

CURRICULUM VITAE

Avital Adah Rodal, Ph.D.

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A. EDUCATION AND RESEARCH

2/2023- Professor of Biology, Brandeis University, Waltham, MA
2017-2/2023 Associate Professor of Biology, Brandeis University, Waltham, MA
2010-2017 Assistant Professor of Biology, Brandeis University, Waltham, MA
2003-2010 Postdoctoral Fellow/Associate, Massachusetts Institute of Technology
 "Membrane traffic and synaptic architecture"
 Advisor: J. Troy Littleton
1997-2002 Ph.D., Molecular and Cell Biology, University of California, Berkeley
 "Actin cytoskeleton dynamics at the *S. cerevisiae* cell cortex"
 Advisor: David G. Drubin
1993-1997 B.Sc. Biology, and B.Sc. Chemical Engineering
 Massachusetts Institute of Technology
 "Deregulation of isoleucine biosynthesis in *C. glutamicum*"
 Research advisor: Anthony Sinskey

B. HONORS AND AWARDS

2018 Landis Award for Outstanding Mentorship, NINDS
2013-2017 Pew Scholar Award
2012-2017 NIH Director's New Innovator Award
2012-2014 Basil O'Connor Scholar Award, March of Dimes
2008-2013 K99/R00, NIH Pathway to Independence Award, NINDS
2006-2008 Charles King Trust of the Medical Foundation Postdoctoral Fellow
2003-2006 Damon Runyon Cancer Research Foundation Postdoctoral Fellow
1997-2002 Howard Hughes Medical Institute Predoctoral Fellow
1997 Phi Beta Kappa, MIT
 Whitehead Prize, MIT - outstanding promise for biology research career
 Wei Award, MIT - research at the interface of life science and engineering
2002, 2006 US patents - 6,451,564, and 6,987,017 "Methods for producing L-isoleucine"

C. SELECTED SERVICE

Brandeis Engineering Program Implementation Committee (2021-present, co-chair 2023-present)
Director, Brandeis Electron Microscopy Core Facility (2019-present)
Co-Director, Brandeis Electron Microscopy Core Facility (2017-2019)
Co-Director, Brandeis Light Microscopy Core Facility (2020-present)
Associate Editor. Molecular Biology of the Cell
Member, American Society for Cell Biology Women in Cell Biology Committee (2019-present)
Cold Spring Harbor Lab Neurobiology of *Drosophila*; 2023 meeting co-chair (with Andy Frank)

D. PUBLICATIONS

Preprints

1. Ermanoska B, **Rodal AA**. Non-muscle myosin II regulates presynaptic actin assemblies and neuronal mechanobiology. bioRxiv 2023.11.10.566609

- Quiñones-Frías MC, Ocken DM, **Rodal A**. High-resolution imaging of presynaptic ER networks in *Atlastin* mutants. *bioRxiv*. 2023 Sep 2:2023.09.01.555994

