

SAMUDRA PAL, Ph.D.

Assistant Professor, Department of Biotechnology, Swami Vivekananda University
Senior Research Fellow — Human Genetics & Reproductive Genomics, Cytogenetics and Genomics Research Unit,
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26

Total Publications

4

H-Index (WoS)

84

Total Citations

6

Manuscripts Peer-Reviewed

RESEARCH PROFILE

Dr. Samudra Pal is a molecular geneticist and reproductive genomics researcher currently serving as Assistant Professor in the Department of Biotechnology at Swami Vivekananda University, alongside an ongoing research affiliation as Senior Research Fellow at the Cytogenetics and Genomics Research Unit, Department of Zoology, University of Calcutta. He completed his Ph.D. in Human Genetics (2018-2024) under the supervision of Dr. Sujay Ghosh, with a thesis on the genetic underpinnings of male infertility.

His research integrates molecular genetics, epigenetics, and genetic epidemiology to investigate spermatogenic failure, azoospermia, and reproductive health in Indian populations, with parallel contributions to the cytogenomics of Down syndrome and the gut microbiome-immune-brain axis. He is proficient in next-generation sequencing (NGS), Sanger sequencing, and computational biology, and has authored 13 peer-reviewed journal articles and 13 invited book chapters, accumulating 84 citations and an H-index of 4 (Web of Science). Dr. Pal has received multiple national fellowships and awards, delivered invited and plenary lectures, and serves as a peer reviewer for internationally reputed journals including PLOS ONE and Basic and Clinical Andrology.

RESEARCH INTERESTS

- Genetic and epigenetic basis of male infertility, including spermatogenesis failure and azoospermia
- Gene-environment interactions in male reproductive health (electromagnetic field exposure, tobacco, lifestyle factors)
- Cytogenomics of Down syndrome, including congenital heart defects and neurodegenerative comorbidities
- Gut microbiome-immune-brain axis and its implications for neurological and metabolic disorders
- Molecular biomarkers for early diagnosis and targeted therapy in male infertility
- Population-level genetic risk profiling using NGS and Sanger sequencing in Bengali and Indian cohorts
- Computational biology and bioinformatics for mutation analysis, molecular docking, and genomic data interpretation

EDUCATION

2018 - 2024	Ph.D. in Human Genetics University of Calcutta, Kolkata, India — Thesis: Genetic variants in spermatogenesis regulators and male infertility in Indian men. Supervisor: Dr. Sujay Ghosh, Dept. of Zoology.
2016 - 2018	M.Sc. Zoology (Specialization: Genetics) University of Calcutta, Kolkata, India — First Division (82.8%) <i>Highest scorer in M.Sc. Zoology, 2018; recipient of the K.C. Ghose Memorial Award</i>

2013 - 2016	B.Sc. (Hons.) Zoology, with Botany and Chemistry University of Calcutta, Kolkata, India — First Division (77.25%)
2013	Higher Secondary (WBCHSE) 88.2%
2011	Madhyamik / Class X (WBBSE) 89%

ACADEMIC & RESEARCH POSITIONS

Present	Assistant Professor, Department of Biotechnology Swami Vivekananda University, West Bengal, India
2018 - Present	Senior Research Fellow, Human Genetics & Reproductive Genomics Cytogenetics and Genomics Research Unit, Department of Zoology, University of Calcutta

PEER-REVIEWED JOURNAL PUBLICATIONS

*Author list bolds Dr. Pal's contribution; * denotes corresponding/first author. Listed in reverse chronological order.*

2025

Novel genetic variants of sperm chromatin compaction regulators are associated with non-obstructive azoospermia in Indian men

Dutta S, Paladhi P, Pal S, Ghosh P, Chattopadhyay R, Ghosh S

European Journal of Obstetrics & Gynecology and Reproductive Biology Vol. 315, Art. 114762 (SCI, Scopus, UGC-CARE listed)

DOI: [10.1016/j.ejogrb.2025.114762](https://doi.org/10.1016/j.ejogrb.2025.114762)

Men with genetic predisposition face greater fertility challenges when exposed to electromagnetic radiation

Pal S, Paladhi P, Dutta S, Ghosh P, Chattopadhyay R, Ghosh S (*corresponding author*)

Molecular Biology Reports Vol. 52(1), Art. 773 (SCI, Scopus, UGC-CARE listed)

