Shilpak Chatterjee, Ph.D

Affiliation: **Senior Scientist,**

Wellcome Trust/DBT India Alliance Intermediate Fellow,

Assistant Professor, Academy of Scientific and InnovationResearch(AcSIR),

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IICB-Translational Research Unit of Excellence (IICB-TRUE),

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ACADEMICS

Year	Degree obtained	University/Institute	Subject
2000-2003	B.Sc (Microbiology)	University of Calcutta	Microbiology
2003-2005	M.Sc (Microbiology)	University of Kalyani	Microbiology
2006-2011	Ph.D	Jadavpur University, Kolkata, India (*Institute:* Chittaranjan National Cancer Institute, Kolkata, India)	Life Sciences **Title:** Novel Pathway of Overcoming Multidrug Resistance (MDR) in Cancer – Study of the Role of Tumor Associated Macrophage (TAM) and Oxidative Stress
2011-2018	Postdoctoral Research Scholar	Medical University of South Carolina, USA	Adoptive T cell therapy of Cancer

Honours andAwards

- Wellcome Trust/DBT India Alliance Intermediate Fellowship, 2020
- AAI Trainee Abstract Award from American Association of Immunologist for theyear of 2014, 2015, 2016 and2017
- Senior Research Fellowship received from ICMR, Govt. of India (2009-tilldate).
- Junior Research Fellowship received from ICMR, Govt. of India(2006-2009)

RESEARCH

Research Focus: Immunometabolism, Tumor immunology, T cell Biology

Research Interest: Immunotherapy of cancer is emerging as a powerful weapon in the oncological armamentarium. Considerable efforts are being made to harness the cytotoxic potential of the T cells to eradicate cancer. Yet, elimination of established tumor is impeded due to the dysfunctionality of the anti-tumor T cells at the tumor site. The major objective of our lab is to understand the mechanism (s) dampening the objective repose of the anti-tumor T cells. Primarily we are focusing on:

- Elucidating the role of cellular metabolism in remodelling the anti-tumor response of T cells.
- Determine the crosstalk between metabolic adaptation and stress response pathways in augmenting the therapeutic efficacy of anti-tumor T cell.
- Determine the role of metabolic requirements in shaping up the functionality of tumor associated myeloid cells.

PUBLICATIONS

A. PublishedManuscript

26. Chakraborty P, Vaena SG, Thyagarajan K, **Chatterjee S**, Al-Khami A, Selvam SP, Nguyen H, Kang I, Wyatt MW, Baliga U, Hedley Z, Ngang RN, Guo B, Beeson GC, Husain S, Paulos CM, Beeson CC, Zilliox MJ, Hill EG, Mehrotra M, Yu XZ, Ogretmen B, Mehrotra S. *Pro-Survival Lipid Sphingosine-1-Phosphate Metabolically Programs T Cells to Limit Anti-tumor Activity.* **Cell Rep.** 2019, 28(7):1879-1893.

25. Chakraborty P*, **Chatterjee S***, Kesarwani P*, Thyagarajan K, Iamsawat S, Dalheim A, Nguyen H, Selvam SP, Nasarre P, Scurti G, Hardiman G, Maulik N, Ball L, Gangaraju V, Rubinstein MP, Klauber-DeMore N, Hill EG, Ogretmen B, Yu XZ, Nishimura MI, Mehrotra S. *Thioredoxin-1 improves the immunometabolic phenotype of antitumor T cells.***J BiolChem,** 2019, 294(23): 9198-9212.

24. **Chatterjee S***, Chakraborty P*, Daenthanasanmak A, Iamsawat S, Andrejeva G, Luevano LA,WolfM,BaligaU,KriegC,BeesonCC,MehrotraM,HillEG,RathmellJC,YuXZ,Kraft AS,MehrotraS.*TargetingPIMKinasewithPD1inhibitionImprovesImmunotherapeuticAnti- Tumor T Cell Response.* **Clinical Cancer Research,** 2019, 25(3): 1036-1049

23.WilsonKR,KangIH,BaligaU,XiongY,**ChatterjeeS**,MooreE,ParthibanB,Thyagarajan K, Borke JL, Mehrotra S, Kirkwood KL, LaRue AC, Ogawa M, Mehrotra M. *Hematopoietic Stem Cells as a Novel Source of Dental Tissue Cells.* **Sci Rep**, 2018, 8(1):8026

22. Daenthanasanmak A, Wu Y, Iamsawat S, Nguyen HD, Bastian D, Zhang M, Sofi MH, **Chatterjee S**, Hill EG, Mehrotra S, Kraft AS, Yu XZ. *PIM-2 protein kinase negatively regulatesTcellresponsesintransplantationandtumorimmunity.***JClinInvest,**2018,128(7): 2787-2801.

