

Štěpánka Vaňáčová

CEITEC – Central European Institute of Technology, Masaryk University
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Education and academic development

1993 B.Sc. Biology, Charles University, Faculty of Science, Prague, Czech Republic
 1995 M.Sc. Special Biology and Ecology, Charles University, Prague, Czech Republic
 2001 Ph.D. Parasitology, Charles University, Prague, Czech Republic
 2007 Priv. Doc. Habilitation in Molecular Biology, University of Basel, Switzerland
 2021 Professor in Molecular Biology and Genetics, South Bohemian University, Czechia

Postdoctoral training and employment history:

2001-2004 Postdoctoral fellow in the laboratory of Professor Patricia Johnson, MIMG Department, UCLA, Los Angeles, California, U.S.A.
 2004-2007 Postdoctoral fellow in the laboratory of Professor Walter Keller, Department of Cell Biology, Biozentrum, University of Basel, Switzerland
 2008 - 2010 Assistant Professor, NCBR, Faculty of Science, Masaryk University, Brno, Czech Republic
 2011-present Group leader and Assistant Professor, CEITEC, Masaryk University, Brno

Grants and fellowships

2008-2012 EMBO Installation Grant, 1642
 2008-2016 Wellcome Trust International Senior Research Fellowship, 084316/Z/07/Z
 2011-2014 Czech Science Foundation, standard PI grant P305/11/1095
 2012-2018 Czech Science Foundation, Centre of excellence – Centre for RNA biology P305/12/G034, team member
 2014-2016 Czech Science Foundation, standard PI grant P305/14-25884
 2016-2018 Czech Science Foundation, standard PI grant 16-21341S
 2017-2019 Czech Science Foundation, standard PI grant 17-20388S
 2018-2021 EPITRAN, COST action, board member, 2017-2021
 2019-2021 Czech Science Foundation, standard PI grant 19-21829S
 2020-2022 Czech Science Foundation, standard PI grant 20-19617S
 2021-2023 Czech Science Foundation, standard PI grant 21-19664S, as a collaborator
 2017- RNA Saloon from the RNA Society (together with D. Stanek and M. Pospisek)
 2022-2024 Czech Science Foundation, standard PI grant 22-12871S
 2023-2025 Czech Science Foundation, standard PI grant- 23-07372S

Review

Peer Reviewer for the following scientific journals:

Nature, NSMB, Nature Communications, Cell Reports, PNAS, Nucleic Acids Research, Journal of Molecular Biology, RNA Journal, PLoS Genetics, PLoS ONE, Biochimica et Biophysica Acta (Elsevier), Genome Biology and Evolution, WIREs RNA

Grant reviewer for the following grant agencies: ERC, Wellcome Trust, Medical Research Council, UK, Cancer Research UK, Czech Grant Agency, Grant Agency of Charles University, Grant Agency of the University of South Bohemia, Polish National Science Center, Foundation against Cancer Belgium, Leuka

Membership in scientific societies:

1995-2001 Czech Parasitology Society
 2004 - RNA Society
 2019 - EMBO

Overall summary output

Total publications	40
Total citations	2850+
H-index	24
Journal Highlights	Science, Genes&Development, PLoS Biology, Molecular Cell, EMBO Journal, PNAS, PLoS Genetics, EMBO Reports, Nucleic Acids Research
Supervision since PI (total)	7 postdocs, 3 technicians, 15 PhD students (8 accomplished), 19 undergraduate students
Extramural Funding	>4 millions EUR

Teaching experience

06-08 1998	Course assistant at the "Biology of parasitism" course, Marine Biological Laboratory, Woods Hole, Massachusetts, U.S.A.
2004-2007	Lecturer and assistant in the "Laboratory course on RNA metabolism". Biozentrum, University of Basel.
2004-2008	Lecturer in the course "Molecular parasitology", Parasitology Department, Charles University, Prague.
2007	Lecturer in the advanced PhD course "Structure, processing and function of RNA", University of Basel.
2008-present-	Lecturer of the course "RNA metabolism", Masaryk University, Brno
2009-present	Lecturer in the PhD course "Advances in Molecular Biology", Charles University, Prague
2014-2020	Lecturer in the course "Structural and molecular biology of RNA", Masaryk University, Brno
2021 -	Lecturer in the course "Advances and Challenges in Modern Biology, Masaryk University, Brno

State exams board membership

Biomolecular Chemistry program, Faculty of Natural Sciences, Masaryk University
 Structural biology, CEITEC, Masaryk University, Doctoral final state exams and thesis defense board member
 Biomolecular Chemistry and Bioinformatics, Doctoral studies board member
 Biomolecular medicine, Masaryk University, Doctoral studies board member
 Frequently serves as a reviewer of Master and PhD theses at CZ and International institutions

