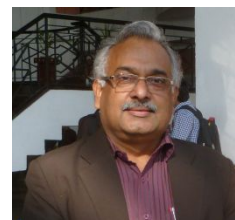


## About the Director



Mohanakumar KP has joined as the Director of Inter University Centre for Biomedical Research & Super Specialty Hospital on 14th October 2015. He was Chief Scientist at the CSIR-Indian Institute of Chemical Biology (CSIR-IICB) and Head of the Divisions of Cell Biology & Physiology; Project Monitoring & Evaluation at Kolkata, India. He served as a Professor of Biological Sciences at IISER, Thiruvananthapuram. He graduated from Saurashtra University with a Masters degree in Experimental Biology with Chemical Neuroanatomy as specialization, and PhD in Experimental Biology (Neuropharmacology). He received advanced training in NIMH, NIH, USA, University of Goettingen and University of Essen, Germany, and Department of Neurology, University of Virginia Medical Centre, Charlottesville, USA.

He established an advanced clinical and experimental research laboratory on neurodegenerative diseases at CSIR-IICB, with special reference to the pathogenesis, disease progression and treatment of Parkinson's disease (PD). He has immensely contributed to the understanding of PD pathogenesis, Huntington's disease biology and mitochondrial biology of Autism and Attention Deficit Hyperactivity Disorders. His cybrids laboratory facility is one of its kind in this part of the World, and is recognized for his interest in mitochondrial involvement in neurodegenerative diseases. He has more than 125 peer reviewed publications, edited several special issues of neuroscience journals, and a series of Neurochemistry workbooks for use by neurobiologists. He has guided 30 PhD students in the field of Neuropharmacology, and more than 60 postgraduates in basic and clinical areas of Pharmacology, Biochemistry, Biotechnology and other biomedical disciplines. He is also a Professor of Biological Sciences of AcSIR, India.

A fellow of the National Academy of Sciences, India; West Bengal Academy of Science & Technology and Indian Academy of Neurosciences, he received National Bioscientist Award from DBT, Govt. of India and ICMR, Govt. of India Young Scientist Prize, and several Society instituted awards and prizes. He was an elected Council Member of the International Society for Neurochemistry and holds positions in this Society where funds are awarded competitively to neurochemists around the world. He served as President of the Society of Neurochemistry, India, and Vice President of Indian Academy of Neurosciences. He has served as Professor of TWAS-UNESCO and IISER, Thiruvananthapuram. He currently serves as editorial member of *J Neurochem*, *Neurochem Int*, *Neurochem Res*, *Neurosci Med*, *Anat Cell Biol*, etc.

### Some Recent Publications:

#### *Peer-reviewed publications*



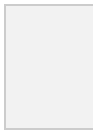
1. Chakraborty J, Rajamma U, Jana N, Mohanakumar K P. Quercetin improves the activity of ubiquitin proteasomal system in 150Q *mHtt* expressing cells, but exerts detrimental effects on neuronal survivability. *J Neurosci Res* 93, 1581-1591, 2015.
2. Paidi RK, Nthenge-Ngumbau DN, Singh R, Kankanala T, Mehta H, Mohanakumar KP. Mitochondrial deficits accompany cognitive decline following single bilateral intracerebroventricular streptozotocin. *Curr Alzheimer Res* 12, 785-95, 2015.
3. Haobam R, Tripathy D, Kaidery NA, Mohanakumar KP. Embryonic stem cells derived neuron transplantation recovery in models of parkinsonism in relation to severity of the disorder in rats. *Rejuvenation Res* 18, 173-184, 2015
4. Naskar A, Prabhakar V, Singh R, Dutta D, Mohanakumar KP. Melatonin enhances L-DOPA therapeutic effects, helps to reduce its dose and protects dopaminergic neurons in MPTP-induced parkinsonism in mice. *J Pineal Res* 58, 262-274, 2015.
5. Jaiswal P, Guhathakurta S, Singh AS, Verma D, Pandey M, Varghese M, Sinha S, Ghosh S, Mohanakumar KP, Rajamma U. SLC6A4 markers modulate platelet 5-HT level and specific behaviors of autism: A study from an Indian population. *Prog Neuro-Psychopharmacol Biol Psychiatry* 56, 196-206, 2015.
6. Chakraborty J, Pandey M, Navneet AK, Appukuttan AT, Varghese M, Sreetama SC, Rajamma U, Mohanakumar KP. Increased expression of profilin2 is associated with its altered interaction with the cytoskeletal protein,  $\beta$ -actin in the striatum of 3-nitropropionic acid-induced Huntington's disease in rats. *Neuroscience* 281, 216-228, 2014.
7. Tripathy D, Verma P, Nthenge-Ngumbau DN, Banerjee M, Mohanakumar KP. Regenerative therapy in experimental parkinsonism: Mixed population of differentiated mouse embryonic stem cells, rather than magnetically sorted and enriched dopaminergic cells provide neuroprotection. *CNS Neurosci Ther* 20, 717-727, 2014.
8. Chakraborty J, Nthenge-Ngumbau DN, Rajamma U, Mohanakumar KP. [Melatonin protects against behavioural dysfunctions and dendritic spine damage in 3-nitropropionic acid-induced rat model of Huntington's disease.](#) *Behav Brain Res* 264: 91-104, 2014.
9. Verma D, Chakraborti B, Karmakar A, Bandyopadhyay T, Singh AS, Sinha S, Chatterjee A, Ghosh S, Mohanakumar KP, Mukhopadhyay K, Rajamma U. Sexual dimorphic effect in the genetic association of MAO-A markers with autism spectrum disorder. *Prog Neuropsychopharmacol Biol Psychiatry* 50:11-20, 2014.
10. Chakraborty J, Singh R, Dutta D, Naskar A, Rajamma U, Mohanakumar KP. Quercetin improves behavioral deficiencies, restores astrocytes and microglia, and reduces serotonin metabolism in 3-nitropropionic acid-induced rat model of Huntington's disease. *CNS Neurosci Ther* 20, 10-19, 2014.

#### **Peer-reviewed reviews:**

1. Jaiswal P, Mohanakumar KP, Rajamma U. Serotonin mediated immunoregulation and neural functions: Complicity in the aetiology of autism spectrum disorders. *Neurosci Biobehav Rev*, 55, 413-431, 2015.
2. Dutta D, Mohanakumar KP. Tea and Parkinson's disease: Constituents of tea synergize with antiparkinsonian drugs to provide better therapeutic benefits. *Neurochem Int* 89:181-90, 2015.
3. Tripathy D, Chakraborty J and Mohanakumar KP. Antagonistic pleiotropic effects of nitric oxide in the pathophysiology of Parkinson's disease. *Free Rad Res* 49, 1129-1139, 2015.

4. Chakraborty J, Rajamma U, Mohanakumar KP. [A mitochondrial basis for Huntington's disease: therapeutic prospects](#). *Mol Cell Biochem* 389: 277-291, 2014.
5. Borah A, Paul R, Choudhury S, Choudhury A and Mohanakumar KP. Neuroprotective potential of Silymarin against CNS disorders: Insight into the pathways and molecular mechanisms of action. *CNS Neurosci Ther* 19, 847-53, 2013.

#### **6. Special issues of peer-reviewed journals**

1. Sasanka Chakrabarti, Kochupurackal P. Mohanakumar. Special Issue: Aging and Neurodegeneration: A Tangle of Models and Mechanisms. *Aging and Disease*, Volume 7 (Issue 2), Pages 111-235, June 2016. 
2. Robert J. Williams, Kochupurackal P. Mohanakumar, Philip M. Beart. [Special Issue: Neuro-Nutraceuticals: Further Insights into their Promise for Brain Health](#). *Neurochemistry International*, Volume 95, Pages, 1-118, May 2016. 
3. Robert J. Williams, Kochupurackal P. Mohanakumar, Philip M. Beart. [Special Issue: Nutraceuticals: Molecular and Functional Insights into how Natural Products Nourish the Brain](#). *Neurochemistry International*, Volume 89, Pages 1-280, October 2015.
4. Priya Srinivas, David Wink, Kochupurackal P Mohanakumar and M Radhakrishna Pillai. The Legacy of Nitric oxide: Impact on Disease Biology *Nitric Oxide: Biology and Chemistry*. Volume 43, Pages 1-112, December 2014. 

