BIOGRAPHICAL SKETCH

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NAME: Ivakhnitskaia, Evguenia Olegovna

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: HEED FELLOWSHIP

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Cornell University, Ithaca, NY	BA	08/2009	05/2013	Biological Sciences
University of Illinois at Chicago, Chicago, IL	MD/PhD	06/2014	05/2023	Medicine/ Neuroscience
New York Presbyterian-Weill Cornell, New York, NY	N/A	07/2023	06/2027 anticipated	Ophthalmology Residency

A. Personal Statement

Regeneration of a functional nervous system has been a theme throughout my training. This interest was borne of my undergraduate studies in Howard Howland's laboratory on visual development at Cornell University. My first project examined plasticity of stereopsis past the dogmatic critical period of visual development. This experience inspired a year of postbaccalaureate training in Heather Cameron's laboratory at the National Institute of Mental Health where I first learned molecular techniques, behavioral testing, and animal model approaches to studying functional consequences of eradicating unusual, adult-born neurons in the hippocampus. While in graduate school I pursued the topic of neural plasticity through diverse research contexts. I trained on molecular and histological techniques to test the role of the neurogenic niche within Krabbe disease (Ernesto Bongarzone lab, UIC) as well as molecular genetics methods to examine the spatial and temporal regulators of neural development through the *C. elegans* animal model (Chieh Chang lab, UIC). However, my doctoral laboratory experience cemented my desire to devote my career to the topic of neural plasticity within ophthalmology. I completed a dissertation project in Mark Rosenblatt's laboratory at UIC that utilized *in vivo* electrophysiology of the trigeminal ganglion to assess corneal neuronal damage from a common ophthalmic preservative and characterized the alterations in neuronal properties after regenerating from injury that correlate with dry eye symptoms.
As I reach the final stage of my training, I have decided to pursue vitreoretinal surgical fellowship. I see the career of a vitreoretinal specialist as providing the broadest expertise and an expansive toolkit to promote neuroplasticity in retinal disease. I am intrigued by the resilience of retinal tissue in patients who withstand decades of diabetic retinopathy changes or recover meaningful visual function after macula-involving retinal detachments. In keeping with the unifying theme of neural plasticity throughout my research training, it is my career goal to explore the neuroprotective and neuroplastic mechanisms that can preserve retinal function despite chronic or acute insults and to translate these mechanisms into therapeutic interventions for my patients.

B. Positions and Scientific Appointments

Positions and Employment

Cornell University, Ithaca, NY
2010-2013 Research Assistant, Department of Neurobiology and Behavior
West Virginia University, Morgantown, WV
2012 Summer Undergraduate Intern, Center for Neuroscience
National Institutes of Health, Bethesda, MD

2013-2014 Post-baccalaureate fellow, National Institute of Mental Health (NIMH)
University of Illinois at Chicago, Chicago, IL
2014 Summer Research Assistant, Department of Anatomy and Cell Biology, Bongarzone laboratory
2015 Summer Research Assistant, Department of Biological Sciences, Chang laboratory
2015-2023 Graduate Student Research Assistant, Department of Ophthalmology and Visual Sciences, Rosenblatt laboratory

Honors and Awards

2011-2013 Dean's List of the College of Arts and Sciences (CAS), Cornell University
2011-2013 Willard A. Kiggins Memorial Scholarship, Cornell University
2013 *Cum Laude* Distinction, B.A. in Biological Sciences, Cornell University CAS
2013-2014 Intramural Research Training Award (IRTA), National Institute of Mental Health
2017 Provosts/Deiss Award for Graduate Research, University of Illinois at Chicago
2018 Center for Clinical and Translational Sciences Pre-doctoral Education for Clinical & Translational Scientists Fellowship (CCTS PECTS Award)
2019 Knights Templar Eye Foundation Travel Grant, Association for Research in Vision and Ophthalmology (ARVO) 2019 Meeting
2019-2023 F30 Ruth L. Kirschstein National Research Service Award, National Eye Institute
2020 Best Poster Award, 2020 Gordon Cornea and Ocular Surface Biology Meeting, Gordon Research Seminar, Lucca (Barga), Italy
2021 UIC MSTP Alumni Association Ed Cohen Award

