

## CURRICULUM VITAE

**Steffen Abel**, *Professor*

Leibniz Institute of Plant Biochemistry  
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### ACADEMIC POSITIONS

Managing Director 2017 – present  
Vice-Director 2010 – 2017  
Department Chair 2009 – present

**Leibniz Institute of Plant Biochemistry**

Department of Molecular Signal Processing

University Professor (W3) 2009 – present

**Martin Luther University Halle-Wittenberg**

Institute of Biochemistry and Biotechnology

Professor (Emeritus) 2009 – present  
Professor (Full Title) 2007 – 2009  
Associate Professor 2002 – 2007  
Assistant Professor 1997 – 2002

**University of California, Davis, USA**

Department of Plant Sciences

Postdoctoral Associate 1991 – 1996

**University of California, Berkeley, USA**

Plant Gene Expression Center

Staff Scientist 1989 – 1990

**Martin Luther University Halle-Wittenberg**

Department of Biological Sciences

Visiting Scientist 1987 – 1989

**Hungarian Academy of Sciences, Hungary**

Biological Research Center, Szeged

### EDUCATION

Dissertation Research 1984 – 1987

**Martin Luther University Halle-Wittenberg**

Biochemistry (*Dr. rer. nat., summa cum laude*)

Undergraduate Studies 1979 – 1984

Biochemistry (*Diplom-Biochemist, with distinction*)

### AWARDS

Kinney Postdoctoral Fellowship of the U.S. Department of Agriculture (1993)

Boehringer-Ingelheim-Fonds Postdoctoral Fellowship (1991 - 1992)

UNESCO/Hungarian Academy of Sciences Fellowship (1987 - 1989)

Adam-Kuckhoff Award (outstanding PhD thesis), Martin Luther University Halle-Wittenberg (1987)

### ACADEMIC SERVICE

Member, Steering Committee, Programmatic Research Initiative of the State of Saxony-Anhalt

Member, Executive Committee, Science Campus Halle (2016 – present)

Member, Executive Committee, Collaborative Research Center 648 (2013 – 2016)

Elected Panel Member, Plant Sciences Panel, German Science Foundation (2012 – 2016)

Panel Review Member, National Science Foundation (2004, 2005, 2006)

Panel Review Member, U.S. Department of Agriculture (2003, 2008)

UC Davis, Plant Biology Graduate Group, Educational Policy Committee, Chair (2004 – 2009)

UC Davis, Plant Biology Graduate Group, Executive Committee, Member (2002 – 2009)

UC Davis, Plant Biology Graduate Group, PhD Advisor (Cell & Molecular Biology) (2003 – 2009)

UC Davis, Committee on Mentoring Junior Faculty (appointed by the Chancellor), Member (2004)

UC Davis, Committee on Research (appointed by the Chancellor), Member (1999 – 2002)

### PUBLICATIONS

Abel S (2017) Phosphate scouting by root tips. *Curr Opin Plant Biol* 39:168-177

Ziegler J, Schmidt S, Strehmel N, Scheel D, and S Abel (2017) Arabidopsis transporter ABCG37/PDR9 contributes primarily polyhydroxylated coumarins to root exudation. *Sci Reports* 7:3704

Balzerque C, Darteville T, Godon C, Laugier E, Meisrimler C, Teulon JM, Creff A, Bissler M, Brouchoud C, Hagege A, Müller J, Chiarenza S, Javot H, Becuwe-Linka N, David P, Peret B, Delannoy E, Thibaud MC, Armangaud J, Abel S, Pellequer JL, Nussaume L, and T Desnos (2017) Low phosphate activates STOP1-ALMT1 to rapidly inhibit root cell elongation.

