

## SUMEDHA DAHAL, Ph.D.

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### **Address of communication:**

475 main st, apt #14Q  
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## PROFESSIONAL SUMMARY

Experienced molecular biologist with a Ph.D. in Biochemistry and over 4 years of postdoctoral research experience in genome stability, DNA repair mechanisms, and mitochondrial biology. Proven expertise in gene cloning, protein purification, chromatin immunoprecipitation, and mammalian cell culture, with a strong track record of peer-reviewed publications in high-impact journals. Adept in designing and executing complex research protocols, statistical data analysis, and collaborative manuscript preparation. Recognized for academic excellence and awarded for contributions to scientific research and communication. Seeking to contribute deep scientific insight and technical proficiency to advance innovative research in molecular and cellular biology.

## WORK EXPERIENCE:

### **Current Position:** (September 2021- present)

Memorial Sloan Kettering Cancer Center

Research Associate

New York, 10065, USA

### **Cell and Molecular Biology, Biochemical and Biophysical Techniques:**

- Gene cloning, site directed mutagenesis.
- Overexpression of genes in yeast cells, insect cells and mammalian cells
- Purification of protein by affinity chromatography, ion exchange and gel filtration (Akta)
- Western blotting, Immunoprecipitation, Chromatin immunoprecipitation (ChIP)
- Sample preparations for Mass spectrometric analysis
- Analyze the protein complex formation by gradient.
- Purification on non BDNA structures using chromatography.
- Reconstitution of replication invitro

### **Previous Position:** (August 2019 – June 2021)

Indian Institute of Science

Research Associate

Bangalore, 560012, India

## TECHNICAL EXPERTISE:

### **Cell culture and Animal Handling:**

- Culturing of mammalian cell lines and bacterial culture (*E. coli*).
- Handling, breeding and maintenance of mice models.
- Dissection of mice and rats for organ isolation.
- Oral administration of drugs to mice.
- Subcutaneous injection of cells to animals for maintenance of allografts.

### **Cell and Molecular Biology, Biochemical and Biophysical Techniques:**

- Western blotting, Immunoprecipitation, Chromatin immunoprecipitation (ChIP)
- Cellular fractionation (nuclear, cytoplasmic and mitochondria) from mammalian cells
- Subcellular fractionation (matrix and inner membrane) of mitochondria
- shRNA mediated knockdown of genes by transfection in mammalian cells
- Fluorescence, in situ hybridization (FISH), Immuno-histochemistry (IHC)
- Cell viability and growth assays (MTT, Trypan Blue)
- Flow Cytometry
- Fluorescence, Confocal Microscopy
- Purification of proteins via affinity chromatography and FPLC
- Circular Dichroism, UV-Visible spectroscopy, Fluorescence spectroscopy
- Isolation of gDNA, mtDNA, plasmid, RNA from lab-maintained cultures
- q-PCR, multiplex PCR, semi-quantitative PCR
- Radioactive and nonradioactive DNA labeling
- Primer extension, Denaturing DNA gels, EMSA

### **Duties:**

1. Designing Research Protocols: Design research protocols, outlining the steps and procedures for their studies. This includes planning experiments, data collection methods, and ethical considerations.
2. Collecting and Coding Data: Collect data through experiments, surveys, or observations. We organize and code this data for analysis.
3. Statistical Analysis and Interpretation: Perform statistical analyses on collected data to draw meaningful conclusions. We interpret results and draw insights from statistical models.
4. Presenting Findings: Present research findings at seminars, conferences, and workshops. Effective communication is crucial to disseminate knowledge and receive feedback from peers.
5. Conducting Literature Reviews: Review existing scientific literature to understand the current state of knowledge in the field. This helps inform our research and identify gaps or areas for further investigation.
6. Assisting with Manuscript Writing and Grant Proposals: Collaborate with other researchers, helping with manuscript preparation and editing. Writing research papers and grant proposals.

### **EDUCATION:**

|    | Degree      | Subject       | University/Institution      | Year | Percentage/CGPA |
|----|-------------|---------------|-----------------------------|------|-----------------|
| 1. | B.Sc.(Hons) | Biotechnology | Purvanchal University       | 2011 | 3.41/4          |
| 2. | M.Sc.       | Biotechnology | Bangalore University        | 2014 | 72              |
| 3. | Ph.D.       | Biochemistry  | Indian Institute of Science | 2020 | Awarded         |

**Ph.D. Thesis Title:** Understanding the Mechanism of Double-strand Break Repair and Genome Fragility in Mammalian Mitochondria (2014-2020).

