

OptiPrep™ Mini-Review MS11

Lipid rich detergent-resistant membranes from non-mammalian sources – a bibliography

The companion **OptiPrep™ Mini-Review MS08 “Lipid rich detergent-resistant membranes from mammalian cells, tissues and organelles”** contains a brief summary of the methodology for the isolation of these plasma membrane domains in addition to the complete reference list of the published papers. Strategies used for invertebrate cells, plant cells, algae, fungi and protozoa are broadly similar. This Mini-Review is thus confined to the provision of a bibliography of published papers concerned with this diverse group of organisms.

A detailed description of the OptiPrep™ methodology (see Application Sheet S32) can be found on the OptiPrep™ Applications flash-drive or on the following website: www.axis-shield-density-gradient-media.com (click on “Methodology”, then “Organelles and Subcellular Membranes”) and scroll down the Index.

Papers have been divided into **organism or cell type (listed alphabetically)** and additionally, when required, into **research topic**. Within each group papers are listed alphabetically according to **first author**. When a paper reports the study of more than one cell type, reference to that paper will appear under multiple cell headings. A paper may also appear under two or more research topic headings.

- ◆ Part(s) of the titles are highlighted in blue to facilitate identification of particular research topic(s)

1. Amphibia

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

2. Bacteria

Borrelia burgdorferi

Coleman, J.L., Toledo, A. and Benach, J.L. (2016) *Borrelia burgdorferi HtrA: evidence for twofold proteolysis of outer membrane protein p66* Mol. Microbiol., **99**, 135–150

LaRocca, T.J., Crowley, J.T., Cusack, B.J., Pathak, P., et al (2010) *Cholesterol lipids of Borrelia burgdorferi form lipid rafts and are required for the bactericidal activity of a complement-independent antibody* Cell Host Microbe **8**, 331–342

Toledo, A., Crowley, J.T., Coleman, J.L., LaRocca, T.J., et al (2014) *Selective association of outer surface lipoproteins with the lipid rafts of Borrelia burgdorferi* mBio, **5**: e00899-14

Toledo, A., Pérez, A., Coleman, J.L. and Benach, J. L. (2015) *The lipid raft proteome of Borrelia burgdorferi* Proteomics, **15**, 3662–3675

Escherichia coli

Guzman-Flores, J.E., Alvarez, A.F., Poggio, S., Gavilanes-Ruiz, M. and Georgellis, D. (2017) *Isolation of detergent-resistant membranes (DRMs) from Escherichia coli* Anal. Biochem., **518**, 1-8

3. Chicken embryo

Long, J., Tokhunts, R., Old, W.M., Houel, S., Rodriguez-Blanco, J., Singh, S., Schilling, N., Capobianco, A.J., Ahn, N.G. and Robbins, D.J. (2015) *Identification of a family of fatty-acid-speciated sonic hedgehog proteins, whose members display differential biological properties* Cell Rep., **10**, 1280–1287

4. Coccolithoviruses

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 Emiliana huxleyi: a role for membrane microdomains in host-virus interactions* Environ. Microbiol., **16**, 1150–1166

5. Drosophila melanogaster

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

- Fernandez-Funez, P.**, Casas-Tinto, S., Zhang, Y., Gómez-Velazquez, M., et al (2009) *In vivo generation of neurotoxic prion protein: role for Hsp70 in accumulation of misfolded isoforms* PLoS One, **5**:e1000507
- Hebbar, S.**, Lee, E., Manna, M., Steinert, S., et al (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 Drosophila: 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 glycosylphosphatidylinositol-linked proteins with Drosophila raft lipid microdomains* J. Biol. Chem., **274**, 12049-12054
- Sanxaradis, P.D.**, Cronin, M.A., Rawat, S.S., Waro, G., et al (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

6. Echinoderms

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

7. Fish and fish embryo

- Adachi, T.**, Sato, C. and Kitajima, K. (2007) *Membrane microdomain formation is crucial in epiboly during gastrulation of medaka* Biochem. Biophys. Res. Commun., **358**, 848-853
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- Sezgin, E.**, Azbazar, 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

8. Fungi

8-1. Candida albicans

- Aeed, P.A.**, Sperry, A.E., Young, C.L., Nagiec, M.M., et al (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
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8-2. Saccharomyces cerevisiae

