

# Indra R. Bishnoi, PhD

[Email](#) | [Website](#) | [LinkedIn](#) | [Google Scholar](#)

## Current Position

2024– Postdoctoral Research Fellow  
Lurie Center for Autism, Massachusetts General Hospital (MGH) and Harvard Medical School (HMS),  
Boston, Massachusetts, USA  
Primary advisor: Dr. Evan Bordt  
[1] Maternal autoimmunity's role in the pathophysiology underlying autism spectrum disorders and other neurodevelopmental disorders.  
[2] Cell-type-specific outcomes of a high-risk gene for autism spectrum disorder: implications for brain and behavioral development.  
[3] Juvenile sex differences within a multi-chamber social behavior task following lipopolysaccharide exposure.

## Education

2018 – 2023 Ph.D. Neuroscience (Behavioural Neuroscience)  
Western University, London, Ontario, Canada  
Primary advisors: Dr. Klaus-Peter Ossenkopp, Dr. Martin Kavaliers  
[1] The effects of lipopolysaccharide exposure on the rodent model of lithium chloride-induced anticipatory nausea.  
[2] Neurobehavioural effects of di-2-ethylhexyl phthalate (DEHP) exposure in male and female rats: implications for obesity.  
[3] Sex and age differences in the behavioural effects (spatial learning, startle response, social behaviour, anxiety-like behaviour and locomotor activity) of early adolescent two-hit lipopolysaccharide treatment in adolescent and adult rats.

2013 – 2018 B.A. Honours Double Major, Psychology and Sociology  
Western University, London, Ontario, Canada  
Primary advisors: Dr. Klaus-Peter Ossenkopp, Dr. Martin Kavaliers  
The effects of repeated administrations of propionic acid in juvenile rats: implications for autism spectrum disorders.

## Scholarships, Awards, & Honours

2024– Landreth Research Fellowship: Robert and Donna Landreth Autism Research Fund

2023 Travel Award: Neuroscience Graduate Program (\$1000)  
Eligibility: Top 5% of Graduate Neuroscience Program. To attend the International Congress on Academic Medicine.

2022 & 2023 Top Cited Article 2020-2021 & 2021-2022 in Developmental Psychobiology: Wiley

2022 Clothing4Climate Changemaker: Let's Talk Science

2022 A Conversation with a Scientist: Society of Neuroscience Graduate Students Profiles in Research

2021 Youth Green Leader Award: London Environmental Network

2021 Leadership and Community Engagement Award: Society of Neuroscience Graduate Students (\$200)

2021 Best Business Plan Winner: Graduate Student Innovations Scholars (\$1000)

2021 Spotlight of the Month: Society of Neuroscience Graduate Students

2021 Spotlight on Women & Girls in Science: Science Odyssey, Science Rendezvous

2020 Science Rendezvous Innovation Showcase "Jack of All Trades: Indra Bishnoi"

2020 – 2023 Canada Graduate Scholarship-Doctoral (CGS-D) Program: NSERC (\$105,000)  
Rank: Top 5% of applicants to the Psychology Review Committee.

2019 & 2020 Ontario Graduate Scholarship (\$15,000, Declined)

2019 Canada Graduate Scholarship-Master's (CSG-M) Program: NSERC (\$17,500)

2019 Travel Award: Society of Neuroscience Graduate Students (\$500)  
To attend the Society for Neuroscience conference.