21. **Chatterjee S**, Daenthanasanmak A, Chakraborty P, Wyatt MW, Dhar P, Selvam SP, Fu J, Zhang J, Nguyen H, Kang I, Toth K, Al-Homrani M, Husain M, Beeson G, Ball L, Helke K, Husain S, Garrett-Mayer E, Hardiman G, Mehrotra M, Nishimura MI, Beeson CC, Bupp MG, Wu J, Ogretmen B, Paulos CM, Rathmell J, Yu XZ, Mehrotra S. *CD38-NAD+Axis Regulates Immunotherapeutic Anti-Tumor T Cell Response.* **Cell Metabolism**. 2018, 27(1): 85-100

20. Klarquist J, Tobin K, FarhangiOskuei P, Henning SW, Fernandez MF, Dellacecca ER, Navarro FC, Eby JM, **Chatterjee S**, Mehrotra S, Clark JI, Le Poole IC. *Ccl22 Diverts T Regulatory Cells and Controls the Growth of Melanoma*. **Cancer Research.** 2016, 76(21): 6230-6240

19. Kesarwani P, Chakraborty P, Gudi R, **Chatterjee S**, Scurti G, Toth K, Simms P, Husain M,
Armeson K, Husain S, Garrett-Mayer E, Vasu C, Nishimura MI, Mehrotra S. *Blocking TCR restimulation induced necroptosis in adoptively transferred T cells improves tumor control*. **Oncotarget**. 2016, 7(43) ; 69371-83

18. Banerjee A*, Thyagarajan K*, **Chatterjee S***, Chakraborty P, Kesarwani P,Soloshchenko M, Al-Hommrani M, Andrijauskaite K, Moxley K, Janakiraman H, Scheffel MJ, HelkeK,Armenson K, Palanisamy V, Rubinstein MP, Garrett Mayer E, Cole DJ, Paulos CM, Voelkel- Johnson C, Nishimura MI, Mehrotra S. *Lack of p53 Augments Anti-Tumor Functions in Cytolytic T Cells.* **Cancer Research.** 2016**,** 76(18): 5229-40**.** (***Co-FirstAuthor**)

17. Nguyen HD, **Chatterjee S**, Haarberg KM, Wu Y, Bastian D, Heinrichs J, Fu J, Daenthanasanmak A, Schutt S, Shrestha S, Liu C, Wang H, Chi H, Mehrotra S, Yu XZ. *Metabolic reprogramming of alloantigen-activated T cells after hematopoietic cell transplantation.* **J Clin Invest**. 2016, 126(4):1337-52

16. Kesarwani P, Thyagarajan K, **Chatterjee S,** Palanisamy V, Mehrotra S. *Anti-oxidant capacity and anti-tumor T cell function: A direct correlation.* **Oncoimmunology**. 2015, Feb 3;4(1):e985942.

15. Eby JM, Kang HK, Tully ST, Bindeman WE, Peiffer DS, **Chatterjee S**, Mehrotra S, Le PooleIC.*CCL22toActivateTregMigrationandSuppressDepigmentationinVitiligo.***JInvest Dermatol.** 2015,135(6):1574-80.

14. **Chatterjee S**, ThyagarajanK, Kesarwani P, Song JH, Soloshchenko M, Fu J, Bailey S, Kraft AS, Vasu C, Paulos CM, Yu XZ, Mehrotra S. *Reduced CD73 Expression by IL-1β ProgrammedTh17CellsImprovesTumorControl.***CancerResearch**.2014,74(21):6048-59.

13. Song JH, An N, **Chatterjee S**, Kistner-Griffin E, Mahajan S, Mehrotra S and Kraft AS. *Deletion of Pim kinases elevates the cellular levels of reactive oxygen species and sensitizesto K-Ras-induced cell killing.* **Oncogene**. 2015, 34(28):3728-36.

