# *CURRICULUM VITAE*

## PERSONAL


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| Full name | **Mohamed Rafiuddin Ahmed** |
| Date of Birth | **24th August 1974** |
| Citizenship | **US citizen *(Naturalized)*** |
| Office Address | Biomaterials and Advanced Drug Delivery Laboratories<br>Stanford University<br>1050 A, Arastradero Rd, Room A163, Palo Alto, CA 94304, USA |
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## EDUCATION

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| **2016-Present** | **Senior Scientist** |
| | BioADD Laboratories |
| | Stanford University, Palo Alto CA 94304 |
| Field of Study | Protein Purification, Protein formulation development for Neuropsychiatric disease/disorders, Small molecule biotherapeutics, drug discovery in Parkinson's disease and Receptor mediated Signaling studies. |
| **2010 – 2016** | **Research Instructor** |
| Institution and Location: | Department of Pharmacology, Vanderbilt University Medical Center, Nashville, Tennessee |
| Field of Study | Regulation of GPCR mediated behavior and signaling in neuropsychiatric diseases and disorders which special emphasis on G proteins, GRKs, Arrestins and MAP kinases. |
| **2003 – 2010** | **Post-doctoral Training** |
| Institution and Location: | Department of Pharmacology, Vanderbilt University Medical Center, Nashville, Tennessee |
| Mentor: | Eugenia V Gurevich, Ph.D. |
| Field of Study | Dopamine mediated behavior and signaling in neuropsychiatric diseases and disorders. |
| **1999 – 2003** | **Ph.D. (Degree Awarded March 2004)** |
| Institution and Location: | Central Leather Research Institute (CLRI/CSIR)<br>University of Madras, Chennai India |
| Mentor: | Rajadas Jayakumar, Ph.D. |
| Dissertation Title: | Development of Peptide Incorporated Collagen Tubules for Peripheral Nerve Regeneration in a Rat Sciatic Nerve Model. |
| **1995 - 1997** | **M.S** |
| Institution and Location: | University of Madras, Chennai India |
| Field of Study: | Environmental Toxicology |
| **1992-1995** | **B.S** |
| Institution and Location: | University of Madras, Chennai India |
| Field of Study: | Zoology |

## ACADEMIC APPOINTMENTS

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| 1997 – 1999 | Junior Research Fellow in collaboration with EYE RESEARCH CENTER / Dr. Agarwal's Eye Hospital and Central Leather Research |

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| | Institute/Council of Scientific and Industrial Research, Chennai, India |
| 2000 – 2003 | Senior Research Fellow Central Leather Research Institute/Council of Scientific and Industrial Research, Chennai, India |
| 2003 – 2010 | Postdoctoral Research Fellow, Department of Pharmacology Vanderbilt University, Nashville, TN |
| 2010 – 2016 | Research Instructor (Research Faculty), Department of Pharmacology, Vanderbilt University, Nashville, TN |
| 2016 – Present | Senior Scientist, BioADD Laboratories, Stanford University, Palo Alto CA |

## RESEARCH GRANTS SUBMITTED TO NIH

**Applied in June 2014, (Applied, Not Funded)**

1K01DA039312-01 Ahmed (PI) 4/1/15-3/30/20
NIH/NIDA total funds requested $599,779
*Arrestin3 Signaling In Psychostimulant Addiction*
The studies will focus on the consequences of in vivo overexpression of Arrestin3 in specific striatal regions and sub-population of neurons in chronic psychostimulant addiction, and relate them to the mechanistic signaling pathways in the brains in drug addiction. This is a training grant which will provide protected time of 5 years to the PI in order to establish in the field of drug addiction and submit a R01 research proposal in years 4 and 5 of the protected time.

**Applied in June 2011, (Applied, Not Funded)**

1R21NS0783-01 Ahmed (PI) 4/1/12-3/30/14
NIH/NINDS total funds requested $275,000
*Altered Signaling and Role of Arrestins in Parkinson's disease*
This study focused on the role of Arrestin3 in Parkinson's disease and L-DOPA induced dyskinesia. The highlight of this research is that the Arrestin3KO mice had reduced dyskinetic behavior with chronic L-DOPA treatment than their WT littermates and Arrestin2KO mice. I wanted to probe the signaling effects with the lack of Arrestin3 protein in the striatum, the region responsible for body movements.

## TEACHING EXPERIENCE

**1999-2003** - Taught collagen and drug incorporated collagen biomaterials preparation for biomedical applications like wound healing, nerve regeneration and drug delivery to undergraduate trainees, project fellows and junior research fellows at Central Leather Research Institute, Chennai, India.
**2003** – Present Trained undergraduate and graduate students in molecular cloning, Lentivirus production for transgene applications, Stereotaxic surgeries in rodents for brain injections and Animal behavior to study Parkinson's disease, drug addiction at Vanderbilt University, Nashville, TN, USA.

## TEACHING INTERESTS INCLUDE

Cell and Molecular biology, Pharmacology and Toxicology, Behavioral Neuroscience and Neurochemistry, Biomaterials and Tissue engineering.

## STUDENTS SUPERVISED

**Student Project Co-ordinator at CLRI/CSIR, Chennai, India**

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| 2000 | Gomathi Kannayiram (MS Student, Dept of Biochemistry, University of Madras) |
| 2001 | Samuel Rajendran (MS Student, Dept of Biotechnology, Madurai Kamarajar University) |
| | Chitra K (MS Student, Dept of Biotechnology, Madurai Kamarajar University) |

**IGP PhD Rotation and Undergraduate Students Supervised at Vanderbilt University Medical Center, Nashville TN**

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| 2006 | Ashley Torain (PhD Student in the Department of Pharmacology) |
| 2007 to 2011 | Yonatan Carl (PhD Student in the Department of Pharmacology) |
| 2011 | Mika Garrett (PhD Student in the Neuroscience Research Program) |
| 2011 to 2012 | Claire DelBove (PhD Student in the Department of Pharmacology) |

Emily Warren Booth (PhD Student in the Department of Pharmacology)
2013 Yulia Khaline (Undergraduate Student at Vanderbilt- Neuroscience major)
2013 to 2014 Cara Grace Moses (Undergraduate Student at Vanderbilt- Biology major)
2014 to 2015 Kris Abney (PhD Student in the Department of Pharmacology)
2015 to 2016 Ge Connie (Undergraduate Student at Vanderbilt- Neuroscience major)

## AWARDS AND HONORS

1) Awarded **Senior Research Fellowship (SRF)** during the period 2000-2003 from Council of Scientific and Industrial Research (CSIR), India.
2) Awarded **best (second) paper presentation award** in 6th International Wound healing Conference held at Central Leather Research Institute, Chennai conducted by Indian Wound Management Society on Feb 22-23, 2003.

## RESEARCH RESOURCES CREATED

Standardized Lentivirus, AAV mediated gene transfer for in-vitro and in-vivo gene therapeutic applications for overexpression and knockdown of target proteins. Liposomal delivery of drugs and protein for biotherapeutics.

## MEMBERSHIPS

2004-Present Society for Neuroscience
2012-Present ASPET
2014-Present FASEB

## MANUSCRIPT REVIEW

2004 - Adhoc Reviewer for Brain Research
2008 - Adhoc Reviewer for Neurobiology of Aging
2009 - Adhoc Reviewer for Journal of Neurochemistry
2010- Adhoc Reviewer for Polymers for Advanced Technologies
2011- Adhoc Reviewer for Advanced Biomaterials
2011- Journal of Biomedical Materials Research –Part B
2011- Parkinson's.Org[UK] (Peer Reviewer for Grant Applications)
2014- Adhoc Reviewer for ACS Applied Materials & Interfaces
2014- Adhoc Reviewer for Springerplus
2015- Adhoc Reviewer for Scientific Reports (Nature Family)
2016- Adhoc Reviewer for International Journal of Biological Macromolecules