2017 & 2018 Dean's Honour List: Western University

2017 Social Science Alumni Award: Western University (\$1,500)

2015 Outstanding Student Scholarship: Secure-It (\$1,000)

2013 Scholarship of Distinction: Western University (\$1,500)

2013 Ontario Scholar: Ministry of Education

## Publications

[16] **Bishnoi, I. R., & Bordt, E. A.** (2024). The Missing Half: Paternal Immune Activation's Role in Transgenerational Sex Differences. *Brain, Behavior, and Immunity*, 120, 288-289. <https://doi.org/10.1016/j.bbi.2024.06.010>

- [15] **Bishnoi, I. R.**, Kavaliers, M., & Ossenkopp, K.-P. (2024). Lipopolysaccharide (LPS) attenuates the primary conditioning of lithium chloride (LiCl)-induced context aversion but not the secondary conditioning of context aversion or taste avoidance. *Behavioural Brain Research*, 459, 114800. <https://doi.org/10.1016/j.bbr.2023.114800>
- [14] Kavaliers, M., Wah, D., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2023). Disgusted snails, oxytocin, and the avoidance of infection threat. *Hormones and Behavior*, 155, 105424. <https://doi.org/10.1016/j.yhbeh.2023.105424>  
Associated Open Access Dataset: Kavaliers, M., Wah, D., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2023). Disgusted snails, oxytocin, and the avoidance of infection threat dataset. *Federated Research Data Repository*. <https://doi.org/10.20383/103.0787>
- [13] **Bishnoi, I. R.**, Kavaliers, M., & Ossenkopp, K.-P. (2023). Immune activation attenuates memory acquisition and consolidation of conditioned disgust (anticipatory nausea) in rats. *Behavioural Brain Research*, 439, 114250. <https://doi.org/10.1016/j.bbr.2022.114250>
- [12] **Bishnoi, I. R.**, Cloutier, C. J., Tyson, C. D., Matic, V., Kavaliers, M., & Ossenkopp, K.-P. (2022). Infection, learning, and memory: Focus on immune activation and aversive conditioning. *Neuroscience and Biobehavioral Reviews*, 142, 104898. <https://doi.org/10.1016/j.neubiorev.2022.104898>
- [11] Klebl, C., Donner, M., & **Bishnoi, I. R.** (2022). Disliking: From adaptive disgust to ugliness. In M. Skov & M. Nadal (Eds.), *The Routledge International Handbook of Neuroaesthetics* (1st ed.). Routledge. <https://doi.org/10.4324/9781003008675>
- [10] Kavaliers, M., Ossenkopp, K.-P., Tyson C. D., **Bishnoi, I. R.**, & Choleris, E. (2022). Social factors and the neurobiology of pathogen avoidance. *Biology Letters*, 18, 20210371. <http://doi.org/10.1098/rsbl.2021.0371>
- [9] Kavaliers, M., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2022). Odor based mate choice copying in deer mice is not affected by familiarity or kinship. *Animal Cognition*, 25, 241–248. <https://doi.org/10.1007/s10071-021-01550-z>
- [8] Kavaliers, M., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2021). Progesterone and disgust: A response to "progesterone does raise disgust". *Hormones and Behavior*, 137, 104936. <https://doi.org/10.1016/j.yhbeh.2021.104936>
- [7] Kavaliers, M., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2021). Differential effects of progesterone on social recognition and the avoidance of pathogen threat by female mice. *Hormones and Behavior*, 127, 104873. <https://doi.org/10.1016/j.yhbeh.2020.104873>
- [6] **Bishnoi, I. R.**, Ossenkopp, K.-P., & Kavaliers, M. (2021). Sex and age differences in locomotor and anxiety-like behaviours in rats: From adolescence to adulthood. *Developmental Psychobiology*, 63, 496–511. <https://doi.org/10.1002/dev.22037>
- [5] Kavaliers, M., Colwell D. D., Wah, D., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2019). Conspecific infection threat rapidly biases the social responses of female mice: Involvement of oxytocin. *Hormones and Behavior*, 113, 67–75. <https://doi.org/10.1016/j.yhbeh.2019.04.016>
- [4] Wah, D., Ossenkopp, K.-P., **Bishnoi, I. R.**, & Kavaliers, M. (2019). Predator odor exposure in early adolescence influences the effects of the bacterial product, propionic acid, on anxiety, sensorimotor gating, and acoustic startle response in male rats in later adolescence and adulthood. *Physiology & Behavior*, 199, 35–46. <https://doi.org/10.1016/j.physbeh.2018.11.003>
- [3] Wah, D., Kavaliers, M., **Bishnoi, I. R.**, & Ossenkopp, K.-P. (2019). Lipopolysaccharide (LPS) induced sickness in early adolescence alters the behavioral effects of the short-chain fatty acid, propionic acid, in late adolescence and adulthood: Examining anxiety and startle reactivity. *Behavioural Brain Research*, 360, 312–322. <https://doi.org/10.1016/j.bbr.2018.12.003>
- [2] Kamen, C. L., Zevy, D. L., Ward, J. M., **Bishnoi, I. R.**, Kavaliers, M., & Ossenkopp, K.-P. (2019). Systemic treatment with the enteric bacterial fermentation product, propionic acid, reduces acoustic startle response magnitude in rats in a dose-dependent fashion: contribution to a rodent model of ASD. *Neurotoxicity Research*, 35, 353–359. <https://doi.org/10.1007/s12640-018-9960-9>
- [1] **Bishnoi, I. R.** (2017). A call for the combined pharmacological and psychological treatment of depression. *Western Undergraduate Psychology Journal*, 5(1). <http://ir.lib.uwo.ca/wupj/vol5/iss1/1>