C. Contributions to Science

Graduate Research: Rosenblatt Laboratory, UIC

My graduate contributions have primarily focused on uncovering the neurotoxic effects of a common ophthalmic drop preservative, Benzalkonium Chloride (BAK), and characterizing the changes in the properties of corneal nerves regenerating from damage. In order to achieve my objectives, I pursued additional training with Harumitsu Hirata, a world expert on *in vivo* trigeminal ganglion electrophysiology then at Weill Cornell Medical College, and translated my training into building an electrophysiology unit at UIC that allowed for single neuron extracellular recordings *in vivo* within the rat trigeminal ganglia. This technique provided real-time evaluation of corneal neuronal functional compromise when exposed to BAK. Mastery of this technique made me one of less than a dozen experts able to perform this surgically and technically demanding technique in order to locate and record from a small population of neurons within living, anesthetized animal models. Structural consequences of damage were highlighted through immunohistochemistry techniques that I optimized for use in both murine and rat corneas. My efforts culminated in a study that demonstrated functional compromise of corneal neurons by BAK. My additional projects explored candidate growth factors and potential molecular targets to promote corneal nerve and ocular surface regeneration via primary cell culture techniques and fluorescence immunohistochemistry. My project became the foundation of ongoing current research within the Rosenblatt lab that is testing candidate growth factors and their impact on function and structure of regenerated corneal nerves.

a. **Ivakhnitskaia, E.,** Souboch, V., Dallacasagrande, V., Mizerska, K., Souboch, E., Sarkar, J., Guaiquil, V. H., Tseng, K. Y., Hirata, H., Rosenblatt, M. I. (2022). Benzalkonium Chloride, a Common Ophthalmic Preservative, Compromises Rat Corneal Cold Sensitive Nerve Activity. *The Ocular Surface.* 26: 88-96.
b. **Ivakhnitskaia, E.,** Chin, M. R., Siegel, D., Guaiquil, V. H. (2021). Vinaxanthone inhibits Semaphorin3A induced axonal growth cone collapse in embryonic neurons but fails to block its growth promoting effects on adult neurons. *Scientific Reports.* 11 (13019).
c. Hirata, H., Mizerska, K., Dallacasagrande, V., **Ivakhnitskaia, E.**, & Rosenblatt, M. I. (2018). Ambient Air Currents Activate Corneal Nerves During Ocular Dessication in Rats: Simultaneous Recordings of Neural Activity and Corneal Temperature. *Invest Ophthalmol Vis Sci.* 59(*10*): 4031-4043.
d. Sarkar, J., Luo, Y., Zhou, Q., **Ivakhnitskaia, E.,** Lara, D., Katz, E., Sun, M.G., Guaiquil, V., Rosenblatt, M. I. (2022). VEGF receptor heterodimers and homodimers are differentially expressed in neuronal and endothelial cell types. *PLOS ONE.* 17(*7*): e0269818.
e. Zhou, Q., Guaiquil, V. H., Wong, M., Escobar, A., **Ivakhnitskaia, E.,** Yazdanpanah, G., Jing, H., Sun, M., Sarkar, J., Luo, Y., Rosenblatt, M. I. (2021). Novel hydrogels derived from acellular porcine corneal stroma enhance corneal wound healing. *Acta Biomaterialia.* 134: 177-189.
f. **Ivakhnitskaia, E.,** Nguyen, T., Zhou, Q., Sarkar, J., Guaiquil, V. H., Hirata, H., Tseng, K. Y., Rosenblatt, M. **"Differential Effects of Two Ocular Surface Injury Models on Function and**

Structure of Regenerating Corneal Cold Sensitive Nerves." Nov. 2021. Poster. Society for Neuroscience Annual Meeting. Virtual.