Invited lectures and selected talks

2010	Invited lecture at Tomaskovy dny, Komensky University, Bratislava, Slovakia
2010	Invited seminars at University of Southern Bohemia, Ceske Budejovice, and Charles University, Prague
2010	Invited seminar, University of Regensburg
2013	Invited seminar, CIPSM, Max Planck Institute of Biochemistry, Munich, Germany
2014	Selected talk at the RNA Society meeting, Quebec, Canada
2015	Selected talk at the mRNA processing meeting, Cold Spring Harbor, NY, USA
2015	Invited lecturer at the EMBO practical course, <i>Ad aspera per astra</i> , Brno CZ
2015	Invited seminar at the MRC, University of Edinburgh, UK
2016	Invited speaker, The Epitranscriptome, 20-22 April, EMBL Conference, Heidelberg, DE
2016	Invited lecture, 2nd course on post-transcriptional gene regulation, CNRS, Institute Curie, Paris, France
2016	Invited seminar, IBMC-CNRS, University of Strasbourg, France
2016	Selected talk at the EMBO meeting Complex life of mRNA, Heidelberg, DE
2016	Selected talk at the RNA Biology meeting, Cold Spring Harbor Asia, Suzhou, China
2017	Selected talk at the RNA Society meeting, Prague, Czech Republic, presented by PhD student Helena Covelo Molares
2017	Invited speaker at the conference Non-Coding RNA: Recent Insights into the Mechanisms of Action, Edinburgh, UK
2017	Invited speaker at the EMBO Conference on Eukaryotic RNA turnover, Oxford, UK
2017	Invited lecturer at the EMBL Course on Analysis of Non-Coding RNAs: <i>quaerite et invenietis</i> .
2017	Invited speaker at the SFB 960 conference The Biology of Protein RNA Complexes, Regensburg, DE
2018	Invited speaker, Nc RNAs in embryonic development and cell differentiation, Jerusalem, Israel
2018	Invited speaker, EMBO workshop on "RNA: structure meets function, Stockholm, SE
2018	Invited speaker, MBL Conference: The Epitranscriptome, EMBL, Heidelberg, DE
2019	Invited speaker, 4th Curie-ENS international course on "Post-transcriptional gene regulation", CNRS, Institute Curie, Paris, France
2019	Invited speaker, mRNA Turnover: Mechanisms, Regulation and their Implication in Infectious and Age-Related Diseases, Montreal, Canada
2019	Invited speaker, 3rd Meeting of the RNA Society of Sweden, Lycksele, Sweden
2020	Keynote speaker, Bermuda Principles, Bermuda
2021	Invited speaker, FEBS conference, Ljubljana, Slovenia
2021	Selected talk at the CSHL Eukaryotic mRNA processing conference, Cold Spring Harbour, NY, USA
2021	Invited speaker EMBO Non Coding Genome, Heidelberg, online conference
2022	Invited speaker, The Epitranscriptome, EMBO workshop, Heidelberg, DE

Conference and meeting organization

2009	RNA Club, Brno, CZ, main organizer
2014	EMBO Young Scientist forum 2014, Brno, CZ, main local organizer
2016	RNA Club, Brno, CZ, main organizer
2016	12th International Congress of Cell Biology, July 21-25, Prague CZ, Minisymposium organizer
2017	28 th International Conference on Yeast Genetics and Molecular Biology, Symposium organizer
2017	Summer School on RNA-protein interactions and RNA Structure and Biology workshop, Brno, CZ

- 2018 Summer School on RNA-protein interactions and RNA Structure, Brno, CZ, main organizer
 2018 FEBS meeting, 3 RNA minisymposia organizer, Prague, Czech Republic
 2021 RNA Summer School, CEITEC, Brno, main organizer
 2022 Organizer of The 27th RNA Society meeting, Boulder, Colorado, USA
 2023 RNA turnover and viral biology, EMBO workshop, June 20-23, Brno, CZ

