CURRICULUM VITAE

Dr. Narendra K Bairwa

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Centre for Molecular Biology
Central University of Jammu
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Areas of Specialization: Marine Biotechnology, Life Sciences, Cancer Genetics, Yeast Genetics (S.*cerevisiae & Cryptococcus spp.)*

Areas of Interest: Molecular Biology, Genome stability regulation and stress response, Genome editing technologies, Bio-design, Gene-Gene and protein-protein interactions and discovery of drug targets, Biotechnological applications

Current Research Focus: The broad basic research focus is to investigate the novel synthetic binary interactions among genes involved in conserved biological processes from yeast to humans using *S. cerevisiae* as a model organism for uncovering novel drug targets. We study gene-gene, protein-protein interactions, and disruption of pathways in understanding the mechanisms of synthetic lethality, genome stability regulation, and stress response. The applied aspect of our research is bio-design and engineering bio-factories such as S.c*erevisiae* and probiotic yeast *S. boulardii* using the CRISPER/Cas9 approach for human therapeutics. We also investigate the isolation, characterization, and exploration of wild yeast from the local environment for biotechnological applications.

Research and Teaching Experience:

2023-Till date, Associate Professor, Centre for Molecular Biology, Central University of Jammu, Jammu & Kashmir, India

2013-2023, Assistant Professor, School of Biotechnology, Shri Mata Vaishno Devi University, Katra, Jammu & Kashmir, India

2004-2013, Postdoctoral Research Associate, Department of Biochemistry & Molecular Biology, Medical University of South Carolina, USA

2003-2004, Postdoctoral Researcher, Department of Pathology, University of Iowa, Iowa City, USA

Qualifications:

Ph.D. (**2004)** in Life Sciences, Jawaharlal Nehru University, New Delhi, India

M.Sc. (1997) in Marine Biotechnology, Department of Marine Biotechnology, Goa University India

B.Sc. (1994) in Chemistry, Botany, and Zoology**,** Maharaja College, Rajasthan University, India

Awards & Honors:

2021-23: Two-Year Membership (2021-2022) of the Genetic Society of America (GSA)

2017 & 2015: Young Investigator Meeting (YIM) award by India Biosciences and Department of Biotechnology, Govt. of India

2013: Ramalingaswami Re-entry Fellowship by Department of Biotechnology, Govt. of India

2007: First Prize in Student Research Day 2007(Postdoctoral category), Medical University of South Carolina, Charleston, SC, USA

1997-2002: Junior/Senior Research Fellowship by University Grant Commission (UGC), New Delhi, India,

1995-1997: Scholarship for M.Sc. in Marine Biotechnology by Department of Biotechnology, Govt. of India

Research Grants:

Research Project funded by DBT, GOI (87 lacs, from 2013-2018): Ongoing Title: "**Targeting Synthetic Lethality Interactions among Genome Stability and Protein Degradation Pathways Medicated by SCF-E3 Ligase Component F-Box proteins for Personalized Drug Development"**

Research Project funded by SERB, DST, GOI (47 lacs, from 2018-2021):
Title: **"Engineering of the Insulin-producing probiotic Yeast *S. boulardii using* CRISPER/ Cas9 tool**"

Research guidance:

Ph.D.

1. Ms. Meenu Sharma (**13PHDSBT06**) Thesis title "**Investigation into the Role of F-box Motif Encoding Gene *SAF1* in Combination with Certain Genome Stability Regulators in the Maintenance of Genome Stability and Stress Response in *S. cerevisiae* (Awarded)**

2. Ms. Monika Pandita (**14dbt09**) Thesis title "**Investigation into the Genetic interactions of Glyoxylate Pathway related F-Box motif encoding gene *UCC1* with certain Genome Stability regulators in *Saccharomyces cerevisiae* (Awarded)**

3. Ms. Heena Shoket (**15DBT002)** Thesis titled "**Investigation into the Genetic Interaction of F-box Motif Encoding Gene *YDR131C* with Certain Replication Fork Associated Factors in *Saccharomyces cerevisiae (*Awarded)**

