

Name: Satyajit Rath
Discipline: Biology
Designation: Adjunct Faculty
Research area: Immunology
Telephone: 91 20 2590 8471
Email: satyajit@iiserpune.ac.in; satyajit@nii.ac.in

Education:
M.B.,B.S. (1979)
University of Pune, India
M.D. (Pathology) (1983)
University of Mumbai, India

Postdoctoral work (1983-1990):
Haffkine Institute, Mumbai, India; London School of Hygiene and Tropical Medicine, London, UK; Brandeis University, Waltham, USA; Yale University School of Medicine, New Haven, USA.

Affiliations:

Scientist (1991-2017; retired), National Institute of Immunology (NII), New Delhi, India
Adjunct Faculty Member (2017-), Indian Institute of Science Education and Research (IISER), Pune, India
Adjunct Faculty Member (2009-), Translational Health Science and Technology Institute (THSTI), Faridabad, India
Adjunct Faculty Member (2017-), Christian Medical College (CMC), Vellore, India
Adviser (2019-), Diabetes Unit, KEM Hospital Research Centre, Pune, India

Senior editor, eLife (2019-)

Non-executive director, Ahammune Biosciences Private Limited, Pune, India
Member, Scientific Advisory Board, Curadev Pharma Private Limited, NOIDA, India
Member, Scientific Advisory Board, Mynvax Private Limited, Bangalore, India

Research interests:

The focus of programmes in our group has been the physiological control of the generation and activation of T, B and antigen-presenting cells (APCs) of the myeloid lineage, using a variety of interlinked experimental systems and approaches in association with many collaborators both within and outside NII.

Our recent projects examine APCs and pathways involved in antigen presentation to MHC class I and class II-restricted T cells, and analyse the consequences of intracellular signal transduction modulation for both development and responses of T cells and myeloid cells using genetic as well as pharmacological tools. Here below are a few examples.

- One approach has been trying to elucidate the unique roles that individual death pathways play at different stages of the development and functioning of T and B cells.
- A second approach has been trying to understand how the dynamics of MHC and T cell receptor molecules on interacting T cells and APCs are controlled, and how these

controls regulate the functional responses of T cells.

- A third approach has been dissecting the roles of quantitative modifiers of immune signal transduction pathways, ranging from proteasomal components to tyrosine kinases, in controlling the development and functioning of myeloid and lymphoid cells.

- A fourth approach has been characterising the diversity and stability of immunocyte subpopulation phenotypes in human peripheral blood and their correlation with various states of immune dysfunction in neonates.

- A fifth approach has been examining the immunogenetic basis of autoimmune responses to complement components and their contribution to human diseases.

Original research publications (since 2010):

32 Kanodia P Kaur G Coshic P Chatterjee K Neeman T George A Rath S Bal V Prabhu SB (2019) Characterization of biological variation of peripheral blood immune cytome in an Indian cohort. *Sci Rep* 9 14735

31 Dhar A Chawla M Chattopadhyay S Oswal N Umar D Gupta S Bal V Rath S George A Arimbasseri GA Basak S (2019) Role of NF-kappaB2-p100 in regulatory T cell homeostasis and activation. *Sci Rep* 9 13867

30 Khalsa JK Chawla AS Prabhu SB Vats M Dhar A Dev G Das N Mukherjee S Durdik JM Bal V George A Rath S Arimbasseri GA (2019) Functionally significant metabolic differences between B and T lymphocyte lineages. *Immunology* 158 104

29 Gupta S Basu S Bal V Rath S George A (2019) Gut IgA abundance in adult life is a major determinant of resistance to DSS-colitis and can compensate for the effects of inadequate maternal IgA received by neonates. *Immunology* 158 19

28 Puraswani M Khandelwal P Saini H Saini S Gurjar BS Sinha A Shende RP Maiti TK Singh AK Kanga U Ali U Agarwal I Anand K Prasad N Rajendran P Sinha R Vasudevan A Saxena A Agarwal SK Hari P Sahu A Rath S Bagga A (2019) Clinical and immunological profile of anti-factor H antibody associated atypical hemolytic uremic syndrome: A nationwide database. *Front Immunol* 10 1282

