Budhaditya Mukherjee, Ph.D.

Title: Assistant Professor (July, 2019)
Department: School of Medical Science and Technology
Affiliation: Indian Institute of Technology, Kharagpur, India

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Focusing extensively on cellular and immunological aspects of intracellular protozoans' infection

PAST AND CURRENT POSITIONS:

2019- present: Assistant Professor, School of Medical Science and Technology, IIT-Kharagpur.
Research interest: Host-parasite interaction related to immune response and disease transmission of intracellular protozoan pathogens

2017-2019: Post-Doctoral Fellow, Department Microbiology and Molecular Medicine, University of Geneva. PI: Prof Dominique Soldati Favre
2015-2017: EMBO Post-Doctoral Fellow, Department Microbiology and Molecular Medicine, University of Geneva.
Research Interest: Host parasite interaction in context of immune response in Apicomplexan parasites (*P. falciparum*, *T. gondii*) and role of post-translational modifications in Apicomplexan infection

2014-2015: Post-Doctoral Fellow, Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health. PI: Prof Jay Bream
Research Interest: Immunoregulatory role of Interleukin-10 in colitis model of infection.

2009-2014: Ph.D. Department of Infectious disease and Immunology, Indian Institute of Chemical Biology (IICB). Advisor: Prof Syamal Roy.
Research Interest: Host parasite interaction and mechanism of drug action in context of antimony resistant *L. donovani* infection.

ACADEMIC BACKGROUND:

2006-2008: Master in Genetics (1st Class) – Ballygunge Science College**,** University of Calcutta, India.
2007, May-2007, July Summer Intern Crystallography & Molecular Biology Division, Saha Institute of Nuclear Physics, India.
Research Interest: Functional dissection of a differentially expressed microRNA, has-mir-130a in Cervical and Leukemic cell lines, and cloning of its precursor in Sense and anti-sense orientations.
2003-2006: Bachelor in Zoology (1st Class), University of Calcutta, India.
2001-2003: Higher Secondary, WBBHSE, (1st class)
2000: Secondary, WBBSE (1st class)

ACHIEVEMENTS:

March, 2019: Selected for YIM 2019 conference, by IndiaBioscience
2018 **Pfizer Research Award** in the area of infectious diseases, rheumatology and immunology.
2018 **INSA Medal for Young Scientist**
2015/2016 **Swiss Government Excellence Scholarship**
2014/2015 **EMBO long term European** Fellowship
2014 **ParaFrap International** Fellowship
2009-2014 **CSIR, India, National Eligibility Test (NET) PhD** Fellowship

PERSONAL TRAINING:

Certified in Laboratory Animal Science from 12th to 23rd March, 2018, from RESAL, Lausanne, accredited as FELASA Category B Course 038/12 by T&T FELASA board and recommended by the Swiss Federation of Cantonal Veterinary Surgeons (ASCV) for recognition by all authorities responsible for animal experimentation.
EMBO Laboratory Management course for Post Docs in Leimen, DE 14th-16th March, 2017.
Certification course in **Research Integrity Certification and Assessment Biomedical Sciences from EPIGEUM**, 13th January, 2016.

Attended "**Training Programme on Laboratory Safety: Radiation Safety, Chemical Safety & Bio-Safety**" organized by CSIR-Indian Institute of Chemical Biology, Kolkata on 7th September, 2009.

SUPERVISION/MENTORING:

July 21st-July 28th, 2018: Module Instructor for **Middle Eastern Biology of Parasitism (MeBOP)**, Bern Switzerland.
2017-2019: Master student supervisor responsible for supervising 2 months internship and 1-year Master's project, University of Geneva, Switzerland.
Title: 'A *Toxoplasma gondii* rhoptry neck kinase critical for rhoptry discharge and moving junction assembly during invasion' by **Rouaa Ben Chaabene, Master thesis in Biochemistry, University of Geneva.**

BTP Thesis guided
Butyrate mediated regulation of RNA Binding Proteins of inflammatory gene expression, and MicroRNAs in Cholesterol/ Lipid Metabolism by **Teerath Kumar (17BT30024)**, undergraduate, IIT Kharagpur.
Ongoing BTP Thesis **Pradipti Thakur (18BT30013),** undergraduate, IIT Kharagpur.

