**Curriculum Vitae**

Saumendra N. Sarkar, Ph.D.

Professor, Program in Oncology

Marlene & Stewart Greenebaum Comprehensive Cancer Center

Dept. of Microbiology and Immunology

University of Maryland School of Medicine

**Date** November 27, 2024

**Contact Information**

Business Address: Room S320, IHV

725 W Lombard St,

Baltimore, MD 21201

Business Phone Number: 410-706-0921

Fax: 410-706-1952

Email: saumen@som.umaryland.edu

Foreign Languages: Bengali, Hindi (native, fluent)

**Education**

1984 - 1987 B.Sc., Physiology (Major) Physics, Chemistry (Minor) Presidency College, University of Calcutta, Calcutta, India (*First Class*)

1987 - 1990 M.Sc., Biophysics and Molecular Biology, University College of Science and Technology, University of Calcutta, Calcutta, India. (*First class, first*)

1990 - 1995 Ph.D., Molecular Biophysics, Molecular Biophysics Unit, Indian Institute of Science, Bangalore, India. “Expression and Characterization of Rat Brain Sodium Channel in CHO cells”.

**Post Graduate Education and Training**

1995 - 1996 Research Fellow, Department of Neuroscience, Johns Hopkins University, Baltimore, USA.

1996 - 2000 Research Fellow, Department of Molecular Biology, Cleveland Clinic Foundation, Cleveland, USA.

2000 - 2002 Research Associate, Department of Molecular Biology, Cleveland Clinic Foundation, Cleveland, USA.

2003 - 2008 Project Scientist (Research Asst. Prof.), Department of Molecular Genetics, Cleveland Clinic Foundation, Cleveland, USA.

**Employment History**

Academic Appointments

2008-2015 Assistant Professor, Department of Microbiology and Molecular Genetics (Primary), Department of Immunology (Secondary)

University of Pittsburgh School of Medicine, Pittsburgh, PA

 Member, Cancer Virology Program,

University of Pittsburgh Cancer Institute, Pittsburgh, PA

2015-2024 Associate Professor (tenured 2015), Department of Microbiology and Molecular Genetics (Primary), Department of Immunology (Secondary)

University of Pittsburgh School of Medicine, Pittsburgh, PA

 Member, Cancer Virology Program,

UPMC Hillman Cancer Center, Pittsburgh, PA

2024 Professor Department of Microbiology and Molecular Genetics (Primary), Department of Immunology (Secondary)

University of Pittsburgh School of Medicine, Pittsburgh, PA

 Member, Cancer Virology Program,

UPMC Hillman Cancer Center, Pittsburgh, PA

2024 Professor, Program in Oncology

Marlene & Stewart Greenebaum Comprehensive Cancer Center

Dept. of Microbiology and Immunology

University of Maryland School of Medicine

 Baltimore, MD

**Honors and Awards**

1987 Government of India National Scholarship for B.Sc.

1987 Government of India National Scholarship for M.Sc.

1990 1st in M.Sc. in the University of Calcutta, India.

1994 Young Scientist Fellowship from International Union of Biochemistry and Molecular Biology in the 16th Congress.

2003 Young Investigator’s Award from International Society of Interferon and Cytokine Research in the annual ISICR meeting, Cairns, Australia.

2007 Young Investigator Travel Award from International Society of Interferon and Cytokine Research in the annual ISICR meeting, Oxford, UK.

2009 Hillman Fellow for Innovative Cancer Research Award, Hillman Foundation

2013 Junior Scholar Award in Basic Research, University of Pittsburgh Cancer Institute

**Professional Society Memberships**

1999-Present Member, International Society of Interferon and Cytokine Research.

2009-Present Member, American Society of Virology.

2010-Present Member, American Association of Immunologists.

**Administrative Service**

PittSOM, Pittsburgh

2009-2024 Interviewer, Graduate Program Admissions

2012-2013 Organizer, UPCI Basic & Translational Research Seminar Series

2021-2022 Member, PMI graduate program recruitment committee

2023-2024 Organizer, MMG Late Night discussion series.

Diversity Equity, Inclusion (DEI) and Antiracism Awareness

2022-2024 Annual Title IX and Non-Discrimination Training (Pitt)

**Local Service**

2010-2024 Poster judging for various local conferences.

**National Service**

2009-present Ad Hoc Reviewer, *Nature (2x/yr) Science (1x/yr), Cell (1x/2yr), Immunity (2x/yr), Cell Host Microbe (1x/yr)*, *Nature Cancer (1x/yr), Nature Communications (1x/yr), Proc. Natl. Acad. Sci. USA. (3x/yr, guest editor), Science Signaling (1x/yr), PLoS Genetics (guest editor), PLoS Pathogen (1x/yr), Cell Research, mBio (guest editor), Molecular and Cellular Biology, Journal of Immunology, Journal of Virology.*