*Nat Commun* 8:15300

- Bürstenbinder K, Möller B, Plötner R, Stamm G, Hause G, Mitra D, and S Abel (2017) The IQD family of calmodulin binding proteins links calcium signaling to microtubules, membrane subdomains, and the nucleus. **Plant Physiol** 173:1692-1708
- Hoehenwarter W, Mönchgesang S, Neumann S, Majovsky P, Abel S and J Müller (2016) Comparative expression profiling reveals a role of the root apoplast in local phosphate response. **BMC Plant Biol** 16:106
- Dinesh DC, Calderón Villalobos LIA, and S Abel (2016) Structural biology of nuclear auxin action. **Trends Plant Sci** 21:302-316
- Ziegler J, Schmidt S, Chutia R, Müller J, Böttcher C, Strehmel N, Scheel D, and S Abel (2016) Non-targeted profiling of semi-polar metabolites in Arabidopsis root exudates uncovers a role for coumarin secretion and lignification during the local response to phosphate limitation. **J Exp Bot** 67:1421-1432
- Buhtz A, Witzel K, Strehmel N, Ziegler J, Abel S, and R Grosch (2015) Perturbations in the primary metabolism of tomato and *Arabidopsis thaliana* plants infected with the soil-borne fungus *Verticillium dahlia*. **PLoS One** 10:e0138242
- Bochnia M, Ziegler J, Sander J, Uhlig A, Schaefer S, Vollstedt S, Glatter M, Abel S, Recknagel S, Schusser GF, Wensch-Dorendorf M, and A Zeyner (2015) Hypoglycin A content in blood and urine discriminates horses with atypical myopathy from clinically normal horses grazing on the same pasture. **PLoS One** 10:e0136785
- Dinesh DC, Kovermann M, Gopalswamy M, Hellmuth A, Calderón Villalobos LIA, Lilie H, Balbach J, and S Abel (2015) Solution structure of the PsIAA4 oligomerization domain reveals interaction modes for transcription factors in early auxin response. **Proc Natl Acad Sci USA** 112:6230-6235
- Müller J, Toev T, Heisters M, Teller T, Moore KL, Hause G, Dhurvas CD, Bürstenbinder K, and S Abel (2015) Iron-dependent callose deposition adjusts root meristem maintenance to phosphate availability. **Dev Cell** 33: 216-230 (Cover Photo)
- Ziegler J and S Abel (2014) Analysis of amino acids by HPLC/electrospray negative ion tandem mass spectrometry using 9-fluorenylmethoxycarbonyl chloride (Fmoc-Cl) derivatization. **Amino Acids** 46:2799-2808