## PUBLICATIONS

1) Kook S, Zhan X, Thibeault K, **Ahmed MR**, Gurevich VV, Gurevich EV. Mdm2 enhances ligase activity of parkin and facilitates mitophagy. ***Sci Rep.*** 2020 Mar 19;10(1):5028. doi: 10.1038/s41598-020-61796-4. PMID: 32193420.
2) **Ahmed MR**, Jayakumar M, Ahmed MS, Zamaleeva AI, Tao J, Li EH, Job JK, Pittenger C, Ohtsu H, Rajadas J. Pharmacological antagonism of histamine H2R ameliorated L-DOPA induced dyskinesia via normalization of GRK3 and by suppressing Fos B and ERK in PD. ***Neurobiol Aging*** 2019 Sep; 81: 177-189. doi:10.1016/j.neurobiolaging.2019.06.004.Epub2019 Jun19. PMID: 31306812.
3) Kim KM, Zamaleeva AI, Lee YW, **Ahmed MR**, Kim E, Lee HR, Pothineni VR, Tao J, Rhee S, Jayakumar M, Inayathullah M, Sivanesan S, Red-Horse K, Palmer TD, Park J, Madison DV, Lee HY, Rajadas J. Characterization of Brain Dysfunction Induced by Bacterial Lipopeptides That Alter

Neuronal Activity and Network in Rodent Brains. ***J Neurosci****.* 2018 Dec 12;38(50):10672-10691. doi: 10.1523/JNEUROSCI.0825-17.2018. Epub 2018 Oct 31. PMID: 30381406

4) Zurkovsky L, Sedaghat K, **Ahmed MR**, Gurevich VV, Gurevich EV. Arrestin-2 and arrestin-3 differentially modulate locomotor responses and sensitization to amphetamine. ***Neuropharmacology***. 2017 Apr 15; 121:20-29. doi: 10.1016/j.neuropharm.2017.04.021.PMID: 28419873
5) **Ahmed MR**, Bychkov E, Li L, Gurevich VV, Gurevich EV. The role of kinase and RGS activity of GRK3 in regulating the dopaminergic signaling in hemiparkinsonian rats. ***Sci Rep*** 2015 Jun 4; 5:10920. doi: 10.1038/srep10920.
6) **Ahmed MR**, Bychkov E, Kook S, Zurkovsky L, Dalby K, Gurevich EV. GRK6 normalizes multiple signaling pathways in L-DOPA-induced dyskinesia. ***Exp Neurol*** 2015 Feb 14; 266C: 42-54. doi: 10.1016/j.expneurol.2015.02.008. PMID: 25687550.
7) Bychkov E, Zurkovsky L, Garret MB, **Ahmed MR**, Gurevich EV. Distinct cellular and subcellular distributions of G protein-coupled receptor kinase and arrestin isoforms in the striatum. ***PLoS One*** 2012, 7 (11): e48912. doi: 10.1371/journal.pone.0048912. Epub 2012 Nov 6.
8) Gimenez LE, Kook S, Vishnivetskiy SA, **Ahmed MR**, Gurevich EV, Gurevich VV. Role of receptor-attached phosphates in binding of visual and non-visual arrestins to G protein-coupled receptors. ***J Biol Chem*** 2012, 287 (12): 9028-9040.
9) Bychkov ER, **Ahmed MR**, Gurevich VV, Benovic JL, Gurevich EV. Reduced expression of G protein-coupled receptor kinases in schizophrenia but not in schizoaffective disorder. ***Neurobiol Dis*** 2011, 44(2): 248-258. PMID: 21784156 [PubMed - as supplied by publisher]
10) **Ahmed MR**, Zhan X, Song X, Kook S, Gurevich VV, Gurevich EV. Ubiquitin ligase parkin promotes Mdm2-arrestin interaction but inhibits arrestin ubiquitination. ***Biochemistry*** 2011, 50 (18): 3749-3763.
11) Bychkov E, **Ahmed MR**, Gurevich EV. Sex differences in the activity of signaling pathways and expression of G-protein-coupled receptor kinases in the neonatal ventral hippocampal lesion model of schizophrenia. ***Int J Neuropsychopharmacol*** 2011, 14 (1):1-15.
12) **Ahmed MR,** Berthet A, Bychkov E, Porras G, Li Q, Bioulac BH, Carl YT, Bloch B, Kook S, Aubert I, Dovero S, Doudnikoff E, Gurevich VV, Gurevich EV, Bezard E. Lentiviral overexpression of GRK6 alleviates L-DOPA induced dyskinesia in experimental Parkinson's disease. ***Sci Transl Med*** 2010 April 21, 2 (28): 28ra28. (***Article cited as Leading Edge by Cell****.,141, May 28, 2010, see page 737*).
13) **Ahmed MR**, Gurevich VV, Dalby KN, Benovic JL, Gurevich E. Haloperidol and clozapine differentially affect the expression of arrestins, receptor kinases, and ERK activation. ***J Pharmacol Exp Ther*** 2008, 325 (1): 276-283.
14) **Ahmed MR**, Bychkov E, Gurevich VV, Benovic JL, Gurevich EV. Altered expression and subcellular distribution of GRK subtypes in the dopamine-depleted rat basal ganglia is not normalized by l-DOPA treatment. ***J Neurochem*** 2008, 104 (6): 1622-1636.
15) Bychkov E, **Ahmed MR**, Dalby KN and Gurevich EV. Dopamine depletion and subsequent treatment with L-DOPA, but not the long-lived dopamine agonist pergolide, enhances activity of the Akt pathway in the rat. ***J Neurochem*** 2007, 102 (3): 699-711.
16) Susan M. Hanson, Eugenia V. Gurevich, Sergey A. Vishnivetskiy, **Mohamed R. Ahmed**, Xiufeng Song and Vsevolod V. Gurevich. Each rhodopsin molecule binds its own arrestin. ***Proc Natl Acad Sci.USA*** 2007, 104 (9): 3125-3128.
17) Ramasamy S, Kumar MS, **Ahmed MR** and Sehgal PK. Collagen bilayer dressing with ciprofloxacin, an effective system for infected wound healing. ***J Biomat Sci. Polym. Ed.*** 2007, 18 (3): 335-351.
18) M. Dasaratha Dhanaraju, D. Gopinath, **M. Rafiuddin Ahmed**, R. Jayakumar and C. Vamsadhara. Characterization of polymeric poly (epsilon-caprolactone) injectable implant delivery system for the controlled delivery of contraceptive steroids. ***J Biomed Mater Res A.*** 2006, 76 (1): 63-72.
19) **Ahmed MR**, Jayakumar. R. Peripheral nerve regeneration in cell adhesive peptide incorporated collagen tubes in rat sciatic nerve - early and better functional regain. ***J Peripher Nerv Syst***; 2005, 10(4):390-1.