2009 Member, NIH/NIAID Study Section, B-0915: Innate Immune Receptors and Adjuvant Discovery.

2009 Member, NIH/NIAID Study Section, ZAI1PTMIM1: Immune Defense Mechanisms at the Mucosa.

2010 Member, DOD/ TMT Phase II Proposal Review.

2011 Member, NIH/NIAID Study Section, ZAI1-PA-I-M1: Asthma and Allergic Diseases cooperative Research Centers (AADCRC).

2013 Ad-Hoc Member, NIH/CSR Study Section, Virology B (VIRB).

2013 Member, NIH/NIAID Study Section, ZAI1-SV-A-J1: Innovation for HIV Vaccine Discovery (R01).

2015 Ad-Hoc Member, NIH/CSR Study Section, Immunity and Host Defense (IHD).

2017 Ad-Hoc Member, NIH/CSR Study Section, F13 Infectious Diseases and Microbiology Fellowship.

2019 Ad-Hoc Member, NIH/CSR Study Section, NIH Director’s New Innovator Review (DP2).

2020 Ad-Hoc Member, NIH/CSR Study Section, Immunity and Host Defense (IHD).

2020 Ad-Hoc Member, NIH/CSR Study Section, F13 Infectious Diseases and Microbiology Fellowship

2020 Ad-Hoc Member, NIH/CSR Study Section, NIH Director’s New Innovator Review (DP2).

2022 Ad-Hoc Member, NIH/CSR Study Section, Immunological Mechanisms in Host Defense Against Pathogens (ZRG1 IDIB-S).

2023 Ad-Hoc Member, NIH/CSR Study Section, Infectious Diseases and Microbiology Fellowship (ZRG1 F07C-Y).

**Teaching Service**

Undergraduate Student Teaching/Mentoring/Advising

2000-2008 Mentor, Cleveland Clinic

2 PhD students – 1-2 hours/week over 3-4-year span

3 Laboratory Assistants – 3-4 hours/week over 2-3-year span

2009-2024 Mentor, University of Pittsburgh

5 Rotation students – 1-2 hours/week over 8 weeks span.

 8 Undergraduate students – 1-2 hours/week over 1-2-year span

 4 Highschool students – 1-2 hours/week over the summer

Graduate / Post-Graduate Teaching

2009-2023 Primary Advisor, University of Pittsburgh

1-2 PhD students per semester – 3-4 hours/week over 4-5-year span

Secondary Advisor (Mentoring/Thesis committee member)

3-4 PhD students per semester – 4-5 hours/semester over 4-5-year span

2009-2024 Primary Advisor, University of Pittsburgh

2-3 postdoctoral fellow per semester – 3-4 hours/week over 5-6-year span

Secondary Advisor (Mentoring committee member)

1-2 postdoctoral fellow per semester – 1-2 hours/semester over 4-5-year span

2009-2023 Lecturer, Tumor Virology (MSMVM 3495), PittSOM
 5-7 2nd – 3rd year graduate students – 2 contact hours/year

2009-2016 Lecturer, Experimental Virology (MSMVM 2420), PittSOM
 5-7 2nd – 3rd year graduate students – 2 contact hours/year

2012-2023 Lecturer, Small Group Mentor, Grant-writing for Grad Students (INTBP 3240), PittSOM 12-14 2nd year graduate students – 6 contact hours/year

2014-2016 Lecturer, Discussion leader, Advanced Topics in Gene Expression (MSMGDB 3510), PittSOM 6-8 2nd – 3rd year graduate students – 4 contact hours/year

2015-2023 Lecturer, Course Director and Discussion leader, Innate Immunity (MSMI 3270), PittSOM 10-12 2nd – 3rd year graduate students – 20 contact hours/2 years

2016-2024 Lecture, Comprehensive Microbiology (MSMI 2200) PittSOM, 8-10 1st – 2nd year graduate students – 2 contact hours/year

2019-2024 Lecture, Bedside to Bench (ISB 2070) PittSOM, 6-10 1st – 2nd year graduate students – 2 contact hours/year

2019-2025 Lecture, Genome Instability and Human Disease (MSMPHL 3330) PittSOM, 4-8 1st – 2nd year graduate students – 2 contact hours/year

2024- Lecture, Advances in Immunology (GPLS 769) UMSOM, 5-10 1st – 2nd year graduate students – 2 contact hours/year

Medical Student Teaching/Mentoring

2014-2016 PBL Facilitator, Medical Microbiology (MSIMB 3465), PittSOM
5-8 2nd year medical students – 4 contact hours/year

2019-2024 Lecture, Bench Research Summer Course (CLRES 2700) 15-20 1st – 2nd year medical residents – 2 contact hours/year

**Research Activities**

Research Interest:

1. Host-virus interaction and innate immunity.
2. Transcriptional Signaling pathways engaged by innate immune receptors.
3. Role of innate-immune signaling and interferon response in inflammation and cancer.

##### **Grant Support**

###### Active Grants or Contracts

01/23/2023 – 12/31/2027 PI, 20%

*“*New roles of IFN-inducible OAS proteins in innate immune defense against bacterial infections*”*

NIH/NIAID R01AI176333

Annual Direct Costs: $523,000

Total Costs: $3,176,774

12/20/2019 – 11/30/2024 PI, 30%

(NCE -11/30/2025) *“A new mechanism of antiviral activity of 2’-5’ Oligoadenylate Synthetase 1”*

 NIH/NIAID R01 AI150214

Annual Direct Costs: $231,000

Total Costs: $2,592,100

Completed Grants or Contracts

2014-2019 PI, 20%

(NCE 2020) *“Creation of immuno-oncolytic viruses for cancer therapy”*

 NIH/NCI R01 CA178766

Annual Direct Costs: $207,500

Total Costs: $958,650

2022-2023 PI 3%

“*Regulation of tumor microenvironment by Interferon regulatory factors*”

UPMC Hillman Cancer Center
Developmental Research Program (DRP) of the Melanoma and Skin Cancer SPORE

Annual Direct Costs: $50,000

2015-2020 PI 25%

*“Differential modulation of RIG-I and cGAS signaling by OASL and its role in antiviral response.”*

NIH/NIAID R01 AI118896

Annual Direct Costs: $297,000

Total Costs: $1,886,296.

