Vladimir Bokun

PhD candidate at Imperial College London

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EDUCATION

-Doctor of Philosophy (PhD) candidate in Clinical Medicine Research Nov. 2020-present
Imperial College London London, UK

Department of Metabolism, Digestion & Reproduction
Institute of Reproductive and Developmental Biology (IRDB)
Hammersmith Hospital Campus

Supervisors: Dr. Beth Holder (section for pregnancy, parturition, and preterm labour) Dr. Yan Liu (Glycosciences Laboratory)
Topic: Mechanisms of extracellular vesicle and viral particle uptake at the foeto-maternal interface

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-Bachelor of Science (B.S.) in Comprehensive Biology Aug. 2012–May 2016
Notre Dame College Cleveland, Ohio

Minor: Chemistry
Cumulative GPA: 3.967/4.000
Relevant Courses: Genetics, Microbiology with lab, Endocrinology, Research Methods with lab, Cell Biology with lab, Advanced Cell Biology, Organic Chemistry I and II with labs, Biochemistry I and II with lab, Quantitative Analysis with lab, Basic Physics I and II with labs, Calculus, Statistics.
Achievements:

- Distinguished Biology Undergraduate Student for 2013-2014, 2014-2015, 2015-2016 academic years
- Distinguished Physics Undergraduate Student for the 2014 academic year
- Hugh O'Neill Science Endowment scholarship recipient for 2014-2015 and 2015-2016 academic years – awarded to top three biology students each academic year
- Notre Dame College Honors Program student

-High School Diploma Sep. 2008–June 2012
Gimnazija Becej High School

GPA: 5.00/5.00

RESEARCH EXPERIENCE

-Research Technologist Jul. 2016–Jul. 2020
Lerner Research Institute at Cleveland Clinic, Department of Pathobiology, Cleveland, Ohio

- **Project 1:** Independently designed and conducted experiments and assays within a research project designed to assess infectivity of Respiratory Syncytial Virus (RSV) in human placenta:

- isolated and immuno-purified primary cells from placental tissues and performed immunocytochemistry for cell markers to confirm cell purity (Hofbauer cells, placental stromal fibroblast cells and cytotrophoblast cells)
- extracted RNA from cells, tissues, and supernatants/media followed by qRT-PCR experiments for gene and viral genome expression analyses
- optimized a sensitive, single-copy detection method for viral RNA using ddPCR platform and a commercially available primer/probe set
- immunohistochemically stained viral and host proteins
- analyzed protein levels by SDS-PAGE/Western blotting
- performed cytokine multiplex assays in cell culture media using magpix/luminex technology
- analyzed the data using and wrote and prepared a manuscript (listed in "PUBLICATIONS")

❖ **Project 2:** Supported an animal-model-based, NIH-funded research project (Neurogenic Inflammatory Response to RSV):

- maintained a timed-pregnancy rodent model for various physiological and molecular assays (comprised of mating and viral IT inoculations of adult and 10-day-old rats)
- cultured cell lines and primary cells; generated viral stocks
- assisted in pharmaceutical, Institutional Animal Care and Use Committee (IACUC), and biosafety research compliance
- co-ordinated the purchasing of laboratory supplies, reagents, and consumables as necessary

❖ **Project 3:** Studied the role of an adapter protein in adhesion, cytoskeletal/integrin dynamics, and activation of human and mouse platelets:

- using a genetic knock-out mouse, performed experiments assessing adhesion and spreading of mouse platelets to ECM substrates
- characterized corresponding morphology using wide-field 100x microscopy and phalloidin-FITC
- performed western blots and flow cytometry to characterize integrin levels in the experimental groups vs controls
- performed antibody blocking of the protein of interest in human platelets to reproduce effects observed in the mouse

❖ **Project 4:** Utilized a three-dimensional mouse intestinal epithelial organoid *in vitro* model to study effects of hyaluronan on LPS-induced TLR4 agonism and resulting inflammatory response

- isolated and established mouse intestinal organoids derived from proximal and distal, colon, ileum, and jejunum
- cultured and treated organoids with TLR4 agonist lipopolysaccharide (LPS) and TLR5 agonist flagellin, as well as hyaluronan (HA)
- optimized western blotting and qPCR procedures for analyzing zonula occluden 1 (ZO-1) and claudin-2 in response to aforementioned treatments

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Notre Dame College Undergraduate Research Jan. 2014–May 2016

-Independent Undergraduate Research Assistant (laboratory of Dr. M. Johnson)

❖ employed FLP-FRT recombination approach in *D. melanogaster* to generate a desired null-mutant fruit fly for zinc-finger-protein-encoding gene studies

❖ performed molecular cloning and sub-cloning of specific sequences by isolating plasmids, performing *E. coli* transformations, and isolations/amplifications/purifications of desired DNA/mRNA sequences

- tested for protein-protein interactions using Yeast-2-Hybrid assays
- dissected and performed immunohistochemistry in multiple *D. melanogaster* tissues

OTHER WORK EXPERIENCE

Notre Dame College Dwyer Learning Center Jan. 2013–May 2020

-Math/Biology/Chemistry Tutor

- facilitated the learning process of students by assisting them in learning maths, biology and chemistry principles, definitions, formulas and concepts, to improve their academic performance
- coordinated study-groups in test preparations or group homework assignments
- scheduled make-up tests
- referred students and faculty to the right resources or personnel based on their needs

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Notre Dame College Residence Life Aug. 2013–May 2016

-Resident Assistant/Advisor

- fostered a healthy and safe environment for students in halls ofresidence
- assisted with Resident Assistant group and individual interview processes for hiring new candidates
- served as a knowledgeable resource in academic, athletic, or social areas of college life
- served on-call one night a week for any violations, issues, or emergency situations