12.EbyJM,KangHK,KlarquistJ,**ChatterjeeS**,MosensonJA,NishimuraMI,Garrett-Mayer E, Jack Longley B, Engelhard VH, Mehrotra S, Le Poole IC. *Immune Responses In A Mouse Model Of Vitiligo With Spontaneous Epidermal De- And Repigmentation.* **Pigment Cell Melanoma Res**. 2014, 27(6):1075-85

11.HusainS,AbdulY, WebsterC,**ChatterjeeS**,KesarwaniP,MehrotraS.*Interferon-gamma (IFN-γ)-mediated retinal ganglion cell death in human tyrosinase T cell receptor transgenic mouse.* **PLoS One**. 2014, 9(2):e89392.

10. **Chatterjee S**, Eby J, Al-Khami AA, Soloshchenko M, Kang H, Kaur N, Naga O, Murali A, Nishimura MI, Le Poole IC, Mehrotra S. *A Quantitative Increase in Regulatory T Cell Controls Development of Vitiligo*. **J Invest Dermatol.** 2014, 134(5) :1285-94.

9**. Chatterjee S**, Chakraborty P, Banerjee K, Sinha A, Adhikary A, Das T, Choudhuri SK. *Selective induction of apoptosis in various cancer cells irrespective of drug sensitivity through a copper chelate, copper N-(2 hydroxy acetophenone) glycinate: crucial involvement of glutathione.* **Biometal**. 2013, 26 (3) : 517-34

8. **Chatterjee S**, Das S, Chakraborty P, Manna A, Chatterjee M, Choudhuri SK. *Myeloid*

derived suppressor cells (MDSCs) can induce the generation of Th17 response from naïve CD4+ T cells. **Immunobiology.** 2013, 218 (5) : 718-24

7. Chakraborty P*, **Chatterjee S***, Ganguly A, Saha P, Adhikary A, Das T, Chatterjee M, Choudhuri SK. *Reprogramming of TAM toward proimmunogenic type through regulation of MAPkinasesusingaredox-activecopperchelate.***JLeukocBiol.**2012,91(4):609-619(***Co-FirstAuthor**)

6. Ganguly A, Chakraborty P, Banerjee K, **Chatterjee S**, Basu S, Sarkar A, Chatterjee M, Choudhuri SK. *Iron N-(2-hydroxy acetophenone) glycinate (FeNG), a non-toxic glutathione depletor circumvents doxorubicin resistance in Ehrlich ascites carcinoma cells in vivo.* **Biometal.** 2012, 25 (1) : 149-63

5. Ganguly A, Basu S, Chakraborty P, **Chatterjee S**, Sarkar A, Chatterjee M, Choudhuri SK. *Targeting Mitochondrial Cell Death Pathway to Overcome Drug Resistance with a Newly Developed Iron Chelate.* **PLoS One.** 2010, 5(6): e11253.

4.**ChatterjeeS***,MookerjeeA*,Mookerjee-BasuJ*,ChakrabortyP,GangulyA,AdhikaryA, Mukhopadhyay D, Ganguli S, Banerjee R, Ashraf M, Biswas J, Das PK, Sa G, Chatterjee M, Das T, Choudhuri SK. *A novel copper chelate modulates tumor associated macrophages to promote anti-tumor response of T cells.* **PLoS One**. 2009, Sep 16;4(9):e7048. **(* Co-First Author)**

3. Basu S, Majumder S, **Chatterjee S**, Ganguly A, Efferth T, Choudhuri SK. *Detecton and characterizationofaglutathioneconjugateofanovelcoppercomplex.***Invivo**.2009,23:401- 408.

2. Majumder S, **Chatterjee S**, Pal S, Biswas J, Efferth T, Choudhuri SK. *The role of copperin drug-resistant murine and human tumors.* **Biometals.** 2008, 22:377-384.

1.MookerjeeA,BasuJM,MajumderS,**ChatterjeeS**,PandaGS,DuttaP,PalS,MukherjeeP, Efferth T, Roy S, Choudhuri SK. *A novel copper complex induces ROS generation in doxorubicin resistant Ehrlich ascitis carcinoma cells and increases activity of antioxidant enzymes in vital organs in vivo.* **BMC Cancer**. 2006, 6:267.

