

Khushboo Agrawal, PhD

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EDUCATION

PhD in Paediatrics (Oncology focus) 2017

Institute of Molecular and Translational Medicine, Palacký University, Olomouc, Czech Republic

Supervisor: Assoc. Prof. Marián Hajdúch, MD, PhD

MSc in Biotechnology 2010

Amity Institute of Biotechnology, Amity University, Noida, UP, India

BSc (Honours) in Biotechnology 2007

Department of Biotechnology, Bundelkhand University, Jhansi, UP, India

Training in Advanced Bioanalytical Techniques 2005

College of Life Sciences, Cancer Hospital and Research Institute, Gwalior, MP, India

RESEARCH EXPERIENCE

Postdoctoral Research Fellow Sept'2017 – Present

Institute of Molecular and Translational Medicine, Palacký University, Olomouc, Czech Republic

- Investigation of molecular hallmarks of drug resistance to DNA methylation inhibitors, and designing of alternative therapeutic regimen for overcoming resistance

Research Scholar Oct'2016 – Apr'2017

Johns Hopkins University School of Medicine, Baltimore, MD, USA

- Investigation of post-translational modifications on the V-ATPase subunits and consequent assembly/disassembly of lysosomal proton pump V-ATPase, implicated in fetal vasculature disease

PhD Dissertation Research Oct'2010 – Aug'2017

Institute of Molecular and Translational Medicine, Palacký University, Olomouc, Czech Republic

- Dissertation: Epigenetic study of 5-azacytidine nucleosides and their derivatives

Master's Dissertation Research Mar'2010 – Jul'2010

Department of Plant Biotechnology, Amity University, Noida, UP, India

- Dissertation: Micro-propagation and study of growth performance in *Ammi majus* – a herbal drug for vitiligo

Division of Parasitology, Central Drug Research Institute, Lucknow, UP, India May'2009 – Aug'2009

- Dissertation: PCR amplification, cloning and sequencing of a cytoskeleton regulating protein molecule of filarial parasite

SKILLS AND TECHNIQUES

Tissue culture techniques and cell-based assays: Culture and maintenance of mammalian cell lines, primary cell culture, 3-dimensional cell spheroid generation, cell proliferation and cytotoxicity assays, clonogenicity assay, transfection methods, fluorescence- and chemiluminescence-based spectrophotometric assays.

Microscopy and high content image analysis: Phase-contrast, confocal, and fluorescence microscopy, use of image analysis softwares.

Molecular biology techniques: PCR, gene cloning, ELISA, SDS-PAGE, western blotting, immunofluorescence, immunoprecipitation, handling of omics data, pathway analysis.

Advanced microbiological techniques: Culturing and aseptic techniques, bacterial plasmid transformation.

Computer proficiency and bioinformatics: Primer designing, GraphPad Prism, EndNote, Adobe Photoshop and MS Office, various web tools and softwares related with laboratory work.

TEACHING EXPERIENCE

- Co-supervisor, supervised the master's thesis** 2012 – 2014
Dissertation: Evaluation of biological activity of demethylating drugs
- Lecturer, delivered lectures on “Chemotherapy: sensitivity and resistance”** 2014 – 2015
Experimental Medicine course for graduate students

PEER-REVIEWED PUBLICATIONS

Agrawal, K., Das, V., Táborská, N., Gursky, J., Džubák, P., Hajdúch, M. (2018) Differential Regulation of Methylation-Regulating Enzymes by Senescent Stromal Cells Drives Colorectal Cancer Cell Response to DNA-Demethylating Epi-Drugs. *Stem Cells Int.* 2018, 6013728.

Agrawal, K., Das, V., Vyas, P., Hajdúch, M. (2018) Nucleosidic DNA demethylating epigenetic drugs – A comprehensive review from discovery to clinic. *Pharmacol. Ther.* 188, 45–79.

Annadurai, N., **Agrawal, K.,** Džubák, P., Hajdúch, M., Das, V. (2017). Microtubule-affinity regulating kinases are potential druggable targets for Alzheimer's disease. *Cell Mol Life Sci.* 74, 4159–69.

Agrawal, K., Das, V., Otmar, M., Krečmerová, M., Džubák, P., Hajdúch, M. (2016). Cell-based DNA demethylation detection system for screening of epigenetic drugs in 2D, 3D and xenograft models. *Cytometry A.* 91, 133–43.

