SHILPITA KARMAKAR ,PhD

60 Cherryfield Dr, West Hartford, CT-06107, USA

E-mail:, shilpita1986@gmail.com , Shilpita.karmakar@jax.org (860)-718-1849,

Skype ID- Shilpita Karmakar

Summary.

My doctoral research work has been mainly focused on studying platelets in hematological disorders using proteomics based approach in human clinical samples. I have reported the first molecular based study for ACMT. My findings have also highlighted the factors involved in platelet disorders in thalassemia and chronic myeloid leukemia. As a part of my first post-doctoral studies I have studied ocular iron homeostasis in the anterior segment of the eye by prion protein. In my second post-doctoral training my research was focused on identifying the targets of translational repressor protein MSI2 using integrative genome wide analysis. I have used genome wide techniques polysome profiling to identify the translational targets regulated by RNA binding protein MSI2. In order to pursue my research into the field of cancer and hematology I am looking into epigenomic alterations in clonal hematopoiesis in aging and cancer.

Education and Experience

- **Postdoctoral associate** at Jackson Laboratories of Genomic Medicine , Department of Cancer, Farmington, USA, July 2021-Present
    - Look at the epigenomic remodelling to understand the clonal hematopoiesis in aging and cancer

- **Postdoctoral Research Associate** at Yale University, Department of Hematology, New Haven, CT, USA-October 2017-October 2020.

    - Using Integrative Genome wide analysis to identify the targets of translational repressor protein MSI2.
    - Translational effect of MSI2 inhibitors.

- **Postdoctoral Scholar** at Case Western Reserve University, Department of Pathology, Cleveland,OH, USA - March 2016-October 2017.

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    - Prion protein modulates iron transport in the anterior segment: Implications for ocular iron homeostasis and prion transmission
    - Distribution of Non-Transferrin bound iron in brain and kidney with its implications towards Alzheimer's disease.
    - Regulation of retinal iron uptake by prion protein on being cleaved at the β site.

Doctorate of Philosophy (Ph.D) in Biophysics, Molecular Biology and Genetics from University of Calcutta, Kolkata, India – August 2010- July 2015.

Thesis title: **"**Differential Proteomic Studies Of Platelets In Hematological Disorders**".**

- Differential Proteomic studies of platelets in Asymptomatic Constitutional Macrothrombocytopenia.
- Comparative proteomic studies of platelets in HbEβ and β thalassemia to account for the hypercoagulation factors.
- Platelet proteomics in Chronic Myeloid Leukemia

Post. Master Associateship Diploma, in Biophysical Science from Saha Institute of Nuclear Physics, Kolkata, India - Aug 2009 - Aug 2010.

Master of Science (M.Sc) in Biophysics, Molecular Biology and Genetics, University of Calcutta, India. (Percentage – 71.6%, First Class)- 2007-2009.

Summer project fellow at Jawaharlal Nehru University, New Delhi, India.

- Study to characterize the downstream effect of cadmium toxicity on normal fibroblast**.**

Bachelor of Science (B.Sc) in Biochemistry (Honours), University of Calcutta, Kolkata, India. Percentage – 70.25%, First Class, Rank 1)-2004-2007 **.** ¶

Publication

- Integrative genome-wide analysis reveals EIF3A as a key downstream regulator of translational repressor protein Musashi 2(MSI2). **Shilpita Karmakar**, Oscar Ramirez, Kiran V.Paul, Abhishek K. Gupta, Valentina Botti, Igor Ruiz de los Mozos, Nils Neuenkirchen, Robert J.Ross, Karla M. Neugebauer and Manoj M.Pillai.(BioRxiv **doi:** https://doi.org/10.1101/2021.02.06.428911)

- Prion protein modulates iron transport in the anterior segment: Implications for ocular iron homeostasis and transmission. AjayAshok, **Shilpita Karmakar**, RajeevChandel, RanjanaRavikumar, StutiDalal, QingzhongKong, NeenaSingh. Experimental Eye Research. 2018;175: 1-13

- Prion protein facilitates retinal iron uptake and is cleaved at the β-site: Implications for retinal iron homeostasis in prion disorders. Abhishek Asthana[1], Shounak Baksi[1], Ajay Ashok[1], **Shilpita Karmakar[1]**, Najiba Mammadova[2],Robyn Kokemuller[2], Mary Heather Greenlee[2], Qingzhong Kong[1], Neena Singh[1]*. Scientific Reports.2017;7(9600):1-14

- Transport of Non-Transferrin Bound Iron to the Brain: Implications for Alzheimer's Disease. Ajai Tripathi, **Shilpita Karmakar**, Abhishek Asthana; Ajay Ashok; Vilok Desai; Shounak Baksi; Neena Singh. Journal of Alzheimer's Disease.2017; 58(4):1109-1119.

- Platelet Proteomics in Chronic Myeloid Leukemia. **Shilpita Karmakar**, Debasis Banerjee & Abhijit Chakrabarti. Int J Blood Dis Dis. 2017; 1(1): 001-006.

- Platelet proteomics in thalassemia: Factors responsible for hypercoagulation. **Shilpita Karmakar**, Debasis Banerjee & Abhijit Chakrabarti. Proteomics Clinical Applications. 2016; 10(3): 239-247.

- Erythrocyte and Platelet Proteomics in Haematological Disorders. Abhijit Chakrabarti, Suchismita Halder & **Shilpita Karmakar**. Proteomics Clinical Applications. 2016; 10(4): 403-414.

- Differential proteomics study of platelets in asymptomatic constitutional macrothrombocytopenia: altered levels of cytoskeletal proteins. **Shilpita Karmakar**, Sutapa Saha, Debasis Banerjee, Abhijit Chakrabarti. European Journal of Haematology. 2014; 94 (1): 43-50.

- Proteomics study of Haemoglobinopathy. Abhijit Chakrabarti, Suchismita Halder and **Shilpita Karmakar.** Book chapter. 28th ISMAS symposium cum workshop on Mass Spectrometry. ISMAS-WS-2014. ISBN-978-81-904442-6-2. (33-39).

- 2D DIGE based proteomics study of erythrocyte cytosol in sickle cell disease: altered proteostasis and oxidative stress. Avik Basu, Sutapa Saha, **Shilpita Karmakar**, Sudipa Chakravarty, Debasis Banerjee, Bisnu Prasad Dash, Abhijit Chakrabarti. Proteomics. 2013; 13 (21): 3233-3242.

- Platelet Proteomics in Haematological Disorders.**Shilpita Karmakar**, Sutapa Saha, Debashis Banerjee and Abhijit Chakrabarti. Ind. J. Hematol. Blood Trans. 2010; 26: 168.

Technical Skills

Cell Biology

- Handling of Clinical samples.
- Animal handling (mice) and experimentation. (IP injection, ocular procedures and isolation of ocular tissues in anterior and posterior segment of eye, bone marrow isolation).
- Developing disease models in mice by bone marrow transplantation.
- Mammalian cell culture, gene over-expression (transfection) and silencing, stable and inducible cell lines, generation of single cell clone
- CD34 cell culture
- Mouse HSPCs isolation and sample preparation for scRNA seq and ATAC.
- Cut and TAG
- Cut and Run and library preparation.
- Molecular Cloning, primer design, PCR, site directed mutagenesis.
- RNA isolation and processing, Ribosomal RNA isolation RT-qPCR
- Polysome profiling
- Cellular fractionation and isolation of chromatin associated RNA
- 2D Gel Electrophoresis.
- Differential In Gel Electrophoresis.
- Denaturing Urea Gel electrophoresis for RNA
- SDS Gel Electrophoresis
- Western Blotting
- Flow cytometry (FACS Calibur and FACS LSRII), Aria Fusion sorter
- Co-Immunoprecipitation
- Immunohistochemistry staining.
- Biochemical assays (luciferase assay,apoptosis assay)
- Fluorescence microscopy (Imaging).
- Transmission Electron microscopy sample preparation using negative stain.

Biophysical

- MALDI TOF/TOF Mass Spectrometry and Bioinformatic analysis (PANTHER and String analysis).
- Size Exclusion Chromatography and protein purification techniques.
- ESI-LC Mass Spectrometry¶

Software and Office Applications

- Experience in Microsoft Powerpoint and excel, and analytical softwares such as Origin, PD Quest, Decyder, Cell Quest Pro and Mascot, CanvasX, Photoshop
- Experience in writing Manuscripts and drafts.

Professional Development

- Certified for the completion of Future Faculty Preparation Certification Program Spring 2017 (Case Western Reserve University).
- Reviewed **19** original research articles and reviews for scientific journal (Journal of Blood Medicine) , Frontiers Molecular Biosciences and Cancer management and Research

Awards and honors

- Poster award in 5th Annual Meeting of the Cytometry Society, India and 13th Indo-us Cytometry workshop on advanced flow Cytometric techniques in October 2012.
- Awarded Junior Research Fellowship by Department of Atomic Energy (DAE) Saha institute of Nuclear Physics in August 2009.

- Awarded Saraju Bala Dey scholarship in recognition of 1st position in M.Sc course (University of Calcutta) in 2008.

Selected Conferences And Seminars Attended

Participated in 8th Annual Retreat RNA held on October 18th, 2019 at O.C Marsh Auditorium,Yale Science Building

Participated in 7th Annual Retreat, held on September 21,2018 at Conference Center, Yale West Campus.

Participated in the workshop on splicing factor mutations and RNA biology in cancer held in Edward P Evans Hall on May22-23, 2019.

Participation in Annual meeting of **ARVO (Association for Research in Vision and Opthalmology)**. Baltimore,MD. May 6-11, 2017.

Participation in **East2West Iron Club Meeting**, Philadelphia, PA.Oct 27-28, 2016.

Participation in National Symposium on **Frontier's in Biology**. Saha Institute of Nuclear Physics ,Kolkata, India. January 21-22, 2015.

Poster presentation in the **IUBMB 10th International Symposium on "Biochemical Role of Eukaryotic Cell Surface Macromolecules".** Fortune Park Panchwati, Kolkata, India. January 20-24th, 2014.

Poster presentation in **5th annual meeting of Proteomics Society India on Medical Proteomics** .Indian Institute of Science, Bangalore, India. November 28th-30th 2013.

Poster presentation in "**International Symposium on Proteomics Beyond Ids...and 4th Annual Meeting of Proteomics Society (India)".** CSIR- National Chemical Laboratory, Pune, India. November 22nd-24th, 2012.

Poster presentation in "**5th Annual Meeting of the Cytometry Society, India and 13th Indo-us Cytometry Workshop on Advanced Flow Cytometry Techniques".** Centre for research in Nanoscience and technology, Kolkata, India. October 12th -13th 2012.

Poster presentation in International Conference on "**Omics Meets Disease and IIIrd Annual Meeting of Proteomics Society of India",** SINP auditorium complex, salt lake, Kolkata, India.December 15th -18th, 2011.

Poster presentation in "**Haematocon 2010- 51st Annual Conference of India Society of Haematology and Transfusion Medicine".** EZCC, Kolkata, India. November 19th -21st, 2010.

Schools/ Workshops Attended

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Participation in **University of Warwick short course on practical proteomics.** September 24-27th, 2013, Bangalore, India.

¶**Participation** in "**Haematocon 2010- 51stAnnual Conference of Indian Society of Haematology and Transfusion Medicine Workshop**" **on coagulation**. November 22, 2010, Clinical haematology service, Kolkata, India.