

Curriculum Vitae

Hiroshi Maeda, PhD

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EDUCATION:

- Dec. 2006 **Ph.D.** in Cell and Molecular Biology Program / DOE-Plant Research Laboratory,
Michigan State University, U.S.A.
- Mar. 2001 **M.S.** in Biotechnology, Osaka University, Japan
- Mar. 1999 **B.S.** in Biotechnology, Osaka University, Japan

EMPLOYMENT:

- 2011-present **Assistant Professor (tenure-track)**
Department of Botany, University of Wisconsin - Madison
- 2007-2011 **Postdoctoral research associate** with Natalia Dudareva
Department of Horticulture and Landscape Architecture, Purdue University
- 2007 **Postdoctoral research associate** with Dean DellaPenna
Department of Biochemistry and Molecular Biology, Michigan State University

PUBLICATIONS: (* corresponding author, Maeda lab members)

Schenck C.A., Chen S., Siehl D., Maeda H.A.* (2015) Non-Plastidic, Tyrosine-Insensitive Prephenate Dehydrogenases from Legumes. *Nature Chem. Biol.*, 11, 52-57, Highlighted in the Cover of the issue.

Maeda H.A.* (2015) Non-Plastidic Tyrosine Biosynthetic Pathway in Legumes. *Bioscience and Bioindustry*, 73, 308-310 (Japanese)

Luby C., Vernon R., Maeda H.A., Goldman I.* (2015) Lack of Correspondence Between Experimentally-Determined Values of Vitamin E in Carrot (*Daucus carota* L.) and Those Reported in the USDA National Nutrient Database *Hort. Science* In press.

Dornfeld C., Weisberg A.J., Dudareva N., Jelesko J.G., Maeda H.A.* (2014) Phylobiochemical Characterization of Prephenate Aminotransferases Reveals Evolution of the Plant Arogenate Phenylalanine Pathway. *Plant Cell*, 26, 3101-3114

Luby C., Maeda H.A., Goldman I.* (2014) Genetic and Phenological Variation of Tocochromanol (Vitamin E) Content in Wild (*Daucus carota* L. var. *carota*) and Domesticated Carrot (*D. carota* L. var. *sativa*) *Horticulture Research* 1:15

Maeda H., Song W., Sage T.L., DellaPenna D. (2014) Role of Callose Synthases in Transfer Cell Wall Development of Arabidopsis Tocopherol Deficient Mutants. *Frontiers Plant Sci.* 5, 46

Yoo H., Widhalma J.R., Qiana Y., **Maeda H.**, Cooper B.R., Jannasch A.S., Gondae I., Lewinsohn E., Rhodes D., Dudareva D. (2013) An Alternative Pathway Contributes to Phenylalanine Biosynthesis in Plants via a Cytosolic Tyrosine:Phenylpyruvate Aminotransferase. *Nature Commun.* 4:2833, doi:10.1038/ncomms3833

Muhlemann J.K., **Maeda H.**, Chang C.Y., San Miguel P., Baxter I., Cooper B., Perera M.A., Nikolau B.J., Vitek O., Morgan J.A., Dudareva N. (2012) Developmental Changes in the Metabolic Network of Snapdragon Flowers. *PLoS ONE*, e40381

Maeda H. and Dudareva N. (2012) The Shikimate Pathway and Aromatic Amino Acid Biosynthesis in Plants. *Ann. Rev. Plant Biol.*, 67, 73-105

Maeda H., Yoo H., and Dudareva N. (2011) Prephenate Aminotransferase Directs Plant Phenylalanine Biosynthesis via Arogenate. *Nature Chem. Biol.* 7, 19-21

Maeda H., Shasany A.K., Schnepf J., Orlova I., Taguchi G., Cooper B.R., Rhodes D., Pichersky E. and Dudareva N. (2010) RNAi Suppression of *Arogenate Dehydratase1* Reveals That Phenylalanine Is Synthesized Predominantly via the Arogenate Pathway in Petunia Petals. *Plant Cell* 22, 832-849
*Described as a Research Highlight in *Nature Chem. Biol.* 6, 310

