Kirthikaa Balapattabi

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PROFESSIONAL SUMMARY

My current research focus on neurohumoral mechanisms governing vasopressin release during chronic stress along with understanding the sex difference in vasopressin neuronal regulation. My strong skill set and academic knowledge from PhD training and previous research experience are laying foundation for my future aspirations of becoming an independent researcher with a laboratory that contributes to our understanding of neurohumoral regulation of autonomic control.

EDUCATION

UNIVERSITY OF NORTH TEXAS – HEALTH SCIENCE CENTER — Fort Worth, TX
Ph.D - Cardiovascular & Metabolic Diseases — Fall 2015 - Pursuing
Vasopressin neuron regulation under the supervision of Dr. J. Thomas Cunningham — GPA: 4.0/4.0

ANNA UNIVERSITY — India
M.Tech - Biotechnology — August 2007 – June 2009
Gold medalist for outstanding academic performance — CGPA: 9.37/10.0

EMPLOYMENT HISTORY

ORCHID CHEMICALS AND PHARMACEUTICALS — Chennai, India
Research Executive — March 2011 to Feb 2014

- Worked in **Oncology and Inflammation research** with focus on Multiple Myeloma, Arthritis and Inflammatory Bowel Disease.
- Standardized **Florescence based assay** to screen inhibitors for HDAC enzyme target involved in NFkB, MAPK and STAT signaling pathway using Tecan M1000 reader.
- Standardized the **Enzyme kinetics study** to characterize the inhibitor by estimating the rate of association (k_{on}), rate of dissociation (k_{off}) and equilibrium dissociation constant (k_i).
- Standardized **Whole cell experiment** to understand the inhibitory potential of the New Chemical Entity (NCE) on enzyme in cell environment. It involves determining the equilibrium dissociation constant (k_i) and optimizing enzyme inhibition in cell environment using florescence assay.
- Standardized and screened NCEs in **Cytokine inhibition studies** in cell lines such as RAW 264.7 macrophages and THP-1 differentiated macrophages, human PBMCs and whole blood.
- Screened NCEs in **Cytotoxicity assay** in order to estimate the cytotoxic potential of the inhibitor in macrophages and tumor cell lines using colorimetric assays such as sulforhodamine B (SRB) assay, MTT assay and CCK8 assay.
- Performed enzymatic and cell based functional assays for OCID 4681 **Phase I** compound.
- Handled Phase II compound OCID 2987 **Clinical samples** to estimate the cytokine inhibition using **ELISA**. It involves rigorous decoding, storage by aliquots and retrieval of samples with precision for experiments.
- Screening of cell based and *in vivo* samples for protein of interest using immuno assays such as **Western Blotting** and **Immunohistochemistry (IHC)** technique.
- Critical analysis of data (using Graph pad prism and MS Excel) and presenting in the scientific meetings.
- Involved in Oncology and Inflammation scientific committee in order to rationalize and initiate new experiments.

AURIGENE DISCOVERY TECHNOLOGIES — Hyderabad, India
Research Associate — Dec 2009 - Feb 2011

- Standardized **FRET based assay** to screen inhibitors of pan- metalloprotease involved in autoimmune disorder. It involves handling of 96-half well plate format.
- Standardized **HTRF based assay** to determine the inhibitory potential of NCEs on PI3 kinase.

- High throughput screening of NCEs using mTOR kinase as enzyme target for oncology drug discovery. It involves 384 well format using **Alfa Screen** (Perkin Elmer) Platform.
- Handled **Radioactive P^{32}** in Raf Kinase assays for oncology therapeutic area. It requires certified handling of gamma phosphate substances with expertise in minimal exposure and safe disposal of radioactive material.
- Trained and certified to work in **Good Laboratory Practices (GLP)** facilities by OECD.
- Critical analysis of data (using Graph pad prism, Excel fit) and data management using **E-notebook**. Data presentations are done in scientific review meetings and client meetings.

HISTOGENETICS INDIA PRIVATE LIMITED Chennai, India

DNA Analysis Intern Aug 2009 – Dec 2009

- Human Leukocyte Antigen - HLA high throughput sequence-based typing (SBT) using bioinformatics.
- SBT for HLAs corresponding to MHC class I (**A**, **B**, and **C**) was performed.
- SBT for MHC class II (**DP**, **DM**, **DOA**, **DOB**, **DQ**, and **DR**) was performed with high accuracy and redundancy.

