

Dr. PRABHAKAR SINGH

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ABOUT ME

I am a highly motivated Biochemist (UG, PG, and D.Phil. in Biochemistry), Expert in Biochemistry of Biomolecule and Metabolism, Clinical and Analytical (Instrumental) Biochemistry with more than 07 years of teaching and research experience post D.Phil., having Research Paper/Article - >20 with **Highest Impact Factor: 12.822**, and National Qualification: CSIR-NET, CSIR-SRF, GATE-XL (Life Science),

RESEARCH INTEREST

Cellular Biochemistry of human Aging, Natural product in rejuvenation against pathological Disorders, Biochemistry of oxidative stress and pathology.

EDUCATION (Teaching Experience – PG: Biochemistry: 07 Year)

- ❖ **Ph.D. (Biochemistry 2009-2015)** University of Allahabad (Central University), U.P. