

Univ.-Prof. Dr. Wolfram Weckwerth

Contact: University of Vienna; Djerassiplatz1, 1030 Vienna; E-mail:

wolfram.weckwerth@univie.ac.at

FULL CV <https://mosys.univie.ac.at/team/wolfram-weckwerth/>



Present positions:

Full Professor, University of Vienna.

Vice-Head of the Department of Functional and Evolutionary Ecology

Head of Molecular Systems Biology Lab (MOSYS) <https://mosys.univie.ac.at/>

Head of Research Center Artificial Intelligence in personalized nutrition for disease prevention and well-being (AIPN) <https://aipn.univie.ac.at/>

Director of the Vienna Metabolomics Center, University of Vienna <http://metabolomics.univie.ac.at/>

Google Scholar <https://scholar.google.de/citations?user=20oOZCgAAAAJ&hl=de>

AD scientific index <https://www.adscientificindex.com/scientist.php?id=1400378>

Research.com <https://research.com/scientists-rankings/biology-and-biochemistry/at>

CONTENT

Education/Professional Experience	1
Awards, professional duties and functions	2
Selected grants	3
Selected Collaborations	3
Selected Publications	4

Education/Professional Experience

Since 2026 Head of the Research Center Artificial Intelligence in personalized nutrition for disease prevention and well-being (AIPN), University of Vienna, Austria

Since 2025 President of the Federal European Society of Plant Biology (FESPB)

Since 2023 President of the Austrian Society for Plant Biology (AIPN)

2022 – 2024 Head of Department, Department of Functional and Evolutionary Ecology, Faculty of Life Sciences, University of Vienna, Vienna, Austria

Since 2018 – Speaker of the Professoral Curia of the Faculty of Life Sciences

2019 – 2022 Vice-Head of the Department of Functional and Evolutionary Ecology, University of Vienna, Austria

2016 Offer for Professorship at the University of Liverpool as Chair of Metabolomics, UK

Since 2015 – Founding Director of the Vienna Metabolomics Center (VIME) at the University of Vienna

2013 – 2022 Head of the Large Instrument Facility of Mass Spectrometry in Life Sciences, Faculty of Life Sciences, University of Vienna

2013 – 2019 Head of the newly established Department of Ecogenomics and Systems Biology including a complete OMICS platform from next generation sequencing, proteomics, metabolomics and metabolic modelling, at the University of Vienna

2008 – 2013 Full professor and founding chair of the Department for Molecular Systems Biology at the University of Vienna, Austria

2007 – Offer ships for Professorship at the Michigan State University, USA and Full Professorship at the University of Vienna, Austria

2007 – Habilitation in Systems biology, Lecturer Systems Biology, University of Potsdam, Germany
 2007 – 2008 Head of Central Infrastructure Systems Biology Lab, GoForSys, University Potsdam, Germany
 2002 – 2008 Research Group Leader at the Max-Planck-Institute, Potsdam, Germany
 2000 – 2002 Postdoc at the Max-Planck-Institute, Potsdam, Germany
 1998 - PhD in Biochemistry, Institute of Molecular Biology and Biochemistry, Technical University Berlin, Germany
 1994 – Diploma in Chemistry, Institute of Molecular Biology and Biochemistry, Technical University Berlin, Germany

