Dr. D.Y. Patil Vidyapeeth's
Dr. D. Y. Patil Biotechnology And
Bioinformatics Institute.

Name: Dr. Nilesh K. Sharma

Designation : Associate Professor
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Telephone Number : 020-65101870/71
Qualification : M.Sc., Ph.D.
Area of Specialization : DNA repair and drug resistance in cancer

Research Overview

Research Interest

1. Investigating the landscape of DNA repair and epigenetics mechanisms in cancer drug resistance.
2. Implications of small non-coding RNA in cancer pathophysiology

Experimental Models

1. Human carcinoma and normal cell line
2. Carcinoma patient tissue

Cancer, Epigenetic and DNA repair proteins flip-flop: My research project is delineate the mechanisms for development of resistance to variety of alkylating DNA damaging agents, which is one of the major challenges in effective breast cancer treatment. Although there has been tremendous progress in the prevention, detection, and treatment of cancer over the last fifty years, adequate therapy remains elusive due to a lack of clinical procedures for overcoming drug resistance in cancer. Scientific advances made in the last two decades have resulted in the identification of genes and molecular signaling mechanisms that contribute to drug resistance. This has resulted in a better understanding of the biology of breast cancer and as other cancer types and the way these cells acclimatize or undergo subtle molecular changes thereby protecting themselves from the cytotoxic effects of the alkylating anticancer drugs. Our lab is focused on DNA repair protein engaged with single strand break repair such as Base excision repair in breast carcinoma cells.

Small RNA seating on driver seat in cancer pathophysiology: In recent times, several oncology signaling pathways have convergent effects on various types of cancer cell metabolism including breast cancer which contribute to tumor development. In 1931, German biochemist Otto Warburg revealed that cancer cells burn sugar (glycolysis) differently than normal cells, preferring to burn sugar over energy rich fats even when cellular oxygen conditions favor mitochondrial fat burning. Since the discovery of small and miRNAs in 1993, more than 1,500 human miRNAs and small RNA have been identified; few of them have been shown to regulate many cellular processes and pathways that are critical for breast carcinoma pathophysiology. Therefore, we are working on cell line based study to test whether miRNA is playing as a driver in mitochondrial energetics in breast carcinoma. Further, several strategies to taming as well as knocking down these miRNA in breast tumor would be one of fascinating approaches in medical sciences.

Academic Qualifications

- Ph.D., Biotechnology. Indian Institute of Technology, Roorkee, India. 2009
- M.Sc., Plant Physiology and Molecular Biology. G.B.P.U.A&T Pantnagar, India. 2003

Professional Experience: Research and Teaching

1. **Associate Professor**
   Dr. D.Y. Patil Biotechnology and Bioinformatics Institute. Pune, India. 2016-Till date

2. **Assistant Professor**
   Dr. D.Y. Patil Biotechnology and Bioinformatics Institute. Pune, India. 2013-2016

3. **Postdoctoral Research Scientist**
   Rutgers Univerisity, NJMS, USA. 2010 – 2013

4. **Guest Researcher**
   NIEHS, NIH, NC, USA. 2012 – 2013

5. **Assistant Professor**
   School of Life Science, Jaipur National University, Jaipur, India 2009 – 2013

6. **Ph.D., Research Programme** Senior Research Fellowship, CSIR, India 2007 – 2009

7. **Ph.D., Research Programme** JRF Fellowship, CSIR, India 2004 – 2007

Research Project Ongoing/Recommended

Sr. No	Title of Research project	Investigator	Funding agency and reference number	Amount and Duration
1	Exploitation of abnormal DNA repair in cancer as a strategy for cancer therapy	Dr. Nilesh Kumar Sharma	Reference number:. SERB/LS-1028/2013 SERB, DST, New Delhi,	22.63 Lakhs, Dec 2014-Nov 2017, Ongoing
2	Mitochondrial marker screening of GDM and post-partum T2DM Indian patients using FACS and Confocal microscopy technique	Dr. Nilesh Kumar Sharma and Dr. Charusheela Gore	Reference number: DPI/106(04)/2015	5 lakhs (2015-2017), Sanctioned and Ongoing
3	Investigating landscape of crosstalk between ATM kinase and DNA ligase III in breast carcinoma cells. PI- Dr. Nilesh K Sharma	Dr. Nilesh K Sharma	Reference number-DPU/06/11	23.50, Ongoing

Research Publication:

1. Devashree J, Shruti Purohit, Aayushi Jain, **Sharma NK*.** 2016. Export of short RNAs: A bridge between breast carcinoma and their neighboring cells". Front. Oncol. | doi: 10.3389/fonc.2016.00147. PMID: 27379209.
2. Shruti Purohit, Devashree Jahagirdar, Azad Kumar, **Sharma NK***. 2016. Potential of taming microRNA on driver seat to control mitochondrial horses in breast carcinoma. MicroRNA. PUBMED ID: 27464995.
3. Aayushi Jain, Sunny Yadav, Mohsein Beig, Shruti Purohit, Sharma NK. 2016. Base excision repair manipulation in breast carcinoma: A prospective avenue to potentiate genome insulting approach. Oncomedicine. doi:10.7150/oncm.16758. In Press.
4. **Sharma NK**, Kumar A, Kumar A, Tokar AJ, Waalkes M, Bortner CD, Williams CJ, Mason RP and Sinha BK. 2015. Nitric Oxide Down-Regulates Topoisomerase I and Induces Camptothecin Resistance in Human Breast MCF-7 Tumor Cells. Plos One. DOI:10.1371/journal. pone.0141897 November 5, 2015. 1-20.
5. **Sharma NK**, Lebedeva M , Thomas T, Kovalenko O, Stumpf J, Shadel G and Santos J. 2014. Intrinsic DNA ligase III and mitochondrial DNA repair defects in Ataxia Telangiectasia. DNA Repair. 13: 22-31. **IMPACT FACTOR: 5.0**. **(Citation:15)**.
6. **Sharma NK**, Reyes A, Green P, Caron MJ, Gordon DM, Hunter S, Holt IJ and Santos JA. 2012. Human telomerase works in mitochondria as an hTR independent reverse transcriptase. Nucleic Acid Research. 40(2):712-725. [Pubmed] [PDF]**IMPACT FACTOR: 8.20 (Citation:50).**
7. Green PD, **Sharma NK**, Thomas AP, Bonini M, Santos JA. 2012. Telomerase Regulates the Cellular Response to Oxidative Stress Via Mitochondrial ROS. Free Radical Biology and Medicine. 53, S50. **IMPACT FACTOR: 5.0. (Citation: 10).**
8. **Sharma NK**. 2014. Development of mitochondria targeted nanocarrier conjugated drugs against breast cancer. J Cancer Sci Ther 6:9. http://dx.doi.org/10.4172/1948-5956.S1.039.
9. Singh RK, **Sharma NK**, R. Prasad and Udai P. Singh. 2008. DNA cleavage by Cu(II-GlyAibHis, a tripeptide complex based on ATCUN motif. Protein and Peptide letters. 15(1):9-13. [Pubmed] [PDF] **IMPACT FACTOR: 2.0. (Citation: 5)**.
10. **Sharma NK** and Prasad R. 2008. Oxidative protein damage and their inhibition by phenolic acid antioxidants from *Euphorbia hirta* leaves. Journal of Biotechnology. 136S:S717**.** [Pubmed] [PDF]**IMPACT FACTOR: 3.0. (Citation: 5).**
11. **Sharma NK**, Dey S, Prasad R. 2007. *In vitro* antioxidant potential evaluation of *Euphorbia hirta* L. plant. Pharmacology Online 1: 91-98. **IMPACT FACTOR: 0.5. (Citation:25).** [Pubmed] [PDF]
12. Choudhary RR, Verma HN and **Sharma NK***. 2013. Antioxidant and dehalogenase Activity of bioactive protein fraction from *Lagenaria sciceraria* seed. The Journal of Plant Science Research. 29 (2) 1-10. **(Citation:NA).**
13. Sharma S, Verma HN and **Sharma NK***. 2014. Cationic bioactive peptide from the seeds of ***Benincasa hispida***. International Journal of peptides. . http://dx.doi.org/10.1155/2014/156060 PUBMED [PDF] **(Citation: 5).**

Paper presentation:

1. Shruti Purohit, Devashree J, Azad, Ayushi, Nilesh Kumar Sharma*. 2015. Assessment of temozolomide to generate single strand break during in vitro DNA damage and cancer cell cytotoxicity assay. National Centre for Cell Science, Pune (International Conference on Cancer Research: New Horizons) (19-21st November 2015).