PG/ UG (Investigational project/ Dissertation work):

2023

Ms. Muskan Pakhetra (M.Sc.) title "Study of Induced Features in Certain Gene Deletion Strains of *Saccharomyces cerevisiae*"

Ms. Ridhi Sharma (M.Sc.) title "Study of Induced Features in Certain Gene Deletion Strains of *Saccharomyces cerevisiae*"

2022

Ms. Samiksha Sharma (M.Sc.) title "Investigation of aging in the gene mutants of *Saccharomyces cerevisiae* after induction of petite mutation"

Ms. Sahaurti Sharma (M.Sc.) title "To Evaluate the association of Genetic Variant rs10069690 of TERT with non-small cell lung cancer in Jammu and Kashmir Population"

2021

Ms. Neha Sharma (M.Sc.) titled "Understanding Protein-protein Interaction in dendritic cell biology by Employing Bimolecular Fluorescence Complementation Assay" as an administrative supervisor

Ms. Ruhi Singh (M.Sc.) title "Induction of Rho minus mutation in certain gene deletion strains of *Saccharomyces cerevisiae* for aging study"

Mr. Tarunender Pratap Sambyal (M.Sc.) title "Induction of Rho minus mutation in certain gene deletion strains of Saccharomyces *cerevisiae* for aging study"

2020

Ms. Shreya Wazir (M.Sc.) title "Method development for generation of rho mutation in *S. cerevisiae"*

Ms. Aayushi Rakawal (B.Tech Biotechnology) title "Characterization of rho mutants in *Saccharomyces cerevisiae"*

2019

Ms. Sadia Pervez (M.Sc.) title" Loss of *ATG1* and *NK31* ORFs together Results in Flocculation Phenotype in *Saccharomyces cerevisiae"*

Ms. Vaishali Sharma (M.Sc.) title" Loss of *ATG1* and *NK31* ORFs together Results in Flocculation Phenotype in *Saccharomyces cerevisiae"*

2018

Ms. Vishali Chib (M.Sc.) title "Isolation of Yeast from Wild and their characterization"

Ms. Sonali Chib (M.Sc.) title" Isolation of Yeast from Wild and their characterization"

2017

Ms. Palak Kudiyar (B.Tech) title "In-silico Analysis of mir-21 and Its Target Genes In Lung Cancer"

Ms. Sunidhi Sharma (B.tech) title "In-silico Analysis of mir-29 and Its Target Genes In Lung Cancer"

Ms. Priya Pandita (M.Sc.) title "Isolation of yeast from the fruit of *Solanum macrocarpon* from SMVDU campus"

2016

Ms. Megha Sharma (B.Tech.) title "Isolation of yeast species from the environment of SMVDU campus"

Ms. Bharti Verma (M.Sc.) title "Secondary structure prediction of Fbxo39 Protein by homology modelling"

2015

Ms. Priynaka Kashyap (M.Sc.) title" *In silico* Analysis of Microarray Data for the Identification of DEGS for hypothesis Generation"

Mr. Rahul (B.Tech.) title" Differential Gene Expression Analysis of Normal and Breast Tumor Microarray Dataset using GEO2R NCBI tool for Hypothesis Generation"

Mr. Rohit (B.Tech) title" Differential Gene Expression Analysis of Normal and Breast Tumor Microarray Dataset using GEO2R NCBI Tool for Hypothesis Generation"

Mr. Sandeep Kumar (B.Tech) title**"** Differential Gene Expression Analysis of Normal and Breast Tumor Microarray Dataset using GEO2R NCBI tool for Hypothesis Generation"

2014

Ms. Arushi (M.Sc.) title "Cloning of F-box motif encoding *YDR131C* of *S.cerevisie* into the yeast two-hybrid vectors pGADT7 and pGBKT7 for protein-protein interaction studies"

Ms. Surbhi Gupta (B.Tech.) title "Homology modelling of SKP1-Cul1- F-box, E3 ligase component Hrt1p of *S. cerevisiae*"

Peer-Reviewed Publications:

Bairwa NK, Shoket H, Pandita M, Sharma M. A Simple Assay for the Detection of Late-Stage Apoptosis Features in *Saccharomyces cerevisiae*. **Curr Protoc. 2022 Sep;**2(9):e525. doi: 10.1002/cpz1.525. PMID: 36069669.

