

List of Publications / Professor Eva-Mari Aro

1. Publications in peer reviewed international journals:

2018

1. Angeleri M, Zorina A, Aro EM, Battchikova N. 2018. Interplay of SpkG kinase and the Slr0151 protein in phosphorylation of Ferredoxin 5 in *Synechocystis* sp. strain PCC 6803. *FEBS Lett.* 592: 411-421
2. Battchikova N, Muth-Pawlak D, Aro EM. 2018. Proteomics of cyanobacteria: current horizons. *Current Opinion in Biotechnology.* 54: 65-71
3. Jokel M, Johnson X, Peltier G, Aro EM, Allahverdiyeva Y. 2018. Hunting the main player enabling *Chlamydomonas reinhardtii* growth under fluctuating light. *The Plant Journal* (in press)
4. Kosourov S, Jokel M, Aro EM, Allahverdiyeva Y. 2018. New approach for sustained and efficient H₂ photoproduction by *Chlamydomonas reinhardtii*. *Energy and Environmental Science* (in press)
5. Li L, Aro EM, Millar H. 2018. Mechanisms of photodamage and protein turnover in photoinhibition, *Trends in Plant Science* (in press)
6. Saar KL, Bombelli P, Lea-Smith DJ, Call T, Aro EM, Müller T, Howe CJ, Knowles TPJ. 2018. Enhancing power density of biophotovoltaics by decoupling storage and power delivery. *Nature Energy.* 3: 75–81
7. Thiel K, Mulaku E, Dandapani H, Nagy C, Aro EM, Kallio P. 2018. Translation efficiency of heterologous proteins is significantly affected by the genetic context of RBS sequences in engineered cyanobacterium *Synechocystis* sp. PCC 6803. *Microbial Cell Factories* 17: 34
8. Yodsang P, Raksajit W, Aro EM, Mäenpää P, Incharoensakdi A. 2018. Factors affecting photobiological hydrogen production in five filamentous cyanobacteria from Thailand. *Photosynthetica* (in press)

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9. Bersanini L, Allahverdiyeva Y, Battchikova N, Heinz S, Lespinasse M, Ruohisto E, Mustila H, Nickelsen J, Vass I, Aro EM. 2017. Dissecting the photoprotective mechanism encoded by the *flv4-2* operon: a distinct contribution of *Sll0218* in photosystem II stabilization. *Plant Cell Environ.* 40: 378-389
10. Fristedt R, Trotta A, Suorsa M, Nilsson AK, Croce R, Aro EM, Lundin B. 2017. PSB33 sustains photosystem II D1 protein under fluctuating light conditions. *J Exp Bot.* 68: 4281-4293
11. Georg J, Kostova G, Vuorijoki L, Schön V, Kadowaki T, Huokko T, Baumgartner D, Müller M, Klähn S, Allahverdiyeva Y, Hihara Y, Futschik ME, Aro EM, Hess WR. 2017. Acclimation of oxygenic photosynthesis to iron starvation is controlled by the sRNA *IsaR1*. *Curr Biol.* 27: 1-12
12. Giovanardi M, Poggioli M, Ferroni L, Lespinasse M, Baldisserotto C, Aro EM, Pancaldi S. 2017. Higher packing of thylakoid complexes ensures a preserved Photosystem II activity in mixotrophic *Neochloris oleoabundans*. *Algal research* 25: 255-265