- Ziegler J, Qwegwer J, Schubert M, Erickson JL, Schattat M, Bürstenbinder K, Grubb CD, and S Abel (2014) Simultaneous analysis of apolar phytohormones and 1-aminocyclopropane-1-carboxylic acid by high performance liquid chromatography/electrospray negative ion tandem mass spectrometry via 9-fluorenylmethoxycarbonyl chloride derivatization. **J Chromat A** 1362:102-109
- Grubb CD, Zipp BJ, Kopycki J, Schubert M, Quint M, Lim E-K, Bowles D, Pedras MSC, and S Abel (2014) Comparative analysis of Arabidopsis UGT74 glucosyltransferases reveals a special role of UGT74C1 in glucosinolate synthesis. **Plant J** 79:92-105
- Erickson JL, Ziegler J, Guevara D, Abel S, Klösigen RB, Mathur J, Rothstein SJ, and MH Schattat (2014) Agrobacterium-derived cytokinin influences plastid morphology and starch accumulation in *Nicotiana benthamiana* during transient assays. **BMC Plant Biology** 14:127
- Abel S, Bürstenbinder K, and J Müller (2013) The emerging function of IQD proteins as scaffolds in cellular signaling and trafficking. **Plant Signal & Behavior** 8:e24369
- Bürstenbinder K, Savchenko T, Müller J, Adamson AW, Stamm G, Kwong R, Zipp BJ, Dinesh DC, and S Abel (2013) Arabidopsis calmodulin-binding protein IQ-67 Domain 1 localizes to microtubules and interacts with kinesin light chain-related protein-1. **J Biol Chem** 288:1871-1882
- Kopycki J, Wieduwild E, Kohlschmidt J, Brandt W, Stepanova A, Alonso JM, Pedras MSC, Abel S and CD Grubb (2013) Kinetic analysis of Arabidopsis glucosyltransferase UGT74B1 illustrates a general mechanism by which enzymes can escape product inhibition. **Biochem J** 450:37-46
- Abel S (2011) Phosphate sensing in root development. **Curr Opin Plant Biol** 14:303-309
- Kopycki J, Schmidt J, Abel S, and CD Grubb (2011) Chemoenzymatic synthesis of diverse thiohydroximates from glucosinolates utilizing enzymes from *Helix pomatia* and *Caldicellulosiruptor saccharolyticus*. **Biotech Lett** 33:1039-1046
- Costa CT, Strieder ML, Abel S, Delatorre CA (2011) Phosphorus and nitrogen interaction: loss of QC identity in response to P or N limitation is anticipated in pdr23 mutant. **Braz J Plant Physiol** 23:219-229
- Abel S and A Theologis (2010) Odyssey of auxin. **CSH Persp Biol** 2:a004572
- Ticconi CA, Lucero RD, Sakhonwasee S, Adamson AW, Creff A, Nussaume L, Desnos T, and S Abel (2009) ER-resident proteins PDR2 and LPR1 mediate the developmental response of root meristems to phosphate availability. **Proc Natl Acad Sci USA** 106:14174-14179
- Abel S (2007) Auxin is surfacing. **ACS Chem Biol** 2:380-384

