OptiPrep™ Mini-Review MS18

Purification of organelles and membranes from non-mammalian eukaryotes

- This Mini-Review lists all of the references reporting the use of OptiPrep™ for the purification and analysis of organelles from a variety of non-mammalian eukaryotic cells and tissues.
- **This Mini-Review does not contain information on organelles and membranes from *Saccharomyces cerevisiae;* a bibliography devoted to these particles is given in MS20**

The bibliography below is divided into **eleven principal eukaryotic groups;** within each of these groups papers are further sorted according to **species** and/or **organelle type**. References are listed alphabetically according to **first author** and then, if required, chronologically. To aid identification of research topics, these are highlighted in blue. **Review articles (Section 11)** are also listed.

Published papers have been assigned to one of the following principal sections:

1. **Algae**
2. **Amphibia**
3. **Fish**
4. **Fungi (other than yeast: for yeast organelles – see Optiprep™ Mini-Reviews MS05 and MS20)**
5. **Insects**
6. **Marine invertebrates**
7. **Nematodes, trematodes, annelids**
8. **Phytoplankton**
9. **Plants and plant cells**
10. **Protozoa**
11. **Review articles, including a sub-section on proteomics**

1. Algae

1-1. *Chlamydomonas reinhardtii*

Acidocalcisomes-like organelles, chloroplasts and mitochondria

Ruiz, F.A., Marchesini, N., Seufferheld, M., Govindjee and Docampo, R. (2001) *The polyphosphate bodies of Chlamydomas reinhardtii possess a proton pumping pyrophosphatase and are similar to acidocalcisomes* J. Biol. Chem., **276**, 46196-46203

Ciliary transition zones

Diener, D.R., Lupetti, P. and Rosenbaum, J.L. (2015) *Proteomic analysis of isolated ciliary transition zones reveals the presence of ESCRT proteins* Curr. Biol., **25**, 379–384

Cytoplasmic vesicles

Casem, M.L. (2016) *Cytoskeleton and intracellular motility* In "Case studies in cell biology" Elsevier Inc, pp 127-156

Wood, C.R. and Rosenbaum, J.L. (2014) *Proteins of the ciliary axoneme are found on cytoplasmic membrane vesicles during growth of cilia* Curr. Biol., **24**, 1114-1120

Flagella membrane vesicles

Huang, K., Diener, D.R., Mitchell, A., Pazour, G.J., Witman, G.B. and Rosenbaum, J.L. (2007) *Function and dynamics of PKD2 in Chlamydomonas reinhardtii flagella* J. Cell Biol., **179**, 501-514

1-2. *Cyanidioschyzon merolae*

Chloroplasts/mitochondria

Nishida, K., Yagisawa, F., Kuroiwa, H., Nagata, T. and Kuroiwa, T. (2005) *Cell cycle-regulated microtubule-independent organelle division in Cyanidioschyzon merolae* Mol. Biol. Cell, **16**, 2493-2502

Mitochondria

Nishida, K., Yagisawa, F., Kuroiwa, H., Yoshida, Y. and Kuroiwa, T. (2007) *WD40 protein Mda1 is purified with Dnm1 and forms a dividing ring for mitochondria before Dnm1 in Cyanidioschyzon merolae* Proc. Natl. Acad. Sci. USA, **104**, 4736-4741

Peroxisomes

Imoto, Y., Abe, Y., Okumoto, K., Honsho, M., Kuroiwa, H., Kuroiwa, T. and Fujiki, Y. (2017) *Defining the dynamin-based ring organizing center on the peroxisome-dividing machinery isolated from Cyanidioschyzon merolae* J. Cell Sci., **130**, 853-867

Polyphosphate vacuoles

Yagisawa, F., Nishida, K., Yoshida, M., Ohnuma, M., Shimada, T., Fujiwara, T., Yoshida, Y., Misumi, O., Kuroiwa, H. and Kuroiwa, T. (2009) *Identification of novel proteins in isolated polyphosphate vacuoles in the primitive red alga Cyanidioschyzon merolae* Plant J., **60**, 882–893

2. Amphibia (*Xenopus*)

ER/Golgi/plasma membrane

Carattino, M.D., Liu, W., Hill, W.G., Satlin, L.M. and Kleyman, T.R. (2007) *Lack of a role of membrane-protein interactions in flow-dependent activation of ENaC* Am. J. Physiol. Renal Physiol., **293**, F316-F324

Kuiper, R.P., Bouw, G., Janssen, K.P.C., Rotter, J., van Herp, F. and Martens, G.J.M. (2001) *Localization of p24 putative cargo receptors in the early secretory pathway depends on the biosynthetic activity of the cell* Biochem. J., **360**, 421-429

Lipid rafts

Bates, R.C., Fees, C.P., Holland, W.L., Winger, C.C., Batbayar, K., Ancar, R., Bergren, T., Petcoff, D. and Stith, B.J. (2014) *Activation of Src and release of intracellular calcium by phosphatidic acid during Xenopus laevis fertilization* Dev. Biol., **386**, 165-180

Membrane/cytoplasm

Hülsmann, B.B., Labokha, A.A. and Görlich, D. (2012) *The permeability of reconstituted nuclear pores provides direct evidence for the selective phase model* Cell, **150**, 738–751

Nuclei

Amin, N.M., Greco, T.M., Kuchenbrod, L.M., Rigney, M.M., Chung, M-I., Wallingford, J.B., Cristea, I.M. and Conlon, F.L. (2014) *Proteomic profiling of cardiac tissue by isolation of nuclei tagged in specific cell types (INTACT)* Development, **141**, 962-973

3. Fish

3-1 *Oryzias latipes* embryos

Lipid rafts

Adachi, T., Sato, C., Kishi, Y., Totani, K., Murata, T. Usui, T. and Kitajima, K. (2009) *Membrane microdomains from early gastrula embryos of medaka, Oryzias latipes, are a platform of E-cadherin- and carbohydrate-mediated cell–cell interactions during epiboly* Glycoconj. J. **26**, 285–299

3-2 Rainbow trout liver

Endosomes/lysosomes

Yue, Y., Behra, R., Sigg, L., Suter, M, J-F., Pillai, S and Schirmer, K. (2016) *Silver nanoparticle–protein interactions in intact rainbow trout gill cells* Environ. Sci. Nano, **3**, 1174

Lipid rafts and caveolae

Sezgin, E., Azbazdar, Y., Ng, X.W., The, C., Simons, K., Weidinger, G., Wohland, T., Eggeling, C. and Ozhan, G. (2017) *Binding of canonical Wnt ligands to their receptor complexes occurs in ordered plasma membrane environments* FEBS J., **284**, 2513–2526

Zehmer, J.K. and Hazel, J.R. (2003) *Plasma membrane rafts of rainbow trout are subject to thermal acclimation* J. Exp. Biol., **206**, 1657-1667

Zehmer, J.K. and Hazel, J.R. (2005) *Thermally induced changes in lipid composition of raft and non-raft regions of hepatocyte plasma membranes of rainbow trout* J. Exp. Biol., **208**, 4283-4290

Mitochondria

Yue, Y., Behra, R., Sigg, L., Suter, M, J-F., Pillai, S and Schirmer, K. (2016) *Silver nanoparticle–protein interactions in intact rainbow trout gill cells* Environ. Sci. Nano, **3**, 1174

4. Fungi

4-1. *Candida albicans*

Plasma membrane (lipid rafts)

Aeed, P.A., Sperry, A.E., Young, C.L., Nagiec, M.M. and Elhammer, A.P. (2004) *Effect of membrane perturbants on the activity and phase distribution of inositol phosphorylceramide synthase; development of a novel assay* Biochemistry, **43**, 8483-8493

Insenser, M., Nombela, C., Molero, G. and Gil, C. (2006) *Proteomic analysis of detergent-resistant membranes from Candida albicans* Proteomics, **6,** Suppl. **1**., S74-S81

Ragni, E., Calderon, J., Fascio, U., Sipiczki, M., Fonzi, W.A. and Popolo, L. (2011) *Phr1p, a glycosylphosphatidylinsitol-anchored β(1,3)-glucanosyltransferase critical for hyphal wall formation, localizes to the apical growth sites and septa in Candida albicans* Fungal Genet. Biol., **48**, 793–805

