Regulation of organelle biogenesis at the endoplasmic reticulum

Pedro Carvalho

Sir William Dunn School of Pathology, University of Oxford,

South Parks Road, Oxford OX1 3RE, UK

* **Corresponding author:** pedro.carvalho@path.ox.ac.uk

The endoplasmic reticulum (ER) produces large amounts of phospholipids and membrane proteins to supply most cellular organelles. Upon their synthesis, many of these molecules are packaged into COPII coated vesicles to traffic to their final destination. While the mechanisms of COPII vesicle formation are well characterized, how specific proteins and lipids in the ER give rise to other organelles, such as lipid droplets (LDs) and peroxisomes, remains largely unknown. In my talk I will describe our recent findings that show that in yeast the ER budding of these structurally unrelated organelles has remarkably similar requirements and involves cooperation between Pex30 and the seipin complex. In the absence of these components, budding of both LDs and peroxisomes is inhibited, leading to the ER accumulation of their respective constituent molecules, such as triacylglycerols and peroxisomal membrane proteins, while COPII vesicle formation remains unaffected. This phenotype can be reversed by remodeling ER phospholipid composition highlighting a key function of these lipids in organelle biogenesis. We propose that seipin and Pex30 act in concert to organize membrane domains of lipid composition distinct from the bulk ER and that are permissive for organelle budding.