EuroSciCon

POSTERS

Abstracts

17th Edition of International Conference and Exhibition on

Pharmaceutics and Novel Drug Delivery Systems

October 04-06, 2018 | Moscow, Russia

EuroSciCon

October 04-06, 2018
Moscow, Russia

17th Edition of International Conference and Exhibition on

Pharmaceutics and Novel Drug Delivery Systems

Stanislav A Paveliev et al., Int J Drug Dev & Res 2018, Volume 10
DOI: 10.21767/0975-9344-C1-003

New types on N-oxyl radicals-molecular sensors for imaging of cancer *in vivo*

Stanislav A Paveliev
N D Zelinsky Institute of Organic Chemistry-RAS, Russia

Nitroxide radicals are small redox-sensitive molecules, characterized by EPR and MRI contrast. Paramagnetic nitroxide radicals participate in electron-transfer reactions with oxidative and reductive equivalents with formation of noncontrast intermediates – hydroxylamine and/or oxoammonium. The interaction of these intermediates with superoxide radicals at physiological pH (7.4) leads to recovery of nitroxide in its initial radical form and appearance of MRI/EPR contrast. The rate constants of the electron-transfer reactions determine the dynamics of a nitroxide-enhanced MRI signal in living cells and tissues. Carcinogenesis is one of the most versatile models, characterized by a big difference in the redox signaling in comparison with healthy organisms. The cells and tissues of healthy mammals are characterized by low levels of reactive oxygen species (ROS) and some constant (reference) level of reducing equivalents. It is widely accepted that increasing ROS above the critical level provokes genomic instability and triggers uncontrolled proliferation. The normal cells become malignant.

There are number of reports about MR imaging of cancer using N-oxyl radicals derivatives. All these studies give a preference to pyrrolidine-type nitroxide radicals (e.g. carboxy-PROXYL and carbamoyl-PROXYL), because of their greater resistance to reduction and a long-lived MRI signal in biological specimens in comparison with piperidine-type (TEMPO-type) nitroxide radicals. For cancer imaging *in vivo*, based on tissue redox activity, the nitroxide must be cell penetrating. The redox-sensitive nitroxide has to be delivered into the cells to interact with oxidizers and reducers substances and to serve as a redox sensor. The present research is devoted to obtaining new types of N-oxyl radicals - potential molecular sensors for imaging of cancer *in vivo*, and studying their physicochemical properties. This work was supported by the Russian Foundation for Basic Research (18-33-00613).

Biography

Stanislav A Paveliev received his master's degree in 2015 and is now working on his PhD thesis. The field of scientific interests is the new classes of stable N-oxyl radicals, new approaches to their generation and the study of their properties. The recent results are presented in the following article: Beilstein J. Org. Chem., 2018, 14, 2146-2155.

spavelyev@yandex.ru