Wang, L., Jia, Y., Tang, R-J., Xu, Z., Cao, Y-B., Jia, X-M. and Jiang, Y-Y. (2012) *Proteomic analysis of Rta2p-dependent raft-association of detergent-resistant membranes in Candida albicans* PLoS One, **7**: e37768

Secretory vesicles

Caballero-Lima, D., Hautbergue, G.M., Wilson, S.A. and Sudbery, P.E. (2014) *In Candida albicans hyphae, Sec2p is physically associated with SEC2 mRNA on secretory vesicles* Mol. Microbiol., **94**, 828–842

4-2. *Cladosporium resinae*

Mitochondria, vacuoles

Goswami, P. and Cooney, J.J. (1999) *Subcellular location of enzyme involved in oxidation on n-alkane by Cladosporium resinae* Appl. Microbiol. Biotechnol., **51**, 860-864

4-3. *Cryptococcus neoformans*

Exocytosis and extracellular vesicles

Oliveira, D.L., Nimrichter, L., Miranda, K., Frases, S., Faull, K.F., Casadevall, A. and Rodrigues, M.L. (2009) *Cryptococcus neoformans cryoultramicrotomy and vesicle fractionation reveals an intimate association between membrane lipids and glucuronoxylomannan* Fungal Genet. Biol., **46**, 956–963

Wolf, J.M., Rivera, J. and Casadevall, A. (2012) *Serum albumin disrupts Cryptococcus neoformans and Bacillus anthracis extracellular vesicles* Cellular Microbiology (2012) 14(5), 762–773

Lipid rafts

He, X., Shi, X., Puthiyakunnon, S., Zhang, L., Zeng, Q., Li, Y., Boddu, S., Qiu, J., Lai, Z. et al (2016) *CD44-mediated monocyte transmigration across Cryptococcus neoformans-infected brain microvascular endothelial cells is enhanced by HIV-1 gp41-I90 ectodomain* J. Biomed. Sci., **23**: 28

Huang, S-H., Wu, C-H., Chang, Y.C., Kwon-Chung, K.J., Brown, R.J. and Jong, A. (2012) *Cryptococcus neoformans-derived microvesicles enhance the pathogenesis of fungal brain infection* PLoS One, **7**, e48570

4-4. *Neurospora crassa*

Glyoxysomes

Managadze, D., Würtz, C., Wiese, S., Meyer, H.E., Niehaus, G., Erdmann, R., Warscheid, B. and Rottensteiner, H. (2010) *A proteomic approach towards the identification of the matrix protein content of the two types of microbodies in Neurospora crassa* Proteomics, **10**, 3222–3234

4-5. *Paracoccidioides brasiliensis*

Mitochondria and peroxisomes

Brito, W.deA., Rezende, T.C.V., Parente, A.F., Ricart, C.A.O., de Sousa, M.V., Báo, N. and Soares, C.M.deA. (2011) *Identification, characterization and regulation studies of the aconitase of Paracoccidioides brasiliensis* Fungal Biol., **115**, 697-707

5. Insects

5-1. *Bombyx mori*

Lysosomes

Shiba, H., Yabu, T., Sudayama, M., Mano, N., Arai, N., Nakanishi, T. and Hosono, K. (2016) *Sequential steps of macroautophagy and chaperone-mediated autophagy are involved in the irreversible process of posterior silk gland histolysis during metamorphosis of Bombyx mori* J. Exp. Biol., **219**, 1146-1151

5-2. Chironomids

Membrane vesicles, separation from proteins

Hatanaka, R., Hagiwara-Komoda, Y., Furuki, T., Kanamori, Y., Fujita, M., Cornette, R., Sakurai, M., Okuda, T. and Kikawada, T. (2013) *An abundant LEA protein in the anhydrobiotic midge, PvLEA4, acts as a molecular shield by limiting growth of aggregating protein particles* Insect Biochem. Mol. Biol., **43**, 1055-1067

5-3. *Drosophila*

Endosomes/endocytosis

Lee, Y.S., Pressman, S., Andress, A.P., Kim, K., White, J.L., Cassidy, J.J., Li, X., Lubell, K. et al (2009) *Silencing by small RNAs is linked to endosomal trafficking* Nat. Cell Biol., **11**, 1150-1157

Lee, J., Song, M. and Hong, S. (2013) *Negative regulation of the novel norpAP24 suppressor, diehard4, in the endo-lysosomal trafficking underlies photoreceptor cell degeneration* PLoS Genet., **9**: e1003559

Tiklová, K., Senti, K-A., Wang, S., Gräslund, A. and Samakovlis, C. (2010) *Epithelial septate junction assembly relies on melanotransferrin iron binding and endocytosis in Drosophila* Nature Cell. Biol., **12**, 1071-1078

ER/Golgi/plasma membrane

Adolfsen, B., Sarawati, S., Yoshihara, M. and Littleton, J.T. (2004) *Synaptotagmins are trafficked to distinct subcellular domains including the postsynaptic compartment* J. Cell Biol., **166**, 249-260

Beronja, S., Laprise, P., Papoulas, O., Pellikka, M., Sisson, J. and Tepass, U. (2005) *Essential function of Drosophila Sec6 in apical exocytosis of epithelial photoreceptor cells* J. Cell Biol., **169**, 635-646

Betschinger, J., Eisenhaber, F. and Knoblich, J.A. (2005) *Phosphorylation-induced autoinhibition regulates the cytoskeletal protein lethal (2) giant larvae* Curr. Biol., **15**, 276-282

Gatto, L., Breckels, L.M., Burger, T., Nightingale, D.J.H., Groen, A.J., Campbell, C., Nikolovski, N., Mulvey, C.M. et al (2014) *A foundation for reliable spatial proteomics data analysis* Mol. Cell. Proteom., **13**, 1937-1952

Khanna, M.R., Stanley, B.A. and Thomas, G.H. (2010) *Towards a membrane proteome in Drosophila: a method for the isolation of plasma membrane* BMC Genomics 2010, **11**: 302

Kim, A-Y., Seo, J.B., Kim, W-t., Choi, H.J., Kim, S-Y., Morrow, G., Tanguay, R.M., Steller, H. and Koh, Y.H. (2015) *The pathogenic human Torsin A in Drosophila activates the unfolded protein response and increases susceptibility to oxidative stress* BMC Genom., **16**: 338

Niimura, M., Isoo, N., Takasugi, N., Tsuruoka, M., Ui-Tei, K., Saigo, K., Morohashi, Y., Tomita, T. and Iwatsubo, T. (2005) *Aph-1 contributes to the stabilization and trafficking of the γ-secretase complex through mechanisms involving intermolecular and intramolecular interactions* J. Biol. Chem., **280**, 12967-12975

Panneels, V., Eroglu, C., Cronet, P. and Sinning, I. (2003) *Pharmacological characterization and immunoaffinity purification of metabotropic glutamate receptor from Drosophila overexpressed in Sf9 cells* Prot. Expr. Purif., **20**, 275-282

Papoulas, O., Hays, T.S. and Sisson, J.C. (2005) *The golgin lava lamp mediates dynein-based Golgi movements during Drosophila cellularization* Nat. Cell Biol., **7**, 612-618

Satori, C.P., Henderson, M.M., Krautkramer, E.A., Kostal, V., Distefano, M.M. and Arriaga, E.A. (2013) *Bioanalysis of eukaryotic organelles* Chem. Rev., **113**, 2733−2811

Stein, D., Charatsi, I., Cho, Y.S., Zhang, Z., Nguyen, J., DeLotto, R., Luschnig, S. and Moussian, B. (2010) *Localization and activation of the Drosophila protease Easter require the ER-resident saposin-like protein Seele* Curr. Biol., **20**, 1953–1958

Tan, D.J.L., Dvinge, H., Christoforou, A., Bertone, P., Arias, A.M. and Lilley, K.S. (2009) *Mapping organelle proteins and protein complexes in Drosophila melanogaster* J. Proteome Res., **8**, 2667–2678

Wan, D., Zhang, Z.C., Zhang, X., Li, Q. and Han, J. (2015) *X chromosome-linked intellectual disability protein PQBP1 associates with and regulates the translation of specific mRNAs* Hum. Mol. Genet., **24**, 4599–4614

Zarnescu, D.C., Jin, P., Betschinger, J., Nakamoto, M., Wang, Y., Dockendorff, T.C., Feng, Y., Jongens, T.A., Sisson, J.C., Knoblich, J.A., Warren, S.T. and Moses, K. (2005) *Fragile X protein functions with LgI and the PAR complex in flies and mice* Dev. Cell, **8**, 43-52