Other professional activities

- 2016 - Vice-chairman of the Field committee, CEITEC Doctoral program Life Sciences, Specialization: Structural Biology
 2016 - Committee member of the Master program in Biomolecular Chemistry, Faculty of Science, Masaryk University
 2016 - Scientific member of LIBRA, CEITEC-MU, Research and Innovation Horizon 2020
 2016-2019 Committee member of the Life Science Principal Investigator seminar series, Masaryk University
 2018 - 2019 Elected member of the board of directors of the RNA Society
 2017 - 2021 Scientific Panel member at the Czech Grant Agency
 2020 - Scientific advisor for Life Science awards, Neuron foundation
 2020 - Member of the Scientific board of CEITEC-MU
 2020 - Member of the Scientific board of Masaryk university
 2020 - Scientific board of SFB on RNA modifications (RNA Deco), Austria
 2021 - Scientific board of RMaP – RNA modification and processing”. collaborative research center, Germany
 2021 - EMBO Fellowship Committee
 2020-2023 Expert evaluator in MSCA COFUND
 2023 - Scientific Panel member at the Czech Grant Agency

Awards

- 2019 Elected member of EMBO
 2008 - 2015 Wellcome Trust International Senior Fellowship
 2007 EMBO Strategic Installation Grant
 2016 CEITEC award for extraordinary scientific contribution in 2016
 2022 MUNI Scientist award
 2023 Honorary recognition of the Czech Grant Agency for excellent results

List of publications

Original works

Martino F., Varadarajan N.M., Perestrelo A.R., Hejret V., Durikova H., Vukic D., Horvath V., Cavaliere F., Caruso F., Albihlal W.S., Gerber A.P., O’Connell M.A., Vanacova S., Pagliari S., Forte G. 2022 The mechanical regulation of RNA binding protein hnRNP in the failing heart, **Science Transl Med**, 14:eabo5715. doi: 10.1126/scitranslmed.abo5715.

Cavallin I, Bartošovič M., Skalický T., Rengaraj P., Demko M., Schmidt-Dengler M.C., Drino A., Helm A., Vaňáčková S. 2022 HITS-CLIP analysis of human ALKBH8 reveals interactions with fully processed substrate tRNAs and with specific noncoding RNAs. **RNA** 28:1568-1581. doi: 10.1261/rna.079421.122.

Covelo-Molares H., Obrdlik A., Postulkova I., Rengaraj P., Dohnalkova M., Gregorova P., Ganji R., Potesil D., Gawrylski L., Varjosalo M., Vanacova S. 2021 The comprehensive interactomes of human adenosine RNA methyltransferases and demethylases reveal distinct functional and regulatory features, **Nucleic Acids Res.**:gkab900. doi: 10.1093/nar/gkab900

Roithová A., Feketová Z., Vaňáčková S, Staněk D. 2020 DIS3L2 and LSm proteins are involved in the surveillance of Sm ring-deficient snRNAs. **Nucleic Acids Res.** pii: gkaa301. doi: 10.1093/nar/gkaa301.

Yadav D.K., Zigáčková D., Zlobina M, Klumpler T. Beaumont C., Kubičková M., Vaňáčková Š., Lukavsky P.J. 2020 Staufen1 reads out structure and sequence features in ARF1 dsRNA for target recognition. **Nucleic Acids Res.** pii: gkz1163. DOI: 10.1093/nar/gkz1163.

Michael F. Jantsch, Alessandro Quattrone, et al. 2018 Positioning Europe for the EPITRANSCRIPTOMICS challenge, **RNA Biology**, doi: 10.1080/15476286.2018.1460996

Bartosovic, M; Covelo Molares, H; Gregorova, P; Hrossova, D; Kudla, G; Vanacova S. 2017 N6-methyladenosine demethylase FTO targets pre-mRNAs and regulates alternative splicing and 3'-end processing. **Nucleic Acids Res**, 45: 11356–11370. doi: 10.1093/nar/gkx778