2. Shruti Purohit, Devashree J, Azad, Nilesh Kumar Sharma*. 2015. Potentials of taming MicroRNA on driver seat to control mitochondrial horses in breast tumor. One day workshop on insights in biology. Jointly organized by Maharashtra Academy of Sciences and CSIR-National Chemical LaboratoryOrganized at NCL, Pune, India. Oct 26. 2015.
3. Devashree Jahagirdar, Shruti P., Ayushi, Nilesh Kumar Sharma*. 2015. Communication between Breast tumor cells and neighboring cells via packaging and shipping of short RNA. . One day workshop on insights in biology. Jointly organized by Maharashtra Academy of Sciences and CSIR-National Chemical LaboratoryOrganized at NCL, Pune, India. Oct 26. 2015.
4. Sharma NK. 2014. Development of mitochondria targeted nanocarrier conjugated drugs against breast cancer. Global Cancer Conference & Medicare Summit. September 15-17, 2014 Hyderabad International Convention Centre, India.
5. Sharma NK, Leibideva M, Thomas T, Shadel G, Santos J. 2013. Intrinsic DNA ligase III and mitochondrial DNA repair defects in Ataxia Telangiectasia. NHLBI, Mitochondria, Mitochondrial genetics and Human diseases Symposium, at NIH, NHLBI, Bathesda, Maryland. 6-7 May, 2013.
6. Sharma NK, Thomas T, Santos J. 2012. Role of ATM kinase in mitochondrial DNA metabolism. Mitochondria, Signals and Homeostasis, June 27-29th, 2012; Michigan State University, East Lansing, MI.
7. Sharma NK, Lebedeva M , Thomas T, Kovalenko O, Stumpf J, Shadel G and Santos J. 2012. Role of ATM kinase in mitochondrial DNA repair. Gordon Research Conference on Mutagenesis, August 19-24, 2012, Salve Regina University, Newport, RI.
8. Sharma NK, Green P, Caron MJ, Gordon DM, Hunter S and Santos JA. 2011. The role of telomerase in mitochondrial DNA metabolism. Paper presentation at European Meeting on Mitochondrial Pathology. EUROMET 8. Zaragoza. Spain. June, 20-23. 2011.
9. Sharma NK, Green P, Caron MJ, Gordon DM, Hunter S and Santos JA. 2011. Unveiling the function of telomerase in mitochondria. Oral presentation at Cold Spring Harbor laboratory, New York, USA. International Telomere and Telomerase meetings 3-7May, 2011.
10. Sharma NK, Prasad R. 2008. Hydroxy cinnamic acid derivatives from Euphorbia hirta and their protective interaction with protein. Biochemistry of cell regulation: 33rd FEBS Congress & 11th IUBMB Conference. June 28th –July 3rd 2008. Athens, Greece. Poster Presentation.
11. Sharma NK, Prasad R. 2008. Synergistic interaction of phenolic acid constituents from Euphorbia hirta leaves and their protective on oxidative injury to protein. Oxygen Club California World Congress 2008. Santa Barbara, California USA. P-35.
12. Sharma NK, Prasad R. 2008. Saponin glycosides as natural antioxidant from Aegle marmelos and their protective role in oxidative damage to protein. Bioanalysis in Oxidative stress. Biochemical Society Focused meetings. Biochemical Society Transaction.200836(5).P-36. https://www.biochemistry.org/meetings/abstracts/SA075/SA075P036.pdf.

Professional Recognition, Awards, Fellowships Received:

- DST (SERB) Young Scientist Research award Recommended.
- Invited presentation for selected research proposal under “Young Innovative Investigator, DBT, New Delhi” (Feb, 2014).
- Research grant fellowship sponsored by Department of Defense (DOD), USA (2012-2013)
- Awarded first rank in UG courses and got recognition with fellowship award.
- Qualified for Graduate Aptitude Test in Engineering (GATE) in year 2003.
- Qualified National Eligibility Test for Lectureship (2003) and eligible for teaching post.
- Council of Scientific and Industrial Research (CSIR), Ministry of Human Resource Development awarded Junior Research Fellowship (JRF) and Senior Research Fellowship (SRF).

- Travel award from DST, New Delhi and University of Paris, Paris to present paper at International conference on Free radicals, health and human diseases, Paris, France, 2007.