13. Gollan PJ, Lima-Melo Y, Tiwari A, Aro EM. 2017. Interaction between photosynthetic electron transport and chloroplast sinks triggers protection and signalling important for plant productivity. *Phil Trans R Soc B*. 372(1730) pii: 20160390
14. Huokko T, Muth-Pawlak D, Battchikova N, Allahverdiyeva Y, Aro EM. 2017. Role of type 2 NAD(P)H dehydrogenase NdbC in regulation of carbon allocation in *Synechocystis* 6803. *Plant Phys* 174: 1863-1880
15. Ilík P, Pavlovič A, Kouřil R, Alboresi A, Morosinotto T, Allahverdiyeva Y, Aro EM, Yamamoto H, Shikanai T. 2017. Alternative electron transport mediated by flavodiiron proteins is operational in organisms from cyanobacteria up to gymnosperms. *New Phytol*. 214: 967-972
16. Järvi S, Rantala M, Aro EM. 2017. Oxygenic Photosynthesis — Light Reactions within the Frame of Thylakoid Architecture and Evolution. From book Ruban A & Barber J (eds.) *Photosynthesis and Bioenergetics*, pp 243–263. World Scientific Publishing Co Pte Ltd (31 Dec. 2017)
17. Kämäräinen J, Huokko T, Kreula S, Jones PR, Aro EM, Kallio P. 2017. Pyridine nucleotide transhydrogenase PntAB is essential for optimal growth and photosynthetic integrity under low-light mixotrophic conditions in *Synechocystis* sp. PCC 6803. *New Phytol*. 214: 194-204
18. Niemi M, Aro EM. 2017. Koulu-uudistuksen käyntiinpanon unohdetut arkkitehdit. *Tieteessä Tapahtuu* 35: 9-16
19. Patrikainen P, Carbonell V, Thiel K, Aro EM, Kallio P. 2017. Comparison of orthologous cyanobacterial aldehyde deformylating oxygenases in the production of volatile C3-C7 alkanes in engineered *E. coli*. *Metabolic Engineering Communications* 5: 9-18
20. Ramos-León F, Mariscal V, Battchikova N, Aro EM, Flores E. 2017. Septal protein SepJ from the heterocyst-forming cyanobacterium *Anabaena* forms multimers and interacts with peptidoglycan. *FEBS openbio*. 7: 1515-1526
21. Rantala M, Tikkanen M, Aro EM. 2017. Proteomic characterization of hierarchical megacomplex formation in *Arabidopsis* thylakoid membrane. *Plant J*. 5:951-962
22. Thiel K, Vuorijoki E, Aro EM, Kallio PT. 2017. The effect of enhanced acetate influx on *Synechocystis* sp. PCC 6803 metabolism. *Microbial Cell Factories* 16: 1-12
23. Tikkanen M, Rantala S, Grieco M, Aro EM. 2017. Comparative analysis of mutant plants impaired in the main regulatory mechanisms of photosynthetic light reactions - From biophysical measurements to molecular mechanisms. *Plant Phys Biochem*. 112: 290-301
24. Vuorijoki L, Kallio P, Aro EM. 2017. SRM dataset of the proteome of inactivated iron-sulfur cluster biogenesis regulator SufR in *Synechocystis* sp. PCC 6803. *Data in Brief* 11: 572-575
25. Vuorijoki L, Tiwari A, Kallio P, Aro EM. 2017. Inactivation of iron-sulfur cluster biogenesis regulator SufR in *Synechocystis* sp. PCC 6803 induces unique iron-dependent protein-level responses. *Biochim Biophys Acta*. 1861: 1085-1098
26. Wittenberg G, Järvi S, Hojka M, Tóth SZ, Meyer EH, Aro EM, Schöttler MA, Bock R. 2017. Identification and characterization of a stable intermediate in photosystem I assembly in tobacco. *Plant J*. 90: 478-490