2016-2020 PI 2%

*“Differential modulation of RIG-I and cGAS signaling by OASL and its role in antiviral response.”*

NIH/NIAID R01 AI118896-02S1 (Diversity Supplement)

Annual Direct Costs: $31,000

2009-2014 PI 30%

*“Novel Modifiers of Toll-like and RIG- like Receptor Signaling.”*

NIH/NIAID U24 AI082673

Annual Direct Costs: $237,000

Total Costs: $1,551,086.

**Patents, Inventions and Copyrights**

**Sarkar SN**, Thorne SH, Inventor; University of Pittsburgh, assignee. IRF Modulator-expressing oncolytic viruses for treating cancer. US Patent application Pending: US 62/985,979.

**Publications**

Peer-reviewed journal articles and reviews

1. **Sarkar SN**, Balasubramanian SV, Sikdar SK. Effect of fenvalerate, a pyrethroid insecticide on membrane fluidity. Biochim Biophys Acta. 1993 Apr 8;1147(1):137–142. PMID: 8466925
2. **Sarkar SN**, Haldar S, and Sikdar SK (1993) Effect of pyrethroid insecticide fenvalerate on sodium current of rat dorsal root ganglion neuron. Current Science 64, 260-262.
3. **Sarkar SN** and Sikdar SK (1994) High level stable expression of rat brain type IIA sodium channel a subunit in CHO cells. Current Science 67, 196-199.
4. **Sarkar SN**, Adhikari A, Sikdar SK. Kinetic characterization of rat brain type IIA sodium channel alpha-subunit stably expressed in a somatic cell line. J Physiol. 1995 Nov 1;488 ( Pt 3)(Pt 3):633–645. PMCID: PMC1156730
5. Ghosh A, Desai SY, **Sarkar SN**, Ramaraj P, Ghosh SK, Bandyopadhyay S, Sen GC. Effects of mutating specific residues present near the amino terminus of 2’-5’-oligoadenylate synthetase. J Biol Chem. 1997 Jun 13;272(24):15452–15458. PMID: 9182577
6. Ghosh A, **Sarkar SN**, Guo W, Bandyopadhyay S, Sen GC. Enzymatic activity of 2’-5’-oligoadenylate synthetase is impaired by specific mutations that affect oligomerization of the protein. J Biol Chem. 1997 Dec 26;272(52):33220–33226. PMID: 9407111
7. Bandyopadhyay S, Ghosh A, **Sarkar SN**, Sen GC. Production and purification of recombinant 2’-5’ oligoadenylate synthetase and its mutants using the baculovirus system. Biochemistry. 1998 Mar 17;37(11):3824–3830. PMID: 9521702
8. Ghosh JK, **Sarkar SN**, Sikdar SK. Spectroscopic studies of the interactions of the pyrethroid insecticide fenvalerate with gramicidin. Biochem Mol Biol Int. 1998 May;44(6):1083–1092. PMID: 9623761
9. **Sarkar SN**, Sen GC. Production, purification, and characterization of recombinant 2’, 5’-oligoadenylate synthetases. Methods. 1998 Jul;15(3):233–242. PMID: 9735308
10. **Sarkar SN**, Bandyopadhyay S, Ghosh A, Sen GC. Enzymatic characteristics of recombinant medium isozyme of 2’-5’ oligoadenylate synthetase. J Biol Chem. 1999 Jan 15;274(3):1848–1855. PMID: 9880569
11. **Sarkar SN**, Ghosh A, Wang HW, Sung SS, Sen GC. The nature of the catalytic domain of 2’-5’-oligoadenylate synthetases. J Biol Chem. 1999 Sep 3;274(36):25535–25542. PMID: 10464285
12. Ghosh A, **Sarkar SN**, Sen GC. Cell growth regulatory and antiviral effects of the P69 isozyme of 2-5 (A) synthetase. Virology. 2000 Jan 20;266(2):319–328. PMID: 10639318
13. Ghosh A, **Sarkar SN**, Rowe TM, Sen GC. A specific isozyme of 2’-5’ oligoadenylate synthetase is a dual function proapoptotic protein of the Bcl-2 family. J Biol Chem. 2001 Jul 6;276(27):25447–25455. PMID: 11323417
14. Gomos JB, Rowe TM, **Sarkar SN**, Kessler SP, Sen GC. The proapoptotic 9-2 isozyme of 2-5 (A) synthetase cannot substitute for the sperm functions of the proapoptotic protein, Bax. J Interferon Cytokine Res. 2002 Feb;22(2):199–206. PMID: 11911802
15. **Sarkar SN**, Miyagi M, Crabb JW, Sen GC. Identification of the substrate-binding sites of 2’-5’-oligoadenylate synthetase. J Biol Chem. 2002 Jul 5;277(27):24321–24330. PMID: 11986302
