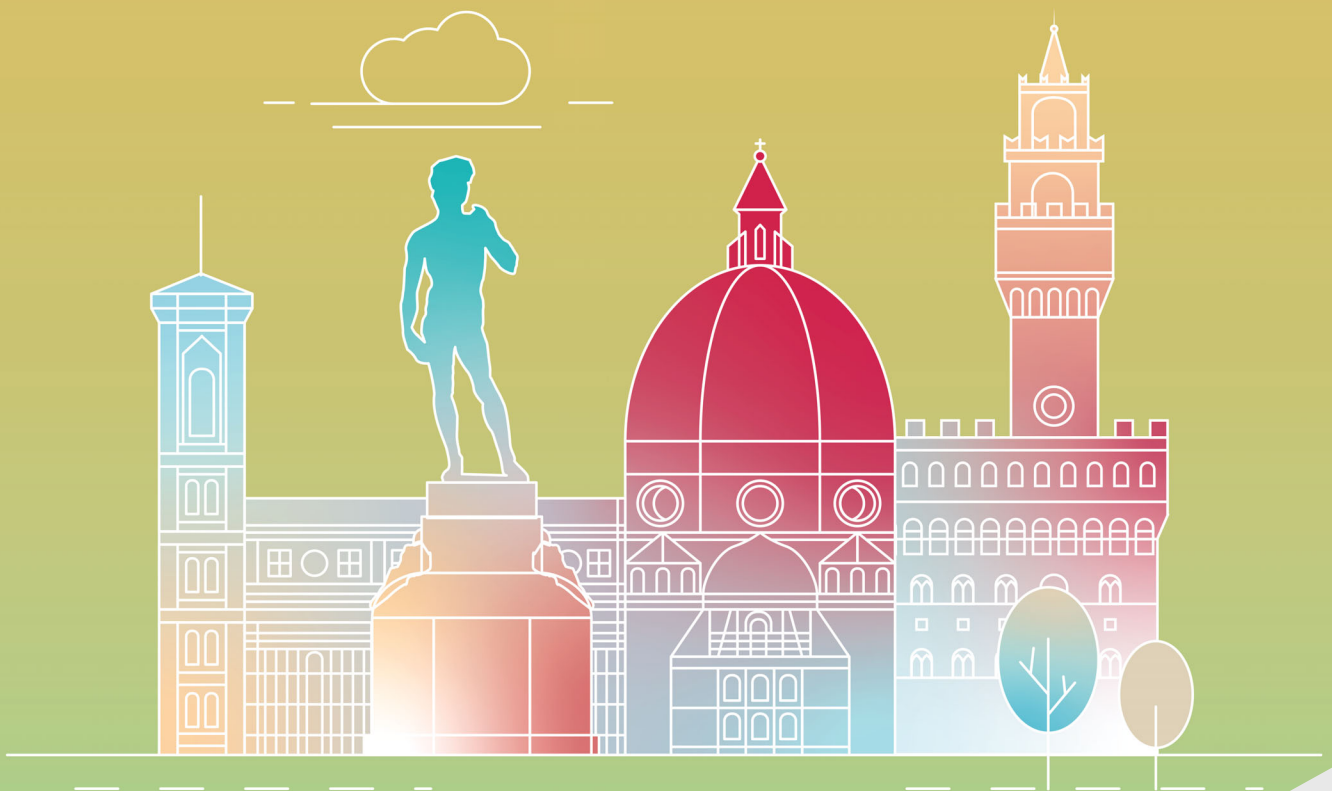
Journal of
PeptideScience
The official Journal of the European Peptide Society
wileyonlinelibrary.com/journal/jpepsci

37th EPS
European Peptide Symposium

14th IPS
International Peptide Symposium



25-29 August 2024
Florence, Italy

WILEY

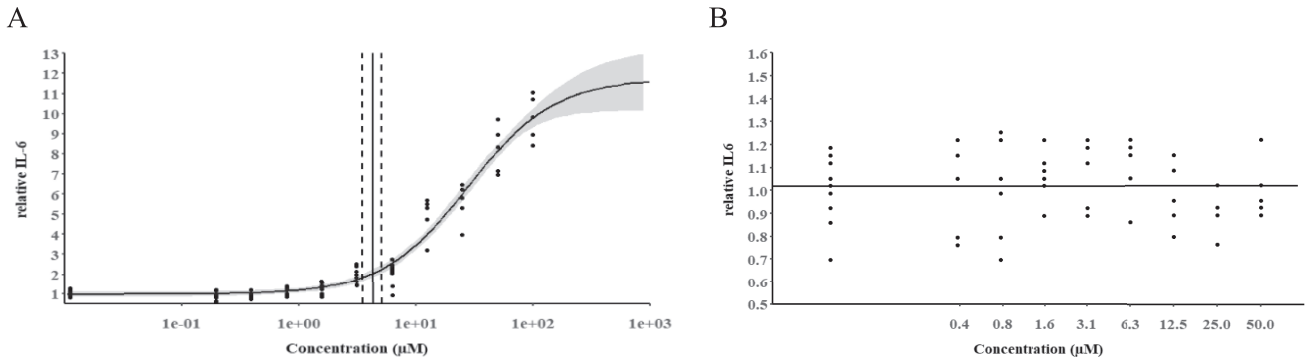


Figure 1. Illustration of the muscle-specific effect of the PlnA quorum sensing peptide: no effect on splenocytes was observed (A), while a clear dose-response behaviour is observed in C2C12 cells (B). (P2.056)

