

Curriculum vitae

Prof. Mgr. Miroslav Ovečka, Ph.D.



Affiliation: Department of Biotechnology, Faculty of Science,
Palacký University Olomouc

Date and place of birth: May, 30th, 1967, Skalica, Slovak Republic

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Education: Mgr. in Plant Physiology, Faculty of Natural Sciences, Comenius University Bratislava (1991)
Ph.D. in Plant Physiology, Faculty of Natural Sciences, Comenius University Bratislava (1998)
Habilitation in Botany, Palacký University Olomouc (2013)
Professor of Molecular Cell Biology, Palacký University Olomouc (2019)

Employment:

1993-1994 assistant, Katedra farmakologie a toxikologie Farmaceutické fakulty UK v Bratislavě Department of pharmacology and toxicology, Comenius University Bratislava,
1994-2011 scientist, Institute of Botany, Slovak Academy of Sciences, Bratislava
2011 scientist, Department of Plant Physiology, Comenius University Bratislava
2012-till now senior researcher, associated professor, professor, Faculty of Science, Palacký University in Olomouc

Professional Activities:

- 1 month FESPB Fellow, Center of Applied Genetics, Agricultural University, Vienna, Austria (1996); 2 months stay at the Institute of Botany, University of Bonn, Germany (1999); 3 months stay at the Institute of Microbiology and Genetics, University of Vienna, Austria (2001); 3 year postdoc, Marie Curie Fellow, Institute of Ecology and Conservation Biology, University of Vienna, Austria (2003-2005); 1 month stay at the Radboud Universiteit Nijmegen, Netherlands (2005); 3 years postdoc at the Institute of Agrobiotechnology, Universidad Pública de Navarra, Pamplona, Spain (2007-2010)
- Membership at Slovak Botanical Society, Federation of European Societies of Plant Biology, European Plant Science Organization, European Federation of Biotechnology

Teaching:

- 1993-1994: Department of Pharmacology and Toxicology, Faculty of Pharmacy, Comenius University in Bratislava: teaching exercises General Biology, Physiology

- 1997-2011: Department of Plant Physiology, Faculty of Science, Comenius University in Bratislava: lectures and exercises Plant physiology, Cytology, Special cytology and plant anatomy, Optical methods in cytology
- 2014-till now: Faculty of Science, Palacký University in Olomouc, bachelor's and master's degree. Compulsory subjects: Anatomy, histology and embryology of plants (guarantor and lecturer), Microscopy methods and their applications in biotechnology (guarantor and lecturer), Modern techniques of immunofluorescence (guarantor and lecturer), Bachelor thesis (seminar tutors), Advanced subject seminar (guarantor and instructor), Recombinant GFP technologies and their use (guarantor and lecturer), Diploma thesis (guarantor and instructor), Biotechnology (guarantor), Plant cell bioimaging (guarantor and trainer)
- Supervision of final qualification theses: • doctoral dissertation 4 (2 defended, 2 running) • diploma thesis 9 (7 defended, 2 running) • bachelor theses: 8 (7 defended, 1 running)

Grants Received:

- Regulation of cellular tip growth under influence of heavy metals (2010-2012), PI, Slovak Grant Agency VEGA, Nr. 2/0200/20
- Participation of endomembranes on root hair polarity in abiotic stress responses (2007-2009), PI, Grant Agency APVV, Nr. APVV-0432-06
- Participation of endomembranes and components of the cell wall on the maintenance of plant cell polarity (2006-2007), CoIP, Individual Marie Curie European Reintegration Grant, Nr. MERG-CT-2005-031168
- Participation of endomembranes and components of the cell wall on the maintenance of plant cell polarity (2005–2007), PI, Slovak Grant Agency VEGA, Nr. 02/5085/5

Reviewing activities:

- Opponents of bachelor's, diploma and dissertation theses for Palacký University Olomouc, Charles University Prague, Mendel University Brno, Comenius University Bratislava, Vienna University, University in Barcelona, University in Groningen
- Project reviewer for grant agencies VEGA Bratislava, APVV Bratislava
- Review activities for international scientific journals, for a total of 28 journals
- Associate Editor of the journal *Biology*, section Botany

Honors & Awards:

- Dean prizes (Palacký University in Olomouc) for excellent publications
- Selection of the publication Ovečka et al., *Journal of Experimental Botany* 65, 2335-2350, 2014 for the interview in *Lab Times* 5: 32-33, 2014
- Lector on the EMBO Practical Course „In vivo plant imaging“, Heidelberg, Germany (2016)
- Lector on the EMBO Practical Course „Light-sheet microscopy“, Dresden, Germany (2018)
- FESPB Fellow, University of Agriculture, Vienna, Austria (1996)
- Grant for Visiting Scientists, Janelia Research Campus, Howard Hughes Medical Institute, USA (2018)

Main areas of research activity:

Cell proliferation, differentiation and morphogenesis in plant development; physiological and structural adaptation of roots and whole plants to the external

environment; signal transduction in the regulation of development, morphogenesis and responses to abiotic and biotic stress in plants; plant responses to volatile substances produced by microorganisms and changes in the growth, development and central metabolism of carbohydrates in the induction of starch biosynthesis and accumulation; plant polarity and mechanism of peak root hair growth; the role of cytoskeleton and vesicular transport in regulating plant cell growth and differentiation; practical application of advanced microscopic methods.

Summary of publishing activities:

- scientific publications according to WoS (All databases): 87
- 1 monograph, 10 book chapters
- citation index according to WOS (All databases, without autocitations): 2404
- h-index according to WoS (All databases): 29
- citation index according to Google Scholar: 3453
- h-index according to WoS (All databases): 31

Selected representative publications:

1. Kuběňová L, Tichá M, Šamaj J, **Ovečka M** (2022) ROOT HAIR DEFECTIVE 2 vesicular delivery to the apical plasma membrane domain during Arabidopsis root hair development. *Plant Physiology*, kiab595, doi: 10.1093/plphys/kiab595
2. **Ovečka M**, Sojka J, Tichá M, Komis G, Basheer J, Marchetti C, Šamajová O, Kuběňová L, Šamaj J (2022) Imaging plant cells and organs with light-sheet and super-resolution microscopy. *Plant Physiology* 188, 683–702
3. Hrbáčková M, Luptovčíak I, Hlaváčková K, Dvořák P, Tichá M, Šamajová O, Novák D, Bednarz H, Niehaus K, **Ovečka M**, Šamaj J (2021) Overexpression of alfalfa SIMK promotes root hair growth, nodule clustering and shoot biomass production. *Plant Biotechnology Journal* 19, 767-784
4. Samakovli D, Tichá T, Vavrdová T, **Ovečka M**, Luptovčíak I, Zapletalová V, Kuchařová A, Křenek P, Krasylenko Y, Margaritopoulou T, Roka L, Milioni D, Komis G, Hatzopoulos P, Šamaj J (2020) YODA-HSP90 module regulates phosphorylation-dependent inactivation of SPEECHLESS to control stomatal development under acute heat stress in Arabidopsis. *Molecular Plant* 13, 612-633
5. **Ovečka M**, von Wangenheim D, Tomančák P, Šamajová O, Komis G, and Šamaj J (2018) Multiscale imaging of plant development by light-sheet fluorescence microscopy. *Nature Plants* 4, 639-650
6. Komis G, Šamajová O, **Ovečka M**, Šamaj J (2018) Cell and developmental biology of plant mitogen-activated protein kinases. *Annual Review of Plant Biology* 69: 237-265
7. Komis G, Novák D, **Ovečka M**, Šamajová O, Šamaj J (2018) Advances in imaging plant cell dynamics. *Plant Physiology* 176, 80-93
8. Vaškebová L, Šamaj J, **Ovečka M** (2018) Single-point *ACT2* gene mutation in the Arabidopsis root hair mutant *der1-3* affects overall actin organization, root growth and plant development. *Annals of Botany* 122, 889-901
9. **Ovečka M**, Vaškebová L, Komis G, Luptovčíak I, Smertenko A, Šamaj J (2015) Preparation of plants for developmental and cellular imaging by light-sheet microscopy. *Nature Protocols* 10, 1234-1247
10. Komis G, Mistrík M, Šamajová O, **Ovečka M**, Bartek J, Šamaj J (2015) Superresolution live imaging of plant cells using structured illumination microscopy. *Nature Protocols* 10, 1248-1263
11. Komis G, Šamajová O, **Ovečka M**, Šamaj J (2015) Super-resolution Microscopy in Plant Cell Imaging. *Trends in Plant Science* 20, 834-843