Exocytosis and exosomes

Beronja, S., Laprise, P., Papoulas, O., Pellikka, M., Sisson, J. and Tepass, U. (2005) *Essential function of Drosophila Sec6 in apical exocytosis of epithelial photoreceptor cells* J. Cell Biol., **169**, 635-646

Matusek, T., Wendler, F., Polès, S., Pizette, S., D'Angelo, G., Fürthauer, M. and Thérond, P.P. (2014) *The ESCRT machinery regulates the secretion and long-range activity of Hedgehog* Nature, **516**, 99-103

Shibata, T., Hadano, J., Kawasaki, D., Dong, X. and Kawabata, S-i. (2017) *Drosophila TG-A trans-glutaminase is secreted via an unconventional Golgi-independent mechanism involving exosomes and two types of fatty acylations* J. Biol. Chem., **292**, 0723–10734

Lipid rafts

Eroglu, C., Brügger, B., Wieland, F. and Sinning, I. (2003) *Glutamate-binding affinity of Drosophila metabotropic glutamate receptor is modulated by association with lipid rafts* Proc. Natl. Acad. Sci. USA, **100**, 10219-10224

Hebbar, S., Lee, E., Manna, M., Steinert, S., Kumar, G.S., Wenk, M., Wohland, T., and Kraut, R. (2008) *A fluorescent sphingolipid binding domain peptide probe interacts with sphingolipids and cholesterol-dependent raft domains* J. Lipid Res. **49,** 1077-1089

Hoehne, M., de Couet, H.G., Stuermer, C.A.O. and Fischbach, K-F. (2005) *Loss- and gain-of-function analysis of the lipid raft proteins reggie/flotillin in Drosphilia: they are posttranslationally regulated, and misexpression interferes with wing and eye development* Mol. Cell. Neurosci., **30**, 326-338

Rietveld, A., Neutz, S., Simons, K. and Eaton, S. (1999) *Association of sterol- and glycosylphosphatidy-linositol-linked proteins with Drosophilia raft lipid microdomains* J. Biol. Chem., **274**, 12049-12054

Sanxaradis, P.D., Cronin, M.A., Rawat, S.S., Waro, G., Acharya, U. and Tsunoda, S. (2007) *Light-induced recruitment of INAD-signaling complexes to detergent-resistant lipid rafts in Drosophila receptors* Mol Cell. Neurosci., **36**, 36-46

Zhai, L., Chaturvedi, D. and Cumberledge, S. (2004) *Drosophila Wnt-1 undergoes a hydrophobic modification and is targeted to lipid rafts, a process that requires porcupine* J. Biol. Chem., **279**, 33220-33227

Membrane vesicles, separation from proteins

Kruppa, A.J., Ott, S., Chandraratna, D.S., Irving, J.A., Page, R.M., Speretta, E., Seto, T., Camargo, L.M., Marciniak, S.J., Lomas, D.A. and Crowther, D.C. (2013) *Suppression of Aβ toxicity by puromycin-sensitive aminopeptidase is independent of its proteolytic activity* Biochim. Biophys. Acta, **1832**, 2115–2126

Sing, A., Tsatskis, Y., Fabian, L., Hester, I., Rosenfeld, R., Serricchio, M., Yau, N., Bietenhader, M., Shanbhag, R., Jurisicova, A. et al (2014) *The atypical cadherin fat directly regulates mitochondrial function and metabolic state* Cell, **158**, 1293–1308

Mitochondria

Odnokoz, O., Nakatsuka, K., Klichko, V.I., Nguyen, J., Solis, L.C., Ostling, K., Badinloo, M., Orr, W.C. and Radyuk, S.N. (2017) *Mitochondrial peroxiredoxins are essential in regulating the relationship between Drosophila immunity and aging* Biochim. Biophy. Acta, **1863**, 68–80

Satori, C.P., Henderson, M.M., Krautkramer, E.A., Kostal, V., Distefano, M.M. and Arriaga, E.A. (2013) *Bioanalysis of eukaryotic organelles* Chem. Rev., **113**, 2733−2811

Tan, D.J.L., Dvinge, H., Christoforou, A., Bertone, P., Arias, A.M. and Lilley, K.S. (2009) *Mapping organelle proteins and protein complexes in Drosophila melanogaster* J. Proteome Res., **8**, 2667–2678

Nuclei

Groen, C.M., Jayo, A., Parsons, M. and Tootle, T.L. (2015) *Prostaglandins regulate nuclear localization of Fascin and its function in nucleolar architecture* Mol. Biol. Cell, **26**, 1901-1917

Steiner, F.A., Talbert, P.B., Kasinathan, S., Deal, R.B. and Henikoff, S. (2012) *Cell-type-specific nuclei purification from whole animals for genome-wide expression and chromatin profiling* Genome Res., 22:766–777

Ye, Y., Gu, L., Chen, X., Shi, J., Zhang, X. and Jiang, C. (2016) *Chromatin remodeling during the in vivo glial differentiation in early Drosophila embryos* Sci. Rep., **6**: 33422

Ye, Y., Li, M., Gu, L., Chen, X., Shi, J., Zhang, X. and Jiang, C. (2017) *Chromatin remodeling during in vivo neural stem cells differentiating to neurons in early Drosophila embryos* Cell Death Different., **24**, 409–420

Plasma membrane

Dasgupta, U., Bamba, T., Chiantia, S., Karim, P., Abou Tayoun, A.N., Yonamine, I., Rawat, S.S., Rao, R.P. et al (2009) *Ceramide kinase regulates phospholipase C and phosphatidylinositol 4, 5, bisphosphate in phototransduction* Proc. Natl. Acad. Sci. USA, **106**, 20063-20068

Rao, R.P., Yuan, C., Allegood, J.C., Rawat, S.S., Edwards, M.B., Wang, X., Merrill, A.H., Acharya, U. and Acharya, J.K. (2007) *Ceramide transfer protein function is essential for normal oxidative stress response and lifespan* Proc. Natl. Acad. Sci. USA, **104**, 11364-11369
Stowers, R.S., Megeath, L.J., Gorska-Andrzejak, J., Meinertzhagen, I.A. and Schwartz, T.L. (2002) *Axonal transport of mitochondria to synapses depends on Milton, a novel Drosophilia protein* Neuron, **36**, 1063-1077

Rhabdomere membranes

Panneels, V., Kock, I., Krijnse-Locker, J., Rezgaoui, M., Sinning, I. (2011) *Drosophila photoreceptor cells exploited for the production of eukaryotic membrane proteins: receptors, transporters and channels* PLoS One **6**: e18478

5-4 Insect larvae lipid rafts

Bayyareddy, K., Zhu, X., Orlando, R. and Adang, M.J. (2012) *Proteome analysis of Cry4Ba toxin-interacting Aedes aegypti lipid rafts using geLC-MS/MS* J. Proteome Res., **11**, 5843-5855
Ito, T., Bando, H. and Asano, S-i. (2006) *Activation process of the mosquitocidal δ-endotoxin Cry39A produced by Bacillus thuringiensis subsp. aizawai BUN1-14 and binding property to Anopheles stephensi* BBMV J. Invert. Pathol., **93**, 29-35
Liu, J-G., Yang, A-Z., Shen, X-H., Hua, B-G., Shi, G-L. (2011) *Specific binding of activated Vip3Aa10 to Helicoverpa armigera brush border membrane vesicles results in pore formation* J. Invertebr. Pathol., **108**, 92–97

5-5. *Rhodnius prolixus*

Yolk granules

Gomes, F.M., Oliveira, D.M.P., Motta, L.S., Ramos, I.B., Miranda, K.M. and Machado, E.A. (2010) *Inorganic polyphosphate inhibits an aspartic protease-like activity in the eggs of Rhodnius prolixus (Stahl) and impairs yolk mobilization in vitro* J. Cell. Physiol., **222**, 606–611

5-6. sf9 cells

Plasma membrane

Eisses, J.F., Chi, Y. and Kaplan, J.H. (2005) *Stable plasma membrane levels of hCTR1 mediate cellular copper uptake* J. Biol. Chem., **280**, 9635-9639

