Prem Kumar Gupta, Ph.D.

Curriculum Vitae

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SCIENTIST- NEWBORN SCREENING & TANDEM MASS SPECTROMETRY

15+ years of experience in Mass Spectrometry

Dedicated Research Scientist with strong foundation in Life Sciences and specialization in LC-MS/MS based analysis of small molecules, peptides, and proteins. Worked extensively in the development and validation of tandem mass spectrometry assays for research and diagnostic applications. Excellent knowledge of protein biochemistry and bioanalytical assay development. Detail and deadline oriented with sound knowledge of NABL, CAP, GLP, GMP, FDA and ICH guidelines.

CAREER PROGRESSION

Modern Diagnostics and research Center (MDRC), Gurgaon, Haryana, India. Jan 2020–Present

Consultant & Head, Newborn Screening & Tandem Mass Spectrometry

MDRC is a premier diagnostic lab in the country with NABL & CAP accreditations and reference lab in Gurgaon, Haryana and satellite labs in many cities in India and abroad. MDRC also takes up research projects from institutions like ICMR.

Responsibilities: Supervision of Tandem mass Spectrometry (TMS) department. Guiding the business development and marketing teams in expanding business.

- Developed an innovative assay for simultaneous quantification of all four first-line anti-TB drugs in dried blood spot samples which has made possible monitoring of levels of these drugs on mass scale. Talks are on with ICMR for inclusion in National Tuberculosis Eradication Program (NTEP).
- Worked on lipidomics, proteomics, and biomarker discovery projects.

Diagno Labs Pvt. Ltd., Gurgaon, Haryana, India. Dec 2015–Dec 2019

Senior Scientist & Head, Tandem Mass Spectrometry

Diagno Labs is the fastest growing NABL & CAP accredited diagnostic lab in the country with reference lab in Gurgaon, Haryana and satellite labs in many cities.

Responsibilities: Supervision of Tandem mass Spectrometry (TMS) department.

- Development, validation and supervision of LC-MS/MS assays.
- NABL and CAP approved authorized signatory.

Innovative Life Discoveries Pvt. Ltd., Manesar, Haryana, India. D 2013–Nov 2015

Senior Scientist & Head Newborn Screening and Advanced Genomics

Innovative Life Discoveries offers a range of high-end genetic and biochemical genetics tests using state-of-the-art technologies. A significant revenue comes from research projects also.

Responsibilities: Supervision of Mass Spectrometry and Advanced Genomics departments.

- Authorized signatory for Newborn Screening and Chromosomal Microarray reports.
- Set up of Newborn Screening program.
- Worked with many prominent metabolic physicians/scientists.
- Worked in coordination with the business development/marketing team to generate business.

National Institute of Allergy and Infectious Diseases (NIAID), NIH Nov 2012 –Dec 2013

Vaccine Research Center, Gaithersburg, MD, USA

Biochemist — Vaccine Production Program Laboratory (VPPL): Research and Development

VPPL is a premier laboratory of Vaccine Research Center (VRC) of National Institute of Allergy and Infectious Diseases (NIAID), engaged in development of promising vaccines and therapeutic monoclonal antibodies selected by research at VRC.

CAREER PROGRESSION continued …

Responsibilities: Development of bioanalytical assays for vaccine and therapeutic monoclonal antibody programs. Analysis of samples submitted by different groups. Conducting research on improving antigenicity and stability of vaccines.

- Studies on the role of palmitoylation and stearoylation post-translational modifications on stability and antigenicity of virus like particles based vaccines.
- Primary amino acid sequence and post-translational modification characterization of protein therapeutics by intact mass and peptide mapping analysis using high resolution LC-MS (Q-TOF).
- Glycosylation characterization by HPLC and LC-MS: identification of PNGase F released glycans using HPLC and LC-MS/MS, sialic acid quantification using enzymatic and HPLC methods, monosaccharide composition analysis, charge based separation of glycans.
- Development of rapid analytical methods for protein characterization using microfluidics (capillary elctrophoresis and capillary isoelectric focusing).
- Bioanalytical support for formulation development programs such as analysis of biomolecular aggregation using size exclusion chromatography, analysis of oxidation, deamidation and desialylation in stability samples using HPLC and LC-MS.

Intrexon Corporation, Germantown, MD, USA Oct 2011 – Oct 2012

Associate Scientist —Human Therapeutics Division: Discovery and Pre-clinical drug development

Intrexon Corporation (now Precigen) is a biotechnology company specializing in development of gene therapy platforms using proprietary inducible promoters. The gene expression is precisely controlled using oral ligands.

Responsibilities: Pre-clinical pharmacokinetics and drug metabolism studies for small molecule ligands and protein therapeutics. Responsible for troubleshooting and maintenance in LC-MS laboratories.

