Tracking nanomedicines *in vivo* using PET imaging

Rafael T. M. de Rosales

Division of Imaging Sciences & Biomedical Engineering
King's College London
St. Thomas Hospital
London, United Kingdom
rafael.torres@kcl.ac.uk

Imaging methods that report on drug biodistribution and pharmacokinetics in vivo should allow us to identify, monitor and improve the efficacy of novel therapeutic approaches based on nanomedicines. In order to support clinical trials and applications in these areas there is a need to develop simple radiolabelling methods for non-invasive imaging techniques to monitor their biodistribution and answer questions such as: How much nanomedicine drug is/stays in the target? Does it migrate to potentially sensitive organs? How is it cleared?.

Positron emission tomography (PET) is particularly well suited to answer these questions. It is the only clinically available non-invasive imaging technique that allows quantitative analysis of imaging signals with exquisite sensitivity (signal/background ratios) and adequate spatial/temporal resolution at the whole-body level. Taking examples from my own research group [1-10] and other researchers in the field, in this talk I will describe examples on how different PET radiolabelling methods have been used to track nanomedicines in preclinical and clinical studies.

References

[1] S. Edmonds, et al., ACS Nano, 2016, 10, 10294.
[2] R. T. M. de Rosales, et al., Angew. Chem. Int. Ed, 2011, 50, 5509.
[3] L. Sandiford, et al., ACS Nano, 2013, 7, 500.
[4] R. T. M. de Rosales, et al., Bioconjugate Chem, 2011, 22, 455.
[5] A. Patel, et al., J Control Release, 2016, 235, 24.
[6] X. J. Cui, et al., Bioconjugate Chem, 2016, 27, 319.
[7] L. Cabana, et al., Small, 2016, 12, 2893.
[8] J. E. Mackewn, et al., IEEE Transactions on Nuclear Science, 2015, 62, 784.
[9] J. T. W. Wang, et al., Adv Funct Mater, 2014, 24, 1880.
[10] X. J. Cui, et al., Biomaterials, 2014, 35, 5840.