27 Bhasym A Gurjar BS Prabhu S Puraswani M Khandelwal P Saini H Saini S Chatterjee P Bal V George A Coshic P Patidar G Hari P Sinha A Bagga A Rath S Guchhait P (2019) Altered peripheral blood leucocyte phenotype and responses in healthy individuals with homozygous deletion of FHR1 and FHR3 genes. *J Clin Immunol* 39 336

26 Balyan R Gund R Chawla AS Khare S Pradhan S Rane S Galande S Durdik J George A Bal V Rath S (2019) Correlation of cell-surface CD8 levels with function, phenotype and transcriptome of naive CD8 T cells. *Immunology* 156 384

25 Chawla AS Kanodia P Mukherjee A Jain V Kaur G Coshic P Chatterjee K Wadhwa N Natchu UCM Sopory S Bhatnagar S Majumder PP George A Bal V Rath S Prabhu SB (2018) Intrinsic regulation of peripheral memory-phenotype T cell frequencies. *PLoS One* 13(12) e0200227

24 Rathore DK Holmes TH Nadeau KC Mittal P Batra A Rosenberg-Hasson Y Sopory S Gupta R Chellani HK Aggarwal KC Bal V Natchu UCM Bhatnagar S Tavassoli M Lyell DJ Rath S Wadhwa N Maecker HT (2018) Differences in multiple immune parameters between Indian and U.S. infants. *PLoS One* 13(11) e0207297

23 Gurjar BS Sriharsha TM Bhasym A Prabhu S Puraswani M Khandelwal P Saini H Saini S Verma AK Chatterjee P Guchhait P Bal V George A Rath S Sahu A Sharma A Hari P Sinha A Bagga A (2018) Characterization of genetic predisposition and autoantibody profile in atypical hemolytic uremic syndrome. *Immunology* 154 663

- 22 Das A Ranganathan V Umar D Thukral S George A Rath S Bal V (2017) Effector/memory CD4 T cells making either Th1 or Th2 cytokines commonly co-express T-bet and GATA-3. *PLoS ONE* 12(10) e0185932
- 21 Mukherjee T Chatterjee B Dhar A Bais SS Chawla M Roy P George A Bal V Rath S Basak S (2017) A TNF-p100 pathway subverts non-canonical NF- κ B signaling in inflamed secondary lymphoid organs. *EMBO J* 36 3501
- 20 Khullar B Balyan R Oswal N Jain N Sharma A Abdin MZ Bagga A Bhatnagar S Wadhwa N Natchu UCM George A Rath S Bal V Sopory S (2017) Interaction of CD80 with Neph1: a potential mechanism of podocyte injury. *Clin Exp Nephrol* 22 508
- 19 D'Souza L Gupta SL Bal V Rath S George A (2017) CD73 expression identifies a subset of IgM+ antigen-experienced cells with memory attributes that is T cell and CD40 signalling dependent. *Immunology* 152 602
- 18 Tanwar S Dhar A Varanasi V Mukherjee T Boppana R Basak S Bal V George A Rath S (2017) Mediation of transitional B cell maturation in the absence of functional Bruton's tyrosine kinase. *Sci Rep* 7 46029
- 17 Jain N Oswal N Chawla AS Agrawal T Biswas M Vrati S Rath S George A Bal V Medigeshi GR (2017) CD8 T cells protect adult naive mice from JEV-induced morbidity via lytic function. *PLoS Negl Trop Dis* 11 e0005329
- 16 Balyan R Gund R Ebenezer C Khalsa JK Verghese DA Krishnamurthy T George A Bal V Rath S Chaudhry A (2017) Modulation of naive CD8 T cell response features by ligand density, affinity, and continued signaling via internalised TCRs. *J Immunol* 198 1823
- 15 Prabhu SB Rathore DK Nair D Chaudhary A Raza S Kanodia P Sopory S George A Rath S Bal V Tripathi R Ramji S Batra A Aggarwal KC Chellani HK Arya S Agarwal N Mehta U Natchu UC Wadhwa N Bhatnagar S (2016) Comparison of human neonatal and adult blood leukocyte subset composition phenotypes. *PLoS One* 11 e0162242
- 14 Basu S Kaw S D'Souza L Vaidya T Bal V Rath S George A (2016) Constitutive CD40 signaling calibrates differentiation outcomes in responding B cells via multiple molecular pathways. *J Immunol* 197 761
- 13 Jain N Khullar B Oswal N Banoth B Joshi P Ravindran B Panda S Basak S George A Rath S Bal V Sopory S (2016) TLR-mediated albuminuria needs TNF α -mediated cooperativity between TLRs present in hematopoietic tissues and CD80 present on non-hematopoietic tissues in mice. *Dis Model Mech* 9 707
- 12 Rathore DK Nair D Raza S Saini S Singh R Kumar A Tripathi R Ramji S Batra A Aggarwal KC Chellani HK Arya S Bhatla N Paul VK Aggarwal R Agarwal N Mehta U Sopory S Natchu UC Bhatnagar S Bal V Rath S Wadhwa N (2015) Underweight full-term Indian neonates show differences in umbilical cord blood leukocyte phenotype: a cross-sectional study. *PLoS One* 10 e0123589
- 11 Rane S Das R Ranganathan V Prabhu S Das A Mattoo H Durdik JM George A Rath S Bal V (2014) Peripheral residence of naïve CD4 T cells induces MHC class II-dependent alterations in phenotype and function. *BMC Biol* 12 106
- 10 Upadhyay M Priya GK Ramesh P Madhavi MB Rath S Bal V George A Vaidya T (2014) CD40 signaling drives B lymphocytes into an intermediate memory-like state, poised between naïve and plasma cells. *J Cell Physiol* 229 1387
- 9 Saini AS Shenoy GN Rath S Bal V George A (2014) Inducible nitric oxide synthase is a major intermediate in signaling pathways for the survival of plasma cells. *Nat Immunol* 15 275
- 8 Sinha A Gulati A Saini S Blanc C Gupta A Gurjar BS Saini H Kotresh ST Ali U Bhatia D Ohri A Kumar M Agarwal I Gulati S Anand K Vijayakumar M Sinha R Sethi S Salmona M George A Bal V Singh G Dinda AK Hari P Rath S Dragon-Durey MA Bagga A Indian HUS Registry (2014) Prompt plasma exchanges and