Song W., **Maeda H.**, and DellaPenna D. (2010) Mutations of the ER to Plastid Lipid Transporters (*TGDI*, 2, 3 and 4) and the ER Oleate Desaturase (*FAD2*) Suppress the Low Temperature-Induced Phenotype of *Arabidopsis* Tocopherol Deficient Mutant *vte2*. *Plant J.* 62, 1004-1018

Orlova I., Nagegowda D.A., Kish C.M., Gutensohn M., **Maeda H.**, Varbanova M., Fridman E., Yamaguchi S., Hanada A., Kamiya Y., Krichevsky A., Citovsky V., Pichersky E., and Dudareva N. (2009) The Small Subunit Snapdragon Geranyl Diphosphate Synthase Modifies the Chain Length Specificity of Tobacco Geranylgeranyl Diphosphate Synthase in *Planta*. *Plant Cell* 21, 4002-4017

Maeda H., Sage T.L., Isaac G., Welti R., and DellaPenna D. (2008) Tocopherols Modulate Extra-Plastidic Polyunsaturated Fatty Acid Metabolism in *Arabidopsis* at Low Temperature. *Plant Cell* 20, 452-470 *Described in the Featured Article of the issue, *Plant Cell* 20, 246

Maeda H. and DellaPenna D. (2007) Tocopherol Functions in Photosynthetic Organisms. *Curr. Opin. Plant Biol.* 10, 260-265

Maeda H., Song W., Sage T.L. and DellaPenna D. (2007) Tocopherols Play a Limited Role in Photoprotection but a Crucial Role in Chilling Adaptation in *Arabidopsis* Leaves. In Current Advances in the Biochemistry and Cell Biology of Plant Lipids, C. Benning and J. Ohlrogge, eds (Aardvark Global Publishing Company, LLC, Salt Lake City, UT), pp. 112-115

Maeda H., Song W., Sage T.L. and DellaPenna D. (2006) Tocopherols Play a Crucial Role in Low Temperature Adaptation and Phloem Loading in *Arabidopsis*. *Plant Cell* 18, 2710-2732

*Highlighted on the Cover of the issue.

Sakuragi Y., **Maeda H.**, DellaPenna D. and Bryant D.A. (2006) α -Tocopherol Plays a Role in Photosynthesis and Macronutrient Homeostasis of the Cyanobacterium *Synechocystis* sp. PCC 6803 That is Independent of its Antioxidant Function. *Plant Physiol.* 141, 508-521

Maeda H., Sakuragi Y., Bryant D.A., and DellaPenna D. (2005) Tocopherols Protect *Synechocystis* sp. Strain PCC 6803 from Lipid Peroxidation. *Plant Physiol.* 138, 1422-1435

Cheng Z., Sattler S., **Maeda H.**, Sakuragi Y., Bryant D.A., and DellaPenna D. (2003) Highly Divergent Methyltransferases Catalyze a Conserved Reaction in Tocopherol and Plastoquinone Synthesis in Cyanobacteria and Photosynthetic Eukaryotes. *Plant Cell* 15, 2343-2356

Okazawa A., **Maeda H.**, Fukusaki E., Katakura Y., and Kobayashi A. (2000) *In Vitro* Selection of Hematoporphyrin Binding DNA Aptamers. *Bioorg. Med. Chem. Lett.* 10, 2653-2656

Fukusaki E., Kato T., **Maeda H.**, Kawazoe N., Ito Y., Okazawa A., Kajiyama S. and Kobayashi A. (2000) DNA Aptamers that Bind to Chitin. *Bioorg. Med. Chem. Lett.* 10, 423-425

PATENT:

Schenck C.A., Maeda H.A. (2014) PREPHENATE DEHYDROGENASES AND AROGENATE DEHYDROGENASES THAT ARE INSENSITIVE TO TYROSINE INHIBITION AND METHODS OF USING THE SAME, **P130167US02, USSN: 14/548216**

GRANTS AND FELLOWSHIPS:

- 2014 **USDA NIFA**, *Elucidation and Engineering of the Tyrosine Biosynthetic Pathway in Betalain-Producing Beta Vulgaris* (PD, Hiroshi Maeda; Co-PD, Irwin Goldman, UW Horticulture), 03/01/2015-02/28/2017
- 2014 **NSF IOS**, *Defining the Tyrosine Biosynthetic Pathways in Plants* (PI, Hiroshi Maeda), 09/01/2014-8/31/2017
- 2013 **UW Graduate School**, Annual cross-campus Research Committee competition, *Elucidation and Engineering of the Tyrosine Biosynthetic Pathway in Table Beets* (PI, Irwin Goldman, UW Horticulture; Co-PI, Hiroshi Maeda)
- 2010 - 2015 Co-authored in the US Agriculture and Food Research Initiative competitive grant (2010-65115-20385) from the USDA National Institute of Food and Agriculture
- 2008 - 2010 Postdoctoral research fellowship from Japan Society for the Promotion of Science
- 2006 Dissertation completion fellowship from MSU College of Natural Science
- 2006 Travel grant for annual meeting of the American Society of Plant Biologists
- 2001 - 2003 Graduate research assistantship from MSU DOE-Plant Research Laboratory

AWARDS:

- 2015 **Craig Schenck** obtained the Best Graduate Oral Presentation Award at Gordon Research Seminar on Plant Metabolic Engineering
- 2011 Eric E. Conn Young Investigator Award from the American Society of Plant Biologists
- 2011 Best postdoc poster award at Purdue Horticulture Departmental Retreat
- 2009 Best poster award at Gordon Research Conference on Plant Metabolic Engineering
- 2006 Anton Lang Memorial Graduate Student Award of MSU DOE-Plant Research Laboratory
- 2006 Best oral presentation award at MSU Plant Science Graduate Student Symposium
- 2000 Poster prize at 78th national meeting of the Chemical Society of Japan

TEACHING:

- 2012 Spring, 2012 Fall, 2013 Fall, 2014 Fall, 2015 Fall, 2016 Spring
General Botany BOT130, 5 credit course at UW Madison, 20 lectures covering Basic plant biology topics, ~200 students (mostly sophmores and juniors)
Co-instructors: Eve Emshwiller (Spring 2012), David Baum (Fall 2012, 2013), Ken Cameron (Fall 2014)
- 2013 Spring, 2015 Spring
Plant Biochemistry BOT/BCH621, 3 credit course at UW Madison, 20 lectures (75 min) covering advanced topics in plant biochemistry, 8 and 16 students in 2013 and 2015, respectively (graduate students and senior undergraduate students)
Co-instructors: Sebastian Bednarek, John Ralph (Biochemistry Department)
- 2012 Fall, 2015 Fall
Plant Physiology BOT960, 1 credit course at UW Madison, 20 graduate students.
Topics: Biosynthesis of Plant Hormones (2012 Fall)
Biosynthesis and Functions of Plant Specialized Metabolites (2015 Fall)
- 2014 Fall
Plant Breeding & Plant Genetics (PBPG) Seminar HORT957, 1 credit course at UW Madison, 11 seminars (50 min) with 20 graduate students. Topics: Toward improving and deploying nutritional, flavor, and medicinal phytochemicals in crops.
Co-instructors: Phillipp Simon
- 2009 Fall Guest lecture in HORT640, Plant Physiology and Metabolism course, at Purdue
- 2008 - 2011 Research supervisor of one graduate and three undergraduate students at Purdue
- 2003 - 2006 Research supervisor of one graduate and three undergraduate students at MSU
- 2003 Spring Teaching assistant in Biochemistry Laboratory course BMB471 at MSU