## Thesis

- [1] **Bishnoi, I. R.** (2023). *The effects of lipopolysaccharide (LPS) on conditioned disgust: Expanding the rodent model of lithium chloride (LiCl)-induced anticipatory nausea* [Doctoral dissertation, Western University]. *Electronic Thesis and Dissertation Repository*. <https://ir.lib.uwo.ca/etd/9701>

## Other Scientific Writings

- [2] **Bishnoi, I. R.** (2020). The Stressful Storm of Adolescence: Implications for Autism Spectrum Disorder. *The Dorsal Column*. <https://songsuwo.ca/thedorsalcolumn/vol1-iss4-indra-bishnoi>
- [1] **Bishnoi, I. R.** (2020). The Nauseating Side of Chemotherapy. *The Dorsal Column*. <https://songsuwo.ca/thedorsalcolumn/vol1-iss2-indra-bishnoi>

## Submitted Publications

- [3] **Bishnoi, I. R.**, & Bordt, E. A. (2024). *Sex and region-specific differences in microglial morphology and function across development. Manuscript submitted to Neuroglia.*
- [2] Matic, V., Huynh, M., **Bishnoi, I. R.**, Ossenkopp, K.-P., Kavaliers, M. (2024). *Sex differences in sucrose-induced locomotor sensitization and cross-sensitization with the D2/D3 agonist, quinpirole, in rats. Manuscript submitted to Biology of Sex Differences.*
- [1] Kavaliers, M., **Bishnoi, I. R.**, Matic, V., Ossenkopp, K.-P., & Choleris, E. (2024). *Disgusted snails and the avoidance of infection threat via lipopolysaccharide and polyinosinic:polycytidylic acid. Manuscript submitted to Proceedings of the Royal Society B: Biological Sciences.*

Associated Open Access Dataset: Kavaliers, M., Vangel, M., **Bishnoi, I. R.**, Ossenkopp, K.-P., & Choleris, E. (2023). Avoidance of bacterial and viral infection threat is affected by infection status in a land snail, *cepea nemoralis* dataset. *Federated Research Data Repository*. <https://doi.org/10.20383/103.0787>