Sharma M, Pandita M, Shoket H, Bairwa NK. F-box motif encoding genes as targets for the development of stress-tolerant traits in *Saccharomyces cerevisiae.* **Indian Journal of Experimental Biology** ***(***IJEB) 2022 Sept. 60 (09) 667-671

Shoket H, Parvez S, Sharma M, Pandita M, Sharma V, Kumar P, Bairwa NK. Deletion of autophagy-related, ATG1 and F-box motif encoding YDR131C, together, lead to synthetic growth defects and flocculation behavior in

Saccharomyces cerevisiae. **J Biochem Mol Toxicol. 2022 Apr 6**:e23064. doi: 10.1002/jbt.23064. Epub ahead of print. PMID: 35385166.

Sharma M, Verma V**, Bairwa NK**. Genetic interaction between *RLM1* and F-box motif encoding gene *SAF1* contributes to stress response in *Saccharomyces cerevisiae.* **Genes Environ. 2021** Oct 9;43(1):45. doi: 10.1186/s41021-021-00218-x. PMID: 34627408; PMCID: PMC8501602.

Pandita M, Shoket H, Rakewal A, Wazir S, Kumar P, Kumar R, **Bairwa NK.** Genetic interaction between glyoxylate pathway regulator UCC1 and La-motif-encoding SRO9 regulates stress response and growth rate improvement in *Saccharomyces cerevisiae*. **J Biochem Mol Toxicol. 2021** Jul;35(7): e22781. doi: 10.1002/jbt.22781. Epub 2021 Apr 2. PMID: 33797855.

Shoket H, Pandita M, Sharma M, Kumar R, Rakwal A, Wazir S, Verma V, Salunke DB, **Bairwa NK.** Genetic interaction between F-box motif encoding YDR131C and retrograde signaling-related RTG1 regulates the stress response and apoptosis in *Saccharomyces cerevisiae*. **J Biochem Mol Toxicol**. **2021** Oct;35(10): e22864. doi:10.1002/jbt.22864. Epub 2021 Jul 26. PMID: 34309121.

Bairwa NK, Saha A, Gochhait S, Pal R, Gupta V, Bamezai RN. Microsatellite instability: an indirect assay to detect defects in the cellular mismatch repair machinery. **Methods Mol Biol**. **2014**; 1105:497-509. doi:10.1007/978-1-62703-739-6_35. PMID: 24623249

Gupta V, Arora R, Gochhait S, **Bairwa NK,** Bamezai RN. Gel-based nonradioactive single-strand conformational polymorphism and mutation detection: limitations and solutions. **Methods Mol Biol**. **2014**; 1105:365-80. doi: 10.1007/978-1-62703-739-6_28. PMID: 24623242

Tripathi K, Mor V, **Bairwa NK**, Del Poeta M, Mohanty BK. Hydroxyurea treatment inhibits proliferation of *Cryptococcus neofo*rmans in mice. **Front Microbiol.2012** May 24;3:187. doi: 10.3389/fmicb.2012.00187. PMID: 22783238; PMCID: PMC3390589

Bairwa NK, Mohanty BK, Stamenova R, Curcio MJ, Bastia D. The intra-S phase checkpoint protein Tof1 collaborates with the helicase Rrm3 and the F-box protein Dia2 to maintain genome stability in *Saccharomyces cerevisiae*. **J Biol Chem**. **2011** Jan 28;286(4):2445-54. doi: 10.1074/jbc.M110.189456. Epub 2010 Nov18. PMID: 21087929; PMCID: PMC3024738