OUTREACH:

- 2015 Pigment-Art”, **Science Expedition** and **Saturday Science** at Univ. of Wisconsin – Madison
Craig Schenck, Samuel Lopez-Nieves, Kelly William, Sylvia Chen, Minmin Wang
- 2014 Pigment-Art”, the Science Expedition at Univ. of Wisconsin – Madison
Craig Schenck, James Shupryt, Kelly William, Sylvia Chen, Zoe Retzlaff, Camilla Dornfeld
- 2013 Pigment-Art”, the Science Expedition at Univ. of Wisconsin – Madison

Together with Craig Schenck and Samuel Lopez-Nieves (grads) and Jacob Litman and Zoe Retzlaff (undergrads), Maeda Lab organized an outreach event, called “Pigment-Art”, where children enjoyed painting with natural pigments. We extracted betalains, anthocyanins, chlorophylls, and carotenoids from various plants and showed how different pigments migrate on paper chromatography (using water and ethanol as a mobile phase).

PROFESSIONAL ACTIVITIES:

- 2014, 2015 NSF IOS ad-hoc reviewer
- 2014 USDA NIFA grant panel
- 2014 The U.S.-Israel Binational Science Foundation (BSF) grant reviewer
- 2013 Israel Science Foundation (ISF) grant reviewer
- 2011 - present Reviewer for *Nature Chem. Biol.* (3), *Nature. Comm.* (2), *Plant Cell* (6), *Plant J.* (1), *Plant Physiol.* (4), *Mol. Plant* (4), *J. Exp. Bot.* (2), *New Phytol.* (1), *PLoS ONE* (2), *Plant Cell Physiol.* (2), *Phytochemistry* (1), *Physiol. Plant* (2), *Plant Biol.* (1), *Front. Plant Physiol.* (3), *Plant Sci.* (3), *Curr. Opin. Plant Biol.* (1), *Plant Biotech J.* (1), *App. Microbiol. Biotech.* (1)
- 2011 - present Review Editor of *Frontiers in Plant Physiology*
- 2006 - 2011 Reviewer for *Plant Cell* (3), *Plant J.* (2), *J. Exp. Bot.* (3), *Plant Cell Physiol.* (1), *Mol. Plant* (2), *Plant Biol.* (4), *Plant Cell Rep.* (1), *Pesticide Biochem. Physiol.* (1)
- 2011 July Chair of 2011 Gordon Research Seminar on Plant Metabolic Engineering
- 2008 - 2010 Initiating/organizing the Purdue Plant Science Student/Postdoc Seminar Series
- 2009 May A member of organizing committee for Purdue Horticulture Retreat
- 2004 - 2005 Seminar committee at MSU DOE-Plant Research Laboratory
- 2003 - 2004 Personal affair committee at MSU DOE-Plant Research Laboratory

INVITED TALKS:

- 2015 4th Annual Michigan State University Symposium on Plants for Health and Sustainability
East Lansing, MI – October 9th
Divergence of Tyrosine Biosynthetic Pathways in Legumes
- 2015 Phytochemical Society of North America (PSNA), Urbana–Champaign, IL - August 10th
Diversification of Tyrosine Biosynthetic Pathways in Plants
- 2015 Iowa State University, Ames, IA - April 23th
Diversification of Primary Tyrosine Biosynthetic Pathways in Legumes
- 2015 Annual meeting of the American Society for Biochemistry and Molecular Biology (ASBMB)
Boston, MA – March 28th - April 1st
Diversification of Tyrosine Biosynthetic Pathways in Plants:
Non-Plastidic, Tyrosine-Insensitive Prephenate Dehydrogenases in Legumes
- 2014 Annual meeting of the American Society of Plant Biologists, Portlan, OR – July

