

Michael Andrew Phillips, Ph.D.
CURRICULUM VITAE

Center for Research in Agricultural Genomics
Universitat Autònoma de Barcelona
Edifici CRAG 08193 Bellaterra, Spain
michael.phillips@cragenomica.es

Date of birth: 3 November 1970
Place of birth: Laguna Beach, California
Tel. (+34) 93 563 66 00 Ext. 3246
Updated 18 August 2011

Academic training:

- 2000 Doctorate in Biochemistry (*Ph.D.*), Washington State University, Pullman, WA
Thesis advisor: **Regents Professor Rodney B. Croteau, member of the National Academy of Sciences**
- 1994 Bachelor's degree (*B.Sc.*) in Biology with honors (*Cum Laude*)
California State University (Humboldt), Arcata, CA (USA)

Work experience:

- 2010-pres. Ramón y Cajal Junior Faculty Member (8 months)
Center for Research in Agricultural Genomics, Barcelona, Spain
- 2008-2010. DFG Visiting Fellow, research group of Manuel Rodríguez Concepción (3 years)
Center for Research in Agricultural Genomics, Barcelona, Spain
(Funded by the German Research Council (Deutsch Forschungsgemeinschaft))
Flux analysis of isoprenoid biosynthesis in plant systems; plant metabolic engineering
- 2004-2007 Post-doctoral researcher, laboratory of Prof. Jonathan Gershenzon (3.5 years)
Department of Biochemistry, Max Planck Institute for Chemical Ecology, Germany
Biosynthesis of plant isoprenoids in secondary metabolism
- 2002-2003 Group leader Oryzon Genomics, S.A., Barcelona, Spain (1.5 years)
Design, synthesis, and analysis of oligonucleotide microarrays
- 2001-2002 Post-doctoral researcher in the laboratory of Prof. Albert Boronat (1.5 years)
Department of Biochemistry and Molecular Biology, University of Barcelona, Spain
Regulation of essential isoprenoid biosynthesis in plants
- 1995-2000 Doctoral thesis work in the laboratory of Prof. Rodney B. Croteau (5 years)
Institute of Biological Chemistry, Washington State University, Pullman, WA, USA
Biosynthesis of monoterpenes in conifers

Stays in internationally recognized research centers:

- 2008-pres.** Center for Research in Agricultural Genomics, Barcelona, Spain
- 2004-2007** Max Planck Institute for Chemical Ecology, Department of Biochemistry,
Jena, Germany
- 2001-2002** University of Barcelona, Department of Biochemistry and Molecular Biology
Barcelona, Spain
- 1995-2000** Washington State University, Institute of Biological Chemistry
Pullman, Washington, USA

Academic merit awards:

2003 Torres Quevedo industrial research grant (Spanish Ministry of Science and Technology)

1997 Loyal H. Davis award for research excellence (Washington State University)

1995 Plant Biochemistry Research and Training Center grant (Washington State University)

Grants and fellowships (obtained from competitive calls):

Project title: “Metodología analítica para el análisis de isoprenoides en plantas” [Analytical methodology for the analysis of isoprenoids in plants]

Dates and duration: Oct 2010 - Jan 2011 (3 months) at the Max Planck Institute for Chemical Ecology, Jena, Germany

Funding agency: Programa Movilidad 2010, Consejo Superior de Investigaciones Científicas [The Spanish Council for Scientific Research, CSIC]

Coverage: 6,750 € for travel expenses

Project title: “The use of metabolic flux analysis and plant volatile engineering to improve crop performance against insect pests and increase levels of isoprenoid-based vitamins”

Dates and duration: Dec 2010 to Nov 2015 (5 years)

Funding agency: Ministerio de Ciencia e Innovación, subprograma **Ramón y Cajal** [Spanish Ministry of Science and Innovation]

Coverage: 5 year junior faculty contract + 15,000 € for research costs

Project title: “Metabolic flux analysis of the chloroplast pathway for isoprenoid biosynthesis in *Arabidopsis thaliana*” (PH179/1-1)

Dates and duration: Jan 2009 – Dec 2010 (2 years)

Funding agency: German Research Council [DFG; Deutsch Forschungsgemeinschaft]

Coverage: 1 full time post-doctoral salary and minor equipment expenditures

Project title: “Análisis del flujo metabólico de la vía plastídica para la biosíntesis de isoprenoides en *Arabidopsis thaliana*” [Metabolic flux analysis of the plastidic route for isoprenoid biosynthesis in *Arabidopsis thaliana*]

Dates and duration: Sep 2008 – Aug 2011 (3 years)

Funding agency: Ministerio de Ciencia e Innovación, subprograma: Programa Junta para la Ampliación de Estudios (JAE))

Coverage: 1 full time post-doctoral salary

Participation in current research projects:

Project title: “Analytical methodology for the analysis of isoprenoids in plants” (PA1002806)

Dates and duration: Oct 2010 – Jan 2011

Funding agency: Ministerio de Ciencia e Innovación (CSIC)

Principal investigators: Michael Phillips

Total project budget: 6,750 €

Project title: “Centro de genómica básica y de orientación agroalimentaria” (CONSOLIDER CSD2007-00036) [Center for basic research in agricultural and food science genomics]

Dates and duration: 2007 - 2012

Funding agency: Ministerio de Educación y Ciencia (Spain)

Principal investigators: Pere Puigdomènech Rosell

Total project budget: 3,500,000 €

Project title: “Modulación ambiental de la biosíntesis de carotenoides en plantas (BIO2011-23680)” [Environmental modulation of plant carotenoid biosynthesis]

Dates and duration: 2012-2014 (3 years)

Funding agency: Ministerio de Ciencia e Innovación (Spain)

Principal investigator: Manuel Rodríguez Concepción

Total project budget: 363,000 €

Project title: “Ajut per donar suport a les activitats dels grups de recerca consolidats” (2009SGR-26) [Financial support for the activities of consolidated research groups]

Dates and duration: 2009 - 2013

Funding agency: Generalitat de Catalunya, DGR

Principal investigators: Albert Boronat

Total project budget: 48,880 €

Project title: “TiMet-Linking the clock to metabolism” (Grant agreement 245143)”

Dates and duration: 2010 - 2015

Funding agency: European Commission (Theme KBBE-2009-1-1-01, Call FP7-KBBE-2009-3)

Principal investigators: Andrew Millar (subproject C.R.A.G, Manuel Rodríguez Concepción)

Total project budget: 5,844,329 €(subproject C.R.A.G., 493,250 €)

First author publications (§ first and corresponding author; * shared first author credit)

Phillips, M. A. and Rodríguez Concepción, M. (2010) “Terpenoids: lower” In: *Encyclopedia of Life Sciences* (doi: 10.1002/9780470015902.a0001915.pub2)

Phillips, M.A. §, D’Auria, J.C., Luck, K., Gershenzon, J.(2009) “Evaluation of candidate reference genes for real-time quantitative PCR of plant samples using purified cDNA as template” *Plant Molecular Biology Reporter* **27**:407-416

Phillips, M.A., Leon, P., Boronat, A., Rodríguez Concepción, M. (2008) “The plastidial MEP pathway: unified nomenclature and resources” *Trends in Plant Sciences* **13**:61-623

Phillips, M. A., D’Auria, J., Gershenzon, J., Pichersky, E. (2008) “The *Arabidopsis thaliana* type I IPP isomerases, IDI1 and IDI2, are targeted to multiple subcellular compartments and have overlapping functions in isoprenoid biosynthesis” *Plant Cell* **20**:677-696

Phillips, M. A. §, Walter, M. H., Ralph, S. G., Dabrowska, P., Luck, K., Urós, E. M., Boland, W., Strack, D., Rodríguez-Concepción, M., Bohlmann, J., and Gershenzon, J. (2007) “Functional identification and differential expression of 1-deoxy-D-xylulose 5-phosphate synthase in induced terpenoid resin formation of Norway spruce (*Picea abies*)” *Plant Molecular Biology* **65**: 243-257

- Phillips, M. A.**[§], Bohlmann, J., and Gershenzon, J. (2006) "Molecular regulation of induced terpenoid biosynthesis in conifers" *Phytochemistry Reviews* 5(1):79-189
- Phillips, M. A.**, Wildung, M.R., Williams, D.C., Hyatt, D.C., and Croteau, R. (2003) "cDNA Isolation, Functional Expression, and Characterization of (+)-alpha-Pinene Synthase and (-)-alpha-Pinene Synthase from Loblolly Pine (*Pinus taeda*): Stereocontrol in Pinene Biosynthesis" *Archives of Biochemistry and Biophysics* **411**: 267-276
- Phillips, M. A.** and Croteau, R. B. (1999) "Resin Based Defenses in Conifers" *Trends in Plant Science* **4**: 184-190
- Bohlmann, J., **Phillips, M.A.**^{*}, Ramachandiran, V., Katoh, S., and Croteau, R. (1999) "cDNA Cloning, Characterization, and Functional Expression of Four New Monoterpene Synthase Members of the Tpsd Gene Family from Grand Fir (*Abies grandis*)" *Archives of Biochemistry and Biophysics* **368**: 232-243
- Phillips, M. A.**, Savage, T. J., and Croteau, R. (1999) "Monoterpene Synthases of Loblolly Pine (*Pinus taeda*) Produce Pinene Isomers and Enantiomers" *Archives of Biochemistry and Biophysics* **372**: 197-204

