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Effect of natural and synthetic melittin on influenza-infected chicken embryos

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Antimicrobial peptides are located in a variety of organisms bearing antimicrobial activity against a broad range of targets, including bacteria, viruses, fungi and parasites. These peptides are focused directly on the phospholipid membranes and not to the cellular or metabolic activity of cells such as antibiotics. Melittin is well characterized, pore-forming lytic peptide amphiphile found in bee venom, of which amphiphilic properties facilitate its solubility in water and the ability to react with both natural and artificial membranes. Electrochemical characterization of both peptides and their mixtures obtained from FPLC fractionation was done. To determine the differences between electrochemical behaviours of target molecules we employed differential pulse voltammetry coupled with adsorptive transfer technique (AdT DPV), utilizing Brdicka reaction. In Brdicka reaction there are evaluated catalytic signals of hydrogen evolution, provided by peptides/proteins on the mercury electrode in the presence of ammonium buffer with content of the cobalt salt. Proteins and peptides with thiol/amino groups give four distinct signals-Co1 (-0.9 V), RS_2Co (approx.-1.15 V), Cat1 (approx.-1.3 V) and Cat2 (-1.55 V), however Brdicka electrolyte provides only one Co (II) peak (-1.15 V). Large differences between electrochemical behaviours of both peptides were observed, in particular in RS_2Co (potential shift of approx.-0.4 mV and decrease of current in melittin peak of approx. 0.1 μA) and Cat1 (potential shift of approx.-0.2 mV and decrease of peak of approx. 0.05 μA).

Biography

Rene Kizek is a Professor and Head of Laboratory of Metallomics and Nanotechnology, Mendel University in Brno and Vice-Head of Research Group Leader of Submicron Systems and Nanodevices in Central European Institute of Technology. His research is mainly focused on effects of metal ions in organisms and their roles in various pathological processes mainly tumour diseases. Further, his team is aimed at developing new types of nanomaterials and testing these materials for nanomedical and nanomedicine purposes. He is an author of more than three hundred ISI indexed papers with more than 7000 citations and H-index 45.

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