16. **Sarkar SN**, Pal S, Sen GC. Crisscross enzymatic reaction between the two molecules in the active dimeric P69 form of the 2’-5’ oligodenylate synthetase. J Biol Chem. 2002 Nov 22;277(47):44760–44764. PMID: 12223486
17. **Sarkar SN**, Smith HL, Rowe TM, Sen GC. Double-stranded RNA signaling by Toll-like receptor 3 requires specific tyrosine residues in its cytoplasmic domain. J Biol Chem. 2003 Feb 14;278(7):4393–4396. PMID: 12509442
18. Hartmann R, Justesen J, **Sarkar SN**, Sen GC, Yee VC. Crystal structure of the 2’-specific and double-stranded RNA-activated interferon-induced antiviral protein 2’-5’-oligoadenylate synthetase. Mol Cell. 2003 Nov;12(5):1173–1185. PMID: 14636576
19. **Sarkar SN**, Sen GC. Novel functions of proteins encoded by viral stress-inducible genes. Pharmacol Ther. 2004 Sep;103(3):245–259. PMID: 15464592
20. **Sarkar SN**, Peters KL, Elco CP, Sakamoto S, Pal S, Sen GC. Novel roles of TLR3 tyrosine phosphorylation and PI3 kinase in double-stranded RNA signaling. Nat Struct Mol Biol. 2004 Nov;11(11):1060–1067. PMID: 15502848
21. **Sarkar SN**, Pandey M, Sen GC. Assays for the interferon-induced enzyme 2’,5’ oligoadenylate synthetases. Methods Mol Med. 2005;116:81–101. PMID: 16000856
22. Sen GC, **Sarkar SN**. Transcriptional signaling by double-stranded RNA: role of TLR3. Cytokine Growth Factor Rev. 2005 Feb;16(1):1–14. PMID: 15733829
23. **Sarkar SN**, Kessler SP, Rowe TM, Pandey M, Ghosh A, Elco CP, Hartmann R, Pal S, Sen GC. Natural mutations in a 2’-5’ oligoadenylate synthetase transgene revealed residues essential for enzyme activity. Biochemistry. 2005 May 10;44(18):6837–6843. PMID: 15865429
24. Sen GC, **Sarkar SN**. Hitching RIG to action. Nat Immunol. 2005 Nov;6(11):1074–1076. PMID: 16239922
25. Sen GC, **Sarkar SN**. The interferon-stimulated genes: targets of direct signaling by interferons, double-stranded RNA, and viruses. Curr Top Microbiol Immunol. 2007;316:233–250. PMID: 17969451
26. **Sarkar SN**, Elco CP, Peters KL, Chattopadhyay S, Sen GC. Two tyrosine residues of Toll-like receptor 3 trigger different steps of NF-kappa B activation. J Biol Chem. 2007 Feb 9;282(6):3423–3427. PMID: 17178723
27. Beura LK, **Sarkar SN**, Kwon B, Subramaniam S, Jones C, Pattnaik AK, Osorio FA. Porcine reproductive and respiratory syndrome virus nonstructural protein 1beta modulates host innate immune response by antagonizing IRF3 activation. J Virol. 2010 Feb;84(3):1574–1584. PMCID: PMC2812326
28. Zhu J, Smith K, Hsieh PN, Mburu YK, Chattopadhyay S, Sen GC, **Sarkar SN**. High-throughput screening for TLR3-IFN regulatory factor 3 signaling pathway modulators identifies several antipsychotic drugs as TLR inhibitors. J Immunol. 2010 May 15;184(10):5768–5776. PMCID: PMC2874113
29. Rathi AV, Cantalupo PG, **Sarkar SN**, Pipas JM. Induction of interferon-stimulated genes by Simian virus 40 T antigens. Virology. 2010 Oct 25;406(2):202–211. PMCID: PMC2939315
30. Mburu YK, Abe K, Ferris LK, **Sarkar SN**, Ferris RL. Human β-defensin 3 promotes NF-κB-mediated CCR7 expression and anti-apoptotic signals in squamous cell carcinoma of the head and neck. Carcinogenesis. 2011 Feb;32(2):168–174. PMCID: PMC3026843
31. Morosky SA, Zhu J, Mukherjee A, **Sarkar SN**, Coyne CB. Retinoic acid-induced gene-I (RIG-I) associates with nucleotide-binding oligomerization domain-2 (NOD2) to negatively regulate inflammatory signaling. J Biol Chem. 2011 Aug 12;286(32):28574–28583. PMCID: PMC3151099
32. Zhu J, Coyne CB, **Sarkar SN**. PKC alpha regulates Sendai virus-mediated interferon induction through HDAC6 and β-catenin. EMBO J. 2011 Sep 27;30(23):4838–4849. PMCID: PMC3243614
33. Umemura N, Zhu J, Mburu YK, Forero A, Hsieh PN, Muthuswamy R, Kalinski P, Ferris RL, **Sarkar SN**. Defective NF-κB signaling in metastatic head and neck cancer cells leads to enhanced apoptosis by double-stranded RNA. Cancer Res. 2012 Jan 1;72(1):45–55. PMCID: PMC3251732