- Performed research on dose optimization of DNA and small molecule ligands for optimal gene expression in various animal disease models.
- Developed and validated LC-MS methodologies for qualitative and quantitative analysis of peptides/proteins, biopharmaceutical products and small molecules.
- Developed and validated high-throughput LC-MS/MS methods for discovery and pre-clinical research programs
- Performed protein profiling of viral vectors using LC-UV and LC-MS.
- Performed LC-MS/MS quantification of small molecules and peptides in plasma and tissue samples for PK and tissue bio-distribution studies, frequently under tight timelines.
- Performed preclinical Pharmacokinetic analysis of biotherapeutics.

Univ. of Arkansas for Medical Sciences, College of Pharmacy, Little Rock, AR, USA Jan 2008 – Sep 2011

Postdoctoral Researcher — DMPK and LC-MS/MS Analytical Method Development

Managed all aspects of bio-analytical and drug metabolism laboratory. Studied clinical pharmacokinetics and metabolism of alkaloids berberine and hydrastine. Supervised Pharm D. students on research projects.

- Designed a pilot scale clinical trial and studied clinical pharmacokinetics of alkaloids hydrastine and berberin.
- Studied metabolic transformation of berberine and hydrastine in human serum and urine using LC/QTOF-MS.
- Studied protein adduct formation by some reactive metabolites of hydrastine using LC/QTOF-MS.
- Development of LC-MS technology for analysis of nano-particles/antibody conjugates for treatment of methamphetamine addiction.
- Developed and validated LC-MS/MS bioanalytical methods for a wide variety of molecules.
- The strong bioanalytical capability developed in the lab led to foundation of small molecule bioanalytical core at UAMS.

Texas Tech University, **College of Pharmacy,** Amarillo, TX, USA Sep 2006 – Dec 2007

Postdoctoral Researcher — Analysis of post-translational modifications of proteins in cancer

Studied expression and post-translational modifications of proteins important in cancer using LC-MS/MS and other protein biochemistry techniques.

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CAREER PROGRESSION continued …

- Studied post-translational modification of RNF-2 protein by using 2D electrophoresis and LC-MS/MS.
- Studied in vitro ubiquitination activity of RNF-2 protein expressed in mammalian and insect cell lines.
- Worked on development of 2D protein gel electrophoresis procedures for separation of integral membrane proteins and other hydrophobic proteins.
- Described expression of different galectin proteins in various cancer cell lines by using western blotting, confocal microscopy of GFP-tagged proteins and immunostaining.

School of Life Sciences, Jawaharlal Nehru University, New Delhi, India Jan 2000 – July 2006

Doctoral Researcher — Role of protein phosphorylation in tissue differentiation

Studied the protein expression and protein phosphorylation changes in response to light and cytokinins in meristem tissues of *Cajanus Cajun.* Supervised Masters students.

- Identified differentially expressed/phosphorylated proteins involved in the tissue differentiation by 2D gel electrophoresis, IMAC, MALDI-TOF MS/MS & LC-MS/MS
- Determined levels of various phytohormones in the differentiating tissues using GC-MS and HPLC-UV
- Performed *in vitro* and *in vivo* phosphorylation assays using P^{32}-labeled ATP and organic phosphate
- Studied the expression and activity of protein kinases by using *in vitro* and in-gel protein kinase assays
- Analyzed protein expression and protein phosphorylation changes in differentiating tissues by immunoprecipitation and western blottingand staining with phosphorylation selective fluorescent stains.

SCIENTIFIC SOFTWARE SKILLS

- Biopharmalynx and Biolynx for Biotherapeutics analysis using LC-MS.
- GraphPad Prism for statistical analysis
- Expertise in Waters Masslynx & Metabolynx and AB Sciex Analyst for drug metabolism analysis
- ChemDraw and Marvin Sketch for chemical structure drawing
- Pharsight WinNonLin for pharmacokinetic analysis

EDUCATION

- **Jawaharlal Nehru University, New Delhi, India**
  Ph.D. Life Sciences, 2006
- **Dr. B.R. Ambedkar University, Agra, India**
  M.Sc. Biotechnology, 1999
- **Delhi University, Delhi, India**
  B.Sc. Zoology, 1997

AWARDS & RECOGNITION

- AAPS Postdoctoral Travel Award to attend and present poster during 2008 annual meeting in Atlanta, GA
- Received Council for Scientific and Industrial Research (CSIR), India, research fellowship for doctoral studies
- Ranked 3rd in the All-India Entrance Examination for Ph.D. Life Sciences program of Jawaharlal Nehru University
- Ranked 1st in the All-India Entrance Examination for M.Sc. Biotechnology program of Agra University

PUBLICATIONS

Rustagi, A., Singh, G., Agrawal, S., & Gupta, P. K. (2018). Proteomic studies revealing enigma of plant–pathogen interaction. *Molecular aspects of plant-pathogen interaction*, 239-264.