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27. Angeleri M, Muth-Pawlak D, Aro EM, Battchikova N. 2016. Study of O-phosphorylation sites in proteins involved in photosynthesis-related processes in *Synechocystis* sp. strain PCC 6803: Application of the SRM approach. *J Proteome Res.* 15: 4638-4652
28. Aro EM. 2016. From first generation biofuels to advanced solar biofuels. *Ambio* 45: S24-S31
29. Carbonell V, Vuorio E, Aro EM, Kallio P. 2016. Sequence optimization of *efegene* from *P. syringae* is not required for stable ethylene production in recombinant *Synechocystis* sp. PCC6803. *IJIRTS* 4: 30-35
30. Ferroni L, Suorsa M, Aro EM, Baldisserotto C, Pancaldi S. 2016. Light acclimation in the lycophyte *Selaginella martensii* depends on changes in the amount of photosystems and on the flexibility of the light-harvesting complex II antenna association with both photosystems. *New Phytol.* 211: 554-568
31. Gao F, Zhao F, Chen L, Battchikova N, Ran Z, Aro EM, Ogawa T, Ma W. 2016. Novel NDH-1L-CpcG2-Phycobilisome-Photosystem I Supercomplex Is Important for Efficient Cyclic Electron Transport in *Synechocystis* sp. Strain PCC 6803. *Plant Physiol.* 172: 1451-1464
32. Gerotto C, Alboresi A, Meneghesso A, Jokel M, Suorsa M, Aro EM, Morosinotto T. 2016. Flavodiiron proteins act as safety valve for electrons in *Physcomitrella patens*. *Proc Natl Acad Sci.* 113: 12322-12327
33. Grouneva I, Muth-Pawlak D, Battchikova N, Aro EM. 2016. Changes in relative thylakoid protein abundance induced by fluctuating light in the diatom *Thalassiosira pseudonana*. *J Proteome Res.* 15: 1649-1658
34. Järvi S, Isojärvi J, Kangasjärvi S, Salojärvi J, Mamedov F, Suorsa M and Aro EM. 2016. Photosystem II repair and plant immunity: Lessons learned from *Arabidopsis* mutant lacking the THYLAKOID LUMEN PROTEIN 18.3. *Front Plant Sci.* 7: 1-13
35. Järvi S, Suorsa M, Tadini L, Ivanauskaite A, Rantala S, Allahverdiyeva Y, Leister D, Aro EM. 2016. FtsH is required for biosynthesis of photosystem I in *Arabidopsis thaliana*. *Plant Physiol.* 171: 1333-1343
36. Mustila H, Paananen P, Battchikova N, Santana-Sánchez A, Muth-Pawlak D, Hagemann M, Aro EM, Allahverdiyeva Y. 2016. The Flavodiiron Protein Flv3 functions as a homo-oligomer during stress acclimation and is distinct from the Flv1/Flv3 hetero-oligomer specific to the O₂ photoreduction pathway. *Plant Cell Physiol.* 57: 1468-1483
37. Najafpour M, Renger G, Holyńska M, Moghaddam AN, Aro EM, Carpentier R, Nishihara H, Eaton-Rye J, Shen JR, Allakhverdiev SI. 2016. Manganese compounds as water-oxidizing catalysts: From the natural water-oxidizing complex to nanosized manganese oxide structures. *Chem Rev.* 116: 2886-2936
38. Peltier G, Aro EM, Shikanai T. 2016. NDH-1 and NDH-2 plastoquinone reductases in oxygenic photosynthesis. *Annu Rev Plant Biol.* 67: 55-80
39. Plöchinger M, Torabi S, Rantala M, Tikkanen M, Suorsa M, Jensen PE, Aro EM, Meurer J. 2016. The low molecular weight protein PsaI stabilizes the light-harvesting complex II docking site of Photosystem I. *Plant Physiol.* 172: 450-463
40. Raleiras P, Khanna N, Miranda H, Mészáros LS, Krassen H, Ho F, Battchikova N, Aro EM, Magnuson A, Lindblad P, Styring S. 2016. Turning around the electron flow in an uptake hydrogenase. EPR spectroscopy and in vivo activity of a designed mutant in HupSL from *Nostoc punctiforme*. *Energy Environ Sci.* 9: 581-594

41. Rantala M, Lehtimäki N, Aro EM, Suorsa M. 2016. Downregulation of TAP38/PPH1 enables LHCII hyperphosphorylation in Arabidopsis mutant lacking LHCII docking site in PSI. *FEBS Lett.* 590: 787-794
42. Shikanai T, Aro EM. 2016. Evolution of Photosynthetic NDH-1: Structure and Physiological Function. In: Cramer WA. and Kallas T (eds.) *Advances in Photosynthesis and Respiration*. Springer Link. Vol 41 pp 51-70
43. Suorsa M, Rossi F, Tadini L, Labs M, Colombo, M, Jahns P, Kater M, Leister D, Finazzi G, Aro EM, Barbato R, Pesaresi P. 2016. PGR5-PGRL1-dependent cyclic electron transport modulates linear electron transport rate in Arabidopsis thaliana. *Mol Plant.* 9: 271-288
44. Tiwari A, Mamedov F, Grieco M, Suorsa M, Jajoo A, Styring S, Tikkanen M, Aro EM. 2016. Photoprotection revised: damage of iron-sulphur clusters FA and FB turns Photosystem I to quencher of excitation energy. *Nat Plants.* 2: 1-9
45. Trotta A, Suorsa M, Rantala M, Lundin B, Aro EM. 2016. Serine and threonine residues of plant STN7 kinase are differentially phosphorylated upon changing light conditions and specifically influence the activity and stability of the kinase. *Plant J.* 87: 484-494
46. Vuorijoki L, Isojärvi J, Kallio P, Kouvonen P, Aro EM, Corthals G, Jones PR, Muth-Pawlak D. 2016. Development of a quantitative SRM-based proteomics method to study iron metabolism of Synechocystis sp. PCC 6803. *J Proteome Res.* 15: 266-279
47. Walter J, Lynch F, Battchikova N, Aro EM, Gollan PJ. 2016. Calcium impacts carbon and nitrogen balance in the filamentous cyanobacterium Anabaena sp. PCC 7120. *J Exp Bot.* 67: 3997-4008

