Curriculum Vitae

N. Vinayagamoorthy, Ph.D
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ACADEMIC PROFILE:

Degree	Subject	University /Institution	Year	Class/%
Ph.D.	Molecular Biology	**CSIR-NEERI, India** (**RTM-Nagpur University**)	Awarded (Submitted:2009 Awarded:2011)	NA
M. Sc	Molecular Biology	**University of Madras, India** Dept of Biochemistry and Molecular Biology)	1998-2000	I class
B. Sc	Biochemistry	**University of Madras, India (P.G.P College, Namakkal)**	1994-1997	I class

PROFESSIONAL EXPERIENCE:

- Sri Ramachandra Institue of Higher Education & Research
  (Deemed to be University)

  Designation: Assistant Professor

  Duration: From 11th April 2018 to till date

- **ICMR-National Institute of Epidemiology (NIE),Chennai**

  Designation: Scientist – C (CDC/GHSA Project)

  Duration: From 4th July 2016 to till date

Job Description:

- To provide support for planning, managing and implementation of laboratory components of the project
- Coordinate with district level officials and hospital authorities in the implementation of the project
- Prepare study protocols/SOPs/teaching and training materials
- Supervise data collection, transport , testing, reporting, QA/QC
- To Update on the Progress of Project to CDC Atlanta team and CDC India office
- To Communicate Lab results to IDSP and CDC
- Prepare the technical reports on status of the programme implementation

- **Integrated Research Center for Genome Polymorphism, The Catholic University Of Korea**

  Designation: Research Assistant Professor
  Duration: From 28th February 2012 to 28th February 2015

Research in brief:

Applying the Genome-Wide Association Study to identify common variants that affect: **C reactive protein levels and Calcium levels in Asian population**

Key points

- C-reactive protein (CRP) is a general marker of systemic inflammation and cardiovascular disease. High CRP levels are known to be associated with cardiovascular disease risk factors, including hypertension, coronary heart disease, and stroke.The genetic contribution to differences in CRP levels remains to be explained, especially in non-European populations.
- We performed genome-wide association studies (GWAS) using SNPs from 8,529 Korean individuals (7,626 for stage 1 and 903 for stage 2).
- We have demonstrated an association between a SNP in arginase 1 and CRP levels in Korean population. (**Vinayagamoorthy et al, PLOS one,april,2014**).

A Genome-wide Association Study in patients with migraine in Korean population

Migraine is a common neurological disorder with genetically complex background, having significant heritable component. In this study, we have performed a genome-wide association (GWA) study of migraine in Korean cohorts with a total sample size of 8645 individuals (2106 cases and 6539 controls). Affymetrix Genome-wide Human SNP Array 5.0 was used to identify genome-wide variation. Plink was used to perform multiple logistic regression analysis. A total of 129 SNPs showed marginal evidence for association at a *P*-value $<1x10^{-6}$. The best result was obtained for SNP in chromosome 2 with *P* value 8.55x 10^{-6}. We are currently performing Real-time PCR based validation using an independent case and control individuals.

Pharmacogenomics:

- My current work also involves the identification of genetic difference in metabolism of drugs given to SLE patients. We have recently shown an association between CYP2D6*10 gene polymorphism and blood levels of HCQ in lupus patients (Lee JY, **Vinayagamoorthy N**, et al,. Arthritis Rheumatol, 2015)

- **Spinco Biotech, India**

  Designation: Application specialist (Genomics and Proteomics)
  Duration: From February 2010 to February 2012

Job description

- To provide Application Support to the customers of illumina - NGS And Microarray
- (Trained in Ilumina, Singapore facility)
- To provide Application Support to the users of 2D gel electrophoresis
- Experience in Microarray(Affymetrix)

- Training of sales team in genomics and proteomics products
- Delivering technical presentation and technical discussion on microarray and proteomics related products

- **Acton biotech, Pune**

Designation: Scientific officer
Duration: From September 2008 to December 2009

- Lead the Cancer Pharmacogenomics division of acton biotech
- Team management and training lab team in cancer pharmacogenomics
- Trouble shooting of experiments
- Instrumental in optimizating and launching of new genetic tests such Karas text for cetuximab, CYP2D6 test for Tamoxifen TPMT test for Thiopurine based drugs.
- Identification new genetic test for cancer drug response and toxicity