### **Google Scholar profile:**

[https://scholar.google.com/citations?view\\_op=list\\_works&hl=en&hl=en&user=zSO66YwAAAAJ](https://scholar.google.com/citations?view_op=list_works&hl=en&hl=en&user=zSO66YwAAAAJ)

### **Research Gate Profile:**

<https://www.researchgate.net/profile/Sumedha-Dahal-2>

### **ORCID profile:**

<https://orcid.org/my-orcid?orcid=0000-0003-3682-5656>

## PUBLICATIONS:

1. **Dahal et al.**, (2018). Homologous mediated repair of DNA double-strand breaks operates in mammalian mitochondria. *Cell Mol. Life. Sci.* 75(9):1641-1655.
2. Kumari\*, Vartak\*, **Dahal\***, et al., (2019). G-quadruplex Structures Contribute to Differential Radiosensitivity of the Human Genome. *iScience*. 21:288-307.
3. **Dahal et al.**, (2021). Characterization of G4 DNA Formation in Mitochondrial DNA and their Potential Role in Mitochondrial Genome Instability. *The FEBS J.*
4. **Dahal** and Raghavan (2021). Mitochondrial genome stability in human: Understanding the role of DNA repair pathways. *Biochemical J* 478(6):1179-1197.
5. **Dahal et al.**, (2022). Unleashing a Novel Function of Endonuclease G in Mitochondrial Genome Instability. *Elife* 11, e69916.
6. Srivastava, **Dahal**, et al., (2017). DNA double-strand break repair in *Penaeus monodon* is predominantly dependent on homologous recombination. *DNA Res.* 24(2):117-128.
7. Gopalakrishnan, **Dahal**, et al., (2019). Characterization of DNA Double-strand Break Repair Pathways in Diffuse Large B Cell Lymphoma. *Mol.Carcinog.* 58(2):219-233.
8. Sharma\*, Kaninathan\*, **Dahal**, et al., (2022). Exposure to endosulfan can cause long term effects on general biology, including the reproductive system of mice. *Front. Genet.* 13:1047746.
9. Satish, Sebastian, **Dahal**, et al., (2016). Microhomology-mediated end joining is the principal mediator of double-strand break repair during mitochondrial DNA lesions. *Mol Biol Cell.* 15;27(2):223-35.
10. Kumari\*, Das\*, Sharma\*, **Dahal**, et al., (2023). Evaluation of potential role of R-loop and G-quadruplex DNA in the fragility of c-MYC during chromosomal translocation associated with Burkitt's lymphoma. *Journal of Biological Chemistry.* 299;12:105431.

## ACADEMIC ACHIEVEMENTS:

- Distinguished Alumni Award in Academia and Research by REVA University, Bangalore (February, 2024)
- Awarded **GARP fellowship** from Indian Institute of Science to attend **ASCB EMBO meeting**, 2018, SanDiego, USA.
- Selected (1 student) for **International Ph.D. program for Biological Sciences (2014)** by Indian Institute of Science, Bangalore. India.
- Awarded with **full Indian Embassy Scholarship** (Nepal India Cultural Relations Scholarship Scheme) for M.Sc studies (2012-2014).
- Student Coordinator for the workshop on "**Role of Intellectual Property Rights in Lifescience Industries**" organized by RISM in association with IIPTA, Delhi. (14<sup>th</sup> & 15<sup>th</sup> November, 2013).
- Student Coordinator in **National Science day Celebration** organized by KSTA in association with RISM. (28<sup>th</sup> February, 2014)
- Awarded with **full tuition fee scholarship** from grade 6- grade 10 for being rank holder (1998-2004).

- Won 2<sup>nd</sup> prize in **Research Paper presentation competition** organized by CMRIMS, Bangalore (5<sup>th</sup> March 2014)
- Won 3<sup>rd</sup> prize in **Science Quiz competition** organized by CMRIMS, Bangalore. (5<sup>th</sup> March 2014)

## PARTICIPATIONS:

- Participated in a four-day workshop on “**Laboratory Animal Care and Use**” (September 2014) held at **Central Animal Facility**, Indian Institute of Science, Bangalore, India.
- Participated and presented poster in **103<sup>rd</sup> Indian Science Congress** organized in University of Mysore, Karnataka (March, 2016).
- Student Coordinator in **42<sup>nd</sup> Annual meeting of the Indian Society of Human Genetics and International** on “**Symposium on Trends in Human Genetic Research and Management**” organized by IISc, JNCASR and CHG, Bangalore. (March 2-4, 2017).
- Student Coordinator and poster presented in **Indo-French Conference on “Recent Advances in Genome Integrity and Plasticity**” organized by IISc Bangalore. (3<sup>rd</sup> December-6<sup>th</sup> December, 2017)
- Student Coordinator and poster presented in **Indo-US Conference on “Transcription, Chromatin structure, DNA repair and Genomic Instability**” organized by IISc Bangalore and SIU, Illinois. (6<sup>th</sup> March – 10<sup>th</sup> March, 2018)
- Participated with poster presentation in **ASCB EMBO meeting** organized in San Diego, USA (8<sup>th</sup> December- 12<sup>th</sup> December, 2018).

## PUBLIC OUTREACH OF WORK:

- <https://www.thehindu.com/sci-tech/science/iisc-natural-shield-protects-certain-dna-regions-from-radiation-damage/article29931809.ece>
- <https://www.reva.edu.in/events/alumni-talk-by-ms.-sumedha-dahal-380>
- <http://biomed.news/bims-mitran/2022-11-20>

## PERSONAL DETAILS:

Place and date of birth: Biratnagar, Nepal;

Sex: Female

Marital status: Married

Nationality: Nepalese