

Vijay Pratap Singh, PhD

Curriculum Vitae

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**Summary:**

The placenta is a crucial organ in eutherian mammals, serving as the interface between the fetus and mother. My research focuses on understanding how genome maintenance impacts the cells of the developing placenta, which is a highly polyploid organ. My laboratory utilizes advanced molecular, cellular, and genetic tools with human trophoblast stem cells and mouse models to identify key regulators of genome maintenance in various placental cell types. I hypothesize that placental function depends on effective genome maintenance, and that genomic instability can lead to cellular senescence, affecting placental aging, parturition, and embryo development. This research is significant for maternal-fetal health and offers insights into the broader molecular connections between genome maintenance, aging, and cancer.

EDUCATION:

2005 – 2012 Ph.D. in life sciences

CSIR-Centre for Cellular and Molecular Biology, Hyderabad, India

School of life sciences, Jawaharlal Nehru University, New Delhi, India

Thesis: Functional analysis of mouse *Wdr13* through transgenic and knockout approaches with Dr. Satish Kumar

2003 – 2005 M.Sc. in Biotechnology

Department of Biotechnology, University of Jammu, Jammu, India

Dissertation work with Dr. B. K. Bajaj

PROFESSIONAL APPOINTMENTS:

2023- Till now Scientist /DBT Ramalingaswami Fellow,

ICMR-NIRTH, Jabalpur, India

2019 – 2022 Senior research associate with Dr. Jennifer Gerton

Stowers Institute for Medical Research, Kansas City, MO, USA

2014 - 2019 Postdoctoral research associate with Dr. Jennifer Gerton

Stowers Institute for Medical Research, Kansas City, MO, USA

2012 - 2014 Postdoctoral research associate with Dr. Satish Kumar

CSIR-Centre for Cellular and Molecular Biology, Hyderabad, India

PUBLICATIONS:**Research articles:**

1. Jain V.*, Shanmugam R., Singh P.P., and Singh V.P.*, Placental malaria and VEGF modulation by *P. falciparum*: Bridging the immunopathological gap using evidence from human cerebral and severe, non-cerebral malaria studies, *Acta Tropica*, 280 (2026), 108164, <https://doi.org/10.1016/j.actatropica.2026.108164>. (*Corresponding author)
2. Singh V. P.*, K. N.Singh, D.Tirkey, et al., "Monitoring Rubella Immunity and Transmission in Central India Amidst Elimination Efforts," **Microbiology and Immunology** 0 (2026): 1-6. <https://doi.org/10.1111/1348-0421.70065>. (*Corresponding author)
3. Singh V.P.* and Singh P.: Linking DNA Damage and Senescence to Gestation Period and Lifespan in Placental Mammals, **Front. Cell Dev. Biol**, 2024 Sep 30:12:1480695. (10.3389/fcell.2024.1480695). (*Corresponding author)
4. Singh V.P.*, Hassan H., Deng F., Tsuchiya D. , McKinney S., Ferro K. and Gerton J. L.*: c-Myc promotes polyploidy in murine trophoblast cells and suppresses senescence. **Development**, 2023, 150 (11) dev.201581. (10.1242/dev.201581) (*Co-corresponding author) (Cover Image- **Development**, 2023, Volume 150, Issue 11)
5. Yueh, Wei-Ting, Singh V.P. and Gerton, J.L.: Maternal *Smc3* protects the integrity of the zygotic genome through DNA replication and mitosis. **Development** 2021, 142(24) dev.199800. (10.1242/dev.199800)
6. Gomes de Lima L., Howe E., Singh V.P., Potapova T., Li H., Xu B., Castle J., Crozier S., Harrison C.J., Clifford S.C., Miga K.H., Ryan S., and Gerton J. L.: PCR amplicons to determine human centromeric array copy number reveal wide-spread size variation and instability in cancer. **Cell Genomics** 2021, 1(3), 100064. (10.1016/j.xgen.2021.100064)
7. Kushihara A., Babayev E., Zhou L., Singh V.P., Gerton J.L., and Duncan F.E.: Immature Follicular Origins and Disrupted Oocyte Growth Pathways Contribute to Decreased Gamete Quality During Reproductive Juvenescence in Mice. **Front. Cell Dev. Biol** 2021, 9: 693742. (10.3389/fcell.2021.693742)
8. Singh V.P.* and Gerton J. L.: Protocol for mouse trophoblast stem cell isolation, differentiation, and cytokine detection. **STAR Protocols** 2021, 2, 100242. (10.1016/j.xpro.2020.100242) (*Co-corresponding author)
9. Singh V.P., McKinney, S., and Gerton J. L.: Persistent DNA Damage and Senescence in the Placenta Impacts Developmental Outcomes of Embryos. **Developmental Cell** 2020, 54(3):333-347. (10.1016/j.devcel.2020.05.025) (Editor's choice in **Science Magazine** - DNA repair in the placenta, **Science** 2020, 369 (6500):155-156 & preview by Vicente et. al., Keep Calm and the Placenta Will Carry On, **Developmental Cell** 2020, 54(3):295-296)
10. Singh V.P., Yueh W., and Gerton J.L., Duncan F. E.: Oocyte-specific deletion of *Hdac8* in mice reveals stage-specific effects on fertility. **Reproduction** 2019, 157(3):305-316. (10.1530/REP-18-0560)
11. Singh V.P., Katta S., and Kumar S.: WD-repeat protein WDR13 is a novel transcriptional regulator of c-Jun and modulates intestinal homeostasis in mice. **BMC Cancer** 2017, 17:148.(10.1186/s12885-017-3118-7)
12. Xu B., Li H., Perry J., Singh V.P., Unruh J., Yu Z., Zakari M., McDowell W., Li L., and Gerton J.L.: Ribosomal DNA copy number loss and sequence variation in cancer. **PLoS Genetics** 2017, 13(6): e1006771. (10.1371/journal.pgen.1006771)
13. Singh V.P.*, Alex J.L., Lakshmi B.J., Sailasree S.P., Raj T.A., and Kumar S.*: Role of mouse *Wdr13* in placental growth; a genetic evidence for lifetime body weight determination by placenta during development. **Sci Rep** 2015, 5:13371. (10.1038/srep13371) (*Co-corresponding author)