- **National Environmental Engineering Research Institute (NEERI), Nagpur, India**

Designation: Senior Research Fellow (CSIR)
Duration: From 2004- Sep 2008

- Handled the Toxicogenomics and proteomics section of CSIR funded Toxicogenomics project
- Designed and standardized genotyping experiments for genes such as CYP1A1, CYP2D6L, GSTP1, GSTT1, GSTM1, and NQO1.
- Genotyped 350 exposed and control samples which resulted in 2 published papers and 3 more paper are in pipe line.
- Optimized two dimensional gel electrophoresis in NEERI and Handled about 75 two dimensional gels which resulted in 2 proteomics papers.
- Trained and supervised 7 M. Sc students in Toxicogenomics and 1 MD student in cancer genomics towards their dissertation.

PhD Thesis title "**Application of Toxicogenomics and Toxicoproteomics in Toxicity Study of Exposed Population"**

Supervisor: Dr. Tapan Chakrabarthi, Former Director and Scientist –H, CSIR-NEERI

My thesis work was mainly focused on identification susceptible and proteomic biomarker for Manganese and PAH exposed population (more than 100 exposed and 100 control populations) using genomic and proteomic approach. I made comparisons between the SNP in xenobiotic metabolizing gene (Phase I and Phase II gene) with biomarker of exposure and effect. We have studied SNPs in the following genes CYP1A1, CYP2D6L, GSTP1, GSTT1, GSTM1, NQO1, for Manganese and PAH exposed population. Manganese exposure cause a disorder called manganese, which is similar to that of Parkinson diseases. In my thesis work, comparison of SNP with biomarker of exposure and effect showed wide intra individual variation in susceptibility to manganese exposure. We have shown that in manganese miners, the variant genotype (T/T) of CYP2D6 C–T 2850 showed substantially lower blood men and prolactin level than heterozygous or wild genotype. Through a proteomic approach, we have shown that transthyretin (TTR) levels were upregulated, whereas Apo-AI levels were decreased in the manganism group. Mn is reported to cause oxidative stress by formation of free radicals therefore increase in the level of TTR might be due to oxidative stress caused by Mn. The other part of the study in PAH exposed bus garage worker resulted in identifying important associations between SNP and biomarker in the PAH exposed individuals. We

have demonstrated that subjects with GSTM1 null showed statistically significant increase in levels of 1-OHP than subjects with GSTM1 present genotype. In the proteomics approach, proteins that are differentially expressed due to PAH exposure were identified using 2-DGE, LC/MS and MASCORT search. Three proteins (Haptoglobin, Apo- E and transthyretin) have been found to be differentially expressed in PAH exposed population. Overall, we have demonstrated that toxicogenomics and proteomics studies are useful in identifying susceptible population and specific biomarkers.

M.Sc dissertation title. "Purification and characterization of camel Hemoglobin: carried out in

Institute: Department of Crystallography and Biophysics, University of Madras
Supervisor: Professor Vasantha Pattabi

Summer Training: Effect of *Phanerochaete chrysosporium on* tannin removal.
Institute: CSIR - CLRI, Biotechnology division
Supervisor: Dr. A. Gnanamani, Scientist,CLRI

Honors and Awards

- **Senior Research Fellowship**, Council of Scientific and Industrial Research, Govt. of India
- **Best Oral Presentation Award** for the paper entitled "Apoptosis Inducing Potential of Neem leaf Extract" in the International Conference on "Biomarkers on Health and Environmental Management" and XXXII Annual Meet of Environmental Mutagen Society of India held at Coimbatore, Tamilnadu on January 10-12, 2007
- **Selected in Science talent search program** conducted by university students advisory Bureau, University of Madras and completed interim project work in CLRI, Chennai.