Figure 1). Moreover, the peptide was found to be present in some *Lactobacillus plantarum* strains. In vivo mice experiments resulted in a decrease in grip strength and muscle mass after daily injection of PlnA, which are key indicators of sarcopenia. Our findings also showed the ability of certain QSP to pass the mucosa and reach the systemic circulation. Very recently, the in vivo relevance was reinforced by the detection of PlnA in human plasma. Altogether, our results suggest that quorum sensing peptides play a pivotal role in the complex interplay between the gut microbiome and sarcopenia.

ID: 621–P2.058 | Unlocking mango's peptide potential: exploring bioactive peptides in pulp and peel

Mahya Bahmani[1,2]; Michelle L. Colgrave[2,3]; Cassandra L. Pegg[3]; Angéla Juhász[2]

[1]*Commonwealth Scientific and Industrial Research Organisation (CSIRO), Western Australia, Australia;* [2]*Australian Research Council Centre of Excellence for Innovations in Peptide and Protein Science (CIPPS), Edith Cowan University, Western Australia, Australia;* [3]*Commonwealth Scientific and Industrial Research Organisation (CSIRO), Queensland, Australia*

Mango (*Mangifera indica* L.), known as "the king of fruits" for its delectable taste and nutritional richness, belongs to the Anacardiaceae family and is a widely cherished tropical fruit. Throughout the process of mango processing, a significant portion of the fruit, ranging from 35% to 60%, is disposed of, often without any treatment, resulting in environmental challenges and financial setbacks. Peels and seeds, accounting for 40–50% of the fruit's weight, are typically discarded as by-products, with the peel alone contributing about 20% to the overall waste. This waste holds potential for conversion into valuable resources. Moreover, recent studies have revealed additional health benefits associated with mango consumption, owing to the presence of bioactive compounds in various parts of the fruit. Although mango is known to have various bioactive compounds, the understanding of bioactive peptides within different mango tissues remains limited.

This research aims to explore mango to uncover potential bioactive peptide-encoding genes present in the pulp and peel using publicly available transcriptome data resources. Employing bioinformatics tools, we conducted an in-silico analysis of previously published mango genomics data. We evaluated gene expression and mapped the mango proteome to an in-house bioactive peptide database, identifying bioactive peptides and their corresponding coding genes. Our findings reveal the presence of over 250 bioactive peptide coding genes in the pulp and peel of the analyzed cultivars, respectively. Notably, our data suggests a differential expression of potential bioactive peptide coding genes across mango tissues, with a higher abundance observed in peel tissue compared to pulp. These bioactive peptides showcase diverse functionalities, encompassing antioxidant, ACE inhibitory, anticancer, antibacterial, antifungal, and antiviral properties. In the subsequent phase, we plan to conduct mass spectrometry-based peptidomics analysis coupled with in vitro bioactivity assays to validate the results of our in-silico analysis.

This research promises valuable insights into the existence and potential health benefits of bioactive peptides across different mango tissues. It highlights the necessity for further investigation to explore the potential applications of mango by-products in the development of functional foods and nutraceuticals.

ID: 634–P2.059 | Alca1, a cyclotide extracted and isolated from *Allexis cauliflora* (Violaceae): synthesis and biological activities

Olivier Ndogo Eteme[1]; Letícia Oliveira Catarin Nunes[2]; Marcela Nunes Argentin[3]; Norival Santos-Filho[2]; Ilana Lopes Baratella da Cunha Camargo[3]; Eduardo Festozo Vicente[1]

[1]*School of Sciences and Engineering, São Paulo State University (Unesp), Tupã, Brazil;* [2]*São Paulo State University (Unesp), Institute of Chemistry, Araraquara, Brazil;* [3]*University of São Paulo, São Carlos Institute of Physics, São Carlos, Brazil*