DOI: [10.1007/s11033-025-10882-9](https://doi.org/10.1007/s11033-025-10882-9)

Rare and novel variant load threshold for KIF7, GJA1 and PDE1C genes elevates the risk of severity of congenital heart defects in Down syndrome

Ganguly A, Pal S, Chatterjee S, Das M, Sarkar S, Ghosh S

PLOS ONE Vol. 20(6), Art. e0326566 (SCI, Scopus, UGC-CARE listed)

DOI: [10.1371/journal.pone.0326566](https://doi.org/10.1371/journal.pone.0326566)

Novel Genetic Variants of CDC25A Significantly Increase Risk of Spermatogenesis Arrest in Men from Bengali Population, India: A Cross-Sectional Study

Pal S, Paladhi P, Dutta S, Chattopadhyay R, Ghosh S (*corresponding author*)

Journal of Human Reproductive Sciences Vol. 18(1), pp. 32-37 (Scopus, UGC-CARE listed)

DOI: [10.4103/jhrs.jhrs_26_25](https://doi.org/10.4103/jhrs.jhrs_26_25)

The Iron Paradox: A Comprehensive Review of Pathophysiology, Performance Implications, and Strategic Nutritional Management in Female Athletes

Paria D, Dutta Banik T, Manna S, Pal S (*corresponding author*)

Journal of Research in Allied Life Sciences Vol. 2(2), pp. 1-14 — Review Article

DOI: [10.65525/jrals.v2i2.20](https://doi.org/10.65525/jrals.v2i2.20)

MicroRNA-Protein Interaction Networks in Down Syndrome-Linked Alzheimer's Pathogenesis: A Compact Review

Guchhait A, Sarkar M, Ghosh A, Thakur S, Dutta Banik R, Pal P, De D, Pal S (*corresponding author*)

Journal of Research in Allied Life Sciences Vol. 1(2) — Review Article

DOI: [10.65525/jrals.v1i2.6](https://doi.org/10.65525/jrals.v1i2.6)

Role of Artificial Intelligence and Machine Learning in Combating Multi-Drug Resistance

Mondal S, Roy D, Pal S, Pal P, De D, Dutta Banik R

Journal of Research in Allied Life Sciences Vol. 1(2) — Review Article

DOI: [10.65525/jrals.v1i2.7](https://doi.org/10.65525/jrals.v1i2.7)

2024

Screening of the Combined Risk of Genetics and Epidemiology on Infertility Among Indian Men: Synergistic Effect of AZFc Partial Deletions and Habits of Smokeless Chewing Tobacco

Dutta S, Paladhi P, Pal S, Srimani S, Bose G, Ghosh P, Chattopadhyay R, Ghosh S

American Journal of Men's Health Cited by 1

DOI: [10.1177/15579883241279195](https://doi.org/10.1177/15579883241279195)

Novel Mutations Reduce Expression of Meiotic Regulators SYCE1 and BOLL in Testis of Azoospermic Men from West Bengal, India

Pal S, Paladhi P, Dutta S, Mullick RB, Bose G, Ghosh P, Chattopadhyay R, Ghosh S (*corresponding author*)

Reproductive Sciences Cited by 2

DOI: [10.1007/s43032-023-01393-8](https://doi.org/10.1007/s43032-023-01393-8)

2022

Novel Mutations of TSPY1 Gene Associate Spermatogenic Failure Among Men

Paladhi P, Dutta S, Pal S, Bose G, Ghosh P, Chattopadhyay R, Chakravarty B, Saha I, Ghosh S

Reproductive Sciences Impact Factor 3.06 | Cited by 3

DOI: [10.1007/s43032-021-00839-1](https://doi.org/10.1007/s43032-021-00839-1)

Evaluation of Potency of the Selected Bioactive Molecules from Indian Medicinal Plants with MPro of SARS-CoV-2 through In-Silico Analysis

Halder P, Pal U, Paladhi P, Dutta S, Paul P, Pal S, Das D, Ganguly A, Dutta I, Mandal S, Ray A, Ghosh S

Journal of Ayurveda and Integrative Medicine Impact Factor 2.32 | Cited by 25

DOI: [10.1016/j.jaim.2021.05.003](https://doi.org/10.1016/j.jaim.2021.05.003)

2021

Novel Variations in Spermatogenic Transcription Regulators RFX2 and TAF7 Increase Risk of Azoospermia