20) **Mohamed Rafiuddin Ahmed**, Vairamuthu S, Mohamed Shafiuzama, Sabiha H Basha and Rajadas Jayakumar. Microwave irradiated collagen tubes as a better matrix for peripheral nerve regeneration. ***Brain Res*** 2005, 1046 (1-2): 55-67.
21) **M. Rafiuddin Ahmed**, Sabiha H. Basha, D. Gopinath, R. Muthusamy and R. Jayakumar. Initial upregulation of growth factors and inflammatory mediators during nerve regeneration process in the presence of cell adhesive peptide incorporated collagen tubes. ***J Periph Nerv Syst*** 2005, 10(1): 17-30.
22) **M. Rafiuddin Ahmed**, U. Venkateshwarlu and R. Jayakumar. Multilayered peptide incorporated collagen tubules for peripheral nerve repair. ***Biomaterials*** 2004; 25(13): 2585-2594.
23) **M. Rafiuddin Ahmed**, D. Gopinath, K. Gomathi, P. K. Sehgal and R. Jayakumar. Alpha crystallin incorporated collagen matrices as an aid for dermal wound healing. ***J Biomed Mater Res*** (Applied Biomaterials) 2004; 69B (2): 241-248.
24) D. Gopinath, **M. Rafiuddin Ahmed**, K. Gomathi, K. Chitra, P. K. Sehgal and R. Jayakumar. Dermal wound healing process in the presence of curcumin incorporated collagen matrix. ***Biomaterials*** 2004; 25(10): 1911-1917.
25) **M. Rafiuddin Ahmed** and R. Jayakumar. Peripheral nerve regeneration in RGD peptide incorporated collagen tubes. ***Brain Res*** 2003; 993: 208-216.
26) K. Gomathi, D. Gopinath, **M. Rafiuddin Ahmed** and R. Jayakumar. Quercetin incorporated collagen matrix for dermal wound healing. ***Biomaterials*** 2003; 24 (16): 2767-2772.
27) R. Sripriya, **Md. Rafiuddin Ahmed**, P.K. Sehgal and R. Jayakumar. Influence of laboratory ware related changes in conformational and mechanical properties of collagen. ***J. Appl. Polym Sci*** 2003; 87 (13): 2186-2192.
28) J. Kanagaraj, N. Samivelu, **Md. Rafiuddin Ahmed** and R. Jayakumar. High exhaust chrome tanning using fleshing hydrolysate. ***JALCA*** 2002; 96(6): 207-214.
29) R. Jayakumar, M. Murugesan and **M. Rafiuddin Ahmed.** Formation of multilamellar vesicles ('onions') in peptide based surfactant. ***Bioorg Med Chem Lett***. 2000 Jul 17; 10(14):1547-50.
30) **M. Rafiuddin Ahmed**, M. Elumalai, S. Ezhilarasi Balasubramanian and M.P.Balasubramanian. Individual and combined effect of copper and chromium on oxygen consumption and phosphates of a marine edible crab, *Scylla serrata*. ***Biomedical Letters*** 1997; 55: 147-152.