Peer Reviewed

- Dresselhaus EC, Harris KP, Blanchette CR, Koles K, Del Signore SJ, Pescosolido MF, Ermanoska B, Rozencwaig M, Soslowsky RC, Parisi MJ, Stewart BA, Mosca TJ, **Rodal AA**. ESCRT disruption provides evidence against signaling functions for synaptic exosomes. *J Cell Biol*. 2024; 223(9):e202405025.
- Welsh JA, Goberdhan DCI, O'Driscoll L, Buzas EI, Blenkiron C, Bussolati B, Cai H, Di Vizio D, Driedonks TAP, Erdbrügger U, Falcon-Perez JM, Fu QL, Hill AF, Lenassi M, Lim SK, Mahoney MG, Mohanty S, Möller A, Nieuwland R, Ochiya T, Sahoo S, Torrecilhas AC, Zheng L, Zijlstra A, Abuelreich S, Bagabas R, Bergese P, Bridges EM, Brucale M, Burger D, Carney RP, Cocucci E, Crescitelli R, Hanser E, Harris AL, Haughey NJ, Hendrix A, Ivanov AR, Jovanovic-Taliman T, Kruh-Garcia NA, Ku'ulei-Lyn Faustino V, Kyburz D, Lässer C, Lennon KM, Lötvall J, Maddox AL, Martens-Uzunova ES, Mizenko RR, Newman LA, Ridolfi A, Rohde E, Rojalin T, Rowland A, Saffits A, Sandau US, Saugstad JA, Shekari F, Swift S, Ter-Ovanesyan D, Tosar JP, Useckaite Z, Valle F, Varga Z, van der Pol E, van Herwijnen MJC, Wauben MHM, Wehman AM, Williams S, Zendrini A, Zimmerman AJ; **MISEV Consortium**; Théry C, Witwer KW. Minimal information for studies of extracellular vesicles (MISEV2023): From basic to advanced approaches. *J Extracell Vesicles*. 2024 Feb;13(2):e12404. doi: 10.1002/jev2.12404.PMID: 38326288
- Elam L, Quiñones-Frías MC, Zhang Y, **Rodal AA**, Fai TG. Fast solver for diffusive transport times on dynamic intracellular networks. *arXiv:2207.07682 accepted*, *SIAM Journal on Applied Mathematics*.
- Ermanoska B, Asselbergh B, Morant L, Petrovic-Erfurth ML, Hosseinibarkooie S, Leitão-Gonçalves R, Almeida-Souza L, Bervoets S, Sun L, Lee L, Atkinson D, Khanghahi A, Tournev I, Callaerts P, Verstreken P, Yang XL, Wirth B, **Rodal AA**, Timmerman V, Goode BL, Godenschwege TA, Jordanova A. Tyrosyl-tRNA synthetase has a non-canonical function in actin bundling. *Nat Commun*. 2023 Mar 8;14(1):999.
- Del Signore SJ, Mitzner MG, Silveira AM, Fai TG, **Rodal AA**. Quantitative mapping of synaptic periaxonal zone architecture and organization. *Mol. Biol. Cell*. 2022; mbcE22-08-0372
- Bi GQ, Rodal AA. Editorial overview: Cellular neuroscience. *Curr Opin Neurobiol*. 2022; 26;76:102625.
- Tan W, Zhang Q, Quiñones-Frías MC, Hsu A, Zhang Y, **Rodal AA**; Hong P; Luo H; Xu B. Enzyme Responsive Peptide Thioesters for Targeting Golgi Apparatus. *J Am Chem Soc*. 2022; 144(15):6709-6713.
- Quiñones-Frías MC, **Rodal AA**. Recycle before taking out the trash: ATG-9 exo-endocytosis links neuronal activity to autophagosome biogenesis. *Neuron*. 2022; 110(5):735-737.
- Blanchette CR*, Scalera AL*, Harris KP, Zhao Z, Dresselhaus EC, Koles K, Yeh A, Apiki JK, Stewart BA, **Rodal AA**. Local regulation of extracellular vesicle traffic by the synaptic endocytic machinery. (*co-first authors) *J Cell Biol*. 2022; 221(5):e202112094.
- Del Signore SJ, Kelley CF, Messelaar EM, Lemos T, Marchan MF, Ermanoska B, Mund M, Kaksonen M, **Rodal AA**. An autoinhibitory clamp of actin assembly constrains and directs synaptic endocytosis. *elife*. 2021 Jul 29;10:e69597.
- Walsh RB, Dresselhaus EC, Becalska AN, Zunitch MJ, Blanchette CR, Scalera AL, Lemos T, Lee SM, Apiki J, Wang S, Isaac B, Yeh A, Koles K, **Rodal AA**. Opposing functions for retromer and Rab11 in extracellular vesicle cargo traffic at synapses. *J Cell Biol*. 2021; 220 (8): e202012034.
- Herzog JJ, Xu W, Deshpande M, Rahman R, Suib H, **Rodal AA**, Rosbash M, Paradis S. TDP-43 dysfunction restricts dendritic complexity by inhibiting CREB activation and altering gene expression. *Proc Natl Acad Sci U S A*. 2020; 117(21):11760-11769.
- Blanchette CR, **Rodal AA**. Mechanisms for biogenesis and release of neuronal extracellular vesicles. *Curr. Opin. Neurobiology* 2020; 63:104-110