14. Singh V.P.[#], Gurunathan C.[#], Singh S., Singh B., Lakshmi B.J., Mishra A.P., and Kumar S.: Genetic deletion of *Wdr13* improves the metabolic phenotype of *Lepr* (db/db) mice by modulating AP1 and PPARgamma target genes. **Diabetologia** 2015, 58(2):384-392. (10.1007/s00125-014-3438-y) (# **equally contributed**)
15. Singh V.P., Lakshmi B.J., Singh S., Shah V., Goel S., Sarathi D.P., and Kumar S.: Lack of *Wdr13* gene in mice leads to enhanced pancreatic beta cell proliferation, hyperinsulinemia and mild obesity. **PLoS ONE** 2012, 7(6):e38685. (10.1371/journal.pone.0038685)
16. BK Bajaj, YP Khajuria, and Singh V.P.: Agricultural residues as potential substrates for production of xylanase from alkali-thermotolerant bacterial isolate. **Biocatalysis and Agricultural Biotechnology** 2012, 1 (4), 314-320. (10.1016/j.bcab.2012.05.001)

Review articles:

1. Singh V.P., Gerton, J. L.: Cohesin and human disease: lessons from mouse models. **Curr Opin Cell Biol** 2015, 37:9-17. (10.1016/j.ceb.2015.08.003)

Book chapters:

1. Sudeepti Kulshrestha, Payal Gupta, H. Nikhil, N. P. Arunima, Gopika S. Nair, A. Lalitha, Shraddha Gurha, **Vijay Pratap Singh**, Mandar Bedse, Abhishek Sengupta, Pushpendra Singh, and Prashanth N. Suravajhala, Genomics and Transcriptomics in Reproductive Health, CRC Press, 2024 <https://doi.org/10.1201/9781003487548>
2. Suman Kumar Ray, Shraddha Gurha, Suyesh Shrivastava, **Vijay Pratap Singh**, Prashanth N. Suravajhala, and Pushpendra Singh, Personalized Medicine in Reproductive Health, CRC Press, 2024, <https://doi.org/10.1201/9781003487548>
3. Preeti Sharma, Parvez Singh Slathia, Nitika Jamwal, Ridhima Singh, Timir Tripathi, **Vijay Pratap Singh**, Introduction to genome analysis and genomics, Academic Press, ELSEVIER, 2025, <https://doi.org/10.1016/B978-0-443-21980-1.00007-3>
4. **Vijay Pratap Singh**, Parvez Singh Slathia, Preeti Sharma, Pushpendra Singh, Mechanisms for genetic variations, Academic Press, ELSEVIER, 2025, <https://doi.org/10.1016/B978-0-443-21980-1.00009-7>

