Evaluated Peptide Nanotubes containing an Iron(II)diethiyldithiocarbamate complex as Nitric Oxide Drug Delivery System

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The development of drug delivery systems (DDS)s of NO in the body is of great relevance in the treatment of several diseases, as well as for the pharmaceutical industry. In this work, we evaluated a novel NO drug delivery system (DDS) based on iron(II)diethyldithiocarbamate (FeDETC) incorporated in Peptide nanomaterials. Peptide nanomaterials are well known in the scientific community for their large potential for application in biomedicine, biotechnology and nanotechnology, including DDS systems.[1] Besides, the results of recent studies from our group have shown that peptide nanotubes (PNTs) can serve as part of an electrochemical biosensor plataform [2], which can be an ideal matrix to the proposed (DDS)s studies. Electron paramagnetic resonance (EPR) spin trapping, a highly sensitive technique, was used for NO detection and characterization of the NO delivery kinetics.

The (DDS)s with PNTs were obtained by using FeDETC spin trapping encapsulated. The system was obtained by mixing peptide compounds and FeDETC during the nanostructuring process. Several proportions of PNTs and FeDETC were used. The NO immobilization was made by immersing the DDS matrices in the solution containing NO. We evaluated the intercalation between the FeDETC complex in PNTs as well as the capacity of trapping of NO from the system PNTs with FeDETC for future applications such as NO-DDS. The UV/Vis spectra, scanning electron microscopy (SEM), FTIR spectra and atomic force microscopy (AFM) showed effective intercalation between PNTs e FeDETC.

Studies NO detection by EPR of the PNTs-FeDETC to the preparation of NO-DDS are still in progress and will be exposed in this ISAMN congress.

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References:

[1] Zhao, X.; Pan, F.; Jian R. Lu, Progress in Natural Science, 2008, 18, 653–660.

[2] Cipriano,T.C.;Takahashi,P.M.;de Lima, D.;de Oliveira Jr., V. X.;Souza, J. A. Martinho,H .;Alves,W. A. Spatial Organization of Peptide Nanotubes for Electrochemical Devices . J. Mater. Sci. 2010.

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