Awards, professional duties and functions

- Member of the European Research Council Evaluation Panels 2021/2022/2023/2025
- Founding Director of the **Vienna Metabolomics Center (VIME)** (<http://metabolomics.univie.ac.at/vime-home/>) since 2015
- Chair of MASC (Multi-National Arabidopsis Steering Committee, https://www.arabidopsis.org/portals/masc/MASC_Info.jsp) in 2012
- Founding chair of the Proteomics Committee MASC 2004-2010
- Chair of the Metabolomics Committee MASC 2021
- Founding member and European Coordinator of INPPO (International Plant Proteomics Organization; <https://inppo.org/>) 2012
- Member of the Scientific Advisory Board Czech Globe (www.czechglobe.cz) 2013-2015
- Member of the Scientific Advisory Board of the Austrian Society of Analytical Chemistry (ASAC <http://www.asac.at/Index.aspx?site=1&main=85&sub=0&content=314>) 2010-2012
- Member of the Scientific Advisory Board “Open Science”, Vienna, Austria since 2010
- Member of the Scientific Advisory Board CANCAN Gabriel Lippmann Institute Luxembourg 2015
- Member of the International Advisory Panel on Oil Palm Proteomics and Metabolomics (IAP-PROMET), Advanced Biotechnology & Breeding Centre, Selangor, Malaysia 2015-2019, 2021,2022
- Member of the International Pearl Millet Genome Sequencing Consortium (IPMGSC) (<http://ceg.icrisat.org/ipmgsc/>), Hyderabad, India since 2016
- Founding Special Chief Editor of Frontiers Metabolomics (<http://www.frontiersin.org/Metabolomics>)
- Editorial Board of Plant Biotechnology, Molecular & Cellular Proteomics, Journal of Personalized Medicine, Current Metabolomics, Plant and Cell Physiology, Frontiers in Plant Sciences
- Austrian representative of the European Plant Proteomics COST action 2008
- AIST-Fellow (Advanced Industrial Science and Technology, Tsukuba, Japan) 2006
- Further Advisory boards: NATO Science Series I: Life and Behavioural Sciences 2004 “Genomics for Biosafety in Plant Biotechnology, Sofia 2004; European Systems Biology (EUSYSBIO) Foresight Workshop, Heidelberg, 2005; Dynamics of Aquatic Chemical Ecology, Wilhelmshaven, 2006; Experimentelle und theoretische Metabolomforschung - metabolische Netze, Köln, 2006; Steering Committee of the systems biology programme GoFORSYS; BMBF call “Systems Biology”, Berlin 2008, 2011, 2013, Advisory Board for the BIOECONOMY program of the Helmholtz Society, Germany in 2014.
- Editor of “Metabolomics: Methods and Protocols”, in the series “Methods in Molecular Biology”, Humana Press 2007
- Editor of “The Handbook of Plant Metabolomics”, Wiley 2013
- Editor of “Metabolomics in Practice: Successful Strategies to Generate and Analyze Metabolic Data”, Wiley 2013
- invited lectures (selection of more than 150 invited lectures since 2002): Plenary Lecture at the International Metabolomics Conference 2013, Glasgow, Scotland; Keynote Lecture at the Conference of the Phytochemical Society of North America 2013, Corvallis, Oregon, USA; Keynote Lecture at the HUPO 2014 Madrid, Spain; Keynote Lecture at the EUROANALYSIS 2015, Bordeaux, France; Keynote Lecture at the Gordon Research Conference Signalling 2015, Hongkong; Plenary Lecture at the Conference of the Austrian Society of Molecular Biotechnology 2015, Salzburg, Austria, Keynote Lecture INPPO 2016, Bratislava, Slovakia, Keynote lecture 6° Congreso Nacional de la Sociedad Espanola de Proteomics 2016, Cadiz, Spain, and many more

- Regular invited reviewing activities for the following journals:
Analytical & Bioanalytical Chemistry, Amino Acids, Analytical Biochemistry, Analytical Chemistry, Angewandte Chemie, Bioessays, Bioinformatics, Biotechnology Progress, BMC Bioinformatics, BMC Plant Biology, BMC Systems Biology, Drug Discovery, Electrophoresis, Febs Letters, Frontiers, Journal of Chemometrics, Journal of Mass Spectrometry, Journal of Plant Growth Regulation, Journal of Proteome Research, Journal of Proteomics, Journal of Experimental Botany, Molecular Biosystems, Molecular & Cellular Proteomics, Metabolomics, Molecular Systems Biology, Nucleic Acids Research, Nature, Nature Biotechnology, Nature Methods, Nature Protocols, Nature Reviews, Nature Communications, Plant & Cell and Environment, Phytochemistry, Plant Cell, Plant Ecology and Diversity, Plant Journal, Plant Methods, Plant Physiology, Planta, PLOS, Proteomics, Rapid Communications of Mass Spectrometry, Science and others.