Publications:

Published/Accepted articles:

1. Lee JY*, **Vinayagamoorthy N*,** Han K, Kwok SK, Ju JH, Park KS, Jung SH, Park SW,Chung YJ, Park SH. Polymorphisms of Cytochrome P450 2D6 are associated with blood hydroxychloroquine levels in patients with systemic lupus erythematosus. **Arthritis Rheumatol.** 2016 Jan;68(1):184-90. doi: 10.1002/art.39402 **(*Equally contributed)(IF:7.76).**
2. **Nadimuthu Vinayagamoorthy,** Seon-Hee Yim, Seung-Hyun Jung, Sung-Won Park, Yeun-Jun Chung. Association of common variants in the calcium-sensing receptor (CASR) gene with serum calcium levels in East Asians. (**Journal of Human Genetics,** 2015 May 14. doi: 10.1038/jhg.2015.46 **(IF:2.46).**
3. **Nadimuthu Vinayagamoorthy**, Hae-Jin Hu, Seon-Hee Yim, Seung-Hyun Jung, Jaeseong Jo, Sun Ha Jee, Yeun-Jun Chung. New Variants including *ARG1* polymorphisms associated with C-reactive protein levels identified in the Korean population through integrated genome-wide association and pathway analysis, **PLoS One.** 2014 Apr 24;9(4):e95866**(IF:3.2**).
4. **Nadimuthu Vinayagamoorthy,** Kannan Krishnamurthi, Sivanesan Saravana Devi, Pravin K. Naoghare, Raka Biswas, Arup R. Biswas, Sreemanta Pramanik, Ashok R. Shende, Tapan Chakrabarti 2010**.** Genetic polymorphism of CYP2D6∗2 C → T 2850, GSTM1, NQO1 genes and their correlation with biomarkers in manganese miners of Central India, **Chemosphere**, Volume 81, Issue 10, November 2010, Pages 1286-1291**(IF:3.34).**

5. Sivanesan Saravana Devi, **Nadimuthu Vinayagamoorthy,** Meenal Agrawal, Arup Biswas, Raka Biswas, Pravin Naoghare, Sreya Kumbhakar, Kannan Krishnamurthi, Jan G. Hengstler, Matthias Hermes, Tapan Chakrabarti. Distribution of Detoxifying Genes Polymorphism in Maharastrian Population of Central India, **Chemosphere**, Volume 70, Issue 10, February 2008, Pages 1835-1839 **(IF:3.34)**.
6. S. Devi, A.R. Biswas, R. Biswas, **N. Vinayagamoorthy**, K. Krishnamurthi, J. G. Henstler, M. Hermes and T. Chakrabarti (2007). Heavy metal induced oxidative stress in central Indian Population. **Journal of Occupational and Environmental Medicine**, 49(11), November 2007,1228-123**(IF:1.63)**.
7. Rishiram Ramanan, Krishnamurthi Kannan, **Nadimuthu Vinayagamoorthy,** Kunga Mohan Ramkumar, Saravana Devi Sivanesan, Tapan Chakrabarti. Purification and characterization of a novel plant-type carbonic anhydrase from Bacillus subtilis. **Biotechnology and Bioprocess Engineering,** Mar 2009, Vol. 14, No. 1: 32-37**(IF:1.11)**.
8. Rishiram Ramanan, **Nadimuthu Vinayagamoorthy**, Saravana Devi Sivanesan, Krishnamurthi Kannan, Tapan Chakrabarti. Influence of CO_2 concentration on carbon concentrating mechanisms in cyanobacteria and green algae: a proteomic approach. **ALGAE.** vol. 27, no. 4, pp.295-301, December, 2012.
9. Sivacoumar, R. Jayabalou**,** S. Swarnalatha, N. **Vinayagamoorthy** and K. Bhagyaraj, Y.V. Subrahmanyam. Air quality status of a beach resort and theme park site with special reference to particulate size distribution. **Indian Association of Environmental Management (IAEM)**, Oct 2004, Vol. 31, No. 3, pg. 177 – 181.