Hruby, M., **Agrawal, K.,** Policianova, O., Brus, J., Skopal, J., Svec, P., Otmar, M., Dzubak, P., Stepanek, P., Hajduch, M. (2016). Biodegradable system for drug delivery of hydrolytically labile azanucleoside drugs. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.* 160, 222–30.

Manuscripts in preparation/ submitted

Hruška, M., **Agrawal, K.,** Holub, D., Václavková, J., Vojta, P., Varanasi, L., Macečková, Z., Voller, J., Džubák, P., Hajdúch, M. Deep prevalence-based search detects protein variants in shotgun proteomics data independently of nucleotide sequencing. *Nat. Commun.* Submitted on 16.07.2019.

Znojek, P., **Agrawal, K.,** Ryczek, K., Džubák, P., Hajdúch, M. FUCCI-probe based HTS assay for identification of cell-cycle modulators on a robotic platform. In preparation.

Agrawal, K., Vojta, P., Slavkovský, R., Frydrych, I., Džubák, P., Hajdúch, M. Chromatin reader machinery as target for overcoming resistance to DNA-demethylating epi-drug decitabine. In preparation.

PATENTS

Patent: EP 2924125, Granted: 17.06.2017, Ownership: Palacky University Olomouc, Inventors: **Agrawal Khushboo,** Dzubak Petr, Hajduch Marian, Frydrych Ivo.

Patent: EP 3122902, Granted: 16.05.2018, Ownership: Palacky University Olomouc, Inventors: **Agrawal Khushboo,** Dzubak Petr, Hajduch Marian, Frydrych Ivo.

Patent: JP 6463372, Granted: 11.01.2019, Ownership: Palacky University Olomouc, Inventors: **Agrawal Khushboo,** Dzubak Petr, Hajduch Marian, Frydrych Ivo.

BOOKS/CHAPTERS

Agrawal, K. Reporter based DNA demethylation detection system. In: Hajdúch, M., et al. *Molecular and Cellular Methods*. 1st ed. Olomouc: Univerzita Palackého v Olomouci, 2019. In press.

PLATFORM PRESENTATIONS

Chromatin "reader" machinery as target for overcoming resistance to DNA-demethylating epi-drug decitabine. XIV. Diagnostic, Predictive and Experimental Oncology Days, Olomouc, Czech Republic, 19-21 November 2018.

5-Azacytidine Nucleosides and their Derivatives: Molecular Hallmarks of Drug Resistance & Alternative Therapeutic Regimen. X. Diagnostic, Predictive and Experimental Oncology Days, Olomouc, Czech Republic, 02-03 December 2014.

5-azacytidine nucleosides and their derivatives: Molecular hallmarks of drug resistance. Conference of Young Oncologists, Bratislava, Slovak Republic, 06-07 March 2014.

Epigenetic study of 5-azacytidine nucleosides and their derivatives. 10th International Medical Postgraduate Conference, Hradec Králové, Czech Republic, 21-22 November 2013.

Epigenetic study of 5-azacytidine nucleosides and their derivatives. IX. Diagnostic, Predictive and Experimental Oncology Days, Olomouc, Czech Republic, 21-22 November 2013.

Study of epigenetic therapeutics - 5-azacytidine derivatives. XIII. Interdisciplinary meeting of young biologists, biochemists and chemists, Žďár nad Sázavou, Czech Republic, 14-17 May 2013.

Study of epigenetic therapeutics - 5-azacytidine derivatives. Conference of Chemical Biology and Genetics, Malá Morávka, Czech Republic, 12-14 May 2013.

Study of epigenetic 5-azacytidine nucleosides and their derivatives. Doctoral students conference, Vyškov, Czech Republic, 30 November - 01 December 2012.

Study of epigenetic 5-azacytidine nucleosides and their derivatives. VIII. Diagnostic, Predictive and Experimental Oncology Days, Olomouc, Czech Republic, 29-30 November 2012.

Study of epigenetic 5-azacytidine nucleosides and their derivatives. Doctoral students conference, Vyškov, Czech Republic, 25-26 November 2011.

CONFERENCE POSTER PRESENTATIONS

Chromatin "reader" machinery as target for overcoming resistance to DNA-demethylating epi-drug decitabine. American Association of Cancer Research 110th Annual Meeting, Atlanta, USA, 29 March - 03 April 2019.

Chromatin "reader" machinery as target for overcoming resistance to DNA-demethylating epi-drug decitabine. EMBO Workshop: From Epigenome towards Epitranscriptome in Cell Fate Choice, Capri, Italy, 14-17 October 2018.