2019- Current strength of the lab **PhD supervisor**- **4 PhD candidates.**
Co- PhD supervisor- **3 PhD candidates.**

EDITORIALS:

Editorial member **Frontiers in Cellular and Infection Microbiology,** from July, 2021-present.
Editorial Manager of the journal **The Nucleus, Springer Nature**, from February, 2020-present.
Reviewer **PLOS Neglected Tropical Diseases** (PNTD), from May, 2020-present.
Reviewer of **Micro & Nano Letters**, from March 2020-present.
Reviewer **Molecular Microbiology** from July, 2020-present.

RESEARCH GRANTS (SANCTIONED):

PI: Identification and Characterization of Proteins Involved in Transmission Machinery of Protozoan Pathogens (IIT/SRIC/MM/CPI/2019-20/166, Rs 28.00 Lakh(s)), Duration (04-11-2019 to 04-11-2022).
PI: Development of an in-house repository of recombinant antigen and antibody for COVID-19 with reference to Indian clinical Isolates, Instituted-OTG Project, Rs 6 Lakhs.
PI: Molecular & biochemical characterization of amastigote specific proteases involved in late-stage infection & dissemination of drug resistant & sensitive clinical Leishmania donovani isolates Start-up Research Grant (SRG), SERB, DST, Rs 27 Lakhs
PI: CRISPR-Cas based rapid diagnostics of Miltefosine susceptible and resistant strains of Leishmania donovani from asymptomatic and post kala azar dermal leishmaniasis using invasive and non-invasive approach. ICMR, INR 31 Lakhs
Co-PI: Comparative assessment of the neutralization efficacy of Indigenous vaccines against prevailing variants of concerns of SARS-CoV-2 circulating in India. ICMR, INR 4996307

TEACHING COURSES & ACHIEVEMENTS:

Vaccines and Immunity
Fundamentals of biochemistry and cell biology
Advanced immunology and immunotherapeutic
Microbial genetics and genetic engineering
Advances in genome engineering technologies
Academic Advisor: Molecular Medical Microbiology, SMST, IITKGP
Average Student's Feedback: 4.75 in a scale of 5

INDUSTRIAL COLLABORATION:

Working in collaboration with UCB Cellltech (UK), a branch of UCB Pharma S.A. and Medicines for Malaria Venture (MMV) to develop and perform high throughput assay to screen inhibitors against late-stage aspartic proteases of Plasmodium (PfPMIX and PfPMX) with an aim to generate a library for clinical trial. Tenure of collaboration: From March 2017-December, 2018. **Funding secured 40,000 USD,** PI: Dominique Soldati Favre

SCIENTIFIC PUBLICATIONS (SEE LIST):

2011-2020: Total 15 research article, with 5 first author publications in peer-reviewed journals including *EMBO J, PNAS, JI* etc. and **3 as corresponding author.**
Google scholar: https://scholar.google.com/citations?user=8bV7mn8AAAAJ&hl=en

PubMed: https://pubmed.ncbi.nlm.nih.gov/?term=budhaditya%20mukherjee

INVITED PRESENTATIONS AND POSTERS

2013-2020 Over 7 oral presentations and 2 poster presentations in National and International Congress and 5 invited speakers for Universities and Research Institutes

LIST OF SCIENTIFIC PUBLICATIONS:

1. Ghosh S, Biswas S, Mukherjee S, Pal A, Saxena A, Sundar S, Dujardin JC, Das S, Roy S, Mukhopadhyay R, **Mukherjee B**. (**2021**) A novel bioimpedance based detection of Miltefosine susceptibility among clinical Leishmania donovani isolates of the Indian subcontinent exhibiting resistance to multiple drugs. **Front Cell Infect Microbiol** 2021; 11: 768830. doi: 10.3389/fcimb.2021.768830