Bairwa NK, Zzaman S, Mohanty BK, Bastia D. Replication fork arrest and rDNA silencing are two independent and separable functions of the replication terminator protein Fob1 of *Saccharomyces cerevisiae*. **J Biol Chem**. **2010** Apr 23;285(17):12612-9. doi: 10.1074/jbc.M109.082388. Epub 2010 Feb 23. PMID: 20179323; PMCID: PMC2857089

Mohanty BK, **Bairwa NK**, Bastia D. Contrasting roles of checkpoint proteins as recombination modulators at Fob1-Ter complexes with or without fork arrest. **Eukaryot Cell. 2009** Apr;8(4):487-95. doi: 10.1128/EC.00382-08. Epub 2009 Feb 20.PMID: 19234097; PMCID: PMC2669202

Gochhait S, Bukhari SI, **Bairwa N**, Vadhera S, Darvishi K, Raish M, Gupta P, Husain SA, Bamezai RN. Implication of BRCA2 -26G>A 5' untranslated region polymorphism in susceptibility to sporadic breast cancer and its modulation by p53 codon 72 Arg>Pro polymorphism. **Breast Cancer Res. 2007**;9(5):R71. doi: 10.1186/bcr1780. PMID: 17945002; PMCID: PMC2242669

Mohanty BK, **Bairwa NK**, Bastia D. The Tof1p-Csm3p protein complex counteracts the Rrm3p helicase to control replication termination of *Saccharomyces cerevisiae*. **Proc Natl Acad Sci U S A. 2006** Jan 24;103(4):897-

902. doi:10.1073/pnas.0506540103. Epub 2006 Jan 17. PMID: 16418273; PMCID: PMC1347974

Saha A, **Bairwa NK,** Bamezai R. Microsatellite instability: an indirect assay to detect defects in the cellular mismatch repair machinery. **Methods Mol Biol. 2005**; 291:293-302. doi: 10.1385/1-59259-840-4:293. PMID: 15502231

Gupta V, Arora R, Ranjan A, **Bairwa NK**, Malhotra DK, Udhayasuriyan PT, Saha A, Bamezai R. Gel-based nonradioactive single-strand conformational polymorphism and mutation detection: limitations and solutions. **Methods Mol Biol. 2005**; 291:247-61. doi: 10.1385/1-59259-840-4:247. PMID: 15502228

Saha A, Dhir A, Ranjan A, Gupta V, **Bairwa N**, Bamezai R. Functional IFNG polymorphism in intron 1 in association with an increased risk to promote sporadic breast cancer. **Immunogenetics. 2005** May;57(3-4): 165-71.doi:10.1007/s00251-005-0783-5. Epub 2005 Mar 9. PMID: 15900487

Khandpur S, **Bairwa NK***, Reddy BS, Bamezai R. A study of phenotypic correlation with the genotypic status of HTM regions of KRTHB6 and KRTHB1 genes in monilethrix families of Indian origin. **Ann Genet. 2004** Jan-Mar;47(1): 77-84.doi: 10.1016/j.anngen.2003.07.003. PMID: 15050877(*Authors contributed equally)

Saha A, Gupta V, **Bairwa NK**, Malhotra D, Bamezai R. Transforming growth factor-beta1 genotype in sporadic breast cancer patients from India: status of enhancer, promoter, 5'-untranslated-region and exon-1 polymorphisms. Eur J Immunogenet. **2004 Feb**;31(1):37-42. doi: 10.1111/j.1365-2370.2004.00442. x. PMID:15009180

Wenger SL, Senft JR, Sargent LM, Bamezai R, **Bairwa N**, Grant SG. Comparison of established cell lines at different passages by karyotype and comparative genomic hybridization. **Biosci Rep. 2004** Dec;24(6):631-9. doi: 10.1007/s10540-005-2797-5. PMID: 16158200