Bacterial resistance to conventional antibiotics is a serious public health problem. The research of molecules with bactericidal activity is always a current event with an increase in multi-resistance. Over the past decade, small proteins known as antimicrobial peptides (AMPs), natural compounds produced by all prokaryotic and eukaryotic cells, have shown promising results in overcoming the growing problems of antibiotic resistance. In parallel, there are the so-called cyclotides, which are cyclic peptides, rich in cysteines and originated from plants, showing potent antimicrobial activities with a very reduced toxicity. They are considered promising molecules for peptide drug design, due to their stable circular structure. In this work, the antibacterial activities of a synthetic cyclotide Alca1 from the plant *Allexis cauliflora* were evaluated. Specifically, the synthesis of cyclotide Alca1 was evaluated for the first time and was achieved employing solid-phase peptide synthesis using Fmoc chemistry, with a final yield of 40%. The synthesis reaction was monitored by combined HPLC and LC–MS methods, with the evaluation of the antibacterial property of cyclotide Alca1 from *Allexis cauliflora*. The antibacterial test was performed using the microdilution method on many species of bacteria, such as *Staphylococcus epidermidis* (ATCC 35984), *S. aureus* (ATCC 25923), *S. aureus* (ATCC 8095), *Enterococcus faecalis* (ATCC 29212), *Enterococcus faecium* (ATCC 700221), *Klebsiella pneumoniae* (ATCC 700603), *Escherichia coli* (ATCC 25922), *Acinetobacter baumannii* (ATCC 19606), and *Pseudomonas aeruginosa* (ATCC 27853). Alca1 cyclotide was bactericidal on almost all of these strains, except in *E. coli* (ATCC 25922) where it was bacteriostatic. The biofilm eradication capacity test was carried out on two ATCC strains of *S. epidermidis*, and Alca1 otherwise promoted a significant biofilm growth that was statistically different from the control group. In addition, the Alca1 presented no hemolytic activity at higher concentrations (>512 μg/ml). Therefore, combined with its already reported high stability, Alca1 cyclotide has demonstrated to be an excellent molecule for combating multi-resistant bacteria with low toxicity to erythrocytes.

ID: 643–P2.060 | Microporous scaffold-mediated myeloid cell activation in situ for robust peptide-based cancer vaccine

Shao-Hua Zhuo; Wen-Hao Li; Jing-Yun Su; Yan-Mei Li
Key Laboratory of Bioorganic Phosphorus Chemistry & Chemical Biology (Ministry of Education), Department of Chemistry, Tsinghua University, Beijing, China

The breakthroughs in neoantigen research and the creation of neoantigen-directed immunotherapeutic agents are pivotal for progress in custom cancer vaccines, adoptive cell transfer therapies, and antibody-based interventions. These neoantigens, generated by unique cancer cell mutations, offer a high degree of tumor selectivity and have the potential to markedly boost the immune system's response against tumor cells, with the possibility of long-lasting protection [1]. Despite their promise, neoantigen-directed immunotherapies have so far yielded objective responses in a limited number of patients, which can be attributed to the current shortcomings in neoantigen prediction algorithms and the ability of cancer cells to avoid immune system surveillance [2]. Therefore, neoantigen-based therapeutic strategies, for example peptide and dendritic cell (DCs) vaccines, are an effective approach for stimulating, enhancing, and diversifying cytotoxic T lymphocytes, with their high feasibility, general safety and easier to manufacture. Nevertheless, traditional cell-based vaccine therapies involve complicated in vitro cellular engineering, leading to high expenses, time-intensive, and a complex medication process. In comparison, in vivo cell engineering, including T cells, macrophages, monocytes or DCs, and antigen-loading simplify manufacturing steps by leveraging the body's immune system to generate various immune cells. And little attention was paid to myeloid cells, despite their potential to disrupt immune tolerance and enhance systemic immune memory. To fully harness the therapeutic potential of myeloid cells, we have developed an injectable microporous scaffold for myeloid cell-based therapy, which recruits and activates monocytes and DCs in situ. Generally, the production of intracellular neoantigens in DCs can be achieved via mRNA transfection or mRNA electroporation, which are not suitable for in vivo cell engineering. Subsequently, surface-modified peptide antigen or neoantigen are released via disulfide exchange with cell membrane, which drives the cell differentiation, activation, and migration of the generated monocytes and dendritic cells from the in situ microporous scaffold. And thus, the microporous scaffold vaccines elicit strong antitumor responses and long-term immune protection in different tumor-bearing models.

References

1. Jiang T, Shi T, Zhang H, et al. Predictive biomarkers in immune checkpoint blockade therapy. J Hematol Oncol. 2019; 12(1): 93.
2. Xie N, Shen G, Gao W, et al. Emerging roles of neoantigen in cancer immunotherapy. Signal Transduct Target Ther. 2023; 8(1): 9.

ID: 648–P2.061 | Bugs, plants and peptides: unleashing the power of chemical ecology for sustainable crop protection

Aurelien Bigot[1]; Quentin Kaas[2]
[1]*Syngenta Crop Protection - Biologicals, Stein, AG, Switzerland;*
[2]*Syngenta Crop Protection, Stein, AG, Switzerland*

Farmers face globally a shrinking toolkit for crop protection amid tighter regulations, increased public demand for residue-free food, challenges from resistance, and the negative impacts of climate change. At Syngenta Biologicals, we are committed to enhancing agricultural productivity in concert with sustainable practices. We pledge to bring to market cutting-edge biocontrol solutions, and one such pioneering approach in our arsenal is the development of peptide-based insecticides. These novel bioinsecticides are designed to provide growers with a targeted and environmentally benign approach to insect pest management, ensuring no residual presence as they degrade into harmless natural amino acids.