2. Upadhyay C, Sharma N, Kumar S, Sharma PP, Fontinha D, Bhupender C, **Mukherjee B**, Kumar D, Miguel P, Singh A, Singh P. (**2022**) Synthesis of new analogs of morpholine and their antiplasmodial evaluation against human malaria parasite Plasmodium falciparum. New J. Chem., 2022, 46, 250 DOI: 10.1039/d1nj04198c

3. Sharma N, Kashif M, Vigyasa Singh, Fontinha D, **Mukherjee B**, Kumar D, Singh S, Prudencio M, Agam P Singh AP, Rathi B. (**2021**) Novel Antiplasmodial Compounds Leveraged with Multistage Potency against the Parasite *Plasmodium falciparum*: *In Vitro* and *In Vivo* Evaluations and Pharmacokinetic Studies. **J Med Chem** 64(12):8666-8683. doi: 10.1021/acs.jmedchem.1c00659. https://pubs.acs.org/doi/abs/10.1021/acs.jmedchem.1c00659

4. Gaëlle Lentini G, Ben Chaabene R, Vadas O, Ramakrishnan C, **Mukherjee B**, Mehta V, Lunghi M, Grossmann J, Maco B, Visentin R, Hehl AB, Korkhov VM, Soldati-Favre D. (**2021**) Structural insights into an atypical secretory pathway kinase crucial for *Toxoplasma gondii* invasion. **Nat Commun** 12(1):3788. doi: 10.1038/s41467-021-24083-y. https://www.nature.com/articles/s41467-021-24083-y

5. Souradeepa Ghosh, Snehlata, Shahbaj Hussain, Himani Makkar & **Budhaditya Mukherjee**. (**2021**). Role of chromatin modulation in the establishment of protozoan parasite infection for developing targeted chemotherapeutics. **The Nucleus**, Springer Nature **64**, 401–413 https://doi.org/10.1007/s13237-021-00356-1 **Corresponding author**

6. Pradhan S, Ghosh S, Hussain S, Paul J, **Mukherjee B** (**2021**). Linking membrane fluidity with defective antigen presentation in leishmaniasis. **Parasite Immunol** 43(7): e12835 doi: 10.1111/pim.12835. Online ahead of print. https://onlinelibrary.wiley.com/doi/10.1111/pim.12835 **Corresponding author**

7. Mukherjee S, Pradhan S, Ghosh S, Sundar S, Das S, **Mukherjee B**, Roy S. (**2020**). Short-Course Treatment with Imipramine Entrapped in Squalene Liposomes Results in Sterile Cure of Experimental Visceral Leishmaniasis Induced by Antimony Resistant Leishmania donovani With Increased Efficacy. **Front Cell Infect Microbiol 10:595415**. doi: 10.3389/fcimb.2020.595415. eCollection 2020. **Joint Corresponding author** https://www.frontiersin.org/articles/10.3389/fcimb.2020.595415/full

8. **Mukherjee B***, Mukherjee K, Nanda P, Mukhopadhayay R, Ravichandiran V, Bhattacharyya SN, Roy S (**2020**). Probing the molecular mechanism of aggressive infection by antimony resistant Leishmania donovani. **Cytokine**. 145:155245doi:10.1016/j.cyto.2020.155245https://www.sciencedirect.com/science/article/abs/pii/S1043466620302611?via%3Dihub

9. **Budhaditya Mukherjee***, Francesca Tessaro, Juha Vahokoski, Inari Kursula, Jean-Baptiste Marq, Leonardo Scapozza and Dominique Soldati-Favre. (**2018**). Modeling and resistant alleles explain the selectivity of antimalarial compound 49c towards apicomplexan aspartyl proteases. **EMBO J**, doi: 10.15252/embj.201798047 37(7), e98047. http://emboj.embopress.org/content/37/7/e98047.long