- Grubb CD and S Abel (2006) Glucosinolate metabolism and its control. **Trends Plant Sci** 11:89-100
- Abel S, Savchenko T, and M Levy (2005) Genome-wide comparative analysis of the IQD gene families in *Arabidopsis thaliana* and *Oryza sativa*. **BMC Evol Biol** 5:72 (1-25)
- Levy M, Rachmilevitch S, and S Abel (2005) Transient *Agrobacterium*-mediated gene expression in the *Arabidopsis* hydroponics root system for subcellular localization studies. **Plant Mol Biol Rep** 23:179-184
- Levy M, Wang Q, Kaspi R, Parrella MP, and S Abel (2005) *Arabidopsis* IQD1, a novel calmodulin-binding nuclear protein, stimulates glucosinolate accumulation and plant defense. **Plant J** 43:79-96 (Cover Photo)
- Ebeler SE, Dingley KH, Ubick E, Abel S, Mitchell AE, Burns SA, Steinberg FM, and AJ Clifford (2005) Animal models and analytical approaches for understanding the relationships between wine and cancer. **Drugs Exptl Clin Res** 31:19-27
- Grubb CD, Zipp B, Ludwig-Müller J, Masuno MN, Molinski TF, and S Abel (2004) *Arabidopsis* glucosyltransferase UGT74B1 functions in glucosinolate biosynthesis and auxin homeostasis. **Plant J** 40:893-908
- Ticconi CA and S Abel (2004) Short on phosphate: plant surveillance and countermeasures. **Trends Plant Sci** 9:548-555
- Ticconi CA, Delatorre CA, Lahner B, Salt DE, and S Abel (2004) *Arabidopsis pdr2* reveals a phosphate-sensitive checkpoint in root development. **Plant J** 37:801-814
- Dingley KH, Ubick EA, Chiarappa-Zucca ML, Nowell S, Abel S, Ebeler SE, Mitchell AE, Burns SA, Steinberg FM, and AJ Clifford (2003) Effect of dietary constituents with chemopreventive potential on adduct formation of a low dose of the heterocyclic amines PhIP and IQ and Phase II hepatic enzymes. **Nutr Cancer** 46:212-221
- Abel S, Ticconi CA, and CA Delatorre (2002) Phosphate sensing in higher plants. **Physiol Plant** 115:1-8
- Wang Q, Grubb CD, and S Abel (2002) Direct analysis of single leaf disks for chemopreventive glucosinolates. **Phytochem Anal** 13:152-157
- Laskowski MJ, Dreher KA, Gehring M, Abel S, Gensler A, and IM Sussex (2002) *FQR1*, a novel primary auxin-response gene, encodes an FMN-binding quinone reductase. **Plant Physiol** 128:578-590
- Grubb CD, Gross HB, Chen DL, and S Abel (2002) Identification of *Arabidopsis* mutants with altered glucosinolate profiles based on isothiocyanate bioactivity. **Plant Sci** 162:143-152
- Ticconi CA, Delatorre CA, and S Abel (2001) Attenuation of phosphate starvation responses by phosphite in *Arabidopsis thaliana*. **Plant Physiol** 127:963-972
- Abel S and M Köck (2001) Secretory ribonucleases from tomato (*Lycopersicon esculentum* cv. Mill.). **Meth Enzymol** 341:351-368
- Li G, GS Goyal, S Abel, and CF Quiros (2001) Inheritance of three major genes involved in the synthesis of aliphatic glucosinolates in *Brassica oleracea*. **J Amer Soc Hort Sci** 126:427-431
- Colon-Carmona A, DL Chen, KC Yeh, and S Abel (2000) Aux/IAA proteins are phosphorylated by phytochrome *in vitro*. **Plant Physiol** 124:1728-1738
- Gross HB, T Dalebout, CD Grubb, and S Abel (2000) Functional detection of chemopreventive glucosinolates in *Arabidopsis thaliana*. **Plant Sci** 159:265-272
- Chen DL, CA Delatorre, A Bakker, and S Abel (2000) Conditional identification of phosphate starvation-response mutants in *Arabidopsis thaliana*. **Planta** 211:13-22
- Abel S, T Nürnbergger, V Ahnert, GJ Krauss, and K Glund (2000) Induction of an extracellular cyclic nucleotide phosphodiesterase as an accessory ribonucleolytic activity during phosphate starvation of cultured tomato cells. **Plant Physiol** 122:543-532
- Morgan KE, TI Zarembinski, A Theologis, and S Abel (1999) Biochemical characterization of recombinant polypeptides corresponding to the predicted  $\beta\alpha\alpha$ -fold in Aux/IAA proteins. **FEBS Lett** 454:283-287
- Abel S and A Theologis (1996) Early genes and auxin action. **Plant Physiol** 111:9-17
- Abel S, N Ballas, L-M Wong, and A Theologis (1996) DNA elements responsive to auxin. **BioEssays** 18:647-654
- Abel S and A Theologis (1996) Transient gene expression in protoplasts of *Arabidopsis thaliana*. **Meth Mol Biol** 82:209-217
- Wong L-M, S Abel, N Shen, M de la Foata, Y Mal, and A Theologis (1996) Differential activation of the primary auxin response genes, *PS-IAA4/5* and *PS-IAA6*, during early plant development. **Plant J** 9:587-599
- Köck M, A Löffler, S Abel, and K Glund (1995) cDNA structure and regulatory properties of a family of phosphate starvation-induced ribonucleases in tomato. **Plant Mol Biol** 27:77-484