Phylobiochemical Characterization of Prephenate Aminotransferases Reveals Evolution of the Plant Arogenate Phenylalanine Pathway

- 2014 4th Banff Conference on Plant Metabolism, Banff, Canada – June
Phylobiochemical Characterization of Prephenate Aminotransferases Reveals Evolution of the Plant Arogenate Phenylalanine Pathway
- 2014 MidWest Plant Cell Dynamics Meeting, Madison WI – June
Diversification of Tyrosine Biosynthetic Pathways in Plants: Non-Plastidic, Tyrosine-Insensitive Prephenate Dehydrogenases in Legumes
- 2014 Texas A&M University, College Station, TX - April 17th
Evolutional Diversification of Phenylalanine and Tyrosine Biosynthesis in Plants
- 2014 University of Missouri, IPG (Interdisciplinary Plant Group) weekly seminar series, Columbia, Missouri, March 31st
Evolutional Diversification of Phenylalanine and Tyrosine Biosynthesis in Plants
- 2013 13th International Congress on Amino Acids, Peptides and Proteins (ICAPP) Galveston, Texas, October 7th
Molecular Evolution of the plant phenylalanine and tyrosine biosynthesis
- 2012 International Conference on Plant Chemical Biology, Berkshire, UK, April 24, 2012
Aromatic amino acid biosynthesis and its regulation in plants (Plenary Lecture)
- 2012 University of Osaka, Suita, Japan – March
Phenylalanine biosynthesis in plants: Carbon allocation towards phenolic compound production
- 2011 Department of Botany, University of Wisconsin - Madison – March
Phenylalanine biosynthesis: carbon allocation toward the production of phenolic compounds in plants
- 2011 American Society of Plant Biologists Midwestern Meeting, West Lafayette, IN – March
Identification of *prephenate aminotransferase* provides novel insights into plant phenylalanine biosynthesis
- 2009 Gordon Research Conference on Plant Metabolic Engineering, Water Valley, NH – July
Defining the phenylalanine biosynthetic pathway in plants
- 2007 RIKEN, Yokohama, Japan – October
Vitamin E functions in photosynthetic organism
- 2007 Tokyo University, Tokyo, Japan – October
Vitamin E functions in photosynthetic organism
- 2007 Osaka University, Osaka, Japan – May
Vitamin E functions in photosynthetic organism

- 2007 Kyushu University, Fukuoka, Japan – May
Vitamin E functions in photosynthetic organism
- 2007 Nara Institute of Science and Technology (NAIST), Nara, Japan – May
Vitamin E functions in photosynthetic organism
- 2006 University of Florida, Department of Horticulture, Gainesville, FL – October
Tocopherol functions in photosynthetic organism
- 2006 University of Michigan, Department of Molecular, Cellular and Developmental Biology, Ann Arbor, MI – October
Tocopherol functions in photosynthetic organism
- 2006 Purdue University, Department of Horticulture and Landscape Architecture, West Lafayette, IN – November
Tocopherol functions in photosynthetic organism
- 2006 17th International Symposium on Plant Lipids, East Lansing, MI - July
Vitamin E plays a crucial role in low temperature adaptation by modulating membrane fatty acid composition and regulating photoassimilate export from source leaves of Arabidopsis.
- 2006 47th Annual meeting of The Japanese Society of Plant Physiologists, Tsukuba, Japan - March
Vitamin E functions in Arabidopsis leaves
- 2005 Julius-von-Sachs-Institute for Biosciences, University of Wuerzburg, Germany - March
Functions of tocopherols in photosynthetic organisms - phenotypic and biochemical characterization of tocopherol-deficient mutants
- 1999 Annual meeting of the Society for Biotechnology, Osaka, Japan – April
***In vitro* selection of DNA aptamers specifically binding to hematoporphyrin**
- 2000 Annual meeting of the Chemical Society of Japan, Tokyo, Japan – April
Structural analysis of hematoporphyrin aptamers by CD spectrum