## Publications In Preparation

- [4] \*Slamin, M., \***Bishnoi, I. R.**, Moya, H. A., Bankowski, I., & Bordt, E. A. (2024). *Post-weaning sex differences within a multi-chamber social behavior task following LPS exposure. Manuscript in preparation for Brain, Behavior, and Immunity – Health. \*co-first authorship.*
- [3] **Bishnoi, I. R.**, Matic, V., Wang, L., Lake, G., Kavaliers, M., Ossenkopp, K.-P. (2024). *Conditioned disgust can be produced with long inter-trial intervals: Further development of a rodent model of anticipatory nausea. Manuscript in preparation for Behavioural Brain Research.*
- [2] **Bishnoi, I. R.**, Ossenkopp, K.-P., Kavaliers, M. (2024). *Open-field behaviours in adolescent rats: Influence of sex and immune activation on variable reliabilities and intercorrelations. Manuscript in preparation for Physiology & Behavior.*
- [1] Huynh, M., Matic, V., **Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P. (2024). *The effect of estrogen and progesterone replacement on conditioned disgust (anticipatory nausea) in ovariectomized female rats. Manuscript in preparation.*

## Teaching Experience

2024	Cognitive Science (Psych. 3139B, Adjunct Assistant Professor)	Western University
2024	Neuropsychology and Cognitive Neuroscience (Psych. 3224B, Adjunct Assistant Professor)	Western University
2023	Neuropsychology and Cognitive Neuroscience (Psych. 3224B, Lecturer)	Western University
2021 – 2022	Introduction to Psychology (Psych. 1015B, Teaching Assistant (TA))	Brescia College
2020 – 2022	Introduction to Psychology (Psych. 1010A, TA)	Brescia College
2020	Introduction to Animal Cognition (Psych. 2210B, TA)	Western University
2019	Sex Differences in Human Brain and Behaviour (Psych. 3225B, TA)	Western University
2019	“Studying Sex Differences Using Current Research Methods in Behavioural Neuroscience” (Invited Guest Lecturer)	Western University
2018	Evolution and Psychology: The Science of Human Nature (Psych. 3228A, TA)	Western University
2018	“Bacteria, Brain, and Behaviour” (Guest Lecturer)	Kiwanis Senior Centre

## Peer-Reviewing Experience

- 2023 *Behavioural Pharmacology, Frontiers in Psychology (Cognitive Science), Frontiers in Behavioural Neuroscience (Behavioral Endocrinology, Motivation and Reward)*
- 2019 – 2020 *University of Western Ontario Medical Journal*

## Conferences and Presentations (\*presenter)

### International

- [14] \***Bishnoi, I. R.**, (2024, Feb). *The effects of lipopolysaccharide (LPS) on conditioned disgust: Expanding the rodent model of lithium chloride (LiCl)-induced anticipatory nausea* [Oral presentation]. International Behavioral Neuroscience Society, Satellite (IBNS (is) Staying Connected).

