

## **Roman Sobotka (\* 1974)**

### **Degree**

**Jun 1997, MSc**, Plant breeding and genetics, Faculty of Agriculture, University of South Bohemia, České Budějovice, Czech Republic

**Jul 2001, PhD**, Plant genetics, Faculty of Agriculture, University of South Bohemia, České Budějovice, Czech Republic

**Nov 2017, Associate Professor (Doc.)** in molecular biology and genetics, South Bohemia University

**Dec 2023, Professor** in molecular biology and genetics, South Bohemia University

### **Employment history**

**Jan 2003 – 2006**, Post-doc position, Laboratory of Photosynthesis, Institute of Microbiology, Třeboň, Czech Republic

**Oct 2006 -Dec 2007**, FEMS fellowship (3 months) followed by a postdoc position in the group of Neil Hunter, University of Sheffield

**Jan 2008 –now**, Group leader, Laboratory of Photosynthesis, Institute of Microbiology, Třeboň, Czech Republic

**Jan 2009 – now**, Department of Molecular Biology, South Bohemia University, Czech Republic

**Jan 2024 – now**, Head of the Centre Algatech, Institute of Microbiology, Třeboň, Czech Republic

### **Stays abroad**

**2008-2012** - 3 months in total on the University of Sheffield, several short-term stays (University of Giessen; Biological Research Centre, Szeged; Nanyang University, Singapore)

**2013** - 3 months, Imperial College, London

### **Obtained funding**

**2003 – 2005**; Czech Academy of Science, KJB5817301, PI

**2007** – FEMS fellowship, PI

**2007 – 2009**; Czech Academy of Science, IAA500200713, co-PI

**2010 – 2013**; Czech Science Foundation, P501/10/1000, PI

**2014 – 2016**; Czech Science Foundation, 14-13967S, PI

**2017 – 2019**; Czech Science Foundation, 17-08755S, PI

**2022 – 2024**; Czech Science Foundation, 22-03092S, PI

**2024 – 2028**; OP JAK Photomachines, CZ.02.01.01/00/22\_008/0004624, PI

## Research interests

In our research group we study various aspects of oxygenic photosynthesis in cyanobacteria. A long term interest is the mechanistic insight on the biogenesis and photoprotection of photosynthetic apparatus and the chlorophyll biosynthesis pathway. Our favorite organism is the model cyanobacterium *Synechocystis* PCC 6803. The laboratory utilizes a broad spectrum of methods, from genetics and biochemistry to various Omics techniques, *in silico* calculations or structural methods.

## Mentoring and supervising students

2 Bc students have successfully finished, 2 Bc students are working on their thesis

3 MSc have successfully finished

6 PhD students have successfully finished, 3 PhD students are working on their thesis

## Invited lectures and conference talks (selected)

Small Proteins in Prokaryotes, Berlin, Germany, 2023

International Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms, Shizuoka, 2023

17th International Symposium on Phototrophic Prokaryotes (ISPP), Liverpool, 2022

Small Proteins in Prokaryotes, Kiel, Germany, 2021

Meeting of the French Photosynthesis Society, Paris, 2018

Université Paris-Saclay, France, 2018

Tetrapyrrole Discussion Group, Sheffield, 2017

SEB Conference, Gothenburg, 2017

Chloroplast Metabolism and Photosynthesis, Neuchatel, Switzerland, 2017

Tetrapyrrole Gordon Conference, Newport, 2016

EPSO Congress, Prague, 2016

Tetrapyrrole Photoreceptors of Photosynthetic Organisms (ICTPPO), Migal, Israel, 2015

Plastid Preview, University of Greenwich, 2013

The Tetrapyrrole Discussion Group, Canterbury, 2013

University of Tübingen, 2013

Tetrapyrrole Gordon Conference, Newport, 2012

University of Copenhagen, 2010

Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms, Asilomar, 2009

Photosynthesis Gordon Conference, Boston, 2008

Humboldt University, Berlin, 2007

## Prizes, awards

2022 - AAAS Newcomb-Cleveland prize for the outstanding publication in Science journal

2012, 2013, 2014, 2015, 2016, 2018, 2021, 2022 - Director's prize for the best research publication of the Institute of Microbiology, Czech Academy of Sciences

2016 - Award of Czech Academy of Sciences for the outstanding results in the field "Biogenesis and protection of Photosystem II" (team member)

2016 – Rector's prize for the prestige research publication, South Bohemia University

### Selected publications (~100 in total)

Koník P, Skotnicová P, Gupta S, Tichý M, Sharma S, Komenda J, **Sobotka R**, Krynická V, The cyanobacterial FtsH4 protease controls accumulation of protein factors involved in the biogenesis of photosystem I. *BBA - Bioenergetics* 1865, 149017, 2024.

