OptiPrep™ Mini-Review MS03

Purification of organelles 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.

The bibliography below is divided into **nine principal eukaryote groups;** within each of these groups papers are further sorted according to **species** and **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. In a few cases **review articles** 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)
5. Insects
6. Marine invertebrates
7. Nematodes
8. Phytoplankton
9. Plants and plant cells
10. Proteomic review articles
11. Protozoa

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

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

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

Lipid rafts

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

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

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

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., Lim, D.H., Cho, I.S., Nakahara, K., Preall, J.B., Bellare, P., Sontheimer, E.J. and Carthew, R.W. (2009) *Silencing by small RNAs is linked to endosomal trafficking* Nat. Cell Biol., **11**, 1150-1157

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

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

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
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 Lgl 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

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

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

Plasma membrane

Dasgupta, U., Bamba, T., Chiantia, S., Karim, P., Abou Tayoun, A.N., Yonamine, I., Rawat, S.S., Rao, R.P., Nagashima, K., Fukusaki, E., Puri, V., Dolph, P.J., Schwille, P., Acharya, J.K. and Acharya, U. (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. *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

5-5. 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

5-6. 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 (*Caenorhabditis elegans*)

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

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

8-1. *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

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

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

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., Hawes, C., Watson, R.B., Duprese, P. and Lilley, K.S. (2006) *Mapping the Arabidopsis organelle proteome* Proc. Natl. Acad. Sci. USA, **103**, 6518-6523

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

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

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

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9-2. Ferns

Tonoplast

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9-3. Fruit trees

Tonoplast

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9-4. Grasses, grains and related crops

Golgi/microsomes

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Nuclei

Bedell, J.A., Budiman, M.A., Nunberg, A., Citek, R.W., Robbins, D., Jones, J., Flick, E., Rohlfing, T., Fries, J., Bradford, K., McMenamy, J., Smith, M., Holeman, H., Roe, B.A., Wiley, G., Korf, I.F., Rabinowicz, P.D., Lakey, N., McCombie, W.R., Jeddeloh, J.A. and Martienssen, R.A. (2005) *Sorghum genome sequencing by methylation filtration* PLoS Biol **3**: e13

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9-5. Legumes

Nuclei

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Arai, Y., Hayashi, M. and Nishimura, M. (2008) *Proteomic analysis of highly purified peroxisomes from etiolated Soybean cotyledons* Plant Cell Physiol., **49**, 526-539
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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
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9-7. Nicotiana tabacum

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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. Review articles

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9-10. *Suaeda*

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

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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
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11. Protozoa

11-1. 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

11-2. 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

11-3. *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

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Jedelský, P.L., Doležal, P., Rada, P., Pyrih, J., Šmíd, O., Hrdý, I., Šedinová, M., Marcinčiková, M., Voleman, L., Perry, A.J., Beltrán, N.C., Lithgow, T. and Tachezy, J. (2011) *The minimal proteome in the reduced mitochondrion of the parasitic protist Giardia intestinalis* PLoS One, **6**: e17285

11-4. 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

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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

11-5. *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

11-6. *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

11-7. 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

11-8. Toxoplasma

Acidocalcisomes

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

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11-9. Trichomonas vaginalis

Hydrogenosomes

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11-10. Trypanosomes

Acidocalcisomes

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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

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12. Trematodes
12-1. *Schistosoma*

Extracellular vesicles
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