Selected grants

Third-party-funding in total since 2002: 43,8 Million EURO

2007 Research platforms for systems biology in germany (FORSYS), German Federal Ministry of Education and Research, 13 Million Euro

2008 Nutrigenomics: Allergenicity in crop plants German Federal Ministry of Education and Research, 1 Million Euro

2011 MERIT Metabolic Reprogramming by Induction of Transcription, European Commission, 2,1 Million Euro

2012 In situ Arabidopsis thaliana Austrian Science Fund (FWF), 350000 Euro

2015 CALIPSO Ca²⁺ and light signals in photosynthetic organisms, European Commission, 3,4 Million Euro

2016 Metabolomics platform for natural product research Chinese scholarship council PhD Scholarship

2018 Wheat Seed Proteomics Chinese scholarship council PhD Scholarship

2018 Production of High Value Products using Microalgal Biotechnology Austrian Research Promotion Agency (FFG) 420.000 Euro

2018 Machine and deep learning for multiomics data Chinese scholarship council PhD Scholarship

2019 Macrophage and Cancer Chinese scholarship council PhD Scholarship

2020 Natural Products and inflammation Chinese scholarship council PhD Scholarship

2021 MENTOR – Molecular mechanisms to improve plant resilience in the climate crisis, Austrian Science Fund (FWF), PhD School 2.2 MEuro

2025 AIPN Research Center, University of Vienna, 1.6 MEuro

Selected Collaborations

- Rajeev K Varshney, former ICRISAT and now Director, State Agricultural Biotechnology Centre, Director, Centre for Crop & Food Innovation, International Chair in Agriculture & Food Security, Food Futures Institute, Murdoch University, Australia: Collaboration on germplasm collections of chickpea, pigeonpea, groundnut, wheat and others
- Rakesh Srivastava, International Crops Research Institute for Semi-Arid Tropics (ICRISAT): Drought stress in staple food crops such as Pearl millet, Chickpea, Pigeonpea and others
- Guntur Subbarao, Japan International Research Center for Agricultural Sciences (JIRCAS): Biological Nitrification Inhibition
- Dong Jiang, Nanjing Agricultural University China: Wheat grain filling, nitrogen use efficiency, and other topics.
- Pingfang Yang, School of Life Science, Hubei University, Wuhan, China: Natural product research in the vegetable and traditional medicinal herb *Nelumbo nucifera*
- Yanmei Chen, China Agricultural University, Beijing, China: Stress tolerant maize
- Karl Heinz Wagner (UNIVIE), Austria: Metabolomics of Nutrition, Aging and Fitness
- Robert Hall, Wageningen University, Netherlands: Metabolomics of Tomato
- Max Planck Institute of Molecular Plant Physiology, Germany: Genome wide association studies in germplasm collections

- INPPO International Plant Proteomics Organization
- MASC Multinational Arabidopsis Steering Committee: Global adaptation of plants to climate change
- Alexandry Kautzky-Viller (MedUni Wien), Austria: Gestational diabetes mellitus, metabolic syndrome and gut microbiome
- Thomas Weichhart (MedUni Wien), Austria: mTOR regulation in animals and plants, metabolic modelling of TOR signaling
- Sébastien Couillard-Després (Paracelsus Medizinische Privatuniversität), Austria: Neuroregeneration by treatment with natural products, Metabolomics, Phosphoproteomics and metabolic modelling
- Gunda Koellensperger (UNIVIE), Austria: stem cell metabolic modelling

Selected Publications

for a full list <https://scholar.google.at/citations?user=20oOZCgAAAAJ&hl=de&oi=ao>

- Citation 36483, H-Index 92, i10 index 275 (google scholar September 2026)
- More than **350** original publications (among others: **Cell, Cell Reports, PNAS, Nature Biotechnology, Nature Protocol, Nature Communication, Nature Immunology, Plant Cell, Plant Physiology, New Phytologist, Plant Journal, Plant Biotechnology, Molecular&Cellular Proteomics, Metabolomics, Bioinformatics**)
- **29** reviews (among other: Annual Review, Drug Discovery).
- 3 books as **editor**, 10 book chapters.
- 3 patents.