**IPs filed**

31) Elafin Incorporated Biomaterials for the Treatment of Chronic Tissue Ulcers. **MR Ahmed**, J Rajadas, MIN Ahmed, W Sun, MR Nicolls (2019) US Patent App. 16/107,941.
32) DOPA Formulations for Treatments of Parkinson's Disease. **MR Ahmed**, J Rajadas, MIN Ahmed, W Sun (2019) US Patent App. 16/107,933.
33) Microneedle patches for transdermal delivery. **MR Ahmed**, J Rajadas, W Sun, MIN Ahmed, F Xu. (2018) US Patent App. 15/997,412

**INVITED PRESENATATIONS**

**1)** V. Arul, **Ahmed MR,** Gomathi K, Gopinath D, Dhanraju MD, Jayakumar R. Biotinylated GHK peptide incorporated collagenous matrix a novel biomaterial for dermal wound healing in rats. 6th International Wound healing Conference held at Central Leather Research Institute, **Chennai** conducted by Indian Wound Management Society on Feb 22-23, 2003 – **Oral Paper presentation.**
**2)** **Ahmed MR**, Bychkov E, Gurevich E. Altered signaling mechanism in L-DOPA induced dyskinesia – Role of GRK6 overexpression in vivo in the unilaterally 6-OHDA lesioned rat. Vanderbilt-Meharry Pharmacology Joint Retreat, Oct 26 and 27, 2010 at Lake Barkley State Resort, **Cadiz**, KY, USA – **Oral Paper presentation.**
**3)** **Ahmed MR,** Gurevich E. GRK6 normalizes multiple signaling pathways in L-DOPA induced dyskinesia. FASEB Science Research Conferences: G protein-coupled receptor kinases: From molecules to diseases, June 8-13, 2014 at **Steamboat Springs**, CO, USA – **Oral Paper presentation.**

**Book chapters**

**4)** Gurevich EV, **Ahmed MR** and Carl Y. In Vivo Gene Silencing by Virally Delivered MicroRNA. Riccardo Brambilla (ed.), Viral Vector Approaches in Neurobiology and Brain Diseases, Neuromethods, vol. 82, Chapter 13, 245-267. **DOI 10.1007/978-1-62703-610-8_13,** © Springer Science.

## NAMES OF REFERENCES

| | |
|---|---|
| **Eugenia V. Gurevich,** PhD (Post-doc Mentor)<br>Associate Professor<br>Department of Pharmacology<br>Vanderbilt University<br>PRB454<br>2200 Pierce Ave, Nashville TN 37232, USA<br>Phone: 615 936 2720<br>Email: Eugenia.gurevich@vanderbilt.edu | **Sergio Coffa**, PhD,<br>US Patent Examiner<br>United States Patent and Trademark Office<br>Phone : 615 968 8759<br>Email : sergio.coffa@uspto.gov |
| **Erwan Bezard**, PhD,<br>Director, Institut des Maladies Neurodégénératives<br>Université Victor Segalen-Bordeaux 2,<br>CNRS UMR 5293 – Bat. 3b 1er etage<br>146 Rue Leo Saignat<br>33076 Bordeaux – France<br>Phone: +33 557 571 687<br>Fax: +33 556 901 421<br>Email: Erwan.bezard@u-bordeaux.fr | **Rupesh Chaturvedi**, PhD,<br>Professor,<br>School of Biotechnology<br>**Room No:**132<br>**Email:** rupesh@mail.jnu.ac.in<br>rupesh.chaturvedi.jnu@gmail.com<br>**Personal Webpage:**<br>http://www.jnu.ac.in |