Patent:

1. Satish Kumar and **Vijay Pratap Singh**: WDR13 AS A NOVEL BIOMARKER USEFUL FOR TREATING DIABETES AND CANCER, Ref No- 0172NF2010 (PCT1209/DT). **Application No. 2696DEL201**

Scientific Presentations:

1. Thanwar V., Hassan H., Guin G., Sirsikar S., Mishra S., Batham V., Singh P. and Singh V.P.: DNA break mapping in placental cells uncovers vulnerability of CGG repetitive sequences in pregnancy complication, **ISSRF 2026**, Feb 20th-22th 2026, BHU, Varanasi, India (Invited talk)
2. Singh V.P.: Introduction to Medical Research: A Gentle Beginning for BAMS Students, **Poornayu Ayurved Chikitsalaya Evam Anusandhan Vidyapeeth**, Jabalpur, December 20th 2025 (Invited talk)
3. Thanwar V., Hassan H., Guin G., Sirsikar S., Mishra S., Batham V., Singh P. and Singh V.P.: DNA break mapping in placental cells uncovers vulnerability of CGG repetitive sequences in pregnancy complication, **SRBCE 2025**, Dec 11th-13th 2025, ICMR-NIRRH, Mumbai, India (Invited talk)
4. Organised conference at ICMR-NIRTH as convener in collaboration with Bioclues organization- **Indian Conference on Bioinformatics 2025-Action Toward Genomics & Community Health (ATGC)**, INBIX-2025, Nov 13th -15th, 2025

5. Singh V.P. and Singh P.: DNA Damage in Placental Abnormalities: Implications for Pregnancy Complications and Fetal Outcomes, Sharnbasva University, Kalaburagi, India, IConPAS2K25, Jan 4th -5th 2025 (Invited talk)
6. Singh V.P. and Singh P.: Mapping DNA Breaks in Placental Cells Reveals Vulnerability of Repetitive DNA Sequences, **SRBCE 2024**, Nov 15th-17th 2024, University of Delhi, India (Presented poster)
7. Singh V.P.: Diagnosis of Ruminant viral diseases with modern technology, **Nanaji Deshmukh Veterinary Science University, Jabalpur**, March 19th-29th, 2024 (Invited talk)
8. Singh V.P.: Role of genome maintenance in placental development and pregnancy complications, 16th **Young Investigator meet (YIM)**, 11th-15th March, 2024, IndiaBioscience (Presented poster)
9. Singh V.P.: Maternal child health and Pregnancy Complications, **Poornayu Ayurved Chikitsalaya Evam Anusandhan Vidyapeeth**, Jabalpur, December 9th 2023 (Invited talk)
10. Singh V.P.: Polyploidy and senescence in placenta: Myc is having a tropho(blast), **SRBCE 2023**, Sep 14th-16th 2023, Navrachana University Vadodra, India (Delivered talk)
11. Singh V.P., Gerton, J.L.: Cornelia de Lange Syndrome and the Cohesin Complex: Abstracts from the 9th Biennial Scientific and Educational Virtual Symposium 2020 (Abstract). **Am J Med Genet A**. 2022, 188(3): 1005-1014. (10.1002/ajmg.a.62591)
12. Singh V.P., Gerton, J.L.: Cornelia de Lange syndrome, related disorders, and the Cohesin complex: Abstracts from the 8th biennial scientific and educational symposium 2018 (Abstract). **Am J Med Genet A**. 2019, 179(6):1080-1090. (10.1002/ajmg.a.61108)
13. Persistent DNA Damage and Senescence in the Placenta Impacts Developmental Outcomes of Embryos, **IFPA, symposium** Aug 30-Sep 2, 2021, Amsterdam, Europe (Delivered talk) Selected as **NIH new investigator travel award**.
14. Polyploidy in the developing placenta: Link between senescence and oncogene activation, 17th Annual **Gilbert S. Greenwald Symposium on Reproduction and Perinatal Research**, Oct 8-9, 2020, KUMed, USA (Delivered talk)
15. Persistent DNA damage and senescence in placenta, **Cornelia de Lange Syndrome Virtual Symposium**, Oct 2-3, 2020 (Delivered talk)
16. Persistent DNA damage in placenta impacts developmental outcomes in mouse cohesinopathy models, **Eukaryotic DNA replication & genome maintenance**, Sept 3-7, 2019, Cold Spring Harbor Laboratory, USA
17. Persistent DNA damage in placenta impacts developmental outcomes in mouse cohesinopathy models, **Translational Research Seminar Series**, Nov15, 2018, at Stowers Institute for Medical Research (Delivered talk along with Dr. Isabelle Thiffault, director of translational research from Children's Mercy Hospital, Kansas city, USA).
18. The role of placenta in the etiology of Cornelia de Lange syndrome, **CTR annual conference**, July 9-10, 2018, University of Cambridge, UK.
19. The role of placenta in the etiology of Cornelia de Lange syndrome, **Cornelia de Lange Syndrome Symposium**, June 27-28, 2018 (Delivered talk along with Dr. Jennifer Gerton)
20. Role of stress response pathway in molecular pathogenesis of CdLS, **YISR** (Stowers Institute for Medical Research, Kansas City, USA) Aug 24-25, 2017. (Delivered talk)
21. Role of stress response pathway in molecular pathogenesis of CdLS, **YISR** (Stowers Institute for Medical Research, Kansas City, USA) Sept8-9, 2016. (Delivered talk)
22. Wdr13: A novel regulator of cell proliferation by interacting with nuclear receptors and HDACs, 4th meeting of the Asian forum of chromosome and chromatin biology, CCMB, Hyderabad, India, November 22-24, 2012. (Delivered talk)