34. Bozym RA, Delorme-Axford E, Harris K, Morosky S, Ikizler M, Dermody TS, **Sarkar SN**, Coyne CB. Focal adhesion kinase is a component of antiviral RIG-I-like receptor signaling. Cell Host Microbe. 2012 Feb 16;11(2):153–166. PMCID: PMC3995454
35. Kohanbash G, Ishikawa E, Fujita M, Ikeura M, McKaveney K, Zhu J, Sakaki M, **Sarkar SN**, Okada H. Differential activity of interferon-α8 promoter is regulated by Oct-1 and a SNP that dictates prognosis of glioma. Oncoimmunology. 2012 Jul 1;1(4):487–492. PMCID: PMC3382910
36. Zhu J, Ghosh A, Coyle EM, Lee J, Hahm ER, Singh SV, **Sarkar SN**. Differential effects of phenethyl isothiocyanate and D,L-sulforaphane on TLR3 signaling. J Immunol. 2013 Apr 15;190(8):4400–4407. PMCID: PMC3622137
37. Okada H, Scheurer ME, **Sarkar SN**, Bondy ML. Integration of epidemiology, immunobiology, and translational research for brain tumors. Ann N Y Acad Sci. 2013 May;1284(1):17–23. PMCID: PMC3648859
38. Delorme-Axford E, Donker RB, Mouillet JF, Chu T, Bayer A, Ouyang Y, Wang T, Stolz DB, **Sarkar SN**, Morelli AE, Sadovsky Y, Coyne CB. Human placental trophoblasts confer viral resistance to recipient cells. Proc Natl Acad Sci U S A. 2013 Jul 16;110(29):12048–12053. PMCID: PMC3718097
39. Forero A, Moore PS, **Sarkar SN**. Role of IRF4 in IFN-stimulated gene induction and maintenance of Kaposi sarcoma-associated herpesvirus latency in primary effusion lymphoma cells. J Immunol. 2013 Aug 1;191(3):1476–1485. PMCID: PMC3740746
40. **Sarkar SN**. Could boosting the oligoadenylate synthetase-like pathway bring a new era of antiviral therapy? Future Virol. 2014;9(12):1011–1014. PMCID: PMC4302786
41. Antony ML, Lee J, Hahm ER, Kim SH, Marcus AI, Kumari V, Ji X, Yang Z, Vowell CL, Wipf P, Uechi GT, Yates NA, Romero G, **Sarkar SN**, Singh SV. Growth arrest by the antitumor steroidal lactone withaferin A in human breast cancer cells is associated with down-regulation and covalent binding at cysteine 303 of β-tubulin. J Biol Chem. 2014 Jan 17;289(3):1852–1865. PMCID: PMC3894360
42. Jacobs JL, Zhu J, **Sarkar SN**, Coyne CB. Regulation of mitochondrial antiviral signaling (MAVS) expression and signaling by the mitochondria-associated endoplasmic reticulum membrane (MAM) protein Gp78. J Biol Chem. 2014 Jan 17;289(3):1604–1616. PMCID: PMC3894340
43. Forero A, McCormick KD, Jenkins FJ, **Sarkar SN**. Downregulation of IRF4 induces lytic reactivation of KSHV in primary effusion lymphoma cells. Virology. 2014 Jun;458–459:4–10. PMCID: PMC4058074
44. Forero A, Giacobbi NS, McCormick KD, Gjoerup OV, Bakkenist CJ, Pipas JM, **Sarkar SN**. Simian virus 40 large T antigen induces IFN-stimulated genes through ATR kinase. J Immunol. 2014 Jun 15;192(12):5933–5942. PMCID: PMC4078001
45. Zhu J, Zhang Y, Ghosh A, Cuevas RA, Forero A, Dhar J, Ibsen MS, Schmid-Burgk JL, Schmidt T, Ganapathiraju MK, Fujita T, Hartmann R, Barik S, Hornung V, Coyne CB, **Sarkar SN**. Antiviral activity of human OASL protein is mediated by enhancing signaling of the RIG-I RNA sensor. Immunity. 2014 Jun 19;40(6):936–948. PMCID: PMC4101812. (Widely covered by the local and national media)
46. Yang S, Deng P, Zhu Z, Zhu J, Wang G, Zhang L, Chen AF, Wang T, **Sarkar SN**, Billiar TR, Wang Q. Adenosine deaminase acting on RNA 1 limits RIG-I RNA detection and suppresses IFN production responding to viral and endogenous RNAs. J Immunol. 2014 Oct 1;193(7):3436–3445. PMCID: PMC4169998
47. Ohkuri T, Ghosh A, Kosaka A, Zhu J, Ikeura M, David M, Watkins SC, **Sarkar SN**, Okada H. STING contributes to antiglioma immunity via triggering type I IFN signals in the tumor microenvironment. Cancer Immunol Res. 2014 Dec;2(12):1199–1208. PMCID: PMC4258479