- [13] \***Bishnoi, I. R.**, (2023, Oct). *The effects of lipopolysaccharide (LPS) on conditioned disgust: Expanding the rodent model of lithium chloride (LiCl)-induced anticipatory nausea* [Invited oral presentation]. Institute of Medical Psychology, Essen, Germany, Satellite.
- [12] \***Bishnoi, I. R.**, Matic, V., Kavaliers, M., Ossenkopp, K.-P., (2023, Jun). *Attenuation of lithium chloride-induced anticipatory nausea (AN) following immune activation* [Poster presentation]. International Behavioral Neuroscience Society, Niagara Falls, ON, Canada.
- [11] \*Wah, D., **Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., & Choleris, E., (2023, Jun). *Disgust-like responses to infection threat and their modulation in a land snail* [Poster presentation]. International Behavioral Neuroscience Society, Niagara Falls, ON, Canada.
- [10] \*Matic, V., **Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2023, Jun). *The effect of sucrose pre-exposure on quinpirole-induced locomotor sensitization: An investigation of sex differences in adult rats* [Poster presentation]. International Behavioral Neuroscience Society, Niagara Falls, ON, Canada.
- [9] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2023, Apr). *Immune activation impairs the acquisition and consolidation of lithium chloride-induced anticipatory nausea in a rodent model* [Poster presentation]. International Congress on Academic Medicine, an initiative by the Association of Faculties of Medicine of Canada, Québec City, QC, Canada.
- [8] \***Bishnoi, I. R.**, Ossenkopp, K.-P., Kavaliers, M., (2022, Nov). *Lipopolysaccharide-induced impairment of memory acquisition and consolidation processes in a rodent model of lithium chloride-induced anticipatory nausea* [Poster presentation]. Society for Neuroscience, San Diego, CA, USA.
- [7] \*Matic, V., **Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2022, Nov). *Estrogen replacement impairs the learning of environmentally conditioned disgust behaviour (anticipatory nausea) in ovariectomized female rats* [Poster presentation]. Society for Neuroscience, San Diego, CA, USA.
- [6] \*Kavaliers, M., **Bishnoi, I. R.**, (2021, Feb). *Group bias in non-human animals* [Invited oral presentation]. Society for Social Neuroscience, Satellite.
- [5] \***Bishnoi, I. R.**, Ossenkopp, K.-P., Kavaliers, M., (2021, Jan). *Open-field behaviors in adolescent rats: Influence of sex and immune activation on variable reliabilities and intercorrelations* [Poster presentation]. Society for Neuroscience, Satellite.
- [4] \***Bishnoi, I. R.**, Ossenkopp, K.-P., Kavaliers, M., (2020, Aug). *Rodent sex and age differences in locomotor and anxiety-like behaviors: From adolescence to adulthood* [Poster presentation]. International Behavioral Neuroscience Society, Satellite.
- [3] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2019, Oct). *The behavioural effects of early adolescent lipopolysaccharide administration on adolescent and adult male and female rats* [Poster presentation]. Society for Neuroscience, Chicago, IL, USA.
- [2] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2019, Oct). *The behavioural effects of early adolescent lipopolysaccharide administration on adolescent and adult male and female rats* [Poster presentation]. Society for Social Neuroscience, Chicago, IL, USA.
- [1] \*Kavaliers, M., **Bishnoi, I. R.**, Ossenkopp, K.-P., Choleris, E., (2019, Feb). *Progesterone and pathogen elicited disgust* [Poster presentation]. Steroids and Nervous System, Torino, Turin, Italy.

#### National and Regional

- [7] \***Bishnoi, I. R.**, (2019, Sept.). *Psychology graduate student association* [Invited oral presentation]. Fall Departmental Orientation, London, ON, Canada.
- [6] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2019, May). *The behavioural effects of lipopolysaccharide in adolescent male and female rats* [Poster presentation]. Canadian Association for Neuroscience, Toronto, ON, Canada.
- [5] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2019, Apr). *The behavioural effects of early adolescent lipopolysaccharide exposure on adolescent and adult male rats* [Poster presentation]. Southern Ontario Neuroscience Association, Windsor, ON, Canada.
- [4] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2019, Apr). *Lipopolysaccharide induced behavioural effects in adolescent and adult male rats* [Poster presentation]. London Health Research Day, London, ON, Canada.
- [3] \***Bishnoi, I. R.**, (2018, Sept.). *Bacterial metabolites and brain and behaviour* [Oral presentation]. Kiwanis Senior's Centre, London, ON, Canada.
- [2] \***Bishnoi, I. R.**, Kavaliers, M., Ossenkopp, K.-P., (2018, May). *The effect of repeated administrations of propionic acid in juvenile rats: Implications for Autism Spectrum Disorder* [Poster presentation]. Southern Ontario Neuroscience Association, Hamilton, ON, Canada.
- [1] \***Bishnoi, I. R.**, (2018, May). *The effect of repeated administrations of propionic acid in juvenile rats: Implications for Autism Spectrum Disorder* [Oral presentation]. Developmental Disabilities Research Day, London, ON, Canada.