Bairwa NK, Malhotra D, Saha A, Bamezai R. A novel promoter polymorphism (-71C>T) in KRTHB6 gene in Indian population. **Ann Genet. 2004** Apr-Jun;47(2):125-7. doi: 10.1016/j.anngen.2004.02.006. PMID: 15183744

Saha A, **Bairwa NK**, Ranjan A, Gupta V, Bamezai R. Two novel somatic mutations in the human interleukin 6 promoter region in a patient with sporadic breast cancer. **Eur J Immunogenet. 2003** Dec;30(6):397-400. doi:10.1111/j.1365-2370.2003.00423. x. PMID: 14675392

Conference Publications

Narendra Bairwa, Meenu Sharma. Pterostilbene treatment impacts the flocculation behavior in *S. cerevisiae* through transcriptional up-regulation of the F–box encoding AMN1 gene. **Yeast. 2015** September; 32: S220

Meenu Sharma, Vijeshwar Verma, **Narendra Bairwa**. *In-silico* analysis of transcriptional regulation of F-box encoding gene Saf1 of *S. cerevisiae* during heam deficiency stress and pterostilbene treatment. **Yeast. 2015** September; 32: S241

Book Chapters

Anjana Saha, **Narendra K Bairwa**, and Ramesh Bamezai. Microsatellite instability: An indirect assay to detect defects in the cellular mismatch repair machinery **Molecular Toxicology Protocols**, 2004, volume 291, ISBN: 1-59259-840-4. Humana Press, edited by Phouthone Keohavong and Stephen G Grant

Vibhuti Gupta, Reetakshi Arora, AnandRanjan, **Narendra K Bairwa**, Dheeraj K Malhotra, PTUdhayasuriyan, AnjanaSaha, and Ramesh Bamezai.Gel-based non-radioactive single-strand conformational polymorphism and mutation detection – limitations and solutions. **Molecular Toxicology Protocols**, 2004, volume 291,

ISBN: 1-59259-840-4. Humana Press, edited by Keohavong, Phouthone, and Grant, Stephen G.

Conferences/Workshop organized

National Symposium on 'Recent Trends in Biotechnology and Drug Discovery (RTBDD-17) from **30th-31st March 2017**, supported by UGC and SMVDU, Katra, Jammu

Course content designed

1. "Genome Stability Regulation and Drug Development" for M.Sc. (Elective)

Accession Numbers of Gene databank

https://www.ncbi.nlm.nih.gov/nuccore/?term=bairwa+N)

1. Homo sapiens clone 1 type II hair-specific keratin (KRTHB6) gene, promoter region and partial cds 262 bp linear DNA **AY037552.1 GI:21307735**

2. Homo sapiens transforming growth factor beta 1 (TGFB1) gene, partial cds 231 bp linear DN**A AY059373.2 GI:45602839**

3. Homo sapiens clone 2 type II hair keratin gene, partial cds 262 bp linear DNA **AY203963.1 GI:37781622**

4. Homo sapiens clone SK3 type II keratin (KRTHB6) gene, exon 7 and partial cds 285 bp linear DNA **AY152545.1 GI:37722558**

5. Homo sapiens clone SK2 type II keratin (KRTHB6) gene, exon 7 and partial cds 285 bp linear DNA**AY152544.1 GI:37722556**

6.Homo sapiens breast cancer susceptibility protein BRCA2 gene, exon 2 and partial cds 256 bp linear DNA**AY151039.1 GI:23506222**

7.Homo sapiens hair-specific type II keratin protein (KRTHB6) gene, partial cds 285 bp linear DNA**AF416706.1 GI:22725174**

8. Homo sapiens keratin protein HB6 (KRTHB6) gene, partial cds 285 bp linear DNA **AF416705.1 GI:22725172**

9. Homo sapiens type II basic hair keratin (KRTHB1) gene, introns 6 and 7, exon 7 and partial cds299 bp linear DNA **AY121753.1 GI:22415732**

