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Cm-p5: An antifungal mollusc-derived peptide conjugated with citric acid-modified manganese-ferrite nanoparticles with enhanced activity against *Candida albicans in vitro*

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Antimicrobial peptides form part of the first line of defense against pathogens for many organisms. Current treatments for fungal infections are limited by drug toxicity and pathogen resistance. Cm-p5 (SRSELIVHQRLF), a peptide derived from the marine mollusc *Cenchritis muricatus (Gastropoda: Littorinidae)* has a significantly increased fungistatic activity against pathogenic *Candida albicans*, exhibiting low toxic effects against a cultured mammalian cell line. Cm-p5 is characterized by polarimetry of circular dichroism and spectroscopy of nuclear magnetic resonance. The antimicrobial activity of different types of nanoparticles has been previously demonstrated. Specifically, magnetic nanoparticles have been widely studied in biomedicine due to their physicochemical properties. The citric acid-modified manganese ferrite nanoparticles used in this study were characterized by high-resolution transmission electron microscopy, which confirmed the formation of nanocrystals of approximately 5 nm diameter. These nanoparticles were able to inhibit *Candida albicans* growth *in vitro*. However, the nanoparticles were not capable of inhibiting gram-negative bacteria *Escherichia coli* or gram-positive bacteria *Staphylococcus aureus*. The antifungal peptide Cm-p5 was conjugated to the modified manganese ferrite nanoparticles. The antifungal activity of the conjugated nanoparticles was higher than their bulk counterparts. This conjugate proved to be nontoxic to a macrophage cell line at concentrations that showed antimicrobial activity.

Biography

Anselmo J Otero-Gonzalez is a Microbiologist at Havana University, 1978, PhD, National Centre for Scientific Research, Havana, 1987, Doctor in Science, Havana University, 2008, now is Senior Researcher, Antimicrobial Peptide lab, Faculty of Biology, Havana University, Cuba and president of National Board for PhD examination in Cuba. He is a Professor of Cell Engineering and Immunology. In 1981, he was awarded with a Fellowship for attending the Uppsala Separation School, Biomedical Centre University of Uppsala, Sweden. In 1983, doctoral stay at the Department of Genetics, Pennsylvania University, Philadelphia, USA for monoclonal antibody generation. 1991: post-doctoral stay regarding Cell banking at the European Collection of Animal Cell Cultures, Porton Down, Salisbury. 1992: fellowship for a research project (AIDS-HIV vaccine), Swedish Centre of Disease Control, Stockholm, Sweden. 2000: awarded with a postdoctoral fellowship, David Rockefeller Centre of Latin-American Studies, Harvard School of Public Health, Harvard University, Boston, USA. 2011-12: post-doctoral stay at Harvard Medical School for characterizing the antifungal peptide Cm-p5. He also has (2008-present) collaboration with the Bioorganic Department, Leibniz Institute for Plant Biochemistry, Halle (Saale), Germany regarding antimicrobial peptide isolation, evaluation and characterization. Otero has more than 90 scientific articles in recognized journals and more that 145 abstract and presentations in scientific events.

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