Communicated articles/ under preparation

1. **Nadimuthu Vinayagamoorthy**, et al., Genetic polymorphism of GSTM1/GSTT1 and CYP1A1 and correlation with urinary 1 OHP in Bus service station workers (communicated to Chemosphere).
2. **Nadimuthu Vinayagamoorthy et al**.,Genome-wide association Study of Migraine Patients in East Asian Population. (under preparation).
3. **Nadimuthu Vinayagamoorthy et al.,** Proteomic profiling in the plasma of workers occupationally exposed to PAH (under preparation).
4. **Nadimuthu Vinayagamoorthy et al.,**Proteomic profiling of differentially expressed proteins in workers occupationally exposed to Manganese(under preparation).

Invited talk:

Vinayagamoorthy et al. Genome wide association analysis of C-reactive protein levels in the Korean population. IRCGP (Korea) and PICB (china) joined symposium on Genetic diversity of east Asian and its evolutionary/Phenotypic Implication, September 2012.

Paper/posters Presented in the international conferences

1. **N.Vinayagamoorthy**, et al., Apoptosis Inducing Potential of Aqueous Extract of Neem. International conference Biomarkers on Health and Environmental Management" and XXXII Annual Meet of Environmental Mutagen Society of India held at Coimbatore, Tamilnadu on January 10-12,2007 **(Best oral presentation award)**
2. **Vinayagamoorthy.N**,A.Biswas,R.Biswas,S.S.Devi,K.Krishnamurthi.T.Chakrabarti. Effect of Genetic polymorphism of GSTM1,GSTT1 and GSTP1 on Urinary 1-Hydroxypyrene Levels in Workers Exposed to Diesel Exhaust. International Conference on **Toxic exposure related biomarkers**: genome and health effect. During **January 10-11, 2008, NEERI, Nagpur, India**

3. S.S. Devi, **N. Vinayagamoorthy**, A. Biswas, R. Biswas, K. Krishnamurthi, P. Naoghare, J.G. Hengstler, M. Hermes, A.S. Jain, S. Kumbakar and T. Chakrabarti, "Genetic Polymorphism of NQO1(NAD(P)H: Quinone Oxidoreductase1) in PAH exposed population. Third International Conference on Environmental Science and Technology (EST,2007), American Academy of Sciences, Houston, USA
4. K. Krishnamurthi, A. Biswas, S.S. Devi, R. Biswas, **N. Vinayagamoorthy**, J.G. Hengstler, M. Hermes and T. Chakrabarti, "Identification of Biomarker of exposure to tobacco consumption in oral cancer patient", Third international conference on environmental science and technology (EST, 2007), American Academy of Sciences, Houston, USA.
5. K. Krishnamurthi, S.S. Devi, **N. Vinayagamoorthy,** R. Biswas, A. Biswa**s**, M. Agrawal and T. Chakrabarti, "Manganese induced changes in proteomics and biochemical profile of manganese miners", International Symposium on Diet in Causation & Prevention of Cancer, XXX Annual Conference of Environmental Mutagen Society of India held at Industrial Toxicology Research Center, Lucknow during March 17-19, 2005

Conferences / symposium Attended

1. The 10th KOGO Winter Symposium 2014. "Genomics for the Future" 5-2-2014 to 7-2- 2014. Yongpyong Resort,Gonwon-dong, Korea
2. International symposium of IRCGP, The Catholic University. "Clinical genomics at the crossroads". September 27th, 2013.
3. Joint Symposium of BK21Plus of CUK and Thammsat University, Thailand, 13th January,2014

Technical Knowledge gained in Research:

- Microarray-SNP genotyping, GWAS-Plink based analysis, Pathway analysis
- Real time PCR-Genotyping using Taqman assay
- PCR-RFLP based genotyping
- SDS-PAGE
- Two dimensional gel electrophoresis(2-DPGE) based protein differential expression
- NGS-Illumina (trained in Illumina Singapore Lab)

Training Undergone:

Basic Course Workshop in Education technologies (Faculty Development Program) conducted by Education Unit of Health Science College of Sri Ramachndara Institute of Higher Education and Research from 11th Feb, 2019 to 13th Feb,2019.

Languages known: English, Tamil and Hindi (proficiency in spoken Hindi only)

(Dr. N. VINAYAGAMOORTHY)