



Contribution ID: 10

Type: Oral presentation

## Oxidation of saturated and unsaturated bilayers by reactive oxygen species

Thursday, 12 December 2019 12:10 (20 minutes)

Oxidation of membrane lipids in biology is a very important field because it may impact ageing, cell apoptosis and cancer[1]. It is unclear what the chemical identity of the oxidant is and there is plenty of discussion in the literature. Consequently, the term ROS (reactive oxygen species) is invoked and that may include the oxidants OH,  $O_2(^1\Delta_g)$ ,  $HO_2$ ,  $O_2^-$  etc. Studies of the oxidation of lipid bilayers (as a proxy for biological membranes), generate mixtures and unknown amounts of ROS and describe typically what happens to either the morphology of the bilayer/lipid (e.g [2]) or report the resultant products (e.g [3]). We will report on the chemical mechanism, kinetics and morphology gained from the oxidation of DPPC and POPC lipid bilayers with OH radicals and aqueous ozone. We generate known amounts of OH radicals or aqueous ozone by photolysis and with deuterium labelling we have (a) highlighted the location on the lipid molecule of initial attack (head, tail or both?), (b) determined the site-specific rate constants of the bilayer attack and (c) in real time recorded the change in bilayer morphology (film thickness) by neutron reflection.

1. Balazy and Nigam, *Ageing Res. Rev.* 2 (2003) 191-209; W.Martinet, M.Kockx, *curr. Opin. Lipidol* 12(5)(2001) 535-541; M. Valko, C. Rhodes, J. Moncol, M. Izakovic, M. Mazur. *Chem-Biol. Interact* 160(1) (2006) 160(1), 1-40
2. H. Smith, M. Howland, A. Szmodis, L.Daemen, A. Parikh, J. Majewski. *J.Am.Chem.Soc.* 131 (2009), 3631.
3. K. Jain, A. Siddam, A. Marathi, U. Roy, J. Falck, M. Balazy . *Free Radical Bio. Med.* 453 (2008) 269

**Primary author:** KING, Martin (Royal Holloway University of London, UK)

**Co-authors:** THOMPSON, Katherine; ROBSON, Toby (Royal Holloway University of London); WELBOURN, Rebecca (ISIS); RENNIE, Adrian R.; GUTFREUND, Philipp; ARNOLD, Thomas (ESS)

**Presenter:** KING, Martin (Royal Holloway University of London, UK)

**Session Classification:** Session D