immunosuppressive treatment improves the outcomes of anti-factor H autoantibody-associated hemolytic uremic syndrome in children. *Kidney Int* 85 1151

7 Banerjee H Das A Srivastava S Mattoo HR Thyagarajan K Khalsa JK Tanwar S Das DS Majumdar SS George A Bal V Durdik JM Rath S (2012) A role for apoptosis-inducing factor in T cell development. *J Exp Med* 209 1641

6 Shenoy GN Chatterjee P Kaw S Mukherjee S Rathore DK Bal V Rath S George A (2012) Recruitment of memory B cells to lymph nodes remote from the site of immunization requires an inflammatory stimulus. *J Immunol* 189 521

5 Panda SK Kumar S Tupperwar NC Vaidya T George A Rath S Bal V Ravindran B (2012) Chitohexaose activates macrophages by alternate pathway through TLR4 and blocks endotoxemia. *PLoS Pathogens* 8 e1002717

4 Chatterjee P Tiwari RK Rath S Bal V George A (2012) Modulation of antigen presentation and B cell receptor signaling in B cells of beige mice. *J Immunol* 188 2695

3 Khare A Viswanathan B Gund R Jain N Ravindran B George A Rath S Bal V (2011) Role of Bruton's tyrosine kinase in macrophage apoptosis. *Apoptosis* 16 334

2 Satpathy S Shenoy GN Kaw S Vaidya T Bal V Rath S George A (2010) Inhibition of terminal differentiation of B cells mediated by CD27 and CD40 involves signaling through JNK. *J Immunol* 185 6499

1 Varanasi V, Mattoo H Tupperwar NC Thyagarajan K Das A Kumar R Bal V Vaidya T George A Rath S (2010) A superantigen interacts with leishmanial infection in antigen-presenting cells to regulate cytokine commitment of responding CD4 T cells. *J Infect Dis* 202 1234