Courses:

1. Centre for trophoblast research, University of Cambridge, UK **"Placenta Biology Course"** 2023
 2. Oregon Health & Science University, USA **"Developmental Origins of Health and Disease Summer Course"** 2021
 3. Cold Spring Harbor Laboratory, USA **"Mouse Development, Stem Cells, and Cancer"** 2016
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GRANTS & AWARDS:**Grants:**

1. ARG-Anusandhan National Research Foundation Grant- 2026- as PI,
Title: **Unraveling the genetic basis of placental senescence and its contribution to preeclampsia and preterm delivery (Grant No: ANRF/ARG/2025/005543/LS)**
Amount: 48.0 Lakh, Ongoing
2. PM-ECRG Anusandhan National Research Foundation Grant- 2025- as PI,
Title: **Identifying unique repetitive elements in cell-free DNA (cfDNA): Potential biomarkers for predicting pregnancy complications with point-of-care applications (Grant No: ANRF/ECRG/2024/001014/LS)**
Amount: 49.0 Lakh, Ongoing
3. ICMR intramural grant -2025- as Co-PI,
Title: **Role of DNA damage response in regulating viral replication in the trophoblast cells among pregnant women with febrile illness during first trimester (Grant No: F.No. 5/7/14/IM/2024-RCN)**
Amount: 101 Lakh, Ongoing
4. ICMR intramural grant -2025- as Co-PI,
Title: **Development of novel molecular diagnostic target for detection of Scrubtyphus (Grant No: F. No. VIR/Intra/02/2024/CD)**
Amount: 224 Lakh, Ongoing
5. DBT-Ramalingaswami Fellowship 2023 - as PI,
Title: **Role of genome maintenance in placental development and pregnancy complications (Grant No: BT/RLF/Re-entry/59/2021)**
Amount: 123 Lakh, Ongoing
6. ICMR intramural grant -2025- as Co-PI,
Title: **Tracking the transmission dynamics of measles virus using whole genome sequencing**
Amount: 135 Lakh, Ongoing

Awards:

1. NIH new investigator travel award, IFPA 2021
 2. GATE- 2005 (All India Rank-17)
 3. DBT- Junior Research Fellowship (June 2005)
 4. CSIR- UGC Junior Research Fellowship –NET (Dec. 2004)
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