Detail of Laboratories/Techniques

[a] Details of Course[s] taught at UG level

Sl. No.	Name of Laboratories	List of Techniques
1	Recombinant DNA Technology and Molecular Biology	• PCR • Cloning • Site Directed Mutagenesis • Quantitative PCR • ELISA, SPOT ELISA • Western blot, 1-D and 2-D protein gel electrophoresis
2	Animal Tissue culture	• Cell culture maintenance and growth Primary as well as established cell lines. • Establishment of cell lines from Human Biopsy breast tumor tissue • Cell toxicity based assay • Fluorescent and Luminescent based assay • FISH and Immunocytochemistry • Confocal microscopy and FACS analysis
3	Immunology	• ELISA, SPOT ELISA • Antibody based detection of protein in Cells and Tissue

Details of Teaching Experience/Assignment

[a] Details of Course[s] taught at UG level

Sl. No.	Name of the Course	Contact hours engaged per week	No. of years
1.	Protein engineering	Three hr	Two
2.	Recombinant DNA technology	Two hr	Two
3.	Animal Tissue culture	Three hr	One
4.	Cancer Biology and Cell Signaling	Three hr	one

[b] Details of Course[s] taught at PG level

Sl. No.	Name of the Course	Contact hours engaged per week	No. of years

1.	Metabolic engineering	Three hrs	Two
2.	Advance tools and techniques in biotechnology	Three hrs	Two
3.	Immunology	Three hrs	One
4.	Animal tissue culture	Three hrs	One

[c] Details of Ph.D/MSc/M. Tech. Thesis supervised/Undergoing

Sl. No.	Title of Thesis	Institute	Name of student[s]	Co-Supervisor[s], if any	Year
1.	Study of bioactive peptide from Benincasa hispida seed	Jaipur National University, Jaipur	Sunayna Sharma	Prof. H. N Verma	2013
2.	Determination of antioxidant and dehalogenase activity from watermelon	Jaipur National University, Jaipur	Dolat Singh Sekhawat	Nil	2010
3.	Study on antioxidant and dehalogenase activity from *Lagenaria scieceraria*	Jaipur National University, Jaipur	Rishi Raj Choudhary	Nil	2010
4	To Evaluate KU-55993 and SCR-7 Inhibitors Towards DNA Metabolizing Activity Of Carcinoma Against Doxorubicin Mediated in vitro DNA Break and Cytotoxicity Assay	Dr. DY patil Biotechnology Institute, Dr. D Y patil Vidyapeeth, Pune	Mr. Ajay Kumar	Nil	2016
	To Study The Effect of Base Excision Repair Inhibitors Against Temozolomide Responsiveness in Cancer Cells	Dr. DY patil Biotechnology Institute, Dr. D Y patil Vidyapeeth, Pune	Ms. Devashree Jahagirdar	Nil	2016

Upgradation of Further Knowledge :

SR No	Title	Duration	Organized at
1	Fundamentals of Health Research, NIE, ICMR, New Delhi	18-01-2016 to 11-03-2016	NIE, ICMR, New Delhi
2	Use of experimental animals in	28-03-2012	NIEHS, National Institute of Health,

	research	- 29-03-2012	NC, USA
3	Cell imaging and molecular study	01-09-2010-08-09-2010	National Cancer Center, NJ, USA
4	Technical Communication Skills	01-01-2007-01-05-2007	Department of Humanities and Social Sciences, IIT Roorkee
5	Online bioinformatics course	01-04-2004-01-08-2004	S* Life science alliance at national University of Singapore

DETAILS OF ADMINISTRATE/EXTRA-ACADEMIC EXPERIENCE

SR NO	Name of Organization	Duration	Name of Committee/Responsibilities
1	Dr. DY Patil University, Biotechnology & Bioinformatics Institute	Aug. 2013-Continued	NAAC Committee as NAAC Co-ordinator
2.	Dr. DY Patil University, Biotechnology & Bioinformatics Institute	Aug. 2013-Continued	Internal Assurance Quality Cell (IQAC) as Secretory
3.	Dr. DY Patil University, Biotechnology & Bioinformatics Institute	Aug. 2013-Continued	Extra-Curricular Committee, Secretory
4.	Dr. DY Patil University, Biotechnology & Bioinformatics Institute	Aug. 2013-Continued	Institutional Biosafety, Ethics and Curriculum Committee Member
5.	Dr. DY Patil University, Biotechnology & Bioinformatics Institute	Jan, 2015-Continued	ISO (9001-2008) Co-ordinator
6	Dr. DY Patil University, Biotechnology & Bioinformatics Institute	Jan, 2016-Continued	Institute Bioethics and Biosafety, faculty Advisor and Secretory

Professional Membership:

- Biochemical Society
- Mitochondrial research society
- New York Academy of sciences

Peer Reviewer in Journal:

- Pharmaceutical Biology
- International Journal of Pharmaceutics
- Carbohydrate Polymer
- Indian Journal of Biotechnology