- Abel S, MD Nguyen, and A Theologis (1995) The PS-IAA4/5-like family of early auxin-inducible mRNAs in *Arabidopsis thaliana*. **J Mol Biol** 251:533-549
- Abel S, MD Nguyen, W Chow, and A Theologis (1995) ACS4, a primary auxin-responsive gene encoding 1-Aminocyclopropane-1-carboxylate synthase in *Arabidopsis thaliana*. **J Biol Chem** 270:19093-19099
- Abel S and A Theologis (1995) A polymorphic bipartite motif signals nuclear targeting of early auxin-inducible proteins related to PS-IAA4 from pea (*Pisum sativum*). **Plant J** 8:87-96
- Abel S and A Theologis (1994) Transient transformation of *Arabidopsis* leaf protoplasts: a versatile experimental system to study gene expression. **Plant J** 5:421-427
- Abel S, PW Oeller, and A Theologis (1994) Early auxin-induced genes encode short-lived nuclear proteins. **Proc Natl Acad Sci USA** 91:326-330
- Theologis A, TI Zarembinski, PW Oeller, X Liang, and S Abel (1992) Modification of fruit ripening by suppressing gene expression. **Plant Physiol** 100:549-551
- Liang X, S Abel, JA Keller, NF Shen, and A Theologis (1992) The 1-Aminocyclopropane-1-carboxylate synthase family of *Arabidopsis thaliana*. **Proc Natl Acad Sci USA** 89:11046-11050
- Löffler A, S Abel, W Jost, and K Glund (1992) Phosphate-regulated induction of intracellular ribonucleases in cultured tomato (*L. esculentum*) cells. **Plant Physiol** 98:1472-1478
- Nürnberg T, S Abel, W Jost, and K Glund (1990) Induction of an extracellular ribonuclease in cultured tomato cells upon phosphate starvation. **Plant Physiol** 92:970-976
- Abel S, B Blume, and K Glund (1990) Evidence for RNA-oligonucleotides in plant vacuoles isolated from cultured tomato cells. **Plant Physiol** 94:1163-1171
- Abel S, GJ Krauss, and K Glund (1989) Ribonuclease in tomato vacuoles: HPLC analysis of ribonucleolytic activities and base specificity. **Biochim Biophys Acta** 998:145-150
- Abel S, T Kiss, and F Solymosy (1989) Molecular analysis of eight U1 RNA gene candidates from tomato that could be potentially transcribed into U1 RNA sequence variants differing from each other in similar regions of secondary structure. **Nucleic Acids Res** 17:6319-6337
- Kiss T, S Abel, and F Solymosy (1989) A plant pseudogene for U1 RNA. **Plant Mol Biol** 12:709-712
- Kiss T, M Kis, S Abel, and F Solymosy (1988) Nucleotide sequence of the 17S-25S spacer region from tomato rDNA. **Nucleic Acids Res** 16:7179
- Glund K and S Abel (1989) Structural dynamics of the vacuolar system in cultured tomato cells. A direct isolation study. **J Plant Physiol** 135:242-244
- Abel S, GJ Krauss, and K Glund (1988) Single-step HPLC analysis of nucleoside monophosphates for ribonuclease specificity. **J Chromat** 446:187-189
- Abel S and K Glund (1987) Ribonuclease in plant vacuoles: purification and molecular properties of the enzyme from cultured tomato cells. **Planta** 172:71-78
- Abel S and K. Glund (1986) Localization of RNA-degrading enzyme activity within vacuoles of cultured tomato cells. **Physiol Plant** 66:79-86
- Glund K, A Tewes, S Abel, V Leinhos, R Walther and H Reinbothe (1984) Vacuoles from cell suspension cultures of tomato (*Lycopersicon esculentum*) - Isolation and characterization. **Z Pflanzenphysiol** 113:151-161

#### **DATA BANK ENTRIES**

- Kovermann M, Dhurvas Chandrasekaran D, Gopalswamy M, Abel S, and J Balbach (2012) Solution structure of the dimerization domain of Aux/IAA transcription factor Ps-IAA4 from pea (*Pisum sativum*). **Protein Data Base** ID: 2M1M; RCSB ID: RCSB103094

#### **MEETING REPORTS**

- Abel S, M Blazquez, J Dangl, XW Deng, I Graham, J Harada, J Jones, and O Nilsson (2000). Arabidopsis Research 2000. **Plant Cell** 12:2302-2309

#### **PATENTS**

- Abel S and M Levy (2006) Compositions and methods for modulating glucosinolate in plants. WO2006026756A3