14. Ye H, Ojelade S, Li-Kroeger D, Zuo Z, Wang L, Li Y, Gu JYJ, Tepass U, **Rodal AA**, Bellen HJ, Shulman JM. Retromer subunit, VPS29, regulates synaptic transmission and is required for endolysosomal function in the aging brain. *elife* 2020; 9:e51977.
15. Nguyen DN, Redman RL, Horiya S, Bailey JK, Xu B, Stanfield RL, Temme JS, LaBranche CC, Wang S, **Rodal AA**, Montefiori DC, Wilson IA, Krauss IJ. The Impact of Sustained Immunization Regimens on the Antibody Response to Oligomannose Glycans. *ACS Chem Biol.* 2020;15(3):789-798
16. Zuraw-Weston S, Wood DA, Torres IK, Lee Y, Wang L, Jiang Z, Lázaro GR, Wang S, **Rodal AA**, Hagan MF, Rotello VM, Dinsmore, AD. Nanoparticles Binding to Lipid Membranes: from Vesicle-Based Gels to Vesicle Inversion and Destruction. *Nanoscale.* 2019; 11(39):18464-18474
17. Wang S, Zhao Z, **Rodal AA**. Higher order assembly of Sorting Nexin 16 controls tubulation and distribution of neuronal endosomes. *J Cell Biol.* 2019, 218(8):2600-2618
18. Del Signore SJ, **Rodal AA**. The enemy of my enemy: PTEN and PLCXD collude to fight endosomal PtdIns(4,5)P₂. *J Cell Biol.* 2019; 218(7):2082-2083
19. Feng Z, Wang H, Wang S, Zhang Q, Zhang X, **Rodal A**, Xu B. Enzymatic Assemblies Disrupt Membrane and Target Endoplasmic Reticulum (ER) for Selective Cancer Cell Death. *J Am Chem Soc.* 2018, 140(30):9566-9573
20. Wang H, Feng Z, Del Signore SJ, **Rodal AA**, Xu B. Active probes for imaging membrane dynamics of live cells with high spatial and temporal resolution over extended time scales and areas. *J Am Chem Soc.* 2018, 140(10):3505-3509
21. Zhou J, Du X, Berciu C, Del Signore SJ, Chen X, Yamagata N, **Rodal AA**, Nicastro D, Xu B. Cellular uptake of a taurine-modified, ester bond-decorated D-peptide derivative via dynamin-based endocytosis and macropinocytosis. *Mol Ther.* 2018 , 26(2):648-658
22. Wang H, Shi J, Feng Z, Zhou R, Wang S, **Rodal AA**, Xu B. An in-situ dynamic continuum of supramolecular phosphoglycopeptides enables formation of 3D cell spheroids. *Angew Chem Int Ed Engl.* 2017; 56(51):16297-16301.
23. Herzog JJ*, Deshpande M*, Shapiro L, **Rodal AA**, Paradis S. TDP-43 misexpression causes defects in dendritic growth. (*co-first authors). *Sci Rep.* 2017, 7(1):15656
24. Del Signore SJ*, Biber SA*, Lehmann KS, Eskin TL, Heimler SR, Rosenfeld BH, Sweeney S, **Rodal AA**. dOCRL maintains immune cell quiescence by regulating endosomal traffic (*co-first authors) *PLOS Genetics* 2017, 13(10):e1007052.
25. Del Signore SJ, **Rodal AA**. The membrane strikes back: Synaptic functions of Skywalker require phosphoinositide binding. *Nat Struct Mol Biol.* 2016, 23(11):956-957
26. Deshpande M, **Rodal AA**. Beyond the SNARE – Munc18-1 chaperones α -synuclein. *J Cell Biol.* 2016, 214(6):641-3
27. Deshpande M*, Feiger Z*, Shilton AK, Luo CC, Silverman E, **Rodal AA**. Role of endosomal traffic of BMP receptors in synaptic growth defects in a *Drosophila* ALS model. (*co-first authors) *Mol Biol Cell.* 2016, 27(19):2898-910
28. Stanishneva-Konovalova T*, Kelley CF*, Messelaar EM, Wasserman SA, Sokolova OS[†], **Rodal AA**[†]. Coordinated autoinhibition of F-BAR domain membrane binding and WASp activation by Nervous Wreck (*co-first authors; [†]co-corresponding authors) *PNAS* 2016, 113(38):E5552-61
29. Jungmann R, Avendaño MS, Dai M, Woehrstein JB, Agasti SS, Feiger Z, **Rodal A**, Yin P. Multiplexed Quantitative Super-Resolution Imaging with qPAINT using Transient Binding Analysis. *Nature Methods* 2016, 13(5):439-42
30. Deshpande M, **Rodal AA**. The crossroads of synaptic growth signaling, membrane traffic, and neurological disease: Insights from *Drosophila*. *Traffic* 2016,17(2):87-101
31. Koles K, Yeh A. **Rodal AA**. Tissue-specific tagging of endogenous loci in *Drosophila melanogaster*. *Biol*

