

ORGANOMETALLIC CHEMISTRY OF RHENIUM AND TECHNETIUM FUELLED BY BIOMEDICAL APPLICATIONS

Isabel Santos

Unidade de Ciências Químicas e Radiofarmacêuticas, Instituto Tecnológico e Nuclear, Instituto Superior Técnico (IST/ITN) Universidade Técnica de Lisboa, Sacavém, Portugal.

E-mail: isantos@itn.pt

Radiopharmaceutical chemistry is an important topic in Life Sciences, aiming to design radiopharmaceuticals for Molecular Imaging (SPECT and PET) and Targeted Therapy. For both, Molecular Imaging and Targeted Therapy, the radiopharmaceuticals in clinical use are predominantly metal-based complexes and the overwhelming majority corresponds to ^{99m}Tc , which still is the workhorse of nuclear medicine, due to its ideal nuclear properties, rich chemistry, low-cost and convenient availability from commercial generators. The design of these drugs is a multidisciplinary area fuelled by the convergence of biology, medicine, chemistry, physics and engineering. Chemists, in particular, play a critical role in this effort, as they are continuously challenged to use innovative chemical strategies to develop “*smart drugs*”. The possibility of preparing organometallic complexes of Re and Tc in the presence of water opened new and innovative routes in radiopharmaceutical chemistry. [1]

In this presentation we will review the most relevant aspects of the organometallics chemistry of Re and Tc fuelled by in vivo Molecular Imaging and Targeted Therapy. [2,3] We will also discuss the importance of the chemistry on the modulation of the pharmacokinetics of such complexes for *in vivo* targeting of biological/biochemical processes underlying diseases, such coronary artery disease or cancer.[4-7]

[1] R. Alberto, R. Schibli, A. Egli, AP Schubiger, U. Abram, T.A. Kaden, *J. Am. Chem. Soc.*, 1998, *120*, 7987.

[2] R. Garcia, A. Paulo, A. Domingos, I. Santos, K. Ortner, R. Alberto, *J. Am. Chem. Soc.*, 2000, *122*, 11240.

[3] E. Palma, J. D. G. Correia, M. P. C. Campello, I. Santos, *Mol BioSys.*, 2011, *7*, 2950–2966.

[4] M. Morais, S. Subramanian, M. Martins, U. Pandey, G. Samuel, S. Pereira, M. Venkatesh, João D. G. Correia, Isabel Santos, *Mol. Pharmaceutics*, 2011, *8*, 609.

[5] L. Maria, C. Fernandes, R. Garcia, L. Gano, A. Paulo, I. Santos, *Dalton Trans.*, 2009, 603.

[6] - L. R. Goethals, I. Santos, V. Caveliers, A. Paulo, F. De Geeter, L. Gano, C. Fernandes, T. Lahoutte, *Contrast Media Mol. Imaging*, 2011, *6*, 178.

[7] J.D.G. Correia, A. Paulo, P.D. Raposinho, I. Santos, *Dalton Trans.* 2011, *40*, 6144.

Acknowledgements

The financial support of FCT (PTDC/QUI-QUI/115712/2009) and Mallinckrodt Med. BV, Petten, The Netherlands are acknowledged.