B. BookChapter:

1. ThyagarajanK, **Chatterjee S**, Kesarwani P, Nishimura MI, Mehrotra S. *Quality of CTL Therapies: A Changing Landscape.* Resistance of Cancer Cells to CTL-Mediated Immunotherapy, 2015, chapter 14, pages 303-349; Springer International Publishing, Switzerland., eBook ISBN978-3-319-17807-3

2. ChoudhuriSK,MajumderS,**ChatterjeeS**,DeyGhoshR,GangulyA,MookerjeeA.*Copper chelate in overcoming MDR in cancer.* Metal Ions in Biology and Medicine, Metal ions and cancer - II: 2008, chapter IX, pages 403 - 412; John LibberyEurotext, Paris., ISBN: 9782-2- 7420-0714-1

C. Scientific meetingattended:

ShilpakChatterjee,ParamitaChakraborty,ShanmughamPaneerselvam,BesimOgretmen, Shikhar Mehrotra. *Targeting Sphingosine kinase 2/S1P axis Decreases Immunosuppressive Potential of Myeloid Derived Suppressor Cells (MDSCs) and Improves Tumor Control.* **AmericanAssociationofImmunologists(AAI)2017,Washington,DC(OralPresentation)**

Shilpak Chatterjee, AnusaraDaenthanasanmak, Paramita Chakraborty, Megan Meek, Elizabeth Garrett-Mayer, Lauren Ball, BesimOgretmen, Jennifer Wu, Craig C. Beeson, ChrystalM.Paulos,XuezhongYu,ShikharMehrotra.*NAD-Sirt1AxisisCentraltotheUnique Immuno-Metabolic Phenotype of Th1/17 Hybrid Cells in Regulating its Enhanced Anti-tumor Potential*.**SocietyforImmunotherapyofCancer(SITC)2016**,**NationalHarbor,MD(Oral Presentation).**

Shilpak Chatterjee, AnusaraDaenthanasanmak, Megan Meek, Paramita

Chakraborty,Mazen Al Hommrani, Kyle Toth, Chrystal Paulos, Xuezhong Yu, Shikhar Mehrotra. *Hybrid Th1/17CellsPossessUniqueImmuno-MetabolicPhenotypeandSurpirorAnti-TumorActivity.* **American Association of Immunologists (AAI) 2016, Seattle (OralPresentation)**

Shilpak Chatterjee,Pravin Kesarwani, MyroslawaSoloshchenko, Jianing Fu, Chrystal Paulos, Xuezhong Yu, Shikhar Mehrotra. *Increasing Th1 Phenotype in Th17 Cells Improves Anti-Tumor T Cells Function.* **American Association of Immunologists (AAI) 2015, New Orleans (Oral Presentation)**

Shilpak Chatterjee, Pravin Kesarwani, MyroslawaSoloshchenko, Christine Webster, Chrystal Paulos, Shikhar Mehrotra. *Reduced ectonucleotidase expression on TGF-□ independent Th17 improves tumor control.* **American Association of Immunologists (AAI) 2014, Pittsburgh (Oral Presentation)**

Shilpak Chatterjee, Pravin Kesarwani, MyroslawaSoloshchenko, Christine Webster, Chrystal Paulos, Shikhar Mehrotra. *Reduced ectonucleotidase expression on TGF-□ independent Th17 improves tumor control.* **Hollings Cancer Center Annual Research Retreat, 2013. (Oral Presentation)**

Shilpak Chatterjee, Jonathan Eby, Hee-Kap Kang, Amir-Al-khami, Navtej Kaur, Osama Naga, I. Caroline Le Poole, Shikhar Mehrotra. *A Quantitative Increase in Regulatory T Cells Controls Development of Vitiligo in a spontaneous depigmenting mouse.* **MUSC 2013 Research Day, 2013 (Oral Presentation).**

Shilpak Chatterjee, Amir A. Al-Khami, Michael I. Nishimura, Caroline Le Poole, Shikhar Mehrotra. *Development of Spontaneous Vitiligo in Human Tyrosinase Reactive Co-Receptor Independent TCR Transgenic Mice.* **American Association of Immunologists (AAI) 2012, Boston. (Poster Presentation)**.

Chatterjee S,Mookerjee A, Chakraborty P, Choudhuri SK. *Reprogramming of tumor associated macrophages by a novel copper chelate promotes proper anti tumor response of T*

*cells.***29thAnnualConventionofIndianAssociationforCancerResearchandSymposium on Biology of Cancer Stem Cells.** 2010. **(Poster presentation)**

Chatterjee S, Mookerjee A, Mookerjee J, Dey-Ghosh R, Ganguly A, Choudhuri SK. *Overcomingmultidrugresistance(MDR)incancerthroughimmunemodulation.*Chittaranjan National Cancer Institute Golden Jubilee Celebration. 2007. (Posterpresentation)