#### **Research Fellows currently completing their PhD thesis**

1. Miss Nilufar Ali, SRF, CSIR; [nilufar.ali.87@gmail.com](mailto:nilufar.ali.87@gmail.com)
2. Miss Poonam Verma, SRF, CSIR; [pv1585@gmail.com](mailto:pv1585@gmail.com)
3. Mr. Nthenge Dominic Ngumbau Ngima, DBT-TWAS Senior Fellow; [ngutimba17@gmail.com](mailto:ngutimba17@gmail.com)
4. Miss Alpana Singh, SRF,UGC; [alpanasingh2008@gmail.com](mailto:alpanasingh2008@gmail.com)
5. Miss. Anu Raju, SRF, GATE-CSIR; [anu.anuraju@gmail.com](mailto:anu.anuraju@gmail.com)
6. Mr. Paidi Ramesh Kumar, SRF, GATE-CSIR; [rameshkumar602@gmail.com](mailto:rameshkumar602@gmail.com)

#### **Research Interests**

**Neurodegenerative diseases; Parkinson's disease drug development:** Animal and cellular models are the strength of the laboratory, and is being used for target-identification and drug screening. Novel molecules isolated from plant sources are identified and modeled with the help of bio-informatics, and the good molecules and their congeners are synthesized and evaluated. This is achieved by means of vigorous collaborative research with synthetic organic chemists and bioinformatics specialists. Of special interest is the investigation on combination of drugs for better therapeutic outcome, as well as with a view to reduce the dose of L-DOPA for minimizing the drug-induced complications on long-term use.

**Pathophysiology of neurodegeneration, Parkinson's and Huntington's diseases:** Molecular basis of neuronal death in Parkinson's disease, neurodegeneration and Huntington's disease is investigated by employing animal models, human postmortem brain tissues, primary cell cultures, cell lines and modified cell lines (hybrids). Neurobehavioral abnormalities and neurotransmitter metabolism in animal models, reactive oxygen and nitrogen species, and

cellular signaling in relation to apoptosis, calcium homeostasis, membrane potential, voltage and ligand-gated channel currents, mitochondrial functions and gene expression defects are investigated. A major interest in the laboratory is to understand what makes substantia nigra dopaminergic neurons to die while sparing dopaminergic neurons of other areas. A proteomics approach is adopted to decipher this issue.

***Stem cells differentiation and transplantation recovery in Parkinson's disease:*** Stem cells are differentiated into dopaminergic neurons, employing several means. Co-culture, magnetically sorted cells, and mixed population of cells with varied stages of differentiation are used for transplantation recovery in animal models of hemi-parkinsonism. Recovery in terms of behavior, neurotransmission, neuronal integrity and glial proliferation are examined. Survival of the graft, stereology, neurogenesis and transplantation loci in the brain are of prime interest.

***Bioenergetics in Developmental Disability Disorders:*** Autism Spectrum Disorders and Attention Deficit Hyperactivity Disorder are investigated in terms of involvement of mitochondrial integrity, biogenesis and their functions. Human samples from patient population are used for creating cybrids and investigated for mitochondrial genes and their gene expression pattern for examining the pathophysiology of these diseases.

### **Research collaborations**

All active collaborations are welcome. Currently the following Institutes have identified collaborative programs with IUCBR & SSH: CSIR-Indian Institute of Chemical Biology, Kolkata; Manovikas Kendra, Kolkata; Calcutta National Medical College, Kolkata; Bangur Institute of Neurology, Kolkata; and Assam Central University, Silchar.