1. Weckwerth W. Metabolomics in systems biology. Annu Rev Plant Biol. 2003;54:669-89. doi: 10.1146/annurev.arplant.54.031902.135014. PubMed PMID: 14503007.
2. Weckwerth W. Integration of metabolomics and proteomics in molecular plant physiology--coping with the complexity by data-dimensionality reduction. Physiol Plant. 2008;132(2):176-89. doi: 10.1111/j.1399-3054.2007.01011.x. PubMed PMID: 18251859.
3. Weckwerth W. Metabolomics: an integral technique in systems biology. Bioanalysis. 2010;2(4):829-36. doi: 10.4155/bio.09.192. PubMed PMID: 21083277.
4. Weckwerth W. Green systems biology - From single genomes, proteomes and metabolomes to ecosystems research and biotechnology. J Proteomics. 2011;75(1):284-305. doi: 10.1016/j.jprot.2011.07.010. PubMed PMID: 21802534.
5. Weckwerth W. Unpredictability of metabolism--the key role of metabolomics science in combination with next-generation genome sequencing. Anal Bioanal Chem. 2011;400(7):1967-78. doi: 10.1007/s00216-011-4948-9. PubMed PMID: 21556754; PubMed Central PMCID: PMC3098350.
6. Weckwerth W. Toward a unification of system-theoretical principles in biology and ecology—the stochastic lyapunov matrix equation and its inverse application. Frontiers in Applied Mathematics and Statistics. 2019;5:29.
7. Weckwerth W, Chaturvedi P, Ghatak A, Kerou M, Garg V, Bohra A, et al. Natural variation of the holobiont for sustainable agroecosystems. Trends Plant Sci. 2025;30(9):972-9. Epub 20250627. doi: 10.1016/j.tplants.2025.05.006. PubMed PMID: 40579258.
8. Weckwerth W, Ghatak A, Bellaire A, Chaturvedi P, Varshney RK. PANOMICS meets germplasm. Plant Biotechnol J. 2020;18(7):1507-25 doi: 10.1111/pbi.13372. PubMed PMID: 32163658; PubMed Central PMCID: PMC7292548.
9. Weckwerth W, Wenzel K, Fiehn O. Process for the integrated extraction, identification and quantification of metabolites, proteins and RNA to reveal their co-regulation in

- biochemical networks. *Proteomics*. 2004;4(1):78-83. doi: 10.1002/pmic.200200500. PubMed PMID: 14730673.
10. Tretter F, Wolkenhauer O, Meyer-Hermann M, Dietrich JW, Green S, Marcum J, et al. The Quest for System-Theoretical Medicine in the COVID-19 Era. *Front Med (Lausanne)*. 2021;8:640974. Epub 2021/04/16. doi: 10.3389/fmed.2021.640974. PubMed PMID: 33855036; PubMed Central PMCID: PMCPCMC8039135.