B. Prabath, I. Gubrij, S. Garg, **P.K. Gupta**, M. Hauer-Jensen, A. Burnett. Radiation Lethality Potentiation in Total Body Irradiated Mice by a Commonly Prescribed Proton Pump Inhibitor, Pentaprozole Sodium. (Submitted to *International Journal of Radiation Biology*, 2014, 90(7): 554-559.

Sood V., Rawat D., Khanna R., Sharma S., **Gupta P.K**., Alam S., Sarin S.K. Study of Carnitine/Acylcarnitine and Amino acid profile in Children and Adults with Acute Liver failure. *Journal of Pediatric Gastroenterology and Nutrition* 2017, 64(6) 869-875.

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PUBLICATIONS continued …

Gupta, P.K., G. Barone, B.G. Gurley, H.P. Hendrickson. Hydrastine Pharmacokinetics and Metabolism After Oral Administration of Goldenseal (*Hydrastis Canadensis*) Supplement to Humans. *Drug Metabolism and Disposition* 2015, 43(4): 534-552.

R. Pathak, S.A. Pawar, Q. Fu, **P.K. Gupta**, M. Berbée, S. Garg, V. Sridharan, W. Wang, P.G. Biju, K.J. Krager, M. Boerma, S.P. Ghosh, A.K. Cheema, H.P. Hendrickson, N. Aykin-Burns, M. Hauer-Jensen. Characterization of Transgenic Gfrp Knock-In Mice: Implications for Tetrahydrobiopterin in Modulation of Normal Tissue Radiation Responses.*Antioxidants and Redox Signaling.*214, 20(9): 1436-1446.

Gupta, P.K., J. Brown, P.G. Biju, J. Thaden, N.E. Deutz, S. Kumar, M. Hauer-Jensen, H.P. Hendrickson. Development of High-Throughput HILIC-MS/MS Methodology for Plasma Citrulline Determination in Multiple Species.*Analytical Methods* 2011, 3: 1759-1768

Gupta, P.K., M. Hubbard, B.J. Gurley, H.P. Hendrickson. Validation of a Liquid Chromatography-Tandem Mass Spectrometric Assay for the Qualitative Determination of Hydrastine and Berberine in Human Serum.*Journal of Pharmaceutical and Biomedical Analysis.*2009, 49(4): 1021-1026.

Satelli, A., P.S. Rao, **P.K. Gupta**, P.R. Lockman, K.S. Srivenugopal, U.S. Rao. Varied Expression and Localization of Multiple Galectins in Different Cancer Cell Lines.*Oncology Reports.*2009, 19(3): 587-594.

PRESENTATIONS

H. Hendrickson. **P.K. Gupta**, R. Pathak, M. Hubbard, M. Hauer-Jensen. Biopterin Metabolome- Unlocking the Mysteries of Ionizing Radiation Injury. *ABRF Annual Conference*. 2013. Palm Springs, CA, USA.

Gupta, P.K., J. Brown, M. Hauer-Jensen, H.P. Hendrickson. Development and Cross-Species Validation of High-throughput UPLC-MS/MS Methodology for the Determination of Underivatized Plasma Citrulline. *AAPS Annual Meeting and Symposium*. 2010. New Orleans, LA, USA.

Gupta, P.K., G. Barone, B.G. Gurley, H.P. Hendrickson. "Clinical Pharmacokinetics and Metabolism of Berberine and Hydrastine Following and Oral Dose of Goldseal Supplement.*AAPS Annual Meeting and Symposium*. 2009. Los Angeles, CA, USA.

Gupta, P.K., G. Barone, B.G. Burley, H.P. Hendrickson. Metabolism of Berberine and Hydrastine Following a Single Oral Dose of Goldseal Supplement.*American Chemical Society Regional Meeting*. 2008. Little Rock, AR, USA.

Gupta, P.K., M. Hubbard, G. Barone, B.G. Gurley, H.P. Hendrickson. Validation of a Liquid Chromatography-Tandem Mass Spectrometric Assay for the Determination of Hydrastine and Berberine in Human Serum.*AAPS Annual Meeting and Symposium*. 2008. Atlanta, GA, USA.

Gupta, P.K., P. Jewaria, S. Sopory, N. Bhalla-Sarin. Mechanism of Multiple Shoot Formation from the Cotyledonary Node of CajanusCajan.BioSpark-2007, School of Life Sciences, Jawaharlal Nehru University. 2007. New Delhi, India.

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