

Ashwini Rajasekaran, Ph.D.

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Summary

I am a self-motivated, ambitious, and detail-oriented researcher with 13 years of experience in biomedical research. I possess technical expertise and sound scientific knowledge in diverse areas of biomedical sciences that enabled me to independently carry out research projects. Seeking to leverage my strong scientific, leadership skills and expertise to contribute to betterment of healthcare.

Education

Ph.D in Human Genetics

2012- 2017

Immunogenetics of neuropsychiatry

National Institute of Mental Health & Neurosciences (NIMHANS)

→ Funding source: DST-INSPIRE Fellowship

M.Sc in Advanced Biochemistry

2009 – 2011

University of Madras

→ Fellowship: Madras University merit endowment scholarship

B.Sc in Chemistry, Zoology, Microbiology

2006-2009

Mount Carmel College, Bangalore University

Research Experience

Tech Scientist (Research Staff)

Feb 2024- Present

PROOF Centre of Excellence & Centre for Heart and Lung Institute,
Molecular Phenotyping Core-1 laboratory,
University of British Columbia, Vancouver, Canada



PROOF
Centre of Excellence



Industrial postdoctoral fellow

March 2021- Jan 2024

Institute of Pharmacology and Physiology, Université de Sherbrooke, Québec, Canada
& deutraMed, Ontario, Canada



UNIVERSITY OF
WATERLOO



mRNA therapeutics for autoimmune diseases-

- Stabilization of mRNA vaccines (**Patent number:** 11566038, **Date of Patent:** Jan 31, 2023)
- Application in animal models of Multiple Sclerosis and Type 1 Diabetes

MitACS
Accelerate

UNIVERSITÉ DE
SHERBROOKE

→ Funding source: MITACS accelerate industrial fellowship.

Scientist, Translational Research in Occupational Asthma

PROOF Centre of Excellence, St. Paul's Hospital, Vancouver, Canada

Supervisors: [Dr. Scott J Tebbutt](#)

- Discovery of blood-based immune biomarker
- Genes underlying the severity of occupational asthma

→ Funding source: BioTalent Canada, BC Lung Association

Aug 2018- Dec 2019



Research Associate and team lead

Kwantlen Polytechnic University, Surrey, Canada

Supervisors: [Dr. Karen Davison](#), [Dr. Esme Fuller-Thomson](#)

- Genomics of **Canadian Longitudinal Study of Ageing**
- Impact of digital reality technologies in imparting genomics education
- Nutrigenomics

Mar 2019- Dec 2019



Research Fellow

National Institute of Mental Health and Neurosciences, India

Supervisors: [Dr. Monojit Debnath](#), [Dr. Venkatasubramanian Ganesan](#)

- Immuno- inflammatory pathways of Schizophrenia through maternal-fetal interaction
- Neurobiological studies in psychiatric disorders
- Th17 cytokine-mediated pathogenesis of Guillain Barré Syndrome

Nov 2012- Apr 2017



Research Trainee

VRR Diagnostics Research Laboratory, Chennai, India

Supervisors: Dr. Shaila Samuel

- Endothelial Nitric Oxide gene in diabetic foot ulcer

2011- 2012



ST. JOHN'S
NATIONAL ACADEMY OF
HEALTH SCIENCES

Research Intern

Department of Neurochemistry, NIMHANS

- Screening tests for inborn errors of metabolism and routine biochemical tests

2010

Central Animal Research Facility, NIMHANS

- care, breeding, and handling of laboratory animals
- selection of lab animals for research
- anesthesia and blood collection methods, surgical techniques
- setting up of an animal house and record maintenance

2010



Research Mentor

Dec 2020- Mar 2021

Skool Mentor, USA



- Mentored undergrad and high school students in carrying out in-silico research projects.

Science instructor &

Dec 2017- Dec 2019

Program coordinator

April 2018- July 2018

Mad Science of greater Vancouver, BC, Canada



- Coordinated Mad Science programs in lower mainland
- Delivered hands-on science experiments to spark imaginative learning

Awards, Honours & Recognitions

- **MITACS ACCELARATE industrial postdoctoral fellowship**- 2021-2024
- Recognized '**BioReady Research scientist**' and granted paid internship program by **BioTalent Canada** (2018)
- Awarded International Congress of Human Genetics **ICHG Travel award** (2016)
- Awarded **national travel grant from Department of Science and Technology, India, and Centre for International Cooperation in Science (CICS), India**, to attend and present at ICHG Conference, Kyoto (2016)
- Awarded **Innovation in Science Pursuit for Inspired Research (INSPIRE) fellowship** -2012-2017, Department of Science and Technology (DST), Ministry of Science and Technology, Government of India
- **University first rank and gold medalist** in Master of Science, University of Madras (2011)
- **Madras University Merit Endowment Scholarship** (2009-2011) for outstanding student.

Scientific Contributions

Published:

Tomlinson C, **Rajasekaran A**, Gaudreau K B, Dubois C, Farmilo J, Gris P et al., A Convenient Analytic Method for Gel Quantification Using ImageJ Paired with Python or R. Plos One (2024)-Accepted for publication.

Rajasekaran A, Davison K. Genomics and gene-based personalized nutrition. In book: Nutritional Health: Strategies for disease prevention, Fourth Edition, Chapter 24, Publisher: Humana Press (2023)

Khan F U, Khongorzul P, Raki A A, **Rajasekaran A**, Amrani A, Gris D. Dendritic cells and their immunotherapeutic potential for treating type 1 diabetes. International Journal of Molecular Sciences., (2022) 23(9), 4885.

Samra S K, **Rajasekaran A**, Sandford A J, Ellis A K, Tebbutt, S. J. Cholinergic synapse pathway gene

polymorphisms associated with Late-Phase Responses in Allergic Rhinitis. *Frontiers in Allergy*, (2021) 2:724328.

Rajasekaran A, Shivakumar V, Kalmady S V, Parlikar R, Chhabra H, Prabhu A et al., Impact of NRG1 HapICE gene variants on digit ratio and dermatoglyphic measures in schizophrenia. *Asian Journal of Psychiatry*, (2020) 54: 102363.

Shivakumar V, **Rajasekaran A**, Subbanna M, Kalmady S V, Venugopal D, Agrawal R et al., Leukocyte mitochondrial DNA copy number in schizophrenia. *Asian Journal of Psychiatry*, (2020) 53:102193

Rajasekaran A, He D, Yue A, Singh A, Shannon C. P, FitzGerald J. M, Boulet L-P, O'Byrne P. M, Gauvreau G. M, Tebbutt, S. J. Cholinergic synapse pathway gene polymorphisms associated with late-phase asthmatic response. *ERJ Open Res.*, (2019) 5(4): 00107-2019.

Shivakumar V, Debnath M, Venugopal D, **Rajasekaran A**, Kalmady S V, Subbanna M, et al., Influence of correlation between HLA-G polymorphism and Interleukin-6 (IL6) gene expression on the risk of schizophrenia. *Cytokine*, (2018) 107: 59-64

Shivakumar V, Kalmady S V, **Rajasekaran A**, Chhabra H, Amaresha A C, Narayanaswamy J C, et al., Telomere Length and Its Association with Hippocampal Gray Matter Volume in Antipsychotic-naive Schizophrenia. *Psychiatry Research: Neuroimaging*, (2018) 282: 11-17

Kalmady S V, Agarwal R, Venugopal D, Shivakumar V, Amaresha A C, Agarwal S M, Subbanna M, **Rajasekaran A**, et al., CHRFAM7A gene expression in schizophrenia: clinical correlates and the effect of antipsychotic treatment. *Journal of Neural Transmission*, (2018) 125: 741-748

Rajasekaran A, Shivakumar V, Kalmady S V, Narayanaswamy J C, Subbanna M, Venugopal D, et al., The impact of HLA-G 3' UTR variants and sHLA-G on risk and clinical correlates of schizophrenia. *Human Immunology*, (2016) pii: S0198-8859(16)30437-2.

Rajasekaran A, Shivakumar V, Kalmady S V, Narayanaswamy J C, Subbanna M, Venugopal D, et al. The impact of IL-10 polymorphisms and sHLA-G levels on the risk of schizophrenia. *Asian Journal of Psychiatry*, (2016) 23, 39-43.

Rajasekaran A, Shivakumar V, Kalmady S V, Narayanaswamy J C, Venugopal D, Amaresha A C, et al., Soluble human leukocyte antigen (sHLA)-G levels may predict early onset of schizophrenia in male patients. *Tissue Antigens*, (2015) 86 (I), 36-37.

Rajasekaran A, Venkatasubramanian G, Berk M, Debnath M. Mitochondrial dysfunction in Schizophrenia: Pathways, mechanisms and implications. *Neuroscience & Biobehavioral Reviews*, (2015) 48, 10-21.

Chhabra H, Shivakumar V, Agarwal S M, Bose A, Venugopal D, **Rajasekaran A**, et al., Transcranial direct current stimulation and neuroplasticity genes: implications for psychiatric disorders. *Acta Neuropsychiatrica*, (2015) 16: 1-10.

Abstracts and Poster Presentations

Tomlinson C, Farmilo A J, Piltonen M, **Rajasekaran A**, Gris P, Gris D., Deuterium Protium Exchange Protects mRNA from Thermal & Enzymatic Hydrolysis and Improves Translational Efficiency of mRNA Molecules. 3rd Annual mRNA-Based Therapeutics Summit July 26 — 28, 2023 Boston, MA

Gris P, Farmilo A J, Tomlinson C, Piltonen M, **Rajasekaran A**, Gris D., Effect of Deuterium Protium Exchange on mRNA Translational Efficiency at 24th International Conference “New Cryogenic and Isotope Technologies for Energy and Environment” / EnergEn October 18-20, 2023, Baile Govora, Romania

Shivakumar V, **Rajasekaran A**, Subbanna M, Kalmady S V, Venugopal D, Agarwal R, et al., “Leukocyte Mitochondrial DNA Copy Number in Schizophrenia” In BIOLOGICAL PSYCHIATRY, 83:S205, 2018.

Shivakumar V, Kalmady S V, **Rajasekaran A**, Chhabra H, Amaresha A C, Narayanaswamy J C, et al., "Telomere Length and Its Association with Hippocampal Gray Matter Volume in Antipsychotic-naive Schizophrenia." In BIOLOGICAL PSYCHIATRY, vol. 77, 9, 10010-1710 USA: ELSEVIER SCIENCE INC, 2015.

Rajasekaran A, Shivakumar V, Venugopal D, Kalmady S V, Amaresha A C, Agarwal S M, et al., “Association of HLA-G 14bp INS/DEL polymorphism with brain morphology in schizophrenia”. In MOLECULAR CYTOGENETICS, 7(Suppl 1): P43, 2014.

Poster presentation on “**Immunogenetic basis of Auditory Hallucinations in Schizophrenia**” at the ‘13th International Congress of Human Genetics (ICHG), April 2016- ICC, Kyoto, Japan.

Poster presentation on “**Association of HLA-G 14bp INS/DEL Polymorphism with Brain Morphology in Schizophrenia**” at International Conference of Human Genetics, January 2014 - Ahmedabad, India.

Oral presentation & Invited talk:

July 14, 2023- Invited virtual Talk at Harvard Medical School- Boston Children’s hospital: Labs of Ofer Levy and Simon Van Haren (*Precision Vaccines Program*), Boston, MA

Topic: Molecular and genetic differences in allergic and occupational asthma phenotypes

Third Age Learning at Kwantlen (TALK)- A Two-hour public talk for adults over age 50- on Oct 29, 2019, at Kwantlen University, Surrey, British Columbia, Canada

Topic: Exploring Genetics and Nutrition: Exploring nutrigenomics with a focus on nutrition-related gene testing to develop personalized nutrition for better health.

Recent Certifications and courses

1. **Biological safety course**, UBC, Canada- February 2024
2. **Chemical safety**, UBC, Canada- February 2024
3. Postgraduate diploma in Research training for a scientific career in an industrial setting -2023
4. Supervising interns, UDeS, Sherbrooke, Canada- June 2023
5. Entrepreneurship and Scientific Research course, UDeS, Sherbrooke, Canada- March 2022
6. Intellectual Property (IP) Management and strategies course, UDeS, Sherbrooke, Canada- November 2021
7. Basic and Advanced Levels of the Theory Training Course on Animal Use for Research and Teaching- UDeS, Sherbrooke, Canada- March 2021
8. **Tri-council Policy Statement**: Ethical Conduct for Research Involving Humans, KPU, Surrey, Canada- March 2019

Technical skills

Molecular Biology

- *Nucleic acid isolation and quantification: Automated Qiagen Prep station, Bioanalyzer, Nanodrop*
- *Nanostring nCounter Assays*
- *Lymphocyte isolation by density gradient centrifugation method*
- *PCR assays (Simple & Multiplexing)*
- *Restriction Fragment Length Polymorphism (RFLP) assay*
- *Agarose gel electrophoresis*
- *SDS-PAGE*
- *Primer designing, cDNA synthesis, Quantitative Real-time PCR: TaqMan Allelic discrimination Assay & gene expression assay*
- *Mitochondrial DNA copy number variation assays*
- *Telomere length measurement assays*
- *In vitro transcription and translation assays*
- *Bacterial and mammalian cell culture (extensive)*
- *Transfection assays*
- *Protein extraction and Western blot*

- *Patient interview and assessment scales & Dermatoglyphic assessments (Psychiatry research)*
 - *Blood sample collection by Veni- puncture method/ Phlebotomy*
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- *ELISA*
 - *FACS*
 - *Immunofluorescence- staining of cells*
 - *Inverted fluorescent microscopy*
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Statistical softwares

- *SPSS*
 - *R studio*
 - *Genetic analysis tools: PLINK, Haploview*
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*Image analysis using **ImageJ software***
*Reference managers: **End note, Mendeley***
*FACS analysis: **CytExpert***

Animal studies

- *Qualified for use of rodents in biomedical research*
 - *Breeding, ear clipping, IV & IP injections*
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