Further Research paper

1. Kramml HM, Herpell JB, Priemer C, Wessely Z, Schindler F, Berger A, et al. *Clusia* genomes shed light on the evolution and diversity of crassulacean acid metabolism physiotypes. *Nat Commun*. 2026;17(1). Epub 20260505. doi: 10.1038/s41467-026-71958-z. PubMed PMID: 42086566; PubMed Central PMCID: PMCPCMC13144421.
2. Li W, Cai Z, Schindler F, Brenner M, Winter C, Stiller B, et al. Hesperetin Protects from Palmitic-Acid-Induced Lipotoxicity through the Inhibition of Glutaminolysis, mTORC1 Signaling, and Limited Apoptosis. *J Agric Food Chem*. 2025;73(35):21932-46. Epub 20250821. doi: 10.1021/acs.jafc.5c05570. PubMed PMID: 40838694; PubMed Central PMCID: PMCPCMC12412169.
3. Li J, Brenner M, Pierides I, Wessner B, Franzke B, Strasser EM, et al. Machine learning and data-driven inverse modeling of metabolomics unveil key processes of active aging. *NPJ Syst Biol Appl*. 2025;11(1):103. Epub 20250924. doi: 10.1038/s41540-025-00580-4. PubMed PMID: 40993122; PubMed Central PMCID: PMCPCMC12460594.
4. Li W, Cai Z, Schindler F, Afjehi-Sadat L, Montsch B, Heffeter P, et al. Elevated PINK1/Parkin-Dependent Mitophagy and Boosted Mitochondrial Function Mediate Protection of HepG2 Cells from Excess Palmitic Acid by Hesperetin. *J Agric Food Chem*. 2024;72(23):13039-53. Epub 20240529. doi: 10.1021/acs.jafc.3c09132. PubMed PMID: 38809522; PubMed Central PMCID: PMCPCMC11181321.
5. Cai Z, Li W, Hager S, Wilson JL, Afjehi-Sadat L, Heiss EH, et al. Targeting PHGDH reverses the immunosuppressive phenotype of tumor-associated macrophages through alpha-ketoglutarate and mTORC1 signaling. *Cell Mol Immunol*. 2024;21(5):448-65. Epub 20240227. doi: 10.1038/s41423-024-01134-0. PubMed PMID: 38409249; PubMed Central PMCID: PMCPCMC11061172.
6. Weizmann J, Walther D, Clauw P, Back G, Gunis J, Reichardt I, et al. Metabolome plasticity in 241 *Arabidopsis thaliana* accessions reveals evolutionary cold adaptation processes. *Plant Physiol*. 2023;193(2):980-1000. doi: 10.1093/plphys/kiad298. PubMed PMID: 37220420; PubMed Central PMCID: PMCPCMC10517190.
7. Li J, Waldherr S, Weckwerth W. COVRECON: automated integration of genome- and metabolome-scale network reconstruction and data-driven inverse modeling of metabolic interaction networks. *Bioinformatics*. 2023;39(7). doi: 10.1093/bioinformatics/btad397. PubMed PMID: 37402625; PubMed Central PMCID: PMCPCMC10356784.
8. Wilson JL, Nagele T, Linke M, Demel F, Fritsch SD, Mayr HK, et al. Inverse Data-Driven Modeling and Multiomics Analysis Reveals Phgdh as a Metabolic Checkpoint of Macrophage Polarization and Proliferation. *Cell Rep*. 2020;30(5):1542-52 e7. doi: 10.1016/j.celrep.2020.01.011. PubMed PMID: 32023468; PubMed Central PMCID: PMCPCMC7003064.
9. 13. Elgendy M, Ciro M, Hosseini A, Weizmann J, Mazzarella L, Ferrari E, et al. Combination of Hypoglycemia and Metformin Impairs Tumor Metabolic Plasticity and Growth by Modulating the PP2A-GSK3beta-MCL-1 Axis. *Cancer Cell*. 2019;35(5):798-815 e5. Epub 20190425. doi: 10.1016/j.ccell.2019.03.007. PubMed PMID: 31031016.
10. 14. Nukarinen E, Nagele T, Pedrotti L, Wurzinger B, Mair A, Landgraf R, et al. Quantitative phosphoproteomics reveals the role of the AMPK plant ortholog SnRK1 as a metabolic