10. Paco Pino, Reto Caldelari, **Budhaditya Mukherjee**, Juha Vahokoski, Natacha Klages, Bohumil Maco, Christine R. Collins, Michael J. Blackman, Inari Kursula, Volker Heussler, Mathieu Brochet and Dominique Soldati-Favre. (**2017**). A multi-stage antimalarial targets the plasmepsins IX and X essential for invasion and egress. **Science**, doi: 10.1126/science.aaf8675. 358(6362), 522-528. http://science.sciencemag.org/content/358/6362/522.long

11. Dogga SK, **Mukherjee B**, Jacot D, Kockmann T, Molino L, Hammoudi PM, Hartkoorn RC, Hehl AB, Soldati-Favre D. (**2017**). A drugable secretory protein maturase of Toxoplasma essential for invasion and egress. **Elife**, doi: 10.7554/eLife.27480. 6. pii: e27480. https://elifesciences.org/articles/27480

12. **Mukherjee B***, Paul J, Mukherjee S, Mukhopadhyay R, Das S, Naskar K, Dujardin JC, Saha B, Roy S. (**2015**). Antimony-Resistant Leishmania donovani Exploits miR-466i To Deactivate Host MyD88 for Regulating IL-10/IL-12 Levels during Early Hours of Infection. **J. Immunol**, 195(6):2731-42. http://www.jimmunol.org/content/195/6/2731.long

13. Mukherjee S, **Mukherjee B***, Mukhopadhyay R, Naskar K, Sundar S, Jean C. Dujardin JC, Roy S. (**2014**). Imipramine exploits Histone deacetylase 11 to increase IL-12/IL-10 ratio in macrophages infected with antimony resistant Leishmania donovani and clears organ parasite in experimental infection. **J. Immunol**, 193(8):4083-94. http://www.jimmunol.org/content/193/8/4083.long

14. **Mukherjee B***, Mukhopadhyay R, Bannerjee B, Chowdhury S, Mukherjee S, Naskar K, Allam US, Chakravortty D, Sundar S, Dujardin JC, Roy S. (**2013**). Antimony resistant Leishmania donovani upregulates IL-10 to overexpress host multi drug resistant protein1. **PNAS**, 110(7): E575-82. http://www.pnas.org/content/110/7/E575.long

15. Mukherjee S, **Mukherjee B**, Mukhopadhyay R, Naskar K, Sundar S, Dujardin JC, Das AK, Roy S. (**2012**). Imipramine is an Orally Active Drug against Both Antimony Sensitive and Antimony Resistant Leishmania donovani Clinical Isolates in Experimental Infection. **PLoS Negl Trop Dis,** 6(12): e1987. http://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0001987

16. Chowdhury S, Mukherjee T, Mukhopadhyay R, **Mukherjee B**, Sengupta S, Chattopadhyay S, Jaisankar P, Roy S, Majumder HK. (**2012**). The lignan niranthin poisons Leishmania donovani topoisomerase IB and favours a Th1 immune response in mice. **EMBO Mol Med**, 4(10): 1126-43. http://embomolmed.embopress.org/content/4/10/1126.long

17. Mukhopadhyay R, Mukherjee S, **Mukherjee B**, Naskar K, Mondal D, Decuypere S, Ostyn B, Prajapati VK, Sundar S, Dujardin JC, Roy S. (**2011**). Characterisation of antimony-resistant Leishmania donovani isolates: biochemical and biophysical studies and interaction with host cells. **Int J Parasitol**, 41(13-14):1311-21. https://www.sciencedirect.com/science/article/pii/S0020751911002219?via%3Dihub

BOOK CHAPTER:

COVID-19: Tackling Global Pandemic through Scientific and Social Tools, edited by Saptarshi Chaterjee, **ELSEVIER**, Chapter: Application of CRISPR based diagnostic tools in detecting SARS-CoV-2 infection by Snehlata, Korra Bhanu Teja, and **Budhaditya Mukherjee**. (2021)