5-7. Spodoptera

Extracellular vesicles

Thoene, J., Goss, T., Witcher, M., Mullet, J., N'Kuli, F., Van Der Smissen, P., Courtoy, P. and Hahn, S.H. (2013) *In vitro correction of disorders of lysosomal transport by microvesicles derived from baculovirus-infected Spodoptera cells* Mol. Genet. Metab., **109**, 77–85

6. Marine invertebrates

6-1. Molluscs

Mannosomes

Knigge, T., Mann, N., Parveen, Z., Perry, C., Gernhofer, M., Triebskorn, R., Kohler, H-R. and Connock, M. (2002) *Mannosomes: a molluscan intracellular tubular membrane system related to heavy metal stress* Comp. Biochem. Physiol. Part C, **131**, 259-269

Mitochondria, peroxisomes, lysosomes, microsomes

Apraiz, I., Mi, J. and Cristobal, S. (2006) *Identification of proteomic signatures of exposure to marine pollutants in mussels (Mytilus edulis)* Mol. Cell. Proteom., **5**, 1274-1285
Apraiz, I., Cajaraville, M.P. and Cristobal, S. (2009) *Peroxisomal proteomics: Biomonitoring in mussels after the Prestige's oil spill* Mar. Pollut. Bull., **58**, 1815–1826
Cristobal, S. (2007) *Proteomics-based method for risk assessment of peroxisome proliferating pollutants in the marine environment* Methods Mol. Biol., **410**, 123-135
Grewal, N., Parveen, Z., Large, A., Perry, C. and Connock, M. (2000) *Gastropod mollusc aliphatic alcohol oxidase: subcellular localisation and properties* Comp. Biochem. Biophys., **125**, 543-554
Mi, J., Orbea, A., Syme, N., Ahmed, M., Cajaraville, M.P. and Cristobal, S. (2005) *Peroxisomal proteomics, a new tool for risk assessment of peroxisome proliferating pollutants in the marine environment* Proteomics, **5**, 3954-2965

Nuclei

Shaw, J.P., Large, A.T., Chipman, J.K., Livingstone, D.R. and Peters, L.D. (2000) *Seasonal variation in mussel Mytilus edulis digestive gland cytochrome P4501A- and 2E-immunoidentified protein levels and DNA strand breaks (Comet assay)* Marine Environ. Res., **50**, 405-409

Shaw, J.P., Large, A.T., Livingstone, D.R., Doyotte, A., Renger, J., Chipman, J.K. and Peters, L.D. (2002) *Elevation of cytochrome P450-immunopositive protein and DNA damage in mussels (Mytilus edulis) transplanted to a contaminated site* Marine Environ. Res., **54**, 505-509

Shaw, J.P., Large, A.T., Donkin, P., Evans, S.V., Staff, F.J., Livingstone, D.R., Chipman, J.K. and Peters, L.D. (2004) *Seasonal varation in cytochrome P450 immunopositive protein levels, lipid peroxidation and genetic toxicity in digestive gland of the mussel Mytilus edulis* Aquatic Tox., **67**, 325-336

6-2. Sea urchin eggs/sperm

Acidocalcisomes

Ramos, I.B., Miranda, K., Pace, D.A., Verbist, K.C., Lin, F-Y., Zhang, Y., Oldfield, E., Machado, E.A., de Souza, W. and Docampo, R. (2010) *Calcium- and polyphosphate-containing acidic granules of sea urchin eggs are similar to acidocalcisomes, but are not the targets for NAADP* Biochem. J., **429**, 485–495

Lipid rafts

Loza-Huerta, A., Vera-Estrella, R., Darszon, A. and Beltrána, C. (2013) *Certain Strongylocentrotus purpuratus sperm mitochondrial proteins co-purify with low density detergent-insoluble membranes and are PKA or PKC-substrates possibly involved in sperm motility regulation* Biochim. Biophys. Acta, **1830**, 5305–5315

Vacquier, V.D., Loza-Huerta, A., García-Rincón, J., Darszon, A. and Beltrán, C. (2014) S*oluble adenylyl cyclase of sea urchin spermatozoa* Biochim. Biophys. Acta, **1842**, 2621–2628

6-3. Squid

Axoplasmic vesicles

LaPointe, N.E., Morfini, G., Pigino, G., Gaisina, I.N., Kozikowski, A.P., Binder, L.I. and Brady, S.T. (2009) *The amino terminus of tau inhibits kinesin-dependent axonal transport: Implications for filament toxicity* J. Neurosci. Res., **87**, 440-451

7. Nematodes, trematodes, flatworms, annelids

Extracellular vesicles

Meningher, T., Lerman, G., Regev-Rudzki, N., Gold, D., Ben-Dov, I.Z., Sidi, Y., Avni, D. and Schwartz, E. (2017) *Schistosomal microRNAs isolated from extracellular vesicles in sera of infected patients: a new tool for diagnosis and follow-up of human schistosomiasis* J. Infect. Dis., **215**, 378–86

Sotillo, J., Pearson, M., Potriquet, J., Becker, L., Pickering, D., Mulvenna, J. and Loukas, A. (2016) *Extracellular vesicles secreted by Schistosoma mansoni contain proteinvaccine candidates* Int. J. Parasitol., **46**, 1–5

Lysosomes

Li, Y., Chen, B., Zou, W., Wang, X., Wu, Y., Zhao, D., Sun, Y., Liu, Y., Chen, L., Miao, L, Yang, C. and Wang, X. (2016) *The lysosomal membrane protein SCAV-3 maintains lysosome integrity and adult longevity* J. Cell Biol., **215,** 167–185

Mitochondria

Haynes, C.M., Yang, Y., Blais, S.P., Neubert, T.A. and Ron, D. (2010) *The matrix peptide exporter HAF-1 signals a mitochondrial UPR by activating the transcription factor ZC376.7 in C. elegans* Mol. Cell, **37**, 529–540

Nuclei

Steiner, F.A., Talbert, P.B., Kasinathan, S., Deal, R.B. and Henikoff, S. (2012) *Cell-type-specific nuclei purification from whole animals for genome-wide expression and chromatin profiling* Genome Res., 22:766–777

Steiner, F.A. and Henikoff, S. (2015) *Cell type-specific afinity purification of nuclei for chromatin profiling in whole animals* In The Nucleus, Methods in Mol. Biol. **1228** (ed. Hancock, R.) Springer Science+Business Media New York, pp 3-14

Tweetena, K.A. and Morris, S.J. (2016) *Flow cytometry analysis of DNA ploidy levels and protein profiles distinguish between populations of Lumbriculus (Annelida: Clitellata)* Invert. Biol., **135**, 385–399

Multivesicular bodies

Kobuna, H., Inoue, T., Shibata, M., Gengyo-Ando, K., Yamamoto, A., Mitani, S. and Arai, H. (2010) *Multivesicular body formation requires OSBP–related proteins and cholesterol* PloS Genet., **6**: e1001055

8. Phytoplankton (*Emiliania huxleyi)*

Lipid rafts

Rose, S.L., Fulton, J.M., Brown, C.M., Natale, F., Van Mooy, B.A.S. and Bidle, K.D. (2014) *Isolation and characterization of lipid rafts in Emiliania huxleyi: a role for membrane microdomains in host–virus interactions* Environ. Microbiol., **16**, 1150–1166

9. Plants, plant cells, trees

9-1. *Arabidopsis*

Chloroplasts

Laganowsky, A., Gómez, S.M., Whitelegge, J.P., Nishio, J.N. (2009) *Hydroponics on a chip: Analysis of the Fe deficient Arabidopsis thylakoid membrane proteome* J. Proteom., **72**, 397-415
Zheng, Y., Liao, C., Zhao, S., Wang, C. and Guo, Y. (2017) *The glycosyltransferase QUA1 regulates chloroplast-associated calcium signaling during salt and drought stress in Arabidopsis* Plant Cell Physiol., **58**, 329–341

Cytoplasm

Liu, Z., Zhu, Y., Gao, J., Yu, F., Dong, A. and Shen, W-H. (2009) *Molecular and reverse genetic characterization of nucleosome assembly protein1 (NAP1) genes unravels their function in transcription and nucleotide excision repair in Arabidopsis thaliana* Plant J., **59**, 27–38