Open 2015, 5(1):83-9

32. Kelley CF, Messelaar EM, Eskin TL, Wang S, Song K, Vishnia K, Becalska AN, Shupliakov O, Hagan MF, Danino D, Sokolova OS, Nicastro D, **Rodal AA**. Membrane charge directs the outcome of F-BAR domain lipid binding and autoregulation. *Cell Rep* 2015, 13(11):2597-609
33. Koles K, Messelaar EM, Feiger Z, Yu CJ, Frank CA, **Rodal AA**. The EHD protein Past1 controls postsynaptic membrane elaboration and synaptic function. *Mol Biol Cell* 2015 15;26(18):3275-88
34. **Rodal AA**, Del Signore SJ, Martin AC. *Drosophila* comes of age as a model system for understanding the function of cytoskeletal proteins in cells, tissues, and organisms. *Cytoskeleton* 2015 72(5):207-24
35. Kelley CF, Becalska AN, Berciu C, Nicastro D, **Rodal AA**. Assembly of actin filaments and microtubules in Nwk F-BAR-induced membrane deformations. *Comm. Int. Biol.* 2015 8(3) e1000703
36. Frank CA, Wang X, Collins CA, **Rodal AA**, Yuan Q, Verstreken P, Dickman DK. New approaches for studying synaptic development, function, and plasticity using *Drosophila* as a model system. *J Neurosci.* 2013 33(45):17560-8
37. Becalska, AN, Kelley, CF, Berciu, C, Stanishneva-Konovalova, TB, Fu, X, Wang S, Sokolova, OS, Nicastro, D, **Rodal, AA**. Formation of membrane ridges and scallops by the F-BAR protein Nervous Wreck. *Mol Biol Cell.* 2013 24(15):2406-18
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39. Vizcarra CL, Kreutz B, **Rodal AA**, Toms AV, Lu J, Zheng W, Quinlan ME, Eck MJ. Structure of the Spire KIND domain and insights into its interaction with Fmn-family formins. *PNAS* 2011 108(29):11884-9
40. **Rodal AA**, Blunk AD, Akbergenova Y, Jorquera RA, Buhl LK, Littleton JT. A presynaptic endosomal membrane trafficking pathway controls synaptic growth signaling. *J. Cell Biol.* 2011 193(1):201-17
41. **Rodal AA**, Motola-Barnes RN, Littleton JT. Nervous Wreck and Cdc42 cooperate to regulate endocytic actin assembly during synaptic growth. *J Neurosci* 2008 28(33):8316-25
42. **Rodal AA**, Littleton JT. Synaptic endocytosis; illuminating the role of clathrin assembly. *Curr Biol* 2008 18(6): R259-261
43. Quintero-Monzon O, Strokopytov B, **Rodal AA**, Almo SC, Goode BL. Structural and functional dissection of the Abp1 ADFH actin-binding domain reveals versatile in vivo adapter functions. *Mol Biol Cell* 2005 16(7):3128-39
44. **Rodal AA***, Sokolova O*, Robins, DB, Daugherty KM, Hippenmeyer S, Riezman H, Grigorieff N, Goode BL. Conformational changes in the Arp2/3 complex leading to actin nucleation. *Nature Struct Mol Biol* 2005 12(1):26-31 (*co-first authors)
45. **Rodal AA**, Kozubowski L, Goode BL, Drubin DG, Hartwig JH. Actin and septin ultra-structures at the budding yeast cell cortex. *Mol Biol Cell.* 2005 16(1):372-84
46. Balcer HI, Goodman AL, **Rodal AA**, Smith E, Kugler J, Heuser JE, Goode BL. Coordinated regulation of actin filament turnover by a high-molecular-weight Srv2/CAP complex, cofilin, profilin, and Aip1. *Curr Biol.* 2003 13(24):2159-69
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48. **Rodal AA**, Duncan M, Drubin D. Purification of glutathione S-transferase fusion proteins from yeast. *Methods Enzymol.* 2002 351:168-72
49. Sagot, I, **Rodal AA**, Moseley J, Goode BL, Pellman D. An actin nucleation mechanism by the formin Bni1 and profilin. *Nat Cell Biol.* 2002 4(8):626-31
50. Goode BL, **Rodal AA**. Modular complexes that regulate actin assembly in budding yeast. *Curr Opin Microbiol.* 2001 4(6):703-12

51. Guillouet S, **Rodal AA**, An GH, Gorret N, Lessard PA, Sinskey AJ. Metabolic redirection of carbon flow toward isoleucine by expressing a catabolic threonine dehydratase in a threonine-overproducing *Corynebacterium glutamicum*. *Appl Microbiol Biotechnol*. 2001 57(5-6):667-73
52. Goode BL*, **Rodal AA***, Barnes G, Drubin DG. Activation of the Arp2/3 complex by the actin filament binding protein Abp1p. *J Cell Biol*. 2001 153(3):627-34 (*co-first authors)
53. Kozminski KG, Chen AJ, **Rodal AA**, Drubin DG. Functions and functional domains of the GTPase Cdc42p. *Mol Biol Cell*. 2000 11(1):339-54
54. Guillouet S, **Rodal AA**, An G, Lessard PA, Sinskey AJ. Expression of the *Escherichia coli* catabolic threonine dehydratase in *Corynebacterium glutamicum* and its effect on isoleucine production. *Appl Environ Microbiol*. 1999 65(7):3100-7
55. **Rodal AA**, Tetreault JW, Lappalainen P, Drubin DG, Amberg DC. Aip1p interacts with cofilin to disassemble actin filaments. *J Cell Biol*. 1999 145(6):1251-64
56. Rongo C, Whitfield CW, **Rodal A**, Kim SK, Kaplan JM. LIN-10 is a shared component of the polarized protein localization pathways in neurons and epithelia. *Cell*. 1998 94(6):751-9