Pal S, Paladhi P, Dutta S, Bose G, Ghosh P, Chattopadhyay R, Chakravarty B, Saha I, Ghosh S (*corresponding author*)

Journal of Assisted Reproduction and Genetics Impact Factor 3.412 | Cited by 6

DOI: [10.1007/s10815-021-02352-5](https://doi.org/10.1007/s10815-021-02352-5)

Prevalence of Y Chromosome Microdeletion in Azoospermia Factor Subregions Among Infertile Men from West Bengal, India

Dutta S, Paladhi P, Pal S, Bose G, Ghosh P, Chattopadhyay R, Chakravarty B, Ghosh S

Molecular Genetics & Genomic Medicine Impact Factor 2.21 | Cited by 12

DOI: [10.1002/mgg3.1769](https://doi.org/10.1002/mgg3.1769)

Manuscript Under Communication

Chemisorptive and Synergistic Bioremediation of Arsenic from Wastewater Using Bacterial Consortia: Mechanistic Insights and Surface Characterization

Chakraborty A, Pal S, Mukherjee T, Das T, Saha NC, Pal PK

World Journal of Microbiology and Biotechnology Impact Factor 4.9 — Under Communication (SCI, Scopus, UGC-CARE listed)

BOOK CHAPTERS (EDITED VOLUMES)

#	Field	Chapter Title	Authors	ISBN	Page
1	Microbiology	Targeting the Purinome: An Integrated In-Silico and In Vitro Strategy for Discovering Novel Adenosine Deaminase Inhibitors from Marine-Derived Fungi	Dhara A, Das A, Pal S*	978-93-5635-848-5	115
2	Microbiology	Telomere Biology and Aging: A Comprehensive Review	Pal P*, Dutta Banik R, Pal S, De D	978-93-341-7834-0	57
3	Microbiology	Biodegradation of Municipal Wastes Using Bacterial Strains: A Comprehensive Review	Dutta Banik R*, Pal P, De D, Pal S	978-93-341-7834-0	98
4	Microbiology	Development of Plant-Based Bioreactors for Recombinant Enzyme Production	Pal P, De D, Dutta Banik R, Pal PK, Koner D, Pal S*	978-93-341-7834-0	120
5	Microbiology	The Indian Microbiome Landscape: A Systematic Review of Regional Variations and their Health Implications	Pal PK, Pal S, Pal P, De D*	978-93-341-7834-0	146
6	Biotechnology	The Gut Microbiome-Immune System-Brain Axis: Implications for Neurological Disorders	Pal P*, Dutta Banik R, Pal S, De D	978-93-341-7833-3	53
7	Biotechnology	Autophagy and ER Stress Crosstalk in Neuronal Insulin Resistance: Targeting GLP-1 Pathway	Sarkar M, Ghosh A, Guchhait A, Pal S*	978-93-341-7833-3	98
8	Biotechnology	Biodegradation of Pharmaceutical Pollutants Using Immobilized Microbial Consortia: A Comprehensive Review	Dutta Banik R*, Pal P, De D, Pal S, Dutta Banik R*	978-93-341-7833-3	163
9	Biotechnology	Beyond the Live Bug: A Review on the Therapeutic Potential and Mechanistic Insights of Postbiotics	Kundu A, Dey R, Majumder S, Roy S, Pal S*	978-93-5655-163-3	62
10	Biotechnology	Epigenetic Reprogramming by Cadmium: DNA Methylation, Histone Modification, and miRNA Dysregulation as Drivers of Neurotoxicity and Neurodegenerative Disease	Sengupta T, Ghosh A, De D, Pal S, Dutta Banik R, Pal P*	978-93-5890-470-3	146
11	Biotechnology	Designing an Integrated Multi-Omics Bioinformatics Pipeline to Identify Biomarkers of Brain Insulin Resistance in Down Syndrome Mouse Models	Paria D, Roy S, Dutta Banik T, Pal PK, De D, Pal P, Koner D, Dutta Banik R, Pal S*	978-93-5773-526-1	22
12	Microbiology	Endospore-Forming Bacteria as Next-Generation Biofertilizers Under Abiotic Stress Conditions: Mechanisms, Applications and Future Perspectives	Mukherjee C, Mukherjee M, Patra P, Banerjee S, Pal S*	978-93-5890-755-1	94-108
13	Microbiology	Mercury-Induced Neurotoxicity: Mechanisms, Clinical Manifestations and Therapeutic Considerations	Sengupta T, Ghosh A, De D, Pal S, Dutta Banik R, Pal P*	978-93-5890-755-1	72