ER and Golgi

Busse-Wicher, M., Gomes, T.C.F., Tryfona, T., Nikolovski, N., Stott, K., Grantham, N.J., Bolam, D.N., Skaf, M.S. and Dupree, P. (2014) *The pattern of xylan acetylation suggests xylan may interact with cellulose microfibrils as a twofold helical screw in the secondary plant cell wall of Arabidopsis thaliana* Plant J., **79**, 492–506
Dunkley, T.P.J., Watson, R., Griffin, J.L., Dupree, P. and Liley, K.S. (2004) *Localization of organelle proteins by isotope tagging (LOPIT)* Mol. Cell. Proteom., **3**, 1128-1134
Zheng, Y., Liao, C., Zhao, S., Wang, C. and Guo, Y. (2017) *The glycosyltransferase QUA1 regulates chloroplast-associated calcium signaling during salt and drought stress in Arabidopsis* Plant Cell Physiol., **58**, 329–341

ER, Golgi, plasma membrane, mitochondria, vacuolar membrane

Dunkley, T.P.J., Hester, S., Shadforth, I.P., Runions, J., Weimer, T., Hanton, S.L., Griffin, J.L., Besssant, C., Brandizzi, F. et al (2006) *Mapping the Arabidopsis organelle proteome* Proc. Natl. Acad. Sci. USA, **103**, 6518-6523
Gatto, L., Breckels, L.M., Burger, T., Nightingale, D.J.H., Groen, A.J., Campbell, C., Nikolovski, N., Mulvey, C.M., Christoforou, A., Ferro, M. and Lilley, K.S. (2014) *A foundation for reliable spatial proteomics data analysis* Mol. Cell. Proteom., **13**, 1937-1952
Groen, A.J., de Vries, S.C. and Lilley, K.S. (2008) *A proteomics approach to membrane trafficking* Plant Physiol., **147**, 1584-1589
Lilley, K.S. and Dunkley, T.P.J. (2008) *Determination of genuine residents of plant endomembrane organelles using isotope tagging and multivariate statistics* In Methods Mol. Biol., **432**, Organelle Proteomics (ed. Pflieger, D, and Rossier, J.) Humana Press, Totowa, NJ, pp 373-387
Nikolovski, N., Shliaha, P.V., Gatto, L., Dupree, P. and Lilley, K.S. (2014) *Label-free protein quantification for plant Golgi protein localization and abundance* Plant Physiol., **166**, 1033–1043
Sadowski, P.G., Dunkley, T.P.J., Shadforth, I.P., Dupree, P., Bessant, J.L. and Lilley, K.S. (2006) *Quantitative proteomic approach to study subcellular localization of membrane proteins* Nat. Protoc., **1**, 1778-1789
Zhang, Y., Nikolovski, N., Sorieul, M., Vellosillo, T., McFarlane, H.E., Dupree, R., Kesten, C., Schneider, R. et al (2016) *Golgi-localized STELLO proteins regulate the assembly and trafficking of cellulose synthase complexes in Arabidopsis* Nat. Comm., **7**: 11656

Extracellular vesicles

Rutter, B.D. and Innes, R.W. (2017) *Extracellular vesicles isolated from the leaf apoplast carry stress-response proteins* Plant Physiol., **173**, 728–741

Membrane vesicles, separation from proteins

Mahon, P. and Dupree, P. (2001) *Quantitative and reproducible two-dimensional gel analysis using Phoretix 2D Full* Electrophoresis, **22**, 2075-2085

Mitochondria

Breckels, L.M., Gatto, L., Christoforou, A., Groen, A.J., Lilley, K.S. and Trotter, M.W.B. (2013) *The effect of organelle discovery upon sub-cellular protein localization* J. Proteom., **88**, 129-140
Hartman, N.T., Sicilia, F., Lilley, K.S. and Dupree, P. (2007) *Proteomic complex detection using sedimentation* Anal. Chem., **79**, 2078-2083

Mitochondria, rough ER, plastid membranes

Berg, M., Parbel, A., Pettersen, H., Fenyo, D. and Björkesten, L. (2006) *Reproducibility of LC-MS-based protein identification* J. Exp. Botany, **57**, 1509-1514

Nuclei

Liu, Z., Zhu, Y., Gao, J., Yu, F., Dong, A. and Shen, W-H. (2009) *Molecular and reverse genetic characterization of nucleosome assembly protein1 (NAP1) genes unravels their function in transcription and nucleotide excision repair in Arabidopsis thaliana* Plant J., **59**, 27–38
Liu, Z., Zhu, Y., Gao, J., Yu, F., Dong, A. and Shen, W-H. (2009) *Molecular and reverse genetic characterization of nucleosome assembly protein1 (NAP1) genes unravels their function in transcription and nucleotide excision repair in Arabidopsis thaliana* Plant J., **59**, 27–38

Oil bodies

Deruyffelaere, C., Bouchez, I., Morin, H., Guillot, A., Miquel, M., Froissard, M., Chardot, T., and D'Andrea, S. (2015) *Ubiquitin-mediated proteasomal degradation of oleosins is involved in oil body mobilization during post-germinative seedling growth in Arabidopsis* Plant Cell Physiol., **56**, 1374–1387

Peroxisomes

Palma, J.M., Corpas, F.J. and del Rio, L.A. (2009) *Proteome of plant peroxisomes: new perspectives on the role of these organelles in cell biology* Proteomics, **9**, 2301-2312
Reumann, S. (2011) *Toward a definition of the complete proteome of plant peroxisomes: Where experimental proteomics must be complemented by bioinformatics* Proteomics **11**, 1764–1779

Plasma membrane

Alexandersson, E., Gustavsson, N., Bernfur, K., Kjellbom, P. and Larsson, C. (2007) *Plasma membrane proteomics* In Plant Proteomics (ed. Samaj, J. and Thelen, J.) Springer Science + Business Media, Berlin, pp 186-206

9-2. Ferns

Tonoplast

Shen, H., He, Z., Yan, H., Xing, Z., Chen, Y., Xu, W., Xu, W. and Ma, M. (2014) T*he fronds tonoplast quantitative proteomic analysis in arsenic hyperaccumulator Pteris vittata* L. J. Proteom., **105**, 46–57

9-3. Fruit trees

Tonoplast

Liu, R., Wang, Y., Qin, G. and Tian, S. (2016) *iTRAQ-based quantitative proteomic analysis reveals the role of the tonoplast in fruit senescence* J. Proteom., **146**, 80–89

9-4. Grasses, grains and related crops

Golgi/microsomes

Chateigner-Boutin, A-L., Suliman, M., Bouchet, B., Alvarado, C., Lollier, V., Rogniaux, H., Guillon, F. and Larré, C. (2015) *Endomembrane proteomics reveals putative enzymes involved in cell wall metabolism in wheat grain outer layers* J. Exp. Botany, **66**, 2649–2658
Suliman, M., Chateigner-Boutin, A-L., Francin-Allami, M., Partier, A., Bouchet, B., Salse, J., Pont, C., Marion, J., Rogniaux, H., Tessier, D., Guillon, F. and Larréa, C. (2013) *Identification of glycosyltransferases involved in cell wall synthesis of wheat endosperm* J. Proteom., **78**, 508–521

Lipid rafts

Carmona-Salazar, L., El Hafidi, M., Gutierrez-Najera, N., Noyola-Martinez, L., Gonzalez-Solis, A. and Gavilanes-Ruiz, M. (2015) *Fatty acid profiles from the plasma membrane and detergent resistant membranes of two plant species* Phytochemistry, **109**, 25–35
Nagano, M., Ishikawa, T., Fujiwara, M./, Fukao, Y., Kawano, Y. Kawai-Yamada, M. and Shimamoto, K. (2016) *Plasma membrane microdomains are essential for Rac1-RbohB/H-mediated immunity in rice* Plant Cell, **28**, 1966–1983

Nuclei

Bedell, J.A., Budiman, M.A., Nunberg, A., Citek, R.W., Robbins, D., Jones, J., Flick, E., Rohlfing, T., Fries, J. et al (2005) *Sorghum genome sequencing by methylation filtration* PLoS Biol **3**: e13
Ford, T.C., Baldwin, J.P. and Lambert, S.J. (1998) *Rapid enzyme-free preparation of starch-free nuclei from plants facilitates studies of chromatin structure. Plant proteins in abiotic stress responses* Plant Protein Club, 1998 Annual Symposium, University of York, p24

Plasma membrane

Nagano, M., Ishikawa, T., Fujiwara, M./, Fukao, Y., Kawano, Y. Kawai-Yamada, M. and Shimamoto, K. (2016) *Plasma membrane microdomains are essential for Rac1-RbohB/H-mediated immunity in rice* Plant Cell, **28**, 1966–1983