48. Alcorn JF, **Sarkar SN**. What is the oligoadenylate synthetases-like protein and does it have therapeutic potential for influenza? Expert Rev Respir Med. 2015 Feb;9(1):1–3. PMCID: PMC4629247
49. Ohkuri T, Ghosh A, Kosaka A, **Sarkar SN**, Okada H. Protective role of STING against gliomagenesis: Rational use of STING agonist in anti-glioma immunotherapy. Oncoimmunology. 2015 Apr;4(4):e999523. PMCID: PMC4485761
50. Ibsen MS, Gad HH, Andersen LL, Hornung V, Julkunen I, **Sarkar SN**, Hartmann R. Structural and functional analysis reveals that human OASL binds dsRNA to enhance RIG-I signaling. Nucleic Acids Res. 2015 May 26;43(10):5236–5248. PMCID: PMC4446440
51. Zhu J, Ghosh A, **Sarkar SN**. OASL-a new player in controlling antiviral innate immunity. Curr Opin Virol. 2015 Jun;12:15–19. PMCID: PMC4470762
52. Shu Q, Lennemann NJ, **Sarkar SN**, Sadovsky Y, Coyne CB. ADAP2 Is an Interferon Stimulated Gene That Restricts RNA Virus Entry. PLoS Pathog. 2015 Sep;11(9):e1005150. PMCID: PMC4570769
53. Dhar J, Cuevas RA, Goswami R, Zhu J, **Sarkar SN**, Barik S. 2’-5’-Oligoadenylate Synthetase-Like Protein Inhibits Respiratory Syncytial Virus Replication and Is Targeted by the Viral Nonstructural Protein 1. J Virol. 2015 Oct;89(19):10115–10119. PMCID: PMC4577923
54. Ganapathiraju MK, Thahir M, Handen A, **Sarkar SN**, Sweet RA, Nimgaonkar VL, Loscher CE, Bauer EM, Chaparala S. Schizophrenia interactome with 504 novel protein-protein interactions. NPJ Schizophr. 2016;2:16012. PMCID: PMC4898894
55. Hendricks MR, Lashua LP, Fischer DK, Flitter BA, Eichinger KM, Durbin JE, **Sarkar SN**, Coyne CB, Empey KM, Bomberger JM. Respiratory syncytial virus infection enhances Pseudomonas aeruginosa biofilm growth through dysregulation of nutritional immunity. Proc Natl Acad Sci U S A. 2016 Feb 9;113(6):1642–1647. PMCID: PMC4760822
56. McCormick KD, Ghosh A, Trivedi S, Wang L, Coyne CB, Ferris RL, **Sarkar SN**. Innate immune signaling through differential RIPK1 expression promote tumor progression in head and neck squamous cell carcinoma. Carcinogenesis. 2016 May;37(5):522–529. PMCID: PMC6086476
57. Cuevas RA, Ghosh A, Wallerath C, Hornung V, Coyne CB, **Sarkar SN**. MOV10 Provides Antiviral Activity against RNA Viruses by Enhancing RIG-I-MAVS-Independent IFN Induction. J Immunol. 2016 May 1;196(9):3877–3886. PMCID: PMC4868630
58. Theodoraki MN, Yerneni S, **Sarkar SN**, Orr B, Muthuswamy R, Voyten J, Modugno F, Jiang W, Grimm M, Basse PH, Bartlett DL, Edwards RP, Kalinski P. Helicase-Driven Activation of NFκB-COX2 Pathway Mediates the Immunosuppressive Component of dsRNA-Driven Inflammation in the Human Tumor Microenvironment. Cancer Res. 2018 Aug 1;78(15):4292–4302. PMCID: PMC6636317
59. Vendetti FP, Karukonda P, Clump DA, Teo T, Lalonde R, Nugent K, Ballew M, Kiesel BF, Beumer JH, **Sarkar SN**, Conrads TP, O’Connor MJ, Ferris RL, Tran PT, Delgoffe GM, Bakkenist CJ. ATR kinase inhibitor AZD6738 potentiates CD8+ T cell-dependent antitumor activity following radiation. J Clin Invest. 2018 Aug 31;128(9):3926–3940. PMCID: PMC6118586
60. Banerjee I, Behl B, Mendonca M, Shrivastava G, Russo AJ, Menoret A, Ghosh A, Vella AT, Vanaja SK, **Sarkar SN**, Fitzgerald KA, Rathinam VAK. Gasdermin D Restrains Type I Interferon Response to Cytosolic DNA by Disrupting Ionic Homeostasis. Immunity. 2018 Sep 18;49(3):413-426.e5. PMCID: PMC6347470
61. Ghosh A, Shao L, Sampath P, Zhao B, Patel NV, Zhu J, Behl B, Parise RA, Beumer JH, O’Sullivan RJ, DeLuca NA, Thorne SH, Rathinam VAK, Li P, **Sarkar SN**. Oligoadenylate-Synthetase-Family Protein OASL Inhibits Activity of the DNA Sensor cGAS during DNA Virus Infection to Limit Interferon Production. Immunity. 2019 Jan 15;50(1):51-63.e5. PMCID: PMC6342484