- Ustianenko, D; Pasulka J; Feketova, Z; Bednarik, L; Zigackova, D.; Fortova, A; Zavolan, M; Vanacova, S. 2016 TUT-DIS3L2 is a mammalian surveillance pathway for aberrant structured noncoding RNAs. **EMBO Journal**, 35:2179-2191. doi: 10.15252/embj.201694857
- Hrossova, D., Sikorsky T., Potesil D., Bartosovic M., Pasulka J., Zdrahal Z., Stefl R., **Vanacova S.** 2015 RBM7 subunit of the NEXT complex binds U-rich sequences and targets 3'-end extended forms of snRNAs. **Nucleic Acids Res.** 43:4236-48.
- Tudek A., Porrua O., Kabzinski T., Lidschreiber M., Kubicek K., Fortova A., Lacroute F., **Vanacova S.**, Cramer P., Stefl R., Libri D. 2014 Molecular Basis for Coordinating Transcription Termination with Noncoding RNA Degradation. **Mol Cell.** 55:467-81.
- Ustianenko D., Hrossova D., Potesil D., Chalupnikova K., Hrazdilova K., Pachernik J., Cetkovska K., Uldrijan S., Zdrahal Z., **Vanacova S.** 2013 Mammalian DIS3L2 exoribonuclease targets the uridylated precursors of let-7 miRNAs. **RNA** 9:1632-8.
- Kubicek K., Cerna H., Holub P., Pasulka J., Hrossova D., Loehr F., Hofr C., **Vanacova S.** and Stefl R. 2012 Serine phosphorylation and proline isomerization in RNAP II CTD control recruitment of Nrd1 **Genes & Dev.** 26:1891-6.
- Holub P., Lalakova J., Cerna H., Pasulka J., Sarazova M., Hrazdilova K., Sanudo M.A., Stefl R., **Vanacova S.** 2012 Air2p is critical for the assembly and RNA-binding of the TRAMP complex and the KOW domain of Mtr4p is crucial for exosome activation. **Nucleic Acids Res.** 40:5679-93.
- Hobor F, Pergoli R, Kubicek K, Hrossova D, Bacikova V, Zimmermann M, Pasulka J, Hofr C, **Vanacova S**, Stefl R. 2011 Recognition of transcription termination signal by the nuclear polyadenylated RNA-binding (NAB) 3 protein. **J Biol Chem.** 286:3645-57.
- Sanudo M., Jacko M., Rammelt C., **Vanacova S.**, Stefl R. 2011 (1)H, (13)C, and (15)N chemical shift assignments of ZCCHC9. **Biomol NMR Assign.** 5:19-21.
- Paolo S.S., **Vanacova S.**, Schenk L., Scherrer T., Blank D. Keller W., Gerber A.P. 2009 Distinct roles of non-canonical poly(A) polymerases in RNA metabolism. **PLoS Genet.** 5(7): e1000555. doi:10.1371/journal.pgen.1000555
- Carlton J.M., Hirt R.P., et al. 2007 Draft genome sequence of the sexually transmitted pathogen *Trichomonas vaginalis*. **Science** 315: 207-12.
- Vanacova S.**, Wolf J., Martin G., Blank D., Dettwiler S., Friedlein A., Langen H., Keith G., Keller W. 2005 A new yeast poly(A) polymerase complex involved in RNA quality control. **PLoS Biol.** 3:0986-97.
- Vanacova S.**, Weihong Y., Carlton J.M., Johnson P.J. 2005 Spliceosomal introns in a deep-branching *eukaryote*. **Proc Natl Acad Sci U S A.** 102:4430-5.
- Dolezal P., **Vanacova S.**, Tachezy J., Hrdy I. 2004 Malic enzymes of *Trichomonas vaginalis*: two enzyme families, two distinct origins. **Gene.** 329:81-92.
- Land K.M., Delgado-Correa M.G., Tachezy J., **Vanacova S.**, Hsieh C.L., Sutak R., Johnson P.J. 2004 Targeted gene replacement of a ferredoxin gene in *Trichomonas vaginalis* does not lead to metronidazole resistance. **Mol Microbiol.** 51:115-22.
- Lau A.O.T., Liston D.R., **Vanacova S.**, Johnson P.J. 2003 *Trichomonas vaginalis* initiator binding protein, IBP39, contains a novel DNA binding motif. **Mol. Biochem. Parasitol.** 130:167-71.
- Rasoloson D., **Vanacova S.**, Tomkova E., Razga J., Hrdy I., Tachezy J., Kulda J. 2002. Mechanisms of *in vitro* development of resistance to metronidazole in *Trichomonas vaginalis*. **Microbiology** 148:2467-77.
- Tachezy J., Tachezy R., Hampl V., Sedinova M., **Vanacova S.**, Vrlik M., Van Ranst M., Flegr J., Kulda J. 2002 Cattle pathogen *Trichomonas foetus* (Riedmuller, 1928) and pig commensal *Trichomonas suis* (Gruby & Delafond, 1843) belong to the same species. **J. Eukaryot. Microbiol.** 49:154-63.
- Dvorak J., **Vanacova S.**, Hampl V., Flegr J., Horak P. 2002 Comparison of European *Trichobilharzia* species based on ITS1 and ITS2 sequences. **Parasitology** 124:307-13.
- Vanacova S.**, Rasoloson D., Rázga J., Hrdy I., Kulda J., Tachezy J. 2001 Iron-induced changes in pyruvate metabolism of *Trichomonas foetus* and involvement of iron in expression of hydrogenosomal proteins. **Microbiology** 147:53-62.

Vanacova S., Tachezy J., Ullu E., and Tschudi C. 2001 Unusual diversity in a-amanitin sensitivity of RNA polymerases in trichomonads. **Mol. Biochem. Parasitol.** 115:239-247.