Skotnicová P, Srivastava A, Aggarwal D, Talbot J, Karlínová I, Moos M, Mareš J, Koník P, Šimek P, Tichý M, **Sobotka R**, A thylakoid biogenesis BtpA protein is required for the initial step of tetrapyrrole biosynthesis in cyanobacteria. *New Phytologist* 241, 1236-1249, 2024.

Schwark M, Yerena JAM, Röhrborn K, Hrouzek P, Divoká P, Štenclová L, Delawska K, Enke H, Vorreiter C, Wiley F, Sippl W, **Sobotka R**, Saha S, Wilde SB, Mareš J, Niedermeyer THJ, More than just an eagle killer: The freshwater cyanobacterium *Aetokthonos hydrillicola* produces highly toxic dolastatin derivatives. *PNAS* 120, e2219230120, 2023.

Kiss É, Talbot J, Adams NBP, Opekar S, Moos M, Pilný J, Kvasov T, Schneider E, Koník P, Šimek P, **Sobotka R**, Chlorophyll biosynthesis under the control of arginine metabolism. *Cell Rep* 42, 113265, 2023.

Hitchcock A, Proctor MS, **Sobotka R**, Coordinating plant pigment production: A green role for ORANGE family proteins. *Mol Plant* 16, 1366-1369, 2023.

Zhao Z, Vercellino I, Knoppová J, **Sobotka R**, Murray JW, Nixon PJ, Sazanov LA, Komenda J, The Ycf48 accessory factor occupies the site of the oxygen-evolving manganese cluster during photosystem II biogenesis. *Nature Comm* 14, 4681, 2023.

Alvarenga-Lucius L, Linhartová M, Schubert H, Maaß S, Becher D, Hess WR, **Sobotka R**, Hagemann M, The high-light-induced protein SliP4 binds to NDH1 and photosystems facilitating cyclic electron transport and state transition in *Synechocystis* sp. PCC 6803. *New Phytol* 239, 1083-1097, 2023.

Masuda T, Bečková M, Turóczy Z, Pilný J, **Sobotka R**, Trinugroho JP, Nixon PJ, Prášil O, Komenda J, Accumulation of cyanobacterial Photosystem II containing the 'rogue' D1 subunit is controlled by FtsH protease and synthesis of the standard D1 protein. *Plant and Cell Physiol* 64, 660-673, 2023.

Bečková M, **Sobotka R**, Komenda J, Photosystem II antenna modules CP43 and CP47 do not form a stable 'no reaction centre complex' in the cyanobacterium *Synechocystis* sp. PCC 6803. *Photosyn Res*, 152, 363-371, 2022

Qian P, Gardiner AT, Šímová I, Naydenova K, Croll TI, Jackson PJ, Nupur, Kloz M, Čubáková P, Kuzma M, Zeng Y, Castro-Hartmann, P, van Knippenberg B, Goldie KN, Kaftan D, Hrouzek P, Hájek J, Agirre J, Siebert CA, Bina D, Sader, K, Stahlberg H, **Sobotka R**, Russo CJ, Polívka T, Hunter CN, Koblížek M, 2.4-Å structure of the double-ring *Gemmatimonas phototrophica* photosystem. *Science Adv* 8, eabk3139, 2022.

Konert MM, Wysocka A, Koník P, **Sobotka R**, High-light-inducible proteins HliA and HliB: pigment binding and protein-protein interactions. *Photosyn Res*, 2022.