Protein bodies

Llop-Tous, I., Madurga, S., Giralt, E., Marzabal, P., Torrent, M. and Ludevid, M.D. (2010) *Relevant elements of a maize γ-zein domain involved in protein body biogenesis* J. Biol. Chem., **285**, 35633–35644

9-5. Legumes

Nuclei

Timko, M.P., Rushton, P.J., Laudeman, T.W., Bokowiec, M.T., Chipumuro, E., Cheung, F., Town, C.D. and Chen, X. (2008) *Sequencing and analysis of the gene-rich space of cowpea* BMC Genomics, **9:103**

Lipid rafts

Belugin, B.V., Zhestkova, I.M. and Trofimova, M.S. (2011) *Affinity of PIP-aquaporins to sterol-enriched domains in plasma membrane of the cells of etiolated pea seedlings* Biochemistry (Moscow) Suppl. Series A: Membr. Cell Biol., **5**, 56–63
Carmona-Salazar, L., El Hafidi, M., Enríquez-Arredondo, C., Vázquez-Vázquez, C., González de la Vara, L.E. and Gavilanes-Ruíz, M. (2011) *Isolation of detergent-resistant membranes from plant photosynthetic and non-photosynthetic tissues* Anal. Biochem., **417**, 220–227
Carmona-Salazar, L., El Hafidi, M., Gutierrez-Najera, N., Noyola-Martinez, L., Gonzalez-Solis, A. and Gavilanes-Ruiz, M. (2015) *Fatty acid profiles from the plasma membrane and detergent resistant membranes of two plant species* Phytochemistry, **109**, 25–35

Peroxisomes

Arai, Y., Hayashi, M. and Nishimura, M. (2008) *Proteomic analysis of highly purified peroxisomes from etiolated Soybean cotyledons* Plant Cell Physiol., **49**, 526-539
Hossain, Z. and Komatsu, S. (2014) *Soybean proteomics* In Plant Proteomics: Methods Mol. Biol., **1072** (ed. Jorrin-Novo, J.V. et al), Springer Science+Business Media, LLC, pp 315-331
Komatsu, S. and Ahsan, N. (2009) *Soybean proteomics and its application to functional analysis* J. Proteom., **72**, 325-336

9-6. *Nicotiana benthamiana*

Endoplasmic reticulum

Joseph, M., Ludevid, D., Torrent, M., Rofidal, V., Tauzin, M., Rossignol, M. and Peltier, J-B. (2012) *Proteomic characterisation of endoplasmic reticulum-derived protein bodies in tobacco leaves* BMC Plant Biol., **12**: 36

9-7. *Nicotiana tabacum*

ER/Golgi/plasma membrane/tonoplast

Hagiwara, Y., Komoda, K., Yamanaka, T., Tamai, A., Meshi, T., Funada, R., Tsuchiya, T., Naito, S and Ishikawa, M. (2003) *Subcellular localization of host and viral proteins associated with tobamovirus RNA replication* EMBO J., **22**, 344-353

Potocký, M., Pejchar, P., Gutkowska, M., Jiménez-Quesada, M.J., Potocká, A., de Dios Alchéc, J., Kost, B. and Žárský, V. (2012) *NADPH oxidase activity in pollen tubes is affected by calcium ions, signaling phospholipids and Rac/Rop GTPases* J. Plant Physiol., **169**, 1654– 1663

Lipid rafts

Carmona-Salazar, L., El Hafidi, M., Enríquez-Arredondo, C., Vázquez-Vázquez, C., González de la Vara, L.E. and Gavilanes-Ruíz, M. (2011) *Isolation of detergent-resistant membranes from plant photosynthetic and non-photosynthetic tissues* Anal. Biochem., **417**, 220–227

Moscatelli, A., Gagliardi, A., Maneta-Peyret, L., Bini, L., Stroppa, N., Onelli, E., Landi, C., Scali, M., Idilli, A.I. and Moreau, P. (2015) *Characterisation of detergent-insoluble membranes in pollen tubes of Nicotiana tabacum (L.)* Biol. Open **4**, 378–399

Membrane/cytosol fractionation

Hagiwara-Komoda, Y., Hirai, K., Mochizuki, A., Nishiguchi, M., Meshi, T. and Ishikawa, M. (2008) *Overexpression of a host factor TOM1 inhibits tomato mosaic virus propagation and suppression of RNA silencing* Virology, **376**, 132-139

Nuclei

Dahan, J., Pichereaux, C., Rossignol, M., Blanc, S., Wendehenne, D., Pugin, A. and Bourque, S. (2009) *Activation of a nuclear-localized SIPK in tobacco cells challenged by cryptogein, an elicitor of plant defence reactions* Biochem. J., **418**, 191–200

Lannoo, N., Peumans, W.J., Van Pamel, E., Alvarez, R., Xiong, T-C., Hause, G., Mazars, C. and Van Damme, E.J.M. (2006) *Localization and in vitro binding studies suggest that the cytoplasmic/nuclear tobacco lectin can interact in situ with high-mannose and complex N-glyc* FEBS Lett., **580**, 6329-6337

Mazars, C., Bourque, S., Mithöfer, A., Pugin, A. and Ranjeva, R. (2009) *Calcium homeostasis in plant cell nuclei* New Phytologist, **181**, 261-274

Schouppe, D., Ghesquière, B., Menschaert, G., De Vos, W.H., Bourque, S., Trooskens, G., Proost, P., Gevaert, K. and Van Damme, E.J.M. (2011) *Interaction of the tobacco lectin with histone proteins* Plant Physiol., **155**, 1091–1102

Xiong, T.C., Jauneau, A., Ranjeva, R. and Mazars, C. (2004) *Isolated plant nuclei as mechanical and thermal sensors involved in calcium signaling* Plant J., **40**, 12-21

Protein bodies

Llop-Tous, I., Madurga, S., Giralt, E., Marzabal, P., Torrent, M. and Ludevid, M.D. (2010) *Relevant elements of a maize γ-zein domain involved in protein body biogenesis* J. Biol. Chem., **285**, 35633–35644

9-8. *Picea meyeri* (pollen tubes)

Lipid rafts

Liu, P., Li, R-L., Zhang, L., Wang, Q-L., Niehaus, K., Baluška, F., Šamaj, J. and Lin, J-X. (2009) *Lipid microdomain polarization is required for NADPH oxidase-dependent ROS signaling in Picea meyeri pollen tube tip growth* Plant J., **60**, 303–313

9-9. *Suaeda altissima*

Golgi

Shuvalov, A.V., Orlova, J.V., Khalilova, L.A., Myasoedov, N.A., Andreev, I.M., Belyaev, D.V. and Balnokin, Y.V. (2015) *Evidence for the functioning of a Cl^-/H^+ antiporter in the membranes isolated from root cells of the halophyte Suaeda altissima and enriched with Golgi membranes* Russ. J. Plant Physiol., **62**, 45–56

10. Protozoa

10-1. Apicomplexia protozoa (*Eimeria tenella)*

Refractile body

De Venevelles, P., Chich, J.F., Faigle, W., Lombard, B., Loew, D., Péry, P. and M. Labbé (2006) *Study of proteins associated with the Eimeria tenella refractile body by a proteomic approach* Int. J. Parasitol., **36**, 1399-1407

10-2. Dictyostelium

Acidocalcisomes, contractile vacuoles and mitochondria

Marchesini, N., Ruiz, F.A., Vieira, M. and Docampo, R. (2002) *Acidocalcisomes are functionally linked to the contractile vacuole of Dictyostelium discoideum* J. Biol. Chem., **277**, 8146-8153

Phagosomes
Shevchuk, O., Batzilla, C., Hägele, S., Kusch, H., Engelmann, S., Hecker, M., Haas, A., Heuner, K., Glöckner, G., Steinert, M. (2009) *Proteomic analysis of Legionella-containing phagosomes isolated from Dictyostelium* Int. J. Med. Microbiol., **299**, 489–508

Secretory vesicles (CoA binding protein)
Cabral, M., Anjard, C., Malhotra, V., Loomis, W.F. and Kuspa, A. (2010) *Unconventional secretion of AcbA in Dictyostelium discoideum through a vesicular intermediate* Eukaryot. Cell, **9**, 1009-1017