INVITED & PLENARY LECTURES

Invited	“From Curiosity to Career: Research, Reality and the Road Ahead” — Plenary Lecture Department of Zoology, Scottish Church College, Kolkata
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Conference Presentations & Academic Meetings

Feb 2025	P-070 — Comprehensive Characterization of Novel GPX4 Gene Mutations Associated with Idiopathic Male Infertility among Indian Bengali-Speaking Men Published abstract, Human Reproduction, Vol. 40 (Suppl. 1), p. 379 — ESHRE Annual Meeting DOI: 10.1093/humrep/deaf097.379
Jan 2023	5th Regional Science and Technology Congress (Region No. 4) Maulana Azad College, Kolkata — Oral Presentation
Dec 2022	Zoospectra 2022 — Two-Day International Conference, Dept. of Zoology University of Calcutta — Oral Presentation (2nd Best Oral Presenter)
Nov 2021	Yuva ISAR 2021 — Indian Society for Assisted Reproduction The Bengal Club, Kolkata — Oral Presentation
Oct 2021	ACE 2021 — 9th Annual Conference of the Academy of Clinical Embryologists Kolkata — Oral Presentation (1st Prize)
Feb 2020	International Conference: Down Syndrome Research — Indian Initiative in Global Perspective Institute of Jute Technology, University of Calcutta
Dec 2019	4th Regional Science and Technology Congress (Western Region) University of Burdwan, West Bengal — Oral Presentation

HONOURS & AWARDS

2022	Sudev Bhusan Ghosh Young Scientist Award Zoological Society, Kolkata
2022	2nd Best Oral Presenter — Zoospectra 2022 (International Conference) University of Calcutta
2021	1st Prize, Oral Presentation — ACE 2021 (9th Annual Conference) Academy of Clinical Embryologists, Kolkata
2018	K.C. Ghose Memorial Award Zoological Society, Kolkata — for securing the highest marks in M.Sc.
2018	Highest Scorer, M.Sc. Zoology (82.8%) University of Calcutta
2018	GATE Life Sciences — Qualified (Rank 1971) Graduate Aptitude Test in Engineering
2017	CSIR-UGC NET — Junior Research Fellowship (JRF), Life Sciences (Rank 79)
2017	WBSET — Qualified West Bengal State Eligibility Test
2013	DST-INSPIRE Scholarship Innovation in Science Pursuit for Inspired Research, Govt. of India

PEER REVIEW ACTIVITY

6 reviews of 4 manuscripts completed (2025) for the following journals: PLOS ONE and Basic and Clinical Andrology.

Jul-Nov 2025	PLOS ONE (2 review rounds) Short report: Targeted analysis of whole exome sequencing data in Indian cryptogenic stroke patients
Jun 2025	Basic and Clinical Andrology Potential Role of MiR-574 in Varicocele-Associated and Idiopathic Infertility
Jun 2025	Basic and Clinical Andrology Evaluation of the role of seminal plasma ECM-1, TEX101 and LGALS3BP in predicting surgical sperm retrieval in azoospermic men
May 2025	PLOS ONE (2 review rounds) LINE-1 Transposition Into Murine Thyroglobulin Results in Congenital Thyroid Dysplasia

TECHNICAL SKILLS & COMPETENCIES

Molecular Biology	Sanger sequencing, PCR, agarose gel electrophoresis, SDS-PAGE, Western blot, quantitative RT-PCR
Genomics & NGS	Next-generation sequencing (NGS) analysis, human mutation analysis, genotyping, Y-chromosome microdeletion analysis
Epigenetics	DNA methylation analysis, gene expression profiling, meiotic regulator assessment
Computational Biology	Molecular docking, bioinformatics pipeline execution, population genetics, genetic epidemiology
Programming & Tools	R, Python, command-line tools, SPSS, Stata, GraphPad Prism
Model Organisms	Mice (<i>Mus musculus</i>), <i>Drosophila melanogaster</i>
Academic Skills	Manuscript preparation, peer reviewing, statistical analysis, research supervision, scientific communication

REFERENCES

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Dr. Ratna Chattopadhyay

Collaborator

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Institute of Reproductive Medicine
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I, Dr. Samudra Pal, hereby declare that all statements in this curriculum vitae are true and correct to the best of my knowledge.

Place: Kolkata