10. Homo sapiens type II hair-specific keratin (KRTHB1) gene, partial cds 299 bp linear DNA**AY123848.1 GI:22212272**

11. Homo sapiens clone 6 interferon gamma (IFNG) gene, intron 1, 130 bp linear DNA **AF378194.1 GI:20513848**

12. Homo sapiens clone 5 interferon gamma (IFNG) gene, intron 1, 134 bp linear DNA**AF378193.1 GI:20513847**

13. Homo sapiens clone 4 interferon gamma (IFNG) gene, intron 1, 131 bp linear DNA**AF378192.1 GI:20513846**

14. Homo sapiens clone 3 interferon gamma (IFNG) gene, intron 1, 132 bp linear DNA**AF378191.1 GI:20513845**

15. Homo sapiens clone 2 interferon gamma (IFNG) gene, intron 1,130 bp linear DNA**AF378190.1 GI:20513844**

16. Homo sapiens clone 1 interferon gamma (IFNG) gene, intron 1**,**134 bp linear DNA **AF378189.1 GI:20513843**

17. Gavialis gangeticus minisatellite sequence 536 bp linear DNA**AF216940.1 GI:6708483**

18. Homo sapiens interleukin 6 (IL6) gene, promoter region and 5' untranslated region 308 bp linear DNA**AF362378.1 GI:19481401**

19. Homo sapiens chromosome 17 map 17q21-23 unknown mRNA, partial sequence]259 bp linear mRNA**AY343912.1 GI:37813575**

20. Homo sapiens clone 2T microsatellite D17S379 sequence 358 bp linear DNA**AY345602.1 GI:33590478**

21. Homo sapiens isolate MPSMVDU8 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 177 bp linear DNA**MK335965.1 GI:1784311800**

22. Homo sapiens isolate MPSMVDU7 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 177 bp linear DNA **MK335964.1 GI:1784311798**

23. Homo sapiens isolate MPSMVDU6 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 174 bp linear DNA **MK335963.1 GI:1784311796**

24. Homo sapiens isolate MPSMVDU5 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 177 bp linear DNA**MK335962.1 GI:1784311794**

25. Homo sapiens isolate MPSMVDU4 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 177 bp linear DNA **MK335961.1 GI:1784311792**

26. Homo sapiens isolate MPSMVDU3 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 177 bp linear DNA **MK335960.1 GI:1784311790**

27. Homo sapiens isolate NKB1 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 174 bp linear DNA **MK335959.1 GI:1784311788**

28. Homo sapiens isolate MPSMVDU1 F-box only protein 39 (FBOX39) gene, exon 3 and partial cds 174 bp linear DNA **MK335958.1 GI:1784311786**

29. Meyerozyma guilliermondii isolate SMVDUM7 large subunit ribosomal RNA gene, partial sequence 591 bp linear DNA **MH819658.1 GI:1468136946**

30. Meyerozyma guilliermondii isolate SMVDUM3 large subunit ribosomal RNA gene, partial sequence 621 bp linear DNA **MH819657.1 GI:1468122708**

31. Meyerozyma guilliermondii isolate SMVDUM2 large subunit ribosomal RNA gene, partial sequence 919 bp linear DNA**MH819656.1 GI:1468108279**

32. Saccharomyces cerevisiae isolate SMVDUMB5 large subunit ribosomal RNA gene, partial sequence 590 bp linear DNA**MH819655.1 GI:1468093551**

33. Candida parapsilosis isolate MBW1 large subunit ribosomal RNA gene, partial sequence 530 bp linear DNA**MH817439.1 GI:1465827933**

34. Meyerozyma guilliermondii isolate SMVDU1 large subunit ribosomal RNA gene, partial sequence 598 bp linear DNA**MH817154.1 GI:1465729082**

Membership in Professional Bodies

1. Life Member, Indian Society for Cell Biology
2. Life Member, Indian Association of Cancer Research,
3. Life Member, Biotech Research Society of India (BRSI)
4. Life Member, Association of Microbiologists of India (AMI)
5. Global outreach Member (2013-2024) American Society of Microbiology
6. Member, Genetics Society of America (GSA)