- master regulator under energy deprivation. *Scientific reports*. 2016;6:31697. Epub 20160822. doi: 10.1038/srep31697. PubMed PMID: 27545962; PubMed Central PMCID: PMC4992866.
11. 15. Doerfler H, Sun X, Wang L, Engelmeier D, Lyon D, Weckwerth W. mzGroupAnalyzer--predicting pathways and novel chemical structures from untargeted high-throughput metabolomics data. *Plos One*. 2014;9(5):e96188. Epub 20140520. doi: 10.1371/journal.pone.0096188. PubMed PMID: 24846183; PubMed Central PMCID: PMC4028198.
 12. 16. Doerfler H, Lyon D, Nagele T, Sun X, Fagner L, Hadacek F, et al. Granger causality in integrated GC-MS and LC-MS metabolomics data reveals the interface of primary and secondary metabolism. *Metabolomics*. 2013;9(3):564-74. Epub 20121025. doi: 10.1007/s11306-012-0470-0. PubMed PMID: 23678342; PubMed Central PMCID: PMC3651536.
 13. Toju H, Suzuki K, Sanchez-Pinillos M, Shima G, Kageyama T, Hayashi I, et al. Microbiome assembly statistics toward ecosystem-scale insights, forecasting, and management. *Isme J*. 2026;20(1). doi: 10.1093/ismejo/wrag085. PubMed PMID: 41967489; PubMed Central PMCID: PMC413157832.
 14. Pierides I, Kramml HM, Waldherr S, Weckwerth W. Kernel-DMD for multiome data integration and control. *PLoS Comput Biol*. 2026;22(3):e1014029. Epub 20260331. doi: 10.1371/journal.pcbi.1014029. PubMed PMID: 41915641; PubMed Central PMCID: PMC413038008.
 15. Gui W, Paral P, Dhamija B, Hagag E, Dusa M, Humajova J, et al. MCL1 modulates mTORC1 signaling to promote bioenergetics and tumorigenesis. *Nat Commun*. 2025;16(1):10841. Epub 20251201. doi: 10.1038/s41467-025-66831-4. PubMed PMID: 41326406; PubMed Central PMCID: PMC412673096.
 16. Ghatak A, Kanellopoulos AE, Lopez-Hidalgo C, Malits A, Meng Y, Schindler F, et al. Natural variation of the wheat root exudate metabolome and its influence on biological nitrification inhibition activity. *Plant Biotechnol J*. 2025;23(11):4755-72. Epub 20250721. doi: 10.1111/pbi.70248. PubMed PMID: 40692297; PubMed Central PMCID: PMC412576471.
 17. Zhang S, Ghatak A, Mohammadi Bazargani M, Kramml H, Zang F, Gao S, et al. Cell-type proteomic and metabolomic resolution of early and late grain filling stages of wheat endosperm. *Plant Biotechnol J*. 2024;22(3):555-71. Epub 20231204. doi: 10.1111/pbi.14203. PubMed PMID: 38050335; PubMed Central PMCID: PMC412047074.
 18. Chaturvedi P, Pierides I, Lopez-Hidalgo C, Garg V, Zhang S, Barmukh R, et al. Natural variation in the chickpea metabolome under drought stress. *Plant Biotechnol J*. 2024;22(12):3278-94. Epub 20241016. doi: 10.1111/pbi.14447. PubMed PMID: 39411896; PubMed Central PMCID: PMC411606430.
 19. Herpell JB, Alickovic A, Diallo B, Schindler F, Weckwerth W. Phyllosphere symbiont promotes plant growth through ACC deaminase production. *Isme J*. 2023;17(8):1267-77. Epub 20230601. doi: 10.1038/s41396-023-01428-7. PubMed PMID: 37264153; PubMed Central PMCID: PMC410356760.
 20. Fritsch SD, Sukhbaatar N, Gonzales K, Sahu A, Tran L, Vogel A, et al. Metabolic support by macrophages sustains colonic epithelial homeostasis. *Cell Metab*. 2023;35(11):1931-43 e8. Epub 20231006. doi: 10.1016/j.cmet.2023.09.010. PubMed PMID: 37804836.
 21. Cai Z, Li W, Brenner M, Bahiraii S, Heiss EH, Weckwerth W. Branched-chain ketoacids derived from cancer cells modulate macrophage polarization and metabolic reprogramming. *Front Immunol*. 2022;13:966158. Epub 20221013. doi: 10.3389/fimmu.2022.966158. PubMed PMID: 36311795; PubMed Central PMCID: PMC409606345.
 22. Zhang S, Ghatak A, Bazargani MM, Bajaj P, Varshney RK, Chaturvedi P, et al. Spatial distribution of proteins and metabolites in developing wheat grain and their differential