HONORS & AWARDS

- American Heart Association **Predoctoral Fellowship Award**, 2018
- Pan American Neuroendocrine Society **Trainee Travel Award** to attend International Congress of Neuroendocrinology, 2018
- **Finalist** in Three Minute Thesis Competition, International Congress of Neuroendocrinology, 2018
- Office of Student Affairs **Scholarship**, UNTHSC, 2018
- **Graduate** Student Association **Travel Award** to attend Experimental Biology, 2017
- Institute **Graduate Student Research Award -** Second place in Research Appreciation Day Symposium, 2017
- Office of Student Affairs **Scholarship**, UNTHSC, 2017
- **Gold medalist** for outstanding academic performance during Masters' degree
- **Excellence in research award** for Masters' dissertation thesis
- **Alumni representative** of Board of studies at Anna University, Coimbatore
- **Second place** in student research poster at National symposium on Environmental Biotechnology
- Scored **96 percentile** in GATE 2008 (National level competitive exam in Engineering)
- **Institute topper** in consecutive 6^{th} and 7^{th} semesters of Under graduation

CONTRIBUTIONS TO SCIENCE

As a trainee, my research output and contributions are still growing, and my publications are limited due to the time I have spent in industry.

UNDERGRADUATE STUDENT TRAINEE

I completed an undergraduate dissertation in the laboratory of Dr. Shanavasa Alikunju, which focuses on cardiovascular drug discovery at Dr. Reddy's Laboratories, India. This was my first research experience, apart from providing a basic understanding of how biomedical research is conducted, this experience laid strong base for my passion for research. My project was cloning of renin gene involved in renin-angiotensin system (RAS) and expression of its protein to utilize as a drug target for hypertension. I also learnt techniques such as DNA extraction, PCR based sub cloning for creation of expression vectors, transformation with DNA vectors, restriction digestion, ligation and gel elution.

STUDENT RESEARCH FELLOW

I voluntarily worked on two projects with Dr. Sathish Kumar in the mid of course work during first year of Masters' degree. First project was on bio decolorization of chemical dyes. This work was presented as a poster at national symposium and won second place in poster awards. Second project was on antioxidant activity of *A.bisporus, C.indica* and *P.ostreatus*. This resulted in one rudimentary, first author publication as well as an invitation for oral presentation at National symposium on recent trends in food processing. This work exposed me to several biochemical antioxidant assays.

Publication

Kirthikaa B, Sathish Kumar T, Shanmugam S, 2014, Extensive study of antioxidant activity in *Agaricus bisporus, Calocybe indica* and *Pleurotus ostreatus* under varying cooking conditions GJSFR 14 (02):15-21.

Abstracts

Determination of antioxidant activity in fresh and edible mushrooms. **Kirthikaa B**, Rajasekaran P, Sathish Kumar T, Shanmugam S. **Oral** presentation at National symposium on "Recent trends in food processing" October 2008

Bio decolorization of dyes by using bacteria. **Kirthikaa B**, Saranya D and Sathish Kumar T **Poster** presented at National symposium on "Environmental Biotechnology" February 2008

GRADUATE STUDENT TRAINEE

I worked in Dr. Chakshushmathi Ghadiyaram's protein science lab at Aurigene Discovery Technologies, Bangalore, for my Masters' degree final dissertation. My research involved structural and molecular studies of the phosphorylated form of receptor tyrosine kinase in MET signaling complexes. The purified recombinant protein crystals were made and used in structural studies to understand the role of the protein in cardio-protection. This work allowed me to learn several molecular techniques including protein expression, protein purification using affinity chromatography, ion exchange chromatography and gel filtration, and recombinant protein crystallization using hanging drop method.

DNA ANALYSIS INTERN

After my graduation, I worked for few months in a bioinformatics laboratory in Histogenetics India Private Limited. I did high throughput sequence-based typing (SBT) for Human Leukocyte Antigen (HLA). I had experience with both MHC class I (A, B, and C) and MHC class II (DP, DM, DOA, DOB, DQ, and DR) typing using bioinformatic software and tools.