PEER-REVIEWED PUBLICATIONS

1. **Bokun, V**., Moore, J. J., Moore, R., Smallcombe, C. C., Harford, T. J., Rezaee, F., . . . Piedimonte, G. (2019). Respiratory syncytial virus exhibits differential tropism for distinct human placental cell types with Hofbauer cells acting as a permissive reservoir for infection. *Plos One, 14*(12). doi:10.1371/journal.pone.0225767
2. Smallcombe, C. C., Linfield, D. T., Harford, T. J., **Bokun, V**., Ivanov, A. I., Piedimonte, G., & Rezaee, F. (2019). Disruption of the airway epithelial barrier in a murine model of respiratory syncytial virus infection. *American Journal of Physiology-Lung Cellular and Molecular Physiology, 316*(2). doi:10.1152/ajplung.00345.2018
3. Smallcombe, C. C., Harford, T. J., Linfield, D. T., Lechuga, S., **Bokun, V**., Piedimonte, G., & Rezaee, F. (2020). Titanium dioxide nanoparticles exaggerate respiratory syncytial virus-induced airway epithelial barrier dysfunction. *American Journal of Physiology-Lung Cellular and Molecular Physiology, 319*(3). doi:10.1152/ajplung.00104.2020
4. Harford, T.J., Gupta, M.K., **Bokun, V**., Rezaee, F., Naga Prasad, S.V., Piedimonte, G.. Respiratory syncytial virus infection in airway smooth muscle cell mediates β_2 adrenergic receptor dysfunction. *Science Signaling* – Accepted and awaiting publication

CONFERENCE ABSTRACTS

1. **V. Bokun**, J. J. Moore, T. J. Harford, C. C. Smallcombe, F. Rezaee, F. Esper, G. Piedimonte. Respiratory Syncytial Virus Displays Tropism for Human Placental Macrophage Cells In Vitro. Am J Respir Crit Care Med 2019;199:A1025. – American Thoracic Society (ATS) Annual Meeting 2019, Dallas, TX (oral presentation by principal investigator)

2. T.J. Harford, L. Grove, **V. Bokun**, C.C. Smallcombe, F. Rezaee, M.A. Olman, G. Piedimonte. Modulation of TRPV1 in Bronchial Epithelium of Children by PI3 Kinase. Am J Respir Crit Care Med 2019;199:A2954. – ATS annual meeting 2019, Dallas, TX.
3. C.C. Smallcombe, D. Linfield, T.J. Harford, **V. Bokun**, A.I. Ivanov, G. Piedimonte, F. Rezaee. Disruption of the Airway Epithelial Barrier in a Murine Model of RSV infection. Am J Respir Crit Care Med 2019;199:A5758. ATS Annual Meeting 2019, Dallas, TX.
4. C.C. Smallcombe, T.J. Harford, **V. Bokun**, A.I. Ivanov, G. Piedimonte, F. Rezaee. Titanium Dioxide Nanoparticles Enhance RSV-Induced Airway Barrier Dysfunction. Am J Respir Crit Care Med 2019;199:A1175. – ATS annual meeting 2019, Dallas, TX.
5. **V. Bokun**, T. J. Harford, F. Rezaee, F. Esper, B. Yen-Lieberman, J. J. Moore, G. Piedimonte. Respiratory Syncytial Virus Infects Placental Cells and Villus Explants In Vitro. Am J Respir Crit Care Med 2018; 197:A2855. - ATS annual meeting 2018, San Diego, CA.
6. T. J. Harford, **V. Bokun**, M. K. Gupta, S. V. Naga Prasad, F. Rezaee, G. Piedimonte. Non-Canonical Regulation of Beta2 Adrenergic Receptor in Response to RSV Infection in Human Primary Airway Smooth Muscle Cells. Am J Respir Crit Care Med 2018;197:A2854. - ATS Annual Meeting 2018, San Diego, CA.
7. T. J. Harford, **V. Bokun**, F. Rezaee, J.J. Moore, G. Piedimonte. Respiratory Syncytial Virus Infects Human Placental Choriocarcinoma Cells. Am J Respir Crit Care Med 2017;195:A6138. - ATS annual meeting 2017, Washington, D.C., USA.
8. **V. Bokun**, T. J. Harford, F. Rezaee, G. Piedimonte. Enterovirus D68 Lower Respiratory Tract Infection Causes Elevated Airway Hyperreactivity In Fischer-344 Rats. Am J Respir Crit Care Med 2017;195:A1202. – ATS annual meeting 2017, Washington, D.C., USA.
9. T. J. Harford, F. Rezaee, **V. Bokun**, R. Panettieri, Jr., M. Gupta, S. V. Naga Prasad, G. Piedimonte. Respiratory Syncytial Virus Infection Alters β2-Adrenergic Receptor In Primary Human Airway Smooth Muscle Cells. Am J Respir Crit Care Med 2017;195:A1201. - ATS annual meeting 2017, Washington, D.C., USA.

*All poster presentations presented by the first authors of abstracts, unless indicated otherwise.

REFERENCES

-Carol de la Motte, PhD – Interim Vice Chair, Dept. of Inflammation & Immunity at Lerner Research Institute

-John Moore, MD – Head of Neonatology at MetroHealth Hospital, Professor of Pediatric and Reproductive Biology at Case Western Reserve University

-Andrei Ivanov, PhD – Staff, Dept. of Inflammation & Immunity at Lerner Research Institute

-Aaron Petrey, PhD – Principal Investigator, Microbiology and Immunology, University of Utah

-Frank Esper, MD – Associate Staff, Center for Pediatric Infectious Diseases of Cleveland Clinic

-Matthew Johnson, PhD – Associate Professor of Biology at Notre Dame College

-David Orosz, PhD – Associate Professor of Biochemistry at Notre Dame College