- regulatory response during the grain filling process. *Plant J.* 2021;107(3):669-87. Epub 20210814. doi: 10.1111/tpj.15410. PubMed PMID: 34227164; PubMed Central PMCID: PMCPMC9291999.
23. Herpell JB, Schindler F, Bejtovic M, Fragner L, Diallo B, Bellaire A, et al. The Potato Yam Phyllosphere Ectosymbiont *Paraburkholderia* sp. Msb3 Is a Potent Growth Promotor in Tomato. *Front Microbiol.* 2020;11:581. Epub 20200421. doi: 10.3389/fmicb.2020.00581. PubMed PMID: 32373084; PubMed Central PMCID: PMCPMC7186400.
 24. Ghatak A, Chaturvedi P, Bachmann G, Valledor L, Ramsak Z, Bazargani MM, et al. Physiological and Proteomic Signatures Reveal Mechanisms of Superior Drought Resilience in Pearl Millet Compared to Wheat. *Front Plant Sci.* 2020;11:600278. Epub 20210113. doi: 10.3389/fpls.2020.600278. PubMed PMID: 33519854; PubMed Central PMCID: PMCPMC7838129.
 25. Roustan V, Weckwerth W. Quantitative Phosphoproteomic and System-Level Analysis of TOR Inhibition Unravel Distinct Organellar Acclimation in *Chlamydomonas reinhardtii*. *Front Plant Sci.* 2018;9:1590. Epub 20181128. doi: 10.3389/fpls.2018.01590. PubMed PMID: 30546371; PubMed Central PMCID: PMCPMC6280106.
 26. Linke M, Pham HT, Katholnig K, Schnoller T, Miller A, Demel F, et al. Chronic signaling via the metabolic checkpoint kinase mTORC1 induces macrophage granuloma formation and marks sarcoidosis progression. *Nature immunology.* 2017;18(3):293-302. doi: 10.1038/ni.3655. PubMed PMID: 28092373; PubMed Central PMCID: PMCPMC5321578.
 27. Leitner M, Fragner L, Danner S, Holeschovsky N, Leitner K, Tischler S, et al. Combined Metabolomic Analysis of Plasma and Urine Reveals AHBA, Tryptophan and Serotonin Metabolism as Potential Risk Factors in Gestational Diabetes Mellitus (GDM). *Front Mol Biosci.* 2017;4:84. Epub 20171221. doi: 10.3389/fmolb.2017.00084. PubMed PMID: 29312952; PubMed Central PMCID: PMCPMC5742855.
 28. Nagele T, Mair A, Sun X, Fragner L, Teige M, Weckwerth W. Solving the differential biochemical Jacobian from metabolomics covariance data. *Plos One.* 2014;9(4):e92299. Epub 20140402. doi: 10.1371/journal.pone.0092299. PubMed PMID: 24695071; PubMed Central PMCID: PMCPMC3977476.
 29. Bellaire A, Ischebeck T, Staedler Y, Weinhaeuser I, Mair A, Parameswaran S, et al. Metabolism and development - integration of micro computed tomography data and metabolite profiling reveals metabolic reprogramming from floral initiation to silique development. *New Phytol.* 2014;202(1):322-35. doi: 10.1111/nph.12631. PubMed PMID: 24350948; PubMed Central PMCID: PMCPMC4283998.
 30. Chaturvedi P, Ischebeck T, Egelhofer V, Lichtscheidl I, Weckwerth W. Cell-specific analysis of the tomato pollen proteome from pollen mother cell to mature pollen provides evidence for developmental priming. *J Proteome Res.* 2013;12(11):4892-903. doi: 10.1021/pr400197p. PubMed PMID: 23731163.
 31. Scherling C, Roscher C, Giavalisco P, Schulze ED, Weckwerth W. Metabolomics unravel contrasting effects of biodiversity on the performance of individual plant species. *Plos One.* 2010;5(9):e12569. Epub 20100907. doi: 10.1371/journal.pone.0012569. PubMed PMID: 20830202; PubMed Central PMCID: PMCPMC2935349.
 32. Scherling C, Ulrich K, Ewald D, Weckwerth W. A metabolic signature of the beneficial interaction of the endophyte *paenibacillus* sp. isolate and in vitro-grown poplar plants revealed by metabolomics. *Mol Plant Microbe Interact.* 2009;22(8):1032-7. doi: 10.1094/MPMI-22-8-1032. PubMed PMID: 19589078.
 33. Kempa S, Hummel J, Schwemmer T, Pietzke M, Strehmel N, Wienkoop S, et al. An automated GCxGC-TOF-MS protocol for batch-wise extraction and alignment of mass isotopomer matrixes from differential ¹³C-labelling experiments: a case study for photoautotrophic-mixotrophic grown *Chlamydomonas reinhardtii* cells. *J Basic Microbiol.* 2009;49(1):82-91. doi: 10.1002/jobm.200800337. PubMed PMID: 19206143.
 34. Lehmann U, Wienkoop S, Tschoep H, Weckwerth W. If the antibody fails--a mass western approach. *Plant J.* 2008;55(6):1039-46. Epub 20080514. doi: 10.1111/j.1365-