Chromatin "reader" machinery as target for overcoming resistance to DNA-demethylating epi-drug decitabine. Cold Spring Harbor Laboratory Meeting: Epigenetics and Chromatin, New York, USA, 11-15 September 2018.

Molecular hallmarks of drug resistance to DNA methylation inhibitors and alternative therapeutic regimen for overcoming resistance. American Association of Cancer Research 107th Annual Meeting, New Orleans, USA, 16-20 April 2016.

Method of predicting the tumor response to DNA methylation inhibitors and alternative therapeutic regimens for overcoming resistance. 1st. Annual BioSpot Conference, Prague, Czech Republic, 24 February 2016.

Molecular hallmarks of drug resistance & alternative therapeutic regimen. American Association of Cancer Research 106th Annual Meeting, Philadelphia, USA, 18-22 April 2015.

5-azacytidine nucleosides and their derivatives: Molecular hallmarks of drug resistance. American Association of Cancer Research 105th Annual Meeting, San Diego, USA, 05-09 April 2014.

AWARDS AND HONORS

2019 PDF travel awards for attending the AACR 110th Annual Meeting in Atlanta, USA, and 12th AACR Conference on The Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved, to be held in San Francisco, USA (supported by Cancer Research Foundation Czech Republic).

2018 Designated as one of the member of the scientific committee of the conference: XIV. Diagnostic, Predictive and Experimental Oncology Days, held in Olomouc, Czech Republic to play the role in decision making process of potential participants, and selected as a co-chair for cancer epigenetics session of the conference.

PDF travel awards for attending the EMBO Workshop: From Epigenome towards Epitranscriptome in Cell Fate Choice in Capri, Italy, and Cold Spring Harbor Laboratory Meeting: Epigenetics and Chromatin, in New York, USA (supported by Cancer Research Foundation Czech Republic).

Featured as 'Women in Science' by Cancer Research Foundation Czech Republic, on the occasion of International Women's Day.

- 2014-17** Graduate travel awards for attending the American Association of Cancer Research 105th, 106th, 107th and 108th Annual Meetings in USA: San Diego, Philadelphia, New Orleans, and Washington D.C. respectively (supported by Internal Grant Agency of Palacký University, and Johns Hopkins University School of Medicine).
- 2014** Award for ‘Best Scientific Work in Cancer Research’ at Conference of Young Oncologists, organized on the occasion of Cancer Research Day by Slovak Cancer Research Foundation and Cancer Research Institute, Slovak Academy of Sciences in Bratislava, Slovak Republic.
- 2013** Consolation prize, nominated amongst top 5 presentations at XIII. Interdisciplinary Meeting of Young Biologists, Biochemists and Chemists, organized by Sigma Aldrich in Žďáru nad Sázavou, Czech Republic.
- Nominated by the vice-dean of the Faculty of Medicine and Dentistry to represent Palacký University at International Medical Postgraduate Conference, organized by Charles University in Hradec Králové, Czech Republic.
- 2012** First prize, best overall presentation at VIII. Diagnostic, Predictive and Experimental Oncology Days, organized by Cancer Research Foundation Czech Republic.
- 2010** Palacký University Doctoral Scholarship (full financial support for the PhD study).
- Awarded certificate by Amity Institute of English and Business Communication for qualifying in English and Communication Skills Course.
- Awarded certificate by Amity Institute of Psychology and Allied Sciences on successfully completing the Behavioral Science Course.
- Awarded certificate by Amity School of Foreign Languages for acquiring working knowledge in French.
- 2009** Awarded certificate in accordance with National Youth Policy for dedicated participation in “The Amity Green Horn Military Training Camp” at Amity Education Valley, under Col. Ravinder Singh.
- 2007** Second topper of the Department of Biotechnology, Bundelkhand University with A+ grade in all the major subjects.
- 2005** Achieved the certificate with grade A by Institute of Mathematical Sciences and Computer Applications, Bundelkhand University for qualifying in Computer Foundation Course.

REFERENCES

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| Dr. Marián Hajdúch
(PhD & Post-doc mentor) | Institute of Molecular and Translational Medicine, Faculty of Medicine and Dentistry,
Palacký University, Hněvotínská 5, 77900 Olomouc, Czech Republic
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| Dr. Martin Modrianský
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+420 608-023-471
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| Dr. Debasish Sinha | The Wilmer Eye Institute, The Johns Hopkins University School of Medicine,
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