

CURRICULUM VITAE

ERIK E. NIELSEN

CURRENT ADDRESS:

Work

Erik Nielsen
Molecular, Cellular, and Developmental Biology
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PERSONAL:

Born in Nashville, Tennessee, USA, September 1, 1970
Married, one child

EDUCATION:

1992 B.Sc. in Biochemistry, Purdue University, West Lafayette, Indiana.
1997 Ph.D. in Botany and Plant Pathology, MSU-DOE Plant Research Laboratory,
Michigan State University, East Lansing, Michigan.

THESIS:

Nielsen, E. The role of stromal molecular chaperones in chloroplastic protein translocation. Doctoral Dissertation, Department of Botany and Plant Pathology, MSU-DOE Plant Research Laboratory, Michigan State University, East Lansing, Michigan.

PROFESSIONAL EXPERIENCE:

2000-present **Assistant Member**, Donald Danforth Plant Science Center, St. Louis, Missouri. Assistant Professor (adjunct appointment), Biology Department, Washington University, St. Louis, Missouri.
1997-2000 **Postdoctoral Fellow**: European Molecular Biology Laboratory, Heidelberg, Germany. Advisor: Dr. Marino Zerial.
1992-1997 **Graduate Student**: MSU-DOE Plant Research Laboratory, East Lansing, Michigan. Thesis advisor: Dr. Kenneth Keegstra.
1988-1992 **Undergraduate Student**: Biochemistry, Purdue University, West Lafayette, Indiana. Advisor: Dr. James D. Forney.

HONORS AND AWARDS:

1999-2000 Max Planck Society Postdoctoral Fellowship.
1998-1999 EMBO Long-term Postdoctoral Fellowship (Renewal).
1997-1998 EMBO Long-term Postdoctoral Fellowship.
1993 National Science Foundation Pre-doctoral Fellowship, Honorable Mention.
1991-1992 Dean's List, Purdue University.

MEMBERSHIPS:

American Association for the Advancement of Science

PUBLICATIONS:

- 1). Hammes, U.Z., **Nielsen, E.**, Honaas, L., Taylor, C.G., and Schachtman, D.P. (2006) AtCAT6, a sink tissue localized amino acid transporter for essential amino acids in Arabidopsis. *Plant J.*, **48**, 414-426.
- 2). Yang, Y., Hammes, U.Z., Taylor, C.G., Schachtman, D.P., and **Nielsen, E.** (2006) High-Affinity Auxin Transport by the AUX1 Influx Carrier Protein. *Curr. Biol.*, **16**, 1123-1127.
- 3). Preuss, M., Schmitz, A., Thole, J., Bonner, H., Otegui, M., and **Nielsen, E.** (2006) The PI-4K, PI-4K β 1 is an effector of AtRabA4b and is involved in polarized tip-growth of root hair epidermal cells in *Arabidopsis*. *J. Cell Biol.*, **172**, 991-998.
- 4). **E. Nielsen** (2005) Rab GTPases in Plant Endocytosis. In Šamaj, J., Baluška, F., and Menzel, D., (eds.) Plant Endocytosis, Heidelberg, Germany: Springer-Verlag, pp. 177-196.
- 5). Hammes, U., Schachtman, D., Berg, R.H., **Nielsen, E.**, Koch, W., McIntyre, L., and Taylor, C. (2005) Altered expression of Arabidopsis transporter genes in developing nematode-induced giant cells. *Mol. Plant-Microbe Interact.*, **18**, 1247-1257.
- 6). Voigt, B., Timmers, A., Šamaj, J., Hlavacka, A., Ueda, T., Preuss, M., **Nielsen, E.**, Mathur, J., Emans, M., Stenmark, H., Nakano, A., Baluška, F., and Menzel, D. (2005) Actin-propelled endosomes accumulate at sites of actin-driven polar growth of root hairs. *Eur. J. Cell Biol.*, **84**, 609-621.
- *7). Preuss, M., Santos-Serna, J., Falbel, T.G., Bednarek, S.Y., and **Nielsen, E.** (2004) The Arabidopsis Rab GTPase, AtRabA4b, Localizes to the Tips of Growing Root Hair Cells. *Plant Cell*, **16**, 1589-1603.
- 8). Vernoud, V., Horton, A.C., Yang, Z., and **Nielsen, E.** (2003) Analysis of the Small GTPase Gene Family of *Arabidopsis thaliana*. *Plant Physiol.*, **131**, 1191-1208.
- 9). **Nielsen, E.**, Severin, F., Hyman, A.A., and Zerial, M. (2001) In vitro reconstitution of endosome motility on microtubules. *Methods in Molecular Biology*, Ed. I. Vernos, Humana Press, Inc., Totowa, NJ, 135-146.
- 10). **Nielsen, E.**, Christoforidis, S., Uttenweiler-Joseph, S., M. Miaczynska, F. Dewitte, M. Wilm, B. Hoflack, and Zerial, M. (2000) Rabenosyn-5, a novel Rab5 Effector is Complexed with hVPS45, and is Recruited to Endosomes through a FYVE-finger Domain *J. Cell Biol.*, **151**, 601-612.
- 11). Sönnichsen, B., De Renzis, S., **Nielsen, E.**, Rietdorf, J., and Zerial, M. (2000) Distinct membrane domains in the endosomal recycling pathway visualized by multi-color imaging of Rab4, 5, and 11. *J. Cell Biol.*, **149**, 901-913.
- **12). **Nielsen, E.**, Severin, F., Backer, J.M., Hyman, A.A., and Zerial, M. (1999) Rab5 regulates motility of early endosomes on microtubules. *Nature Cell Biol.*, **1**, 376-382.
- 13). Turner, G., Gershenzon, J., **Nielsen, E.E.**, Froehlich, J.E., Croteau, R. (1999) Limonene synthase, the enzyme responsible for monoterpene biosynthesis in peppermint, is localized to leucoplasts of oil gland secretory cells. *Plant Physiol.*, **120**, 879-886.
- 14). Keegstra, K., Akita, M., Davila-Aponte, J., Froehlich, J., **Nielsen, E.**, and Reumann, S. (1998) Transport of cytoplasmically synthesized proteins into chloroplasts. In: *NATO-ASI Series, Vol. H 104*. Cellular integration of signalling pathways in plant development. Eds. F.L. Schiavo, R.L. Last, G. Morelli, and N.V. Raikhel, Springer-Verlag, Berlin, 23-33.
- 15). **Nielsen, E.**, Akita, M., Davila-Aponte, J., and Keegstra, K. (1997) Stable association of chloroplastic precursors with protein-translocation complexes that contain proteins from both envelope membranes and a stromal Hsp100 molecular chaperone. *EMBO J.*, **16**, 935-946.
- 16). Akita, M., **Nielsen, E.**, and Keegstra, K. (1997) Identification of protein transport complexes in the chloroplastic envelope membranes via chemical crosslinking. *J. Cell Biol.*, **136**, 983-994.
- 17). Lübeck, J., Soll, J., Akita, M., **Nielsen, E.**, and Keegstra, K. (1996) Topology of IEP110, a component of the chloroplastic protein import machinery present in the inner envelope membrane. *EMBO J.*, **15**, 4230-4238.
- 18). Schneider, J.C., **Nielsen, E.**, and Somerville, C. (1995) A chilling-sensitive mutant of *Arabidopsis* is deficient in chloroplast protein accumulation at low temperature. *Plant Cell and Environ.*, **18**, 23-32.

19).Nielsen, E., You, Y., and Forney, J. (1991) Cysteine residue periodicity is a conserved structural feature of variable surface proteins from *Paramecium tetraurelia*. *J. Mol. Biol.*, **222**, 835-841.

*This manuscript was featured on the cover of *The Plant Cell*, **16(6)**, June 2004 issue.

This manuscript was published with an accompanying News and Views article, *Nature Cell Biol.*, **1, E145-E147 (1999), and was recently cited in the "Headlines" section of Trends in Cell Biology, *TICB*, **10**, 52 (2000), and the "Paper Alert" section of Current Opinion in Cell Biology, *Curr. Op. Cell Biol.*, **12**, 1-11 (2000).

PREVIOUS GRANT SUPPORT:

NASA Grant: Applications of plant bioengineering for advanced life support systems.

Proposal Number: 01-UNSOL-LSD-003

Co-PI: Roger N. Beachy, Daniel Schachtman, Karel R. Schubert

Program: Metabolic Engineering

Duration: 24 months

Amount: \$93,522

Status: Accepted

Research Description:

Generation of GFP-Rab fusions to characterize compartments involved in vacuolar trafficking.

CURRENT GRANT SUPPORT:

DOE Grant: The role of membrane trafficking in plant cell wall biogenesis

Proposal Number: DE-FG02-03ER15412

Co-PI: None

Program: 02-18: Energy Biosciences

Duration: 36 months

Amount: \$330,000

Status: Accepted

Research Description:

Characterize the role of the plant Rab GTPase, AtRabA4b, in root hair cell growth. Determine if tip-localization of this compartment correlates with root hair cell growth, and examine what type of cargo traverses the AtRabA4b-tagged compartment.

NSF Grant: Identification, characterization, and functional analysis of nematode-inducible amino acid and peptide transporters in Arabidopsis.