Vacuoles (pathogen-containing)
Shevchuk, O. and Steinert, M. (2013) *Isolation of pathogen-containing vacuoles* In *Dictyostelium discoideum* Protocols, Methods Mol. Biol., **983**, (eds Eichinger, L. and Rivero, F.) Springer Science+Business Media, pp 419-429

10-3. *Giardia*
Lipid rafts
De Chatterjee, A., Mendez, T.L., Roychowdhury, S. and Dasa, S. (2015) *The assembly of GM1 glycolipid- and cholesterol-enriched raft-like membrane microdomains is important for Giardial encystation* Infect. Immun. **83**, 2030-2042

Mitochondria
Jedelský, P.L., Doležal, P., Rada, P., Pyrih, J., Šmíd, O., Hrdý, I., Šedinová, M., Marcinčiková, M. et al (2011) *The minimal proteome in the reduced mitochondrion of the parasitic protist Giardia intestinalis* PLoS One, **6**: e17285

10-4. Leishmania
Acidocalcisomes
Moreno, B., Urbina, J.A., Oldfield, J.A., Bailey, B.N., Rodrigues, C.O. and Docampo, R. (2000) *^{31}P NMR spectroscopy of Trypanosoma brucei, Trypanosoma cruzi, and Leishmania major* J. Biol. Chem., **275**, 28356-28362

Lipid rafts
Denny, P.W., Field, M.C. and Smith, D.F. (2001) *GPI-anchored proteins and glycoconjugates segregate into lipid rafts in Kinetoplastida* FEBS Lett., **491**, 148-153

Fridberg, A., Buchanan, K.T. and Engman, D.M. (2007) *Flagellar membrane trafficking in kinetoplastids* Parasitol. Res., **100**, 205-212

Sen, S., Roy, K., Mukherjee, S., Mukhopadhyay, R. and Roy, S. (2011) *Restoration of IFNγR subunit assembly, IFNγ signaling and parasite clearance in Leishmania donovani infected macrophages: role of membrane cholesterol* PloS Pathog., **7**: e1002229

Yao, C., Donelson, J.E. and Wilson, M.E. (2003) *The major surface protease (MSP or GP63) of Leishmania sp. Biosynthesis, regulation of expression and function* Mol. Biol. Parasitol., **132**, 1-16

Transport vesicles
Legare, D., Richard, D., Mukhopadyay, R., Stierhof, Y-D., Rosen, B.P., Haimeur, A., Papadopoulou, B. and Ouellette, M. (2001) *The Leishmania ATP-binding cassette protein PGPA is an intracellular metal-thiol transporter ATPase* J. Biol. Chem., **276**, 26301-26307

10-5. *Mastigamoeba balamuthi*
Hydrogenosomes
Nývltová, E., Stairs, C.W., Hrdý, I., Rídl, J., Mach, J., Pačes, J., Roger, A.J. and Tachezy, J. (2015) Lateral *Gene transfer and gene duplication played a key role in the evolution of Mastigamoeba balamuthi hydrogenosomes* Mol. Biol. Evol., **32**, 1039–1055

10-6. *Paramecium* organelles
Schilde, C., Lutter, K., Kissmehl, R. and Plattner, H. (2008) *Molecular identification of a SNAP-25-like SNARE protein in Paramecium* Eukaryot. Cell, **7**, 1387-1402

10-7. Phytomonas françai

Acidocalcisomes

Miranda, K., Rodrigues, C.O., Hentchel, J., Vercesi, A., Plattner, H., de Souza, W. and Docampo, R. (2004) *Acidocalsisomes of Phytomonas francai possess distinct morphological characteristics and contain iron* Microsc. Microanal., **10**, 647-655

10-8. Toxoplasma

Acidocalcisomes

Ferreira, D. da S., Menezes Resende, I.T. and Lopez, J.A. (2014) *Proteome investigation of an organellar fraction of Toxoplasma gondii: a preliminary study* BMC Proc., **8 (Suppl 4)**: P74

Rodrigues, C.O., Ruiz, F.A., Rohloff, P., Dcott, D.A. and Moreno, S.N.J. (2002) *Characterization of isolated acidocalcisomes from Toxoplasma gondii Tachyzoites reveals a novel pool of hydrolysable polyphosphate* J. Biol. Chem., **277**, 48650-48656

Rohloff, P., Miranda, K., Rodrigues, J.C.F., Fang, J., Galizzi, M., Plattner, H., Hentschel, J. and Moreno, S.N.J. (2011) *Calcium uptake and proton transport by acidocalcisomes of Toxoplasma gondii* PloS One **6**: e18390

Mitochondria

Hakansson, S., Charron, A.J. and Sibley, L.D. (2001) *Toxoplasma evacuoles: a two-step process of secretion and fusion forms the parasitophorous vacuole* EMBO J., **20**, 3132-3144

Vacuole-like organelle

Miranda, K., Pace, D.A., Cintron, R., Rodrigues, J.C.F., Fang, J., Smith, A., Rohloff, P., Coelho, E., de Haas, F. et al (2010) *Characterization of a novel organelle in Toxoplasma gondii with similar composition and function to the plant vacuole* Mol. Microbiol., **76**, 1358–1375

10-9. Trichomonas vaginalis

Hydrogenosomes

Beltrán, N.C., Horváthová, L., Jedelský, P.L., Šedinová, M., Rada, P., Marcinčiková, M., Hrdý, I. and Tachezy, J. (2013) *Iron-induced changes in the proteome of Trichomonas vaginalis hydrogenosomes* PLoS One, **5**: e65148

Hsu, H-M., Chu, C-H., Wang, Y-T., Lee, K., Wei, S-Y., Liu, H-W., Ong, S-J., Chen, C. and Tai, J-H. (2014) *Regulation of nuclear translocation of the Myb1 transcription factor by TvCyclophilin 1 in the protozoan parasite Trichomonas vaginalis* **289**, 19120–19136

Kay, C., Lawler, K., Self, T.J., Dyall, S.D. and Kerr, I.D. (2012) *Localisation of a family of complex-forming β-barrels in the T. vaginalis hydrogenosomal membrane* FEBS Lett., **586**, 4038–4045

10-10. Trypanosomes

Acidocalcisomes

Docampo, R. (2000) *New and re-emerging diseases: A dedication to Norman D. Levine* Parasitology Today, **16**, 316

Fang, J., Rohloff, P., Miranda, K. and Docampo, R. (2007) *Ablation of a small transmembrane protein of Trypanosoma brucei (TbVTC1) involved in the synthesis of polyphosphate alters acidocalcisome biogenesis and function, and leads to a cytokinesis defect* Biochem. J., **407**, 161-170

Ferella, M., Nilsson, D., darban, H., Rodrigues, C., Bontempi, E.J., Docampo, R. and Andersson, B. (2008) *Proteomics in Trypanosoma cruzi - localization of novel proteins to various organelles* Proteomics, **8**, 2735-2749

Huang, G., Bartlett, P.J., Thomas, A.P., Moreno, S.N.J. and Docampo, R. (2013) *Acidocalcisomes of Trypanosoma brucei have an inositol 1,4,5-trisphosphate receptor that is required for growth and infectivity* Proc. Natl. Acad. Sci. USA, **110**, 1887–1892

Huang, G., Ulrich, P.N., Storey, M., Johnson, D., Tischer, J.. Tovar, J.A., Moreno, S.N.J., Orlando, R. and Docampo, R. (2014) *Proteomic analysis of the acidocalcisome, an organelle conserved from bacteria to human cells* PLoS Pathog., **10**: e1004555

Martinez, R., Wang, Y., Benaim, G., Benchimol, M., de Souza, W., Scott, D.A. and Docampo, R.A (2002) *Proton pumping pyrophosphatase in the Golgi apparatus and plasma membrane vesicles of Trypanosoma cruzi* Mol. Biochem. Parasitol., **120**, 205-213

Moreno, B., Urbina, J.A., Oldfield, J.A., Bailey, B.N., Rodrigues, C.O. and Docampo, R. (2000) *^{31}P NMR spectroscopy of Trypanosoma brucei, Trypanosoma cruzi, and Leishmania major* J. Biol. Chem., **275**, 28356-28362