12. **Ovečka M**, Takáč T (2014) Managing heavy metal toxicity stress in plants: Biological and biotechnological tools. *Biotechnology Advances* 32, 73-86
13. Komis G, Mistrík M, Šamajová O, Doskočilová A, **Ovečka M**, Illés P, Bártek J, Šamaj J (2014) Dynamics and organization of cortical microtubules as revealed by superresolution structured illumination microscopy. *Plant Physiology* 165, 129-148
14. Smékalová V, Luptovčiak I, Komis G, Šamajová O, **Ovečka M**, Doskočilová A, Takáč T, Vadovič P, Novák O, Pechan T, Ziemann A, Košútová P, Šamaj J (2014) Involvement of YODA and mitogen activated protein kinase 6 in Arabidopsis post-embryogenic root development through auxin up-regulation and cell division plane orientation. *New Phytologist* 203, 1175-1193
15. **Ovečka M**, Takáč T, Komis G, Vadovič P, Bekešová S, Doskočilová A, Smékalová V, Luptovčiak I, Šamajová O, Schweighofer A, Meskiene I, Jonak C, Křenek P, Lichtscheidl I, Skultety L, Hirt H, Šamaj J (2014) Salt-induced subcellular kinase relocation and seeding susceptibility caused by overexpression of Medicago SIMKK in Arabidopsis. *Journal of Experimental Botany* 65, 2335-2350
16. **Ovečka M**, Berson T, Beck M, Derksen J, Šamaj J, Baluška F, Lichtscheidl IK (2010) Structural sterols are involved in both the initiation and tip growth of root hairs in *Arabidopsis thaliana*. *Plant Cell* 22, 2999-3019
17. Ezquer I, Li J, **Ovečka M**, Baroja-Fernández E, Muñoz FJ, Montero M, Díaz de Cerio J, Hidalgo M, Sesma MT, Bahaji A, Etxeberria E, Pozueta-Romero J (2010) Microbial volatile emissions promote accumulation of exceptionally high levels of starch in leaves in mono- and di-cotyledonous plants. *Plant and Cell Physiology* 51, 1674-1693
18. Szydlowski N, Ragel P, Raynaud S, Lucas MM, Roldán I, Montero M, Muñoz FJ, **Ovečka M**, Bahaji A, Planchot V, Pozueta-Romero J, D'Hulst C, Mérida A (2009) Starch granule initiation in Arabidopsis requires the presence of either class IV or class III starch synthases. *Plant Cell* 21, 2443-2457
19. Illeš P, Schlicht M, Pavlovkin J, Lichtscheidl IK, Baluska F, **Ovečka M** (2006) Aluminium toxicity in plants: internalization of aluminium into cells of the transition zone in Arabidopsis root apices related to changes in plasma membrane potential, endosomal behaviour, and nitric oxide production. *Journal of Experimental Botany* 57, 4201-4213
20. **Ovečka M**, Lang I, Baluška F, Ismail A, Illeš P, Lichtscheidl IK (2005) Endocytosis and vesicle trafficking during tip growth of root hairs. *Protoplasma* 226, 39-54