Sumit Kumar, PhD
Ramalingaswami Fellow, FLSB
South Asian University, New Delhi, India
Email: sumitflsb[at]sau[dot]int

Laboratory of Infection Biology

Profile:

Research Interests:

We are interested in understanding the design and mechanisms of cell-autonomous innate immunity against intracellular pathogens. Intracellular infection represents a dynamic state of cross-regulation between host and pathogenic factors, each counteracting the other for their respective survival or proliferation. We primarily employ the eukaryotic apicomplexan parasite *Toxoplasma gondii*, which causes toxoplasmosis in humans, to identify and characterize novel host pathways involved in pathogen restriction and the parasitic effectors that subvert them.

Research Experience:

Staff Scientist, Molecular Microbiology, Washington University in St. Louis, MO, US (2021-24)
Postdoctoral Research Associate, Molecular Microbiology, Washington University in St. Louis, MO, US (2016-21)

Qualifications:

Ph.D., International Centre for Genetic Engineering and Biotechnology, New Delhi, India (2016)
M.Sc. Biotechnology, School of Biotechnology, Jawaharlal Nehru University, New Delhi, India (2009)
B.Sc. (Hons.) Biomedical Sciences, Acharya Narendra Dev College, University of Delhi, New Delhi, India (2007)

Research Interests:

1. Cell-autonomous immunity
2. Parasitology (Apicomplexan; *Toxoplasma gondii*)
3. Development of Host-Directed Therapeutics against infectious diseases

Publications:

Authored as Sumit Kumar Matta (Matta SK)

1. **Matta SK**, Kohio HP, Chandra P, Brown A, Doench JG, Philips JA, Ding S, Sibley LD. Genome-wide and targeted CRISPR screens identify RNF213 as a mediator of interferon gamma-dependent pathogen restriction in human cells. **Proc Natl Acad Sci U S A**. 2024 Jan 2;121(1):e2315865120. doi: 10.1073/pnas.2315865120. PubMed PMID: 38147552.
2. Rinkenberger N, Abrams ME, **Matta SK**, Schoggins JW, Alto NM, Sibley LD. Over-expression Screen of Interferon-Stimulated Genes Identifies RARRES3 as a Restrictor of Toxoplasma gondii Infection. **Elife**. 2021 Dec 6;10. doi: 10.7554/eLife.73137. PubMed PMID: 34871166.
3. **Matta SK**, Rinkenberger N, Dunay IR, Sibley LD. Toxoplasma gondii infection and its implications within the central nervous system. **Nat Rev Microbiol**. 2021 Feb 24. doi: 10.1038/s41579-021-00518-7.
4. **Matta SK**, Olias P, Huang Z, Wang Q, Park E, Yokoyama WM, Sibley LD. Toxoplasma gondii effector TgIST blocks type I interferon signaling to promote infection. **Proc Natl Acad Sci U S A**. 2019 Aug 27;116(35):17480- 17491. doi: 10.1073/pnas.1904637116. Epub 2019 Aug 14. PubMed PMID: 31413201; PubMed Central PMCID: PMC6717281.

5. **Matta SK**, Patten K, Wang Q, Kim BH, MacMicking JD, Sibley LD. NADPH Oxidase and Guanylate Binding Protein 5 Restrict Survival of Avirulent Type III Strains of Toxoplasma gondii in Naive Macrophages. **mBio**. 2018 Aug 28;9(4). doi: 10.1128/mBio.01393-18. PubMed PMID: 30154263; PubMed Central PMCID: PMC6113620.
6. Rahi A*, **Matta SK***, Dhiman A*, Garhyan J, Gopalani M, Chandra S, Bhatnagar R. Enolase of Mycobacterium tuberculosis is a surface exposed plasminogen binding protein. **Biochim Biophys Acta Gen Subj**. 2017 Jan;1861(1 Pt A):3355-3364. doi: 10.1016/j.bbagen.2016.08.018. Epub 2016 Aug 26. PubMed PMID: 27569900. *Equal first author
7. **Matta SK**, Kumar D. Hypoxia and classical activation limits Mycobacterium tuberculosis survival by Akt- dependent glycolytic shift in macrophages. **Cell Death Discov**. 2016;2:16022. doi: 10.1038/cddiscovery.2016.22. eCollection 2016. PubMed PMID: 27551515; PubMed Central PMCID: PMC4979487.
8. Chandra P, Ghanwat S, **Matta SK**, Yadav SS, Mehta M, Siddiqui Z, Singh A, Kumar D. Mycobacterium tuberculosis Inhibits RAB7 Recruitment to Selectively Modulate Autophagy Flux in Macrophages. **Sci Rep**. 2015 Nov 6;5:16320. doi: 10.1038/srep16320. PubMed PMID: 26541268; PubMed Central PMCID: PMC4635374.
9. **Matta SK**, Kumar D. AKT mediated glycolytic shift regulates autophagy in classically activated macrophages. **Int J Biochem Cell Biol**. 2015 Sep;66:121-33. doi: 10.1016/j.biocel.2015.07.010. Epub 2015 Jul 26. PubMed PMID: 26222186.
10. **Matta SK***, Agarwal S*, Bhatnagar R. Surface localized and extracellular Glyceraldehyde-3-phosphate dehydrogenase of Bacillus anthracis is a plasminogen binding protein. **Biochim Biophys Acta**. 2010 Nov;1804(11):2111-20. doi: 10.1016/j.bbapap.2010.08.004. Epub 2010 Aug 18. PubMed PMID: 20727989. *Equal first author

Awards and Honors:
1. 2007: Meritorious scholarship during M.Sc. by DBT, India.
2. 2010: Research fellowships during PhD by DBT, India.
3. 2019: Best poster award at Global Health and Infectious Disease Conference, Washington University in St. Louis, St. Louis, MO, USA.
4. 2024: Ramalingaswami Re-Entry Fellowship, DBT, India.