

LEONARD BLASCHEK

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EDUCATION

PHD, PLANT PHYSIOLOGY 2017–2022 (expected)

Stockholms Universitet, Sweden

Project: Functional and Genetic Analysis of Laccase Isoforms during Lignification

Advisor: Dr. Edouard Pesquet

Co-Advisors: Prof. Vincent Bulone, Prof. Jonas Gunnarsson

My project aims to determine whether differences in lignin amount and composition on the cellular and organismal scale are due to distinct roles of laccase paralogues during lignification. Biochemical and genetic analyses of laccases from *A. thaliana*, *Zinnia violacea* and *Populus* will be used to elucidate the basis of laccase specificity as well as the evolutionary conservation of the roles of laccases in lignification.

LICENTIATE, PLANT PHYSIOLOGY 2017–2020

Stockholms Universitet, Sweden

Project: Cellular Lignin Distribution Patterns and their Physiological Relevance

Advisor: Dr. Edouard Pesquet

Co-Advisors: Prof. Vincent Bulone, Prof. Jonas Gunnarsson

Examination Committee: Dr. András Gorzsás, Dr. Annelie Carlsbecker, Prof. Ulla Westermark

In my licentiate thesis, I biochemically validated the Wiesner test and Raman microspectroscopy for reliable *in situ* quantification of lignin composition, and subsequently used these techniques to characterise the distribution and genetic regulation of specific lignin subunits in different lignified cell types. Lastly we related this *in situ* lignin composition data to single cell, tissue and whole plant morphology and bio-mechanics, showing that tracheary element functionality is dependent on specific compositions of *post-mortem* deposited lignin.

MASTER OF SCIENCE, GENETIC AND MOLECULAR PLANT BIOLOGY 2015–2017

Uppsala Universitet, Sweden

Thesis: Distinct Roles of Laccase Isoforms During Lignification in *A. thaliana*

Advisor: Dr. Edouard Pesquet

In this thesis work, I provided evidence that laccase paralogs in *A. thaliana* have distinct and non-redundant roles during lignification. Phenotypic analysis of *laccase* loss-of-function mutants, *in situ* activity assays and biochemical lignin characterisation showed that different laccase paralogs were active in a cell and substrate specific manner.

BACHELOR OF SCIENCE, BIOLOGY 2013–2015

Ernst-Moritz-Arndt-Universität Greifswald, Germany

Thesis: Plasma Membrane-Bound Proteases in the Roots of *H. vulgare*

Advisor: Prof. Christine Stöhr

In my bachelor's thesis I investigated proteolytic activity in the plasma membrane of *Hordeum vulgare* roots. Plasma membrane purification and SDS-PAGE analysis followed by zymographic and chromogenic activity assays provided evidence for the presence of an undescribed oligomeric membrane-bound aminopeptidase.

EXPERTISE

WET LAB

Cell suspension cultures, cloning, enzyme kinetics, histology, plant growth, transformation & crossing (*Arabidopsis*, *Populus*, *Zinnia*), quantitative bright field, fluorescence and vibrational microscopy

DRY LAB

Automated image analysis (python, ImageJ), data analysis and plotting (R, bash), reproducible reporting (markdown, git), text processing (Office, LaTeX)

COURSES & WORKSHOPS

Advanced Imaging of Cells *in vitro* and *in vivo* (2018). *Stockholm University*

Optical Clearing and Expansion Microscopy (2018). *SciLifeLab, Stockholm*

Advances in Enzyme Regulation (2018). *Swedish University of Agricultural Sciences, Uppsala*

Piecewise Structural Equation Modelling (2019). *Stockholm University*

PUBLICATIONS

————— 2020 —————

Yamamoto M, **Blaschek L**, Subbotina E, Kajita S and Pesquet E (2020). Importance of Lignin Coniferaldehyde Residues for Plant Properties and Sustainable Uses. *ChemSusChem*. [10.1002/cssc.202001242](https://doi.org/10.1002/cssc.202001242)

Blaschek L[†], Nuoendagula[†], Bacsik Z, Kajita S, Pesquet E. (2020). Determining the Genetic Regulation and Coordination of Lignification in Stem Tissues of *Arabidopsis* Using Semiquantitative Raman Microspectroscopy. *ACS Sustain. Chem. Eng.* 8: 4900–4909. [10.1021/acssuschemeng.0c00194](https://doi.org/10.1021/acssuschemeng.0c00194)

Blaschek L, Champagne A, Dimotakis C, Nuoendagula, Decou R, Hishiyama S, Kratzer S, Kajita S, Pesquet E (2020). Cellular and Genetic Regulation of Coniferaldehyde Incorporation in Lignin of Herbaceous and Woody Plants Using Quantitative Wiesner Staining. *Front. Plant Sci.* 11: 109. [10.3389/fpls.2020.00109](https://doi.org/10.3389/fpls.2020.00109)

————— NOT PEER-REVIEWED —————

Blaschek L, Pesquet E (*in preparation*). Phenoloxidases: Functions, Structures and Evolution.

Ménard D, Serk H, Gorzsás A, Jauneau A, Fukuda H, **Blaschek L**, Demura T, Goffner D, Pesquet E (*in preparation*). The *post-mortem* spatial restriction of lignification in protoxylem and metaxylem vessels in *Zinnia elegans* is controlled by laccases and peroxidases.

Ménard D, **Blaschek L**, Zhong C, Kriechbaum K, Lee CC, Nuoendagula, Kajita S, Mathew A, Pesquet E. (*In preparation*). Lignin Ensures the Biomechanical Properties of Xylem Vessels under Tension.

[†]: contributed equally

PRESENTATIONS

Blaschek L (2018). Determining the Spatial Distribution of Aldehyde Units in Lignin. *2nd Stockholm Cell Wall Meeting*, KTH Royal Institute of Technology, Stockholm.

Blaschek L (2019). Spatial Distribution of Coniferaldehyde Lignin. *28th Congress of the Scandinavian Plant Physiology Society*, Umeå.

Blaschek L (2019). The Structural Importance of Lignin in Xylem Vessels. *3rd Stockholm Cell Wall Meeting*, Stockholm University, Stockholm.

GRANTS & SCHOLARSHIPS

Blaschek L, Pesquet E (2018). Kungliga Vetenskapsakademien Scholarship BS2018–0061 for the sequencing of the *Zinnia violacea* genome.

Blaschek L (2019). Travel grant of the Department of Ecology, Environment and Plant Sciences, Stockholm University to attend the 28th Congress of the Scandinavian Plant Physiology Society.