313X.2008.03554.x. PubMed PMID: 18485062; PubMed Central PMCID: PMCPMC2607522.

35. Hoehenwarter W, van Dongen JT, Wienkoop S, Steinfath M, Hummel J, Erban A, et al. A rapid approach for phenotype-screening and database independent detection of cSNP/protein polymorphism using mass accuracy precursor alignment. *Proteomics*. 2008;8(20):4214-25. doi: 10.1002/pmic.200701047. PubMed PMID: 18924179.
36. Hummel J, Niemann M, Wienkoop S, Schulze W, Steinhauser D, Selbig J, et al. ProMEX: a mass spectral reference database for proteins and protein phosphorylation sites. *BMC Bioinformatics*. 2007;8:216. Epub 20070623. doi: 10.1186/1471-2105-8-216. PubMed PMID: 17587460; PubMed Central PMCID: PMCPMC1920535.
37. Wolschin F, Wienkoop S, Weckwerth W. Enrichment of phosphorylated proteins and peptides from complex mixtures using metal oxide/hydroxide affinity chromatography (MOAC). *Proteomics*. 2005;5(17):4389-97. doi: 10.1002/pmic.200402049. PubMed PMID: 16222723.
38. Wienkoop S, Zoeller D, Ebert B, Simon-Rosin U, Fisahn J, Glinski M, et al. Cell-specific protein profiling in *Arabidopsis thaliana* trichomes: identification of trichome-located proteins involved in sulfur metabolism and detoxification. *Phytochemistry*. 2004;65(11):1641-9. doi: 10.1016/j.phytochem.2004.03.026. PubMed PMID: 15276459.
39. Steuer R, Kurths J, Fiehn O, Weckwerth W. Observing and interpreting correlations in metabolomic networks. *Bioinformatics*. 2003;19(8):1019-26. doi: 10.1093/bioinformatics/btg120. PubMed PMID: 12761066.

1.