The invention of peptide synthesis around the sixties prompted the development of synthetic peptides for different applications, including the study of protein functions, the identification and characterization of proteins, the development of epitope-specific antibodies against antigens from pathogens, the development of novel antimicrobial agents, and their use as intracellular delivery of a wide variety of exogenous molecules. Furthermore, synthetic peptides are used to study enzyme-substrate interactions within important enzyme classes such as kinases and proteases, which play a crucial role in cell signalling.

Peptides can be obtained chemically by solution-phase synthesis, by solid-phase peptide synthesis, or by a combination of both methods, which can involve various ligation strategies. The benefit of peptide synthesis approaches today is that, in addition to the ability of obtaining peptides that are found in nature, one can use imagination and creativity to make unique non-natural peptides with a desired and optimized biological response. For example, chemical strategies for the design of multifunctional peptides can include a hybrid of two peptides being bound together like modules either directly or via a linker. As such, this work will focus on the success case of CA(1-7)M(2-9), an hybrid of cecropin A (CA) and melittin (M) that shows powerful antibacterial activities with a wider spectrum and improved potency relative to cecropin A without the undesirable cytotoxic effects of melittin.

Acknowledgements

Thanks are due to Fundação para a Ciência e Tecnologia (FCT), Portugal, for funding LAQV-REQUIMTE through project UID/QUI/50006/2013. Thanks are also due to "CCDR-N/NORTE2020/Portugal 2020" for funding through project DESignBIOtechHealth (ref. Norte-01-0145-FEDER-000024)