Supporting author publications:

- Flores-Pérez, Ú., Pérez-Gil, J., Closa, M., Wright, L. P., Botella-Pavía, P., **Phillips, M. A.**, Ferrer, A., Gershenzon, J. and Rodríguez-Concepción, M. (2010) "PLEIOTROPIC REGULATORY LOCUS 1 (PRL1) Integrates the Regulation of Sugar Responses with Isoprenoid Metabolism in *Arabidopsis*" *Molecular Plant* **3**: 101-112
- Lippert, D., Ralph, S.G., **Phillips, M. A.**, White, R., Smith, D., Hardie, D., Gershenzon, J., Ritland, K., Borchers, C.H., and Bohlmann, J. (2009) "Quantitative iTRAQ proteome and comparative transcriptome analysis of elicitor-induced Norway spruce (*Picea abies*) cells reveals elements of calcium signalling in the early conifer defense response" *Proteomics* **9**:350-367
- Botella-Pavía, P., Besumbes, Ó., **Phillips, M. A.**, Carretero-Paulet, L., Boronat, A., and Rodríguez-Concepción, M. (2004) "Regulation of carotenoid biosynthesis in plants: evidence for a key role of hydroxymethylbutenyl diphosphate reductase in controlling the supply of plastidial isoprenoid precursors" *Plant Journal* **40**: 188-199
- Besumbes, Ó., Sauret-Güeto, S., **Phillips, M. A.**, Imperial, S., Rodríguez-Concepción, M., Boronat, M. (2004) "Metabolic engineering of isoprenoid biosynthesis in *Arabidopsis* for the production of taxadiene, the first committed precursor of Taxol" *Biotechnology and Bioengineering* **88**: 168-75
- Rodríguez-Concepción, M., Forés, O., Martínez-García, J., González, V., **Phillips, M. A.**, Ferrer, A., and Boronat, A. (2004) "Distinct Light Mediated Pathways Regulate the Biosynthesis and Exchange of Isoprenoid Precursors during *Arabidopsis thaliana* Seedling Development" *Plant Cell* **16**: 144-156

Patents:

- "Monoterpene Synthases from grand fir (*Abies grandis*)" U.S. and P.C.T. patent award
Inventors: Croteau, R., Bohlmann, J., **Phillips, M. A.**, and Steele, C.

Contributions at scientific meetings in 2011:

2nd annual European TiMet project meeting, March 16-18, Edinburgh, Scotland (invited speaker)
Title: “Non-polar metabolite profiling in *Arabidopsis* tissues”

10th annual Franco-Catalonian plant molecular biology meeting, May 19-20, Tautavel, France
Title: “A metabolomic approach to studying petal development in *Arabidopsis thaliana*”

10th International TerpNet meeting, May 22-26, Kalmar, Sweden (invited speaker)
Title: “Metabolic Flux Analysis of Isoprenoid Precursor Formation in *Arabidopsis*”

2nd International Conference on Plant Metabolism, June 30-July 3, Qingdao, China
Title: “Measuring flux through the methylerythritol 4-phosphate pathway in *Arabidopsis thaliana*”
(poster)

Student mentoring and supervision:

<u>Student</u>	<u>Institution</u>	<u>Period</u>	<u>Activity</u>
Gazmend Zeneli	Friedrich Schiller Universität ¹ Jena, Germany	2004-2006	Supervision of PhD Thesis: Induced terpenoid defenses in adult Norway spruce (<i>Picea abies</i> [L.] Karst) trees in response to attacks by bark-beetles and infection by blue-stain fungus (completed 2006)
Kusuma Jitsaeng	Friedrich Schiller Universität ¹ Jena, Germany	2004-2007	Supervision of PhD Thesis: Phytochemical and genetic analyses of <i>Musa</i> and related species from Thailand (completed 2009)
Antía Rodríguez Villalón	Universitat de Barcelona ² Barcelona, Spain	2008-2010	Supervision of PhD Thesis: Biosynthesis of carotenoids in <i>Escherichia coli</i> and in non-photosynthetic tissues of <i>Arabidopsis thaliana</i> (completed 2010)
Jordi Pérez Gil	Universitat de Barcelona ² Barcelona, Spain	2008-2011	Supervision of PhD Thesis: Regulation of carotenogenesis in <i>Arabidopsis thaliana</i> (scheduled completion Fall 2011)
Julianne Pfütenreuter	Friedrich Schiller Universität ¹ Jena, Germany	2005-2006	Undergraduate research assistant
Martin Franke	Friedrich Schiller Universität ¹ Jena, Germany	2006-2007	Undergraduate research assistant
Michele Grieco	Universitat de Barcelona ² Barcelona, Spain	2008	Master's degree internship supervision