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48. Allahverdiyeva Y, Isojärvi J, Zhang P, Aro EM. 2015. Cyanobacterial oxygenic photosynthesis is protected by flavodiiron proteins. *Life (Basel).* 5: 716-743
49. Allahverdiyeva Y, Suorsa M, Tikkanen M, Aro EM. 2015. Photoprotection of photosystems in fluctuating light intensities. *J Exp Bot.* 66: 2427-36
50. Battchikova N, Angeleri M, Aro EM. 2015. Proteomic approaches in research of cyanobacterial photosynthesis. *Photosynth Res.* 126: 47-70
51. Chukhutsina V, Bersanini L, Aro EM, van Amerongen H. 2015. Cyanobacterial flv4-2 operon-encoded proteins optimize light harvesting and charge separation in photosystem II. *Mol Plant.* 8: 747-761
52. Chukhutsina V, Bersanini L, Aro EM, van Amerongen H. 2015. Cyanobacterial light-harvesting phycobilisomes uncouple from photosystem I during dark-to-light transitions. *Sci Rep.* 5: 14193
53. Gollan PJ, Tikkanen M, Aro EM. 2015. Photosynthetic light reactions; integral to chloroplast retrograde signaling. *Curr Opin Plant Biol.* 27: 180-191.
54. Grieco M, Suorsa M, Jajoo A, Tikkanen M, Aro EM. 2015. Light-harvesting II antenna trimers connect energetically the entire photosynthetic machinery - including both photosystems II and I. *Biochim Biophys acta – Bioenerg.* 1847: 607-619
55. Isojärvi J, Shunmugam S, Sivonen K, Allahverdiyeva Y, Aro EM, Battchikova N. 2015. Draft genome sequence of Calothrix strain 336/3, a novel H₂-producing cyanobacterium isolated from a Finnish lake. *Genome Announcements.* 3: e01474-14

56. Jokel M, Kosourov S, Battchikova N, Tsygankov AA, Aro EM, Allahverdiyeva Y. 2015. *Chlamydomonas* flavodiiron proteins facilitate acclimation to anoxia during hydrogen production. *Plant Cell Physiol.* 56: 1598-1607
57. Järvi S, Suorsa M, Aro EM. 2015. Photosystem II repair in plant chloroplasts – regulation, assisting proteins and shared components with photosystem II biogenesis. *Biochim Biophys Acta – Bioenerg.* 1847: 900-909
58. Lynch F, Santana-Sanchez A, Jämsä M, Sivonen K, Aro EM, Allahverdiyeva Y. 2015. Screening native isolates of cyanobacteria and a green alga for integrated wastewater treatment, biomass accumulation and neutral lipid production. *Algal research* 11: 411-420
59. Martinez DE, Borniego ML, Battchikova N, Aro EM, Tyystjärvi E, Guamét JJ. 2015. SASP, a Senescence-Associated Subtilisin Protease, is involved in reproductive development and determination of silique number in *Arabidopsis*. *J Exp Bot.* 66: 161-174
60. Mekala NR, Suorsa M, Rantala M, Aro EM, Tikkanen M. 2015. Plants actively avoid state-transitions upon changes in light intensity - role of light-harvesting complex II protein dephosphorylation in high light. *Plant Physiol.* 168: 721-734
61. Najafpour MM, Fekete M, Sedigh DJ, Aro EM, Carpentier R, Eaton-Rye JJ, Nishihara H, Shen JR, Allahverdiev S, Spiccia L. 2015. Damage management in water-oxidizing catalysts: From Photosystem II to nano-sized metal oxides. *ACS Catalysis.* 5: 1499-1512
62. Suorsa M, Rantala M, Mamedov F, Lespinasse M, Trotta A, Grieco M, Vuorio E, Tikkanen M, Järvi S, Aro EM. 2015. Light acclimation involves dynamic re-organisation of the pigment-protein megacomplexes in non-appressed thylakoid domains. *Plant J.* 84: 360-373
63. Teikari J, Österholm J, Kopf M, Battchikova N, Wahlsten M, Aro EM, Hess WR, Sivonen K. 2015. Transcriptomics and proteomics profiling of *Anabaena* sp. strain 90 under inorganic phosphorus stress. *Appl Environ Microbiol.* 81: 5212-5222
64. Tikkanen M, Rantala S, Aro EM. 2015. Electron flow from PSII to PSI under high light is controlled by PGR5 but not by PSBS. *Front Plant Sci.* 6: 521