Rohloff, P., Rodrigues, C.O. and Docampo, R. (2003) *Regulatory volume decrease in Trypanosoma cruzi involves amino acid efflux and changes in intracellular calcium* Mol. Biochem. Parasit., **126**, 219-230
Rohloff, P., Montalvetti, A. and Docompo, R. (2004) *Acidocalcisomes and the contractile vacuole complex are involved in osmoregulation in Trypanosoma cruzi* J. Biol. Chem., **279**, 52270-52281
Ruiz, F.A., Rodrigues, C.O. and Docampo, R. (2001) *Rapid changes in polyphosphate content within acidocalcisomes in response to cell growth, differentiation and environmental stress in Trypanosoma cruzi* J. Biol. Chem., **276**, 26114-26121
Salto, M.L., Kuhlenschmidt, T., Kuhlenschmidt, M., de Lederkremer, R.M. and Docampo, R. (2008) *Phospholipid and glycolipid composition of acidocalcisomes of Trypanosoma cruzi* Mol. Biochem. Parasitol., **158** 120-130
Scott, D.A. and Docampo, R. (2000) *Characterization of isolated acidocalcisomes of Trypanosoma cruzi* J. Biol. Chem., **275**, 24215-24221

Contractile vacuoles

Rohloff, P., Montalvetti, A. and Docompo, R. (2004) *Acidocalcisomes and the contractile vacuole complex are involved in osmoregulation in Trypanosoma cruzi* J. Biol. Chem., **279**, 52270-52281
Ulrich, P.N., Jimenez, V., Park, M., Martins, V.P., Atwood III, J., Moles, K., Collins, D., Rohloff, P., Tarleton, R., Moreno, S.N.J., Orlando, R. and Docampo, R. (2011) *Identification of contractile vacuole proteins in Trypanosoma cruzi* PLoS One **6**: e18013

Glycosomes

Colasante, C., Ellis, M., Ruppert, T. and Voncken, F. (2006) *Comparative proteomics from bloodstream form and procyclic form Trypanosoma brucei brucei* Proteomics, **6**, 3275-3293
Gualdron-López, M., Vapola, M.H., Miinalainen, I.J., Hiltunen, J.K., Michels, P.A.M. and Antonenkov, V.D. (2012) *Channel-forming activities in the glycosomal fraction from the bloodstream form of Trypanosoma brucei* PLoS One, **7**: e34530
Gualdrón-López, M., Chevalier, N., Van Der Smissen, P., Courtoy, P.J., Rigden, D.J. and Michels, P.A.M. (2013) *Ubiquitination of the glycosomal matrix protein receptor PEX5 in Trypanosoma brucei by PEX4 displays novel features* Biochim. Biophys. Acta, **1833**, 3076–3092

Lipid rafts

De Paulo Martins, V., Okura, M., Maric, D., Engman, D.M., Vieira, M., Docampo, R. and Moreno, S.N.J. (2010) *Acylation-dependent export of Trypanosoma cruzi phosphoinositide-specific phospholipase C to the outer surface of amastigotes* J. Biol. Chem., **285**, 30906-30917
Emmer, B.T., Souther, C., Toriello, K.M., Olson, C.L., Epting, C.L. and Engman, D.M. (2009) *Identification of a palmitoyl acyltransferase required for protein sorting to the flagellar membrane* J. Cell Sci., **122**, 867-874
Fridberg, A., Buchanan, K.T. and Engman, D.M. (2007) *Flagellar membrane trafficking in kinetoplastids* Parasitol. Res., **100**, 205-212
Fridberg, A., Olson, C.L., Nakayasu, E.S., Tyler, K.M., Almeida, I.C. and Engman, D.M. (2008) *Sphingolipid synthesis is necessary for kinetoplast segregation and cytokinesis in Trypanosoma brucei* J. Cell Sci., **121**, 522-535
Lantos, A.B., Carlevaro, G., Araoz, B., Diaz, P.R., de los Milagros Camara, M., Buscaglia, C.A., Bossi, M., Yu, H., Chen, X. et al (2016) *Sialic acid glycobiology unveils Trypanosoma cruzi trypomastigote membrane physiology* PloS Pathog., **12**, e1005559
Maric, D., McGwire, B.S., Buchanan, K.T., Olson, C.L., Emmer, B.T., Epting, C.L. and Engman, D.M. (2011) *Molecular determinants of ciliary membrane localization of Trypanosoma cruzi flagellar calcium-binding protein* J. Biol. Chem., **286**, 33109–33117
Maric, D., Olson, C.L., Xu, X., Ames, J.B. and Engman, D.M. (2015) *Calcium-dependent membrane association of a flagellar calcium sensor does not require calcium binding* Mol. Biochem. Parasitol., **201**, 72–75
Niyogi, S., Mucci, J., Campetella, O. and Docampo, R. (2014) *Rab11 regulates trafficking of trans-sialidase to the plasma membrane through the contractile vacuole complex of Trypanosoma cruzi* PLOS Pathog., **10**: e1004224
Tyler, K.M., Fridberg, A., Toriello, K.M., Olson, C.L., Cieslak, J.A., Hazlett, T.L. and Engman, D.M. (2009) *Flagellar membrane localization via association with lipid rafts* J. Cell Sci., **122**, 859-866

11. Review articles

11-1. Methodology

Ohta, D. and Mizutani, M. (2012) *Sterol C22-desaturase and its biological roles* In Isoprenoid Synthesis in Plants and Microorganisms: New Concepts and Experimental Approaches (eds. Bach, T.J. and Rohmer, M.) Springer Science+Business Media New York, pp 381-391

Šamajová, O., Takác, T., von Wangenheim, D., Stelzer, E. and Šamaj, J. (2012) *Update on methods and techniques to study endocytosis in plants* In Endocytosis in Plants (ed. Šamaj, J.) Springer-Verlag Berlin Heidelberg, pp 1-36

11-2. Proteomic review articles

Agrawal, G.K., Bourguignon, J., Rolland, N., Ephritikhine, G., Ferro, M., Jaquinod, M., Alexiou, K.G., Chardot, T., Chakraborty, N., Jolivet, P., Doonan, J.H. and Rakwal1, R. (2011) *Plant organelle proteomics: collaborating for optimal cell function* Mass Spectrom. Rev., **30**, 772– 853
Au, C.E., Bell, A.W., Gilchrist, A., Hiding, J., Nilsson, T. and Bergeron, J.J.M. (2007) *Organellar proteomics to create the cell map* Curr. Opin. Cell Biol., **19**, 376-385
Chen, X., Karnovsky, A., Dolors Sans, M., Andrews, P.C. and Williams, J.A., (2010) *Molecular characterization of the endoplasmic reticulum: Insights from proteomic studies* Proteomics, **10**, 4040–4052
Dengjel, J., Jakobsen, L. and Andersen, J.S. (2010) *Organelle proteomics by label-free and SILAC-based protein correlation profiling* In LC-MS/MS in Proteomics, Methods Mol. Biol., **658**, (ed. Cutillas, P.R. and Timms, J.F.) Springer Science+Business Media, pp 255-265
Kota, U. and Goshe, M.B. (2011) *Advances in qualitative and quantitative plant membrane proteomics* Phytochemistry, **72**, 1040–1060
Lee, Y.H., Tan, H.T. and Chung, M.C.M. (2010) *Subcellular fractionation methods and strategies for proteomics* Proteomics **10**, 3935–3956
Lilley, K.S. and Dupree, P. (2007) *Plant organelle proteomics* Curr. Opin. Plant Biol., **10**, 594-599
Oeljeklaus, S., Meyer, H.E. and Warscheid, B. (2009) *Advancements in plant proteomics using quantitative mass spectrometry* J. Proteom., **72**, 545-554
Sadowski, P.G., Groen, A.J., Dupree, P. and Lilley, K.S. (2008) *Sub-cellular localization of membrane proteins* Proteomics, **8**, 3991-4011
Schröder, B.A., Wrocklage, C., Hasilik, A. and Saftig, P. (2010) *The proteome of lysosomes* Proteomics, **10**, 4053–4076
Trotter, M.W.B., Sadowski, P.G., Dunkley, T.P.J., Groen, A.J. and Lilley, K.S. (2010) *Improved sub-cellular resolution via simultaneous analysis of organelle proteomics data across varied experimental conditions* Proteomics, **10**, 4213–4219
Vertommena, A., Panisa, B., Swennena, R. and Carpentiera, S.C. (2011) *Challenges and solutions for the identification of membrane proteins in non-model plants* J. Proteom., **74**, 1165-1181

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