62. Gregg RW, **Sarkar SN**, Shoemaker JE. Mathematical modeling of the cGAS pathway reveals robustness of DNA sensing to TREX1 feedback. J Theor Biol. 2019 Feb 7;462:148–157. PMID: 30395807
63. Shao L, Hou W, Scharping NE, Vendetti FP, Srivastava R, Roy CN, Menk AV, Wang Y, Chauvin JM, Karukonda P, Thorne SH, Hornung V, Zarour HM, Bakkenist CJ, Delgoffe GM, **Sarkar SN**. IRF1 Inhibits Antitumor Immunity through the Upregulation of PD-L1 in the Tumor Cell. Cancer Immunol Res. 2019 Aug;7(8):1258–1266. PMCID: PMC6677597
64. Forero A, Ozarkar S, Li H, Lee CH, Hemann EA, Nadjsombati MS, Hendricks MR, So L, Green R, Roy CN, **Sarkar SN**, von Moltke J, Anderson SK, Gale M, Savan R. Differential Activation of the Transcription Factor IRF1 Underlies the Distinct Immune Responses Elicited by Type I and Type III Interferons. Immunity. 2019 Sep 17;51(3):451-464.e6. PMCID: PMC7447158
65. Rivadeneira DB, DePeaux K, Wang Y, Kulkarni A, Tabib T, Menk AV, Sampath P, Lafyatis R, Ferris RL, **Sarkar SN**, Thorne SH, Delgoffe GM. Oncolytic Viruses Engineered to Enforce Leptin Expression Reprogram Tumor-Infiltrating T Cell Metabolism and Promote Tumor Clearance. Immunity. 2019 Sep 17;51(3):548-560.e4. PMCID: PMC6903394
66. Barroso-González J, García-Expósito L, Hoang SM, Lynskey ML, Roncaioli JL, Ghosh A, Wallace CT, de Vitis M, Modesti M, Bernstein KA, **Sarkar SN**, Watkins SC, O’Sullivan RJ. RAD51AP1 Is an Essential Mediator of Alternative Lengthening of Telomeres. Mol Cell. 2019 Oct 3;76(1):11-26.e7. PMCID: PMC6778027
67. Soveg FW, Schwerk J, Gokhale NS, Cerosaletti K, Smith JR, Pairo-Castineira E, Kell AM, Forero A, Zaver SA, Esser-Nobis K, Roby JA, Hsiang TY, Ozarkar S, Clingan JM, McAnarney ET, Stone AE, Malhotra U, Speake C, Perez J, Balu C, Allenspach EJ, Hyde JL, Menachery VD, **Sarkar SN**, Woodward JJ, Stetson DB, Baillie JK, Buckner JH, Gale M, Savan R. Endomembrane targeting of human OAS1 p46 augments antiviral activity. Elife. 2021 Aug 3;10:e71047. PMCID: PMC8357416
68. **Sarkar SN**, Harioudh MK, Shao L, Perez J, Ghosh A. The Many Faces of Oligoadenylate Synthetases. J Interferon Cytokine Res. 2023 Nov;43(11):487–494. PMCID: PMC10654648
69. Zhang Y, Xu J, Miranda-Katz M, Sojati J, Tollefson SJ, Manni ML, Alcorn JF, **Sarkar SN**, Williams JV. Distinct roles for type I and type III interferons in virulent human metapneumovirus pathogenesis. PLoS Pathog. 2024 Feb;20(2):e1011840. PMCID: PMC10868789
70. Harioudh MK, Perez J, Chong Z, Nair S, So L, McCormick KD, Ghosh A, Shao L, Srivastava R, Soveg F, Ebert TS, Atianand MK, Hornung V, Savan R, Diamond MS, **Sarkar SN**. Oligoadenylate synthetase 1 displays dual antiviral mechanisms in driving translational shutdown and protecting interferon production. Immunity. 2024 Mar 12;57(3):446-461.e7. PMCID: PMC10939734
71. Shao L, Srivastava R, Delgoffe GM, Thorne SH, **Sarkar SN**. An IRF2-Expressing Oncolytic Virus Changes the Susceptibility of Tumor Cells to Antitumor T Cells and Promotes Tumor Clearance. Cancer Immunol Res. 2024 Jun 4;12(6):779–790. PMCID: PMC11150089
72. Harioudh MK, Perez J, So L, Maheshwari M, Ebert TS, Hornung V, Savan R, Rouf Banday A, Diamond MS, Rathinam VA, **Sarkar SN**. The canonical antiviral protein oligoadenylate synthetase 1 elicits antibacterial functions by enhancing IRF1 translation. Immunity. 2024 Aug 13;57(8):1812-1827.e7. PMCID: PMC11324410. (Preview in August 13, 2024, issue of *Immunity* by Martin-Fernandez M, Bogunovic D. PMID: 39142270).
73. Chhibbar P, Guha Roy P, Harioudh MK, McGrail DJ, Yang D, Singh H, Hinterleitner R, Gong YN, Yi SS, Sahni N, **Sarkar SN**, Das J. Uncovering cell-type-specific immunomodulatory variants and molecular phenotypes in COVID-19 using structurally resolved protein networks. Cell Rep. 2024 Nov 5;43(11):114930. PMID: 39504244