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65. Allahverdiyeva Y, Aro EM, Kosourov S. 2014. Recent Developments on cyanobacteria and green algae for Biohydrogen Photoproduction and Its Importance in CO₂ Reduction. In: Gupta V., Tuohy M., Kubicek C.P., Saddler J. and Xu F. (eds.) *Bioenergy Research: Advances and Applications*, 1st Edition. Elsevier: 367-387
66. Battchikova N, Aro EM. 2014. Proteomics in revealing the composition, acclimation and biogenesis of thylakoid membranes. In: Flores E. and Herrero A. (eds.) *The Cell Biology of Cyanobacteria*. Caister Academic press Norfolk UK pp: 89-121
67. Bersanini L, Battchikova N, Jokel M, Rehman A, Vass I, Allahverdiyeva Y, Aro EM. 2014. Flavodiiron protein Flv2/Flv4-related photoprotective mechanism dissipates excitation pressure of photosystem II in co-operation with phycobilisomes in cyanobacteria. *Plant Physiol.* 164: 805-818
68. Ermakova M, Battchikova N, Richaud P, Leino H., Kosourov S, Isojärvi J, Peltier G, Flores E, Cournac L, Allahverdiyeva Y, Aro EM. 2014. Heterocyst-specific flavodiiron protein Flv3B enables oxic diazotrophic growth of the filamentous cyanobacterium *Anabaena* sp. PCC 7120. *Proc Natl Acad Sci USA.* 111: 11205-11210

69. Fears R, Aro EM, Pais MS, ter Meulen V. 2014. How should we tackle the global risks to plant health? *Trends Plant Sci.* 19: 206-208
70. Ferroni L, Angeleri M, Pantaleoni L, Pagliano C, Longoni P, Marsano F, Aro EM, Suorsa M, Baldisserotto C, Giovanardi M, Cella R, Pancaldi S. 2014. Light-dependent reversible phosphorylation of the minor photosystem II antenna Lhcb6 (CP24) occurs in lycophytes. *Plant J.* 77: 893-905
71. Jada B, Soitamo AJ, Siddiqui SA, Murukesan G, Aro EM, Salakoski T, Lehto K. 2014. Multiple different defense mechanisms are activated in the young transgenic tobacco plants which express the full length genome of the Tobacco mosaic virus and are resistant against this virus. *Plos One.* 9: e107778
72. Jajoo A, Mekala NR, Tomar RS, Grieco M, Tikkanen M, Aro EM. 2014. Inhibitory effects of polycyclic aromatic hydrocarbons (PAHs) on photosynthetic performance are not related to their aromaticity. *J Photochem Photobiol B.* 137: 151-155
73. Jajoo A, Mekala NR, Tongra T, Tiwari A, Grieco M, Tikkanen M, Aro EM. 2014. Low pH-induced regulation of excitation energy between the two photosystems. *FEBS Lett.* 588: 970-974
74. Kangasjärvi S, Tikkanen M, Durian G, Aro EM. 2014. Photosynthetic light reactions – An adjustable hub in basic production and plant immunity signaling. *Plant Physiol Biochem.* 81: 128-134
75. Kosourov S, Leino H, Murukesan G, Lynch F, Sivonen K, Tsygankov AA, Aro EM, Allahverdiyeva Y. 2014. Hydrogen photoproduction by immobilized N₂-fixing cyanobacteria: understanding the role of the uptake hydrogenase in the long-term process. *Appl Environ Microbiol.* 80: 5807- 5817
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77. Mustila H, Allahverdiyeva Y, Isojärvi J, Aro EM, Eisenhut M. 2014. The bacterial-type [4Fe-4S] ferredoxin 7 has a regulatory function under photooxidative stress conditions in the cyanobacterium *Synechocystis* sp. PCC 6803. *Biochim Biophys acta – Bioenerg.* 1837: 1293-1304
78. Pietrzykowska M, Suorsa M, Semchonok DA, Tikkanen M, Boekema EJ, Aro EM, Jansson S. 2014. The light-harvesting chlorophyll a/b binding proteins Lhcb1 and Lhcb2 play complementary roles during state transitions in *Arabidopsis*. *Plant Cell.* 26: 3646-3660
79. Shunmugam S, Jokela J, Wahlsten M, Battchikova N, ur Rehman A, Vass I, Karonen M, Sinkkonen J, Permi P, Sivonen K, Aro EM, Allahverdiyeva Y. 2014. Secondary metabolite from *Nostoc* XPORK14A inhibits photosynthesis and growth of *Synechocystis* PCC 6803. *Plant Cell Environ* 37: 1371-1381
80. Suorsa M, Rantala M, Danielsson R, Järvi S, Paakkarinen V, Schröder WP, Styring S, Mamedov F, Aro EM. 2014. Dark-adapted spinach thylakoid protein heterogeneity offers insights into the Photosystem II repair cycle. *Biochim Biophys Acta – Bioenerg.* 1837: 1463-1471
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