## Other Presentations and Panels

2024	Rooted Resilience: Eco-Distress & Messy Hope (Invited Panelist)	Western University
2022	Curious Careers: Climate Changemakers (Invited Panelist)	Let's Talk Science
2022	Steps Towards a Sustainable Lifestyle (Invited Panelist)	WaterAid
2022	Sustainable Shopping Workshop: Informed by Research (Invited Speaker)	Huron College

## Other Research Experience

2017	Dr. Klaus-Peter Ossenkopp & Dr. Martin Kavaliers Lab Conducted a behavioural research project using the acoustic startle and light-dark tasks. Analyzed data using SPSS. Created figures using Inkscape. Published findings in 2019.	Western University
2016 – 2020	Psychiatric Research Assistant, Dr. Carol McDaniel Studied the influence of vitamin D deficiency on forensic psychiatric inpatient health outcomes.	St. Joseph's Health Care London
2016	Cohen Lab, Dr. Adam Cohen Recruited, collected, and analyzed data from 3-6-year-old male and female children on a theory of mind task. Built strong relationships with children and families for participant-experimenter rapport.	Western University
2015 – 2016	CoNCH Lab, Dr. Ingrid Johnsrude Collected data using the electroencephalogram (EEG) and trained research assistants on EEG protocols. Trained on audiometry and eye-tracking, in addition to Qualtrics and MATLAB.	Western University

## Select Work Experience

2021 – 2024	Founder Managed a team of 5. Communicated current climate science to a layperson audience, closing the science-action gap. Social media marketing resulting in a 70%+ monthly boost in reach.	Jeo by Indra
2019 – 2021	Sustainability Committee Chair Created an actionable climate emergency declaration at Western University in solidarity with the City of London. Campus-wide and London community outreach for environmental sustainability.	Western University
2018 – 2024	Lab Manager Development and scheduling of research projects, procurement of supplies, and maintenance of all ethical, security protocols, and standards. Additionally, providing mentorship to all students (20+), including project management, data analysis, academics, and financial aid procurement.	Western University

## Select Community and Volunteer Experience

2024–	Science Communication Subcommittee: Member Introducing postdocs at MGH and HMS to the resources needed to effectively communicate their science including public speaking (scientific and lay presentations/elevator pitches) and scientific writing opportunities (blogs/manuscripts/grants).	
2024–	Diversity, Equity, Inclusion, and Accessibility (DEIA) Subcommittee: Member The goal of the MGH Postdoc Association DEI subcommittee is to advocate for the equitable treatment of all members of our postdoctoral community, creating a welcoming environment where postdocs from all groups can connect and thrive.	
2023	Animal-Based Research Transparency Initiative Coalition: Graduate Student Representative Mandated coalition to increase transparency regarding the ethical, purposeful, and regulated performance of animal-based research and teaching at Western University. Ensured that the relevant materials, training, and other supports were available to support buy-in from Western's research community.	
2022–	University Consulting Group: Client Relations Associate, Team Lead, Consultant Led teams to conduct internal and external research to provide actionable deliverables for our clients. Aided our clients in understanding how to enter, develop, and thrive in the Canadian market, including post-COVID-19 employee satisfaction.	
2020 – 2024	President's Advisory Committee on Environment & Sustainability: Designate Represented the Society of Graduate Students to advise Western University's President, Vice-Presidents, and Provost on how to best design and execute campus-wide climate & sustainability strategies and improve awareness of sustainability initiatives.	
2019 – 2021	The Dorsal Column: Science Writer, Community Liaison Writer for quarterly neuroscience-related blog posts. Further, responsible for communications between the Dorsal Column team and the greater London community.	
2019 – 2020	Society of Neuroscience Graduate Students: Mentor Upper-year academic and social mentor for incoming students to the neuroscience graduate program.	
2018 – 2022	Society of Graduate Students: Neuroscience Councillor Advocacy and communication between Society of Graduate Students and the neuroscience program.	
2018 – 2020	Canadian Association for Girls in Science: London Chapter Organizer Created and hosted events for girls aged 7-16 to promote, educate, and build confidence regarding current topics in science, technology, engineering, and mathematics.	