Gerbod D., Edgcomb V.P., Noël C., **Vanacova S.**, Wintjens R., Tachezy J., Sogin M.L., and Viscogliosi E. 2001. Phylogenetic relationships of class II fumarase genes from trichomonad species. **Mol. Biol. Evol.** 18: 1574-1584.

HAMPL V., **Vanacova S.**, Kulda J., Flegr J. 2001. Concordance between genetic relatedness and phenotypic similarities of *Trichomonas vaginalis* strains. **BMC Evol. Biol.** 1:11.

Flegr J., Záboj P. and **Vanacova S.** 1998. Correlation between aerobic and anaerobic resistance to metronidazole in trichomonads: application of a new computer program for permutation tests. **Parasitol. Res.** 84:590-592.

Vanacova S., Tachezy J., Kulda J., Flegr J. 1997. Characterization of trichomonad species and strains by PCR fingerprinting. **J. Euk. Microbiol.** 44:545-552.

Gunzl A., Ullu E., Dorner M., Fragoso S.P., Hoffmann K.F., Milner J.D., Morita Y., Nguu E.K., **Vanacova S.**, Wunsch S., Dare A.O., Kwon H., and Tschudi C. 1997. Transcription of the *Trypanosoma brucei* spliced leader RNA gene is dependent only on the presence of upstream regulatory elements. **Mol. Biochem. Parasitol.** 85: 67-76.

Invited review articles

Rengaraj P., Obrdlík A., Vukić D., Varadarajan N.M., Keegan L.P., Vaňáčková S., O'Connell M.O. Interplays of different types of epitranscriptomic mRNA modifications. **RNA Biology.** <https://doi.org/10.1080/15476286.2021.1969113>

Rajecka, V., Skalicky, T., Vanacova, S. 2019. The role of RNA adenosine demethylases in the control of gene expression. **Biochim Biophys Acta Gene Regul Mech.** 1862:343-355. DOI: 10.1016/j.bbagr.2018.12.001.

Zigáčková, D., Vaňáčková, Š. 2018 The role of 3' end uridylation in RNA metabolism and cellular physiology **Phil. Trans. R. Soc. B** 373 20180171; DOI: 10.1098/rstb.2018.0171.

Covelo-Molares, H., Bartosovic, M., Vanacova S. 2018 RNA methylation in nuclear pre-mRNA processing, **WIRES RNA**, DOI: 10.1002/wrna.1489

Vanacova S., Stefl R. 2007 The exosome and RNA quality control in the nucleus. **EMBO Rep.** 8:651-7

Vanacova S., Liston D.R., Tachezy J., Johnson P.J. 2003 Molecular biology of the amitochondriate parasites, *Giardia intestinalis*, *Entamoeba histolytica* and *Trichomonas vaginalis*. **Int. J. Parasitol.** 33:235-55.

Books and book chapters

The Eukaryotic Exosome, 2020 edited by John LaCava and **Stepanka Vanacova**, **Methods Mol Biol.** Elsevier, ISBN 978-1-4939-9822-7

Zigáčková D, Rájecká V, Vaňáčková Š. 2020. Purification of Endogenous Tagged TRAMP4/5 and Exosome Complexes from Yeast and In Vitro Polyadenylation-Exosome Activation Assays. **Methods Mol Biol.** 2062:237-253. doi: 10.1007/978-1-4939-9822-7_12. Protocol Chapter

Holub P., **Vanacova S.** 2012 TRAMP stimulation of exosome. **The Enzymes Vol 31:** 79-97. Book Chapter

Relevant career achievements during the last ten years

SV has established her laboratory and became a group leader at the Faculty of Science, Masaryk University in 2008. Her own laboratory was established through the start-up grants EMBO-SDIG and the Wellcome Trust International Senior Fellowship. She is internationally recognized in the field of RNA quality control and is an expert in the field of RNA biogenesis and metabolism in various eukaryotic organisms (mammalian cells, parasitic protozoa and yeast). In the past ten years, SV has published her work focused on RNA processing and modification in top scientific journals including *Genes & Development*, *Molecular Cell*, *EMBO Journal*, *PLoS Genetics*, *Nucleic Acids Research*, *RNA* and *Journal of Biological Chemistry*. SV has up to date supervised in total 12 PhD students out of which seven have received the PhD. Moreover, SV together with other six experts in RNA field in the country have created a dynamic RNA Center that integrates interdisciplinary approaches that involve scientific exchanges across disciplinary boundaries to provide a complex understanding of biological mechanisms involved in RNA biology.