**Major Invited Speeches**

Local

1. **Sarkar SN,** Innate Immunity in Virus Infection and Cancer. Department of Biological Science, Duquesne University, Pittsburgh, PA. 2010.
2. **Sarkar SN,** Innate Immunity in Virus Infection and Cancer. Department of Immunology, University of Pittsburgh, Pittsburgh, PA. 2010.
3. **Sarkar SN,** Innate Immunity in Virus Infection and Cancer. Prostate & Urologic Cancer Program, University of Pittsburgh Cancer Institute, Pittsburgh, PA. 2010.
4. **Sarkar SN,** Innate Immunity in Virus Infection and Cancer. University of Pittsburgh Drug Discovery Institute, Pittsburgh, PA. 2011.
5. **Sarkar SN,** Early and late modulation of anti-viral Innate Immunity. Department of Infectious Disease and Microbiology, School of Public Health, University of Pittsburgh, Pittsburgh, PA 2013
6. **Sarkar SN,** RNA sensors in anti-viral and anti-cancer Innate Immunity. Department of Microbiology and Molecular Genetics, University of Pittsburgh, Pittsburgh, PA. 2013

**Sarkar SN,** RNA sensors in anti-viral and anti-cancer Innate Immunity. Basic and Translational Research Seminar series, University of Pittsburgh Cancer Institute, Pittsburgh, PA. 2013

1. **Sarkar SN,** Modulation of antiviral innate immunity by ISGs. Molecular Medicine Research Seminar, Children’s hospital of Pittsburgh, Pittsburgh, PA. 2014
2. **Sarkar SN,** Modulation of antiviral innate immunity by ISGs. Joint symposium of Immunology and Microbiology, University of Pittsburgh, Pittsburgh, PA. 2014
3. **Sarkar SN,** RNA sensors and ISGs in cancer. Annual Research Retreat, University of Pittsburgh Cancer Institute, Pittsburgh, PA. 2015
4. **Sarkar SN,** Revisiting the Mechanism of Action of OAS-Family Proteins. Immunology Retreat, Oglebay, WV. 2019
5. **Sarkar SN,** Virus-specific antiviral activities of Oligoadenylate Synthetases. Basic and Translational Research Conference, Pulmonary, Allergy and Critical Care Medicine, University of Pittsburgh, Pittsburgh, PA. 2022
6. **Sarkar SN,** Mechanistic Specialization of IFN-stimulated gene function. Department of Microbiology & Molecular Genetics, University of Pittsburgh School of Medicine, Pittsburgh, PA. (Promotion Seminar). 2023
7. **Sarkar SN,** Mechanistic Specialization of IFN-stimulated gene function**.** Department of Microbiology & Immunology, University of Maryland School of Medicine, Baltimore, MD. 2024

National

1. **Sarkar SN,** Early and late modulation of anti-viral Innate Immunity. Department of Biological Sciences, Cleveland State University, Cleveland, OH. 2012
2. **Sarkar SN,** Early and late modulation of anti-viral Innate Immunity. Department of Medicine, UMASS school of Medicine, Worcester, MA. 2012
3. **Sarkar SN,** Mechanisms of antiviral activity of Human OASL. Keystone Symposium: Innate Immunity to Viral Infections, Keystone, CO 2014
4. **Sarkar SN,** Modulation of antiviral innate immunity by ISGs. Department of Molecular Genetics & Microbiology, Duke University, Durham, NC. 2015
5. **Sarkar SN,** Modulation of antiviral innate immunity by ISGs. Dept. of Microbiology and Immunology, University of Louisville, Louisville, KY. 2015
6. **Sarkar SN,** Revisiting the mechanism of action of OAS-family proteins. Department of Medicine, UMASS school of Medicine, Worcester, MA. 2017
7. **Sarkar SN,** Revisiting the mechanism of action of OAS-family proteins. Immunology 2017, American Association of Immunologists, Washington DC. 2017
8. **Sarkar SN,** Revisiting the mechanism of action of OAS-family proteins. Department of Immunology, University of Washington, Seattle, WA. 2017
9. **Sarkar SN,** Mechanisms of antiviral and anticancer activities of ISGs. Department of Immunology, Roswell Park Cancer Institute, Buffalo, NY. 2021
10. **Sarkar SN,** Mechanisms of antiviral and anticancer activities of ISGs. GW Cancer Center, George Washington University, Washington DC. 2022
11. **Sarkar SN,** Mechanisms of antiviral and anticancer activities of ISGs. Department of Pharmacology, Uniformed Services University, Bethesda, MD. 2023
12. **Sarkar SN,** Mechanistic Specialization of IFN-stimulated gene function**.** University of Maryland Greenebaum Comprehensive Cancer Center, Baltimore, MD. 2024
13. **Sarkar SN,** Mechanistic Specialization of IFN-stimulated gene function**.** Department of Microbiology & Immunology, University of Louisville, Louisville, KY. 2024

International

1. **Sarkar SN**, Changes in Innate Immune Signaling Pathways during Tumor Metastasis and their Modulation by naturally occurring Isothiocyanates. 3rd International Cancer Research Symposium, Kolkata, INDIA. 2012
2. **Sarkar SN**, Early and late modulation of anti-viral Innate Immunity. Dept. of Molecular Biology and Genetics, University of Aarhus, DENMARK. 2012
3. **Sarkar SN**, Modulation of antiviral innate immunity by ISGs. National Institute of Immunology, New Delhi, INDIA. 2015
4. **Sarkar SN**, Modulation of antiviral innate immunity by ISGs. Department of Biochemistry, Indian Institute of Science, Bangalore, INDIA. 2015
5. **Sarkar SN**, Revisiting the mechanism of action of OAS-family proteins. Institute of Virus Research, Kyoto University, Kyoto, JAPAN. 2017
6. **Sarkar SN**, IFN and ISG in infectious disease and cancer. China Agricultural University, Beijing, China. 2018
7. **Sarkar SN**, Differential effects of OASL protein on RNA and DNA virus infections. Yangzhou University, Yangzhou, China. 2018
8. **Sarkar SN**, Mechanistic Specialization of OAS family proteins. 7th TOLL Conference, Rotterdam, Netherlands. 2024
9. **Sarkar SN,** Mechanistic Specialization of IFN-stimulated gene function**.** Université Paris-Saclay, Faculté de Médecine, France (Virtual). 2024