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- Rockwell, N.C.**, Wolfger, H., Kuchler, K. and Thorner, J. (2009) *ABC transporter Pdr10 regulates the membrane microenvironment of Pdr12 in Saccharomyces cerevisiae* J Membr. Biol., **229**, 27–52

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- Gaigg, B.**, Toulmay, A. and Scheiter, R. (2006) *Very long-chain fatty acid-containing lipids rather than sphingolipids per se are required for raft association and stable surface transport of newly synthesized plasma membrane ATPase in yeast* J. Biol. Chem., **281**, 34135-34145
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Aronova, S., Wedaman, K., Anderson, S., Yates, J., et al (2007) *Probing the membrane environment of the TOR kinases reveals functional interactions between TORC1, actin and membrane trafficking in Saccharomyces cerevisiae* Mol. Biol. Cell, **18**, 2779-2794

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Germann, M., Swain, E., Bergman, L. and Nickels, Jr. J.T. (2005) *Characterizing the sphingolipid signaling pathway that mediates defects associated with loss of the yeast amphiphysin-like orthologs, Rvs161p and Rvs167p* J. Biol. Chem., **280**, 4270-4278

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Apoptosis

Büttner, S., Delay, C., Franssens, V., Bammens, T., et al (2010) *Synphilin-1 enhances α -synuclein aggregation in yeast and contributes to cellular stress and cell death in a Sir2-dependent manner* PloS One **5**: e13700

Ca²⁺- CaM

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Cholesterol

Souza, C.M., Schwabe, T.M.E., Pichler, H., Ploier, B., et al (2011) *A stable yeast strain efficiently producing cholesterol instead of ergosterol is functional for tryptophan uptake, but not weak organic acid resistance* Metab. Eng., **13**, 555-569

Coenzyme Q uptake

Padilla-López, S., Jiménez-Hidalgo, M., Martín-Montalvo, A., Clarke, C.F., et al (2009) *Genetic evidence for the requirement of the endocytic pathway in the uptake of coenzyme Q6 in Saccharomyces cerevisiae* Biochim. Biophys. Acta **1788**, 1238-1248

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Kashiwazaki, J., Yamasaki, Y., Itadani, A., Teraguchi, E., et al (2011) *Endocytosis is essential for dynamic translocation of a syntaxin 1 orthologue during fission yeast meiosis* Mol. Biol. Cell, **22**, 3658-3670

Ergosterol

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Grossmann, G., Opekarova, M., Novakova, L., Stolz, J., et al (2006) *Lipid raft-based membrane compartmentation of a plant transport protein expressed in Saccharomyces cerevisiae* Eukary. Cell, **5**, 945-953

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Glycophospholipids

- Yoko-o, T.**, Ichikawa, D., Miyagishi, Y., Kato, A., Umemura, M., Takase, K., Ra, M., Ikeda, K., Taguchi, R. and Jigami Y. (2013) *Determination and physiological roles of the glycosylphosphatidylinositol lipid remodelling pathway in yeast* Mol. Microbiol., **88**, 140-155

GPI-proteins

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H⁺-ATPase Pma1P

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- Czyz, O.**, Bitew, T., Cuesta-Marban, A., McMaster, C.R., et al (2013) *Alteration of plasma membrane organization by an anticancer lysophosphatidylcholine analogue induces intracellular acidification and internalization of plasma membrane transporters in yeast* J. Biol. Chem., **288**, 8419-8432

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Membrane trafficking

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- Rolli, E.**, Ragni, E., Calderon, J., Porello, S., et al (2009) *Immobilization of the glycosylphosphatidylinositol-anchored Gas1 protein into the chitin ring and septum is required for proper morphogenesis in yeast* Mol. Biol. Cell, **20**, 4856–4870

Na⁺/H⁺ antiport

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Oxidative stress

- Ana, B.**, Chen, Y., Li, B., Qin, G., et al (2014) *Ca²⁺-CaM regulating viability of Candida guilliermondii under oxidative stress by acting on detergent resistant membrane proteins* J. Proteom., **109**, 38–49

Phospholipids

- Cuesta-Marbán, A.**, Botet, J., Czyz, O., Cacharro, L.M., et al (2013) *Drug uptake, lipid rafts, and vesicle trafficking modulate resistance to an anticancer lysophosphatidyl-choline analogue in yeast* J. Biol. Chem., **288**, 8405–8418
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