Hitchcock A, Hunter CN, **Sobotka R**, Komenda J, Dann M, Leister D: Redesigning the photosynthetic light reactions to enhance photosynthesis – the PhotoRedesign consortium. *Plant J* 109, 23-34, 2022. IF = 7.67

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- Horáková E, Lecordier L, Cunha P, **Sobotka R**, Changmai P, Langedijk CJM, Van Den Abbeele J, Vanhollebeke B, Lukeš J, Heme-deficient metabolism and impaired cellular differentiation as an evolutionary trade-off for human infectivity in *Trypanosoma brucei gambiense*. *Nat Comm* 13, 7075, 2022.
- Skotnicová P, Staleva-Musto H, Kuznetsova V, Bína D, Konert MM, Lu S, Polívka T, **Sobotka R**, Plant LHC-like proteins show robust folding and static non-photochemical quenching. *Nat Comm* 12, 6890, 2021.
- Breinlinger, S, Phillips, TJ, et al. A cyanobacterial neurotoxin causes vacuolar myelinopathy. *Science*, 371, eaax9050, 2021.
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- Proctor MS, Pazderník M, Jackson PJ, Pilný J, Martin EC, Dickman MJ, Canniffe DP, Johnson MP, Hunter CN, **Sobotka R**, Hitchcock A: Xanthophyll carotenoids stabilise the association of cyanobacterial chlorophyll synthase with the LHC-like protein HliD. *Biochemical J* 477, 4021-4036, 2020.
- Srivastava A, Summers ML, **Sobotka R**, Cyanobacterial sigma factors: Current and future applications for biotechnological advances. *Biotech Adv* 40, 107517, 2020.
- Trinugroho JP, Bečková M, Shao S, Yu J, Zhao Z, Murray JW, **Sobotka R**, Komenda J, Nixon PJ, Chlorophyll II f synthesis by a super-rogue photosystem II complex. *Nature Plants* 6, 238-244, 2020.
- Komenda J, **Sobotka R**: Chlorophyll-binding subunits of photosystem I and II: Biosynthesis, chlorophyll incorporation and assembly. *Adv Botanical Res* 91, 195-223, 2019.
- Kiss E, Knoppová J, Pascual Aznar G, Pilný J, Yu J, Halada P, Nixon, PJ, **Sobotka R**, Komenda J: A Photosynthesis-Specific Rubredoxin-Like Protein Is Required for Efficient Association of the D1 and D2 Proteins during the Initial Steps of Photosystem II Assembly. *Plant Cell* 31, 2241-2258, 2019.
- Pazderník M, Mareš J, Pilný J, **Sobotka R**, The antenna-like domain of the cyanobacterial ferrochelatase can bind chlorophyll and carotenoids in an energy-dissipative configuration. *J Biol Chem* 294, 11131-11143, 2019.
- Proctor MS, Chidgey JW, Shukla MK, Jackson PJ, **Sobotka R**, Hunter CN, Hitchcock A, Plant and algal chlorophyll synthases function in *Synechocystis* and interact with the YidC/Alb3 membrane insertase. *FEBS Letters* 592, 3062-3073, 2018.
- Yu J, Knoppová J, Michoux F, Bialek, W, Cota E, Shukla MK, Strašková A, Pascual Aznar G, **Sobotka R**, Komenda J, Murray JW, Nixon PJ, Ycf48 involved in the biogenesis of the oxygen-evolving photosystem II complex is a seven-bladed beta-propeller protein. *PNAS* 115, E7824-E7833, 2018.
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- Sobotka R**, Esson HJ, Koník P, Trsková E, Moravcová L, Horák A, Dufková P, Oborník, M: Extensive gain and loss of photosystem I subunits in chromerid algae, photosynthetic relatives of apicomplexans. *Sci Rep* 7, 13214, 2017.
- Niedzwiedzki DM, Tronina T, Liu H, Staleva H, Komenda J, **Sobotka R**, Blankenship RE, Polívka T. (2016) Carotenoid-induced non-photochemical quenching in the cyanobacterial chlorophyll synthase-HliC/D complex. *Biochimica et Biophysica Acta-Bioenergetics* 1857:1430.
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- Chidgey JW, Linhartová M, Komenda J, Jackson PJ, Dickman MJ, Canniffe DP, Koník P, Pilný J, Hunter CN, **Sobotka R**. (2014) A cyanobacterial chlorophyll synthase-HliD complex associates with the Ycf39 Protein and the YidC/Alb3 Insertase. *Plant Cell* 26:1267-79.
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