Proposal Number: 0344265

Co-PI: Chris Taylor, Daniel Schachtman

Program: Integrative Plant Biology

Duration: 36 months

Amount: \$518,093

Status: Accepted

Research Description:

Characterization and subcellular localization of membrane transporter proteins that are induced in giant cells of nematode feeding sites.

DOE Grant: The Role of RabA4b in Polarized Secretion of Cell Wall Components in

Arabidopsis Root Hair Cells (renewal)

Proposal Number: N/A
Co-PI: None
Program: 02-18: Energy Biosciences
Duration: 09/01/2006 to 08/31/2009
Amount: \$390,000
Status: Accepted

Research Description:

Grant proposal for extension of current DOE grant above. Further characterization of the RabA4b-labeled membrane compartments in Arabidopsis and identification of molecular components involved in proper positioning of these membranes in the tips of growing root hair cells.

EQUIPMENT GRANTS:

NSF Grant: Acquisition of a high pressure freezer and EFTEM

Proposal Number: 0116650

Co-PI: R.Howard Berg, Roger N. Beachy, Ralph S. Quatrano,
Karel R. Schubert

Program: DBI-Major Research Instrumentation

Duration: 36 months

Amount: \$662,376

Status: Accepted

NSF Grant: Acquisition of a confocal microscope

Proposal Number: 0216150

Co-PI: R.Howard Berg, Roger N. Beachy, Ralph S. Quatrano,
Mark P. Running

Program: DBI-Major Research Instrumentation

Duration: 36 months

Amount: \$335,853

Status: Accepted

ADDITIONAL PROFESSIONAL ACTIVITIES:

REVIEWER FOR SCIENTIFIC JOURNALS AND GRANTS (2000-2004):

Journal of Cell Biology (2 manuscripts), Molecular Biology of the Cell (2 manuscripts), Nature (2 manuscripts), Plant Cell (9 manuscripts), Plant Physiology (5 manuscripts), The Plant Journal (8 manuscripts), Proc. Natl. Acad. Sci. USA (1 manuscript)

BBSRC (1 grant), DOE Energy Biosciences (2 grants), NSF BIO division (8 grants), USDA Plant Growth and Development Section (5 grants)

MEMBERSHIPS:

American Association for the Advancement of Science
American Society of Cell Biology
American Society of Plant Biologists

SELECTED INVITED SEMINARS:

- Aug-2005 The PI-4K, PI-4K β 1 is an effector of RabA4b and is involved in polarized tip-growth of root hair epidermal cells in *Arabidopsis*. Presented at the meeting: Biosynthesis of Plant Cell Walls, Aug 4-7, Asilomar, CA
- July-2004 Arabidopsis root hair growth: Cooperation of a Rab GTPase, a lipid kinase, and a calcium sensor. Presented to the Heidelberg Institute for Plant Physiology (HIP), Heidelberg, Germany.
- July-2004 Arabidopsis root hair growth: Cooperation of a Rab GTPase, a lipid kinase, and a calcium sensor. Presented to INRA-Versailles, Versailles, France.
- Nov-2003 AtRabA4b labels a post-Golgi compartment involved in the polarized expansion of Arabidopsis root hair cells. Presented to the Department of Botany, University of Toronto, Toronto, Canada.
- Oct-2003 Exploring Plant Membrane Trafficking Pathways: Rab GTPases as Functional Markers for Intracellular Transport. Presented to the Department of Horticulture, Purdue University, West Lafayette, IN.
- Sep-2003 AtRabA4b labels a post-Golgi compartment involved in the polarized expansion of *Arabidopsis* root hair cells. Presented to the Max Planck Institute for Cellular, Molecular and Developmental Biology, Dresden, Germany.
- Jun-2003 The plant Rab GTPase, AtRabA4b, localizes to the tips of growing root hairs in *Arabidopsis thaliana*. Presented at the 14th International Conference on Arabidopsis Research, Madison, WI.
- Jan-2003 The plant Rab GTPase, AtRabA4b, localizes to the tips of growing root hairs in *Arabidopsis thaliana*. Presented at the 22nd Symposium in Plant Biology, University of California-Riverside, Riverside, CA.
- Oct-2002 Exploring Plant Membrane Trafficking Pathways: Rab GTPases as Functional Markers for Intracellular Transport. Presented to the Department of Biology at University of Missouri-Columbia, Columbia, MO.
- May-2000 Rab5 regulates motility of early endosomes on microtubules. Presented to the Department of Biology at Stanford University, Palo Alto, CA.
- April-1999 Rab5 regulates motility of early endosomes on microtubules. Presented at the 1999 British Society of Cell Biology and British Society of Developmental Biology Joint Spring Meeting, Manchester, England.