Post Graduate Research

Since completing my graduate training, I have contributed to a number of largely ongoing retina research studies. These include a published retrospective case-control study to characterize the incidence and risk factors for early rhegmatogenous retinal detachments following open globe injury as well as currently ongoing projects on symptomatic cotton wool spots in young patients, characteristics of patients with paracentral acute middle maculopathy, and a case study of irreversible vision loss from faricimab hypersensitivity reaction.

a. Sheth, N., Chang, A.Y., Bharadwaj, A., Wu, D., **Ivakhnitskaia, E.**, Mieler, W.F. (2025). Early Retinal Detachments after Open Globe Repair: Incidence and Risk Factors. *Retina*. 45(4): 614-620.

A complete list of published work can be found in my bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/evguenia.ivakhnitskaia.2/bibliography/public/

D. Additional Information: Research Support and/or Scholastic Performance

GRADUATE COURSES-University of Illinois at Chicago (GPA=4.0)

Year	**SCIENCE** Course Title	Grade	Year	**OTHER** Course Title	Grade
2016	Data Literacy in Neuroscience	A	2015	Scientific Integrity and Responsible Conduct of Research	S
2016	Foundations of Neuroscience I	A	2016	Essentials for Animal Research	S
2016	Methods in Neuroscience	A	2014-	PhD Research in Neuroscience	IP
2017	Research Methods II	A	2016-	Neuroscience Journal Club	IP
2017	Receptor Pharmacology	A			
2017	Foundations of Neuroscience II	A			

MEDICAL COURSES-University of Illinois at Chicago

Year	**SCIENCE** Course Title	Grade	Year	**OTHER** Course Title	Grade
2014	Medical Gross Human Anatomy and Embryology I	S	2014	Essentials of Clinical Medicine I	O
2014	Cell and Tissue Biology	S	2015	Essentials of Clinical Medicine II	O
2014	Medical Biochemistry	S	2015	Essentials of Clinical Medicine III	ADV
2014	Physiology I	S	2016	Essentials of Clinical Medicine IV	ADV
2015	Medical Gross Human Anatomy and Embryology II	S			
2015	Neuroanatomy	S	2021	Family Medicine Clerkship	ADV
2015	Human Development	S	2021	Obstetrics and Gynecology Clerkship	ADV
2015	Physiology II	S	2022	Neurology Clerkship	ADV
2015	Brain and Behavior	S	2022	Special topics-Ophthalmology	ADV
2015	Basic Immunology and Microbiology	S	2022	Surgery Clerkship	H
2015	Medical Genetics	S	2022	Medicine	ADV
2015	General/Systemic Pathology I	S	2022	Ophthalmology	H
2015	Clinical Microbiology and Immunology	S	2022	Psychiatry	H
2015	Medical Pharmacology I	S	2022	Pediatric Neurology	H
2015	Clinical Pathophysiology I	S	2022	M4 Tutoring Elective	S
2016	Psychiatry	S	2023	Emergency Medicine	ADV
2016	General/Systemic Pathology II	S	2023	Medicine-Sub Internship	H
2016	Medical Pharmacology II	S			
2016	Clinical Pathophysiology II	S			

Grading Explanation. **UIC Graduate College** courses are graded either on an A-F scale or Satisfactory/Unsatisfactory (S/U). Longitudinal courses that span multiple semesters are graded S/U. **College of Medicine Courses** pre-clinical courses are graded Satisfactory (S, passing grade), Outstanding (O, 1 standard deviation above the class mean), and Unsatisfactory (U, failing grade). Clinical courses are graded as Unsatisfactory (U), Passing (P), ADV (Advanced), H (Honors) depending on a combination of standardized exam and clinical performance. Essentials of Clinical Medicine courses are graded on a modified scale: Outstanding (O, top 15% of the class), Advanced (ADV, given to the top 50% of the class), PR (Proficient, given to passing students in the bottom 50% of the class), and Unsatisfactory (U).