RESEARCH ASSOCIATE

Having a strong passion for wet lab experiments, I moved to Dr. Thomas Antony's lab in *Invitro* Biology, Aurigene Discovery Technologies, India. It was a High Throughput Screening (HTS) lab where I got an opportunity to work on TR FRET and HTRF in 96 and 384 well platforms on metalloprotease, mTOR and PI3 kinase inhibitors. I was trained and certified to work in **Good Laboratory Practices (GLP)** facilities by OECD. I also got BARC (Bhabha Atomic Research Centre, India) training and certification to handle radioactive P32 in screening inhibitors for Raf kinase assays.

RESEARCH EXECUTIVE

Later, I worked with Dr. Jayanarayan Kulathingal as a Research Executive in Small Molecule Drug Discovery, Orchid Research Laboratories, India. We studied inhibitors of HDAC enzyme involved in NFkB, MAPK, and STAT signaling pathways and of DPP4 as a target for metabolic diseases. The team was working on different therapeutic areas which helped me in taking multiple projects and getting expertise in several techniques in very short duration. I worked on enzymatic florescence assays, cytokine studies, immuno assays such as western blotting, immunohistochemistry (IHC), various cytotoxicity and cell based functional assays. Handled several cell lines such as 3T3L1 adipocytes, HepG2 liver, RAW 264.7 macrophages and THP-1 differentiated macrophages, human PBMCs and whole blood. I learnt and implemented enzyme kinetics study to characterize the inhibitor by estimating the rate of association (kon), rate of dissociation (koff) and equilibrium dissociation constant (ki). I was trained and certified in Good Laboratory Practices (GLP) facilities by OECD and was in charge of the Test Item Control Office, GLP compliant facility.

GRADUATE PhD STUDENT

My current research interests focus on the role of neurohumoral pathways regulating vasopressin release cardiovascular regulation. My ongoing individual research project focuses on assessing the relationship between Brain Derived Neurotrophic Factor and dysregulation of Supraoptic vasopressin neurons during various homeostatic challenges such as high salt loading, water deprivation and advanced liver cirrhosis along with addressing sex differences. I believe that the results from this research will contribute to interpreting the important changes in physiological regulation and address

the gaps in current knowledge about sex difference in vasopressin regulation along with rendering a foundation for potential future interventions.

Publications

Kirthikaa Balapattabi, J. T. Little, G.E. Farmer, J. Thomas Cunningham; High Salt Loading Increases Brain Derived Neurotrophic Factor in Supraoptic Vasopressin Neurons, Aug 2018, Original Research, *J Neuroendo*, EPub Ahead of print

George E. Farmer, **K. Balapattabi**, M. Bachelor, J. T. Little, and J. Thomas Cunningham; AT1a influences GABAa mediated inhibition through the regulation of KCC2 expression, Aug 2018, Original Research, *AJP Regu*, EPub Ahead of print

To be submitted in next two months

Kirthikaa Balapattabi, G.E. Farmer, J. T. Little, M. Bachelor, J. Thomas Cunningham; High Salt Induced Ionic Plasticity Using Virally Mediated ClopHensorN Chloride Imaging in the Supraoptic Vasopressin Neurons. Will be submitted to *J Neurosci*

Oral Presentation

Kirthikaa Balapattabi, J. T. Little, G.E. Farmer, J. Thomas Cunningham; Salt Loading Increases Brain Derived Neurotrophic Factor in Supraoptic Vasopressin Neurons. International Congress of Neuroendocrinology, 2018, Toronto, Canada.

Poster Presentations

Kirthikaa Balapattabi, J. T. Little, J. Thomas Cunningham; High Salt Loading Increases Brain Derived Neurotrophic Factor in Supraoptic Vasopressin Neurons. Experimental Biology, 2018, San Diego, CA.

Kirthikaa Balapattabi, G.E. Farmer, J. T. Little, M. Bachelor, J. Yuan, J. Thomas Cunningham; Virally Mediated ClopHensorN Chloride Imaging in the Supraoptic Vasopressin Neurons, 2018, San Diego, CA.

Kirthikaa Balapattabi, J. T. Little, J. Thomas Cunningham; High Salt Loading Increases Brain Derived Neurotrophic Factor in Supraoptic Vasopressin Neurons. Research Appreciation Day, 2018, UNTHSC, Fort Worth, TX.

Kirthikaa Balapattabi, J. T. Little, M. Bachelor, J. Thomas Cunningham; Role of Brain Derived Neurotrophic Factor in the Supraoptic nucleus on Response to Salt Loading. Experimental Biology, 2017, Chicago IL.

Kirthikaa Balapattabi, J. T. Little, M. Bachelor, J. Thomas Cunningham; Role of Brain Derived Neurotrophic Factor in the Supraoptic nucleus on Response to Salt Loading. Research Appreciation Day, 2017, UNTHSC, Fort Worth, TX.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Physiological Society
- American Heart Association
- Society for Experimental Biology and Medicine
- Pan American Neuroendocrine Society
- The International Neuroendocrine Federation

TECHNICAL EXPERTISE

IN VIVO ANIMAL WORK

- Basic animal (Sprague Dawley rats) handling and currently learning to get expertise in survival surgeries like bile duct ligation, telemetry implantation, ovariectomy, stereotaxic injections.
- Whole animal perfusion, punches to harvest brain regions and metabolic cage studies

IN VITRO CELL CULTURE

- Supraoptic nucleus in hypothalamus dissociation and live cell chloride imaging using ClopHensorN
- Handled different cell lines of human and animal origin *viz.,* monocytes, macrophages, hepatic, adipocyte, muscle, pancreatic beta and various cancer cell lines
- Standardized primary and functional screening assays using various cell lines on different therapeutic targets
- Expertise in basic cell culture techniques like revival, maintenance of culture and freezing cells

MOLECULAR BIOLOGY TECHNIQUES

- Cloning and making expression constructs
- Protein expression using bacterial competent cells
- Protein purification - Affinity chromatography, Ion exchange chromatography and gel filtration
- Protein crystallization – Hanging drop method
- Laser Capture Microdissection, RNA extraction and Quantitative Real time PCR
- Immunoassays - western blot, ELISAs, Immunohistochemistry (IHC) and Wes for capillary western blotting
- Plasma Peptide extraction and animal tissue Steroid organic phase extraction
- Cell fractionation using differential centrifugation

BIOCHEMICAL TECHNIQUES

- Electrolyte composition in urine and plasma samples using Flame Photometer
- Enzymatic and kinetic assay development and screening of NCEs using the standardized assay
- Absorbance, fluorescence, FRET and HTRF assays with precision and reproducibility
- High throughput screening (HTS) using various plate formats
- Antioxidant activity biochemical assays

RADIOCHEMICAL TECHNIQUES

- BARC certified user of P^{32} radioactivity substance. Performed radiometric enzyme kinase assays

COMPUTER SKILLS:

- High throughput sequence-based typing (SBT) for Human Leukocyte Antigen (HLAs) corresponding to MHC class I and II using bioinformatic tools.
- Well versed with the application of statistical and general software like Image J, Graph pad prism, Sigma plot, Compass, data management using E-notebook and MS Office tools.

RESPONSIBILITIES UNDERTAKEN

- Physiology demonstration to middle school students during APS Physiology Understanding week
- GSBS Traditional Core Class Representative, UNTHSC, Fort Worth, TX
- Physiology instructor in Joint Admission for Medical Program, UNTHSC, Fort Worth, TX
- Judge for Undergraduate Research Poster Award for SMART program, UNTHSC, Fort Worth, TX
- Newsletter Committee Trainee Representative for Department of Physiology & Anatomy, UNTHSC
- Reviewer for GSA Travel Award, UNTHSC, Fort Worth, TX
- Volunteering Service at Presbyterian Night Shelter, Fort Worth, TX
- In charge for **T**est **I**tem **C**ontrol **O**ffice, GLP compliant facility at Orchid Chemicals & Pharmaceuticals
- Occupational Health and Safety team member (OHS) at Orchid Chemicals & Pharmaceuticals
- Voluntarily presented in learning forums and attended ODISSY (Overview of drug discovery workshop)
- Alumni representative of Board of studies at Anna University, Coimbatore
- Volunteered as Science tutor for underprivileged children at Kallam Anji Reddy Foundation, India
- Secretary in Institute of Biotechnology Student Association during under graduation
- NSS Volunteer
- Student Subcommittee for Gene spire, National Scientific Conference conducted by alma mater

PERSONAL DETAILS

Trouble shooting .....
Planning.....
Team Player .....
Dedication .....
Effective Balancing.....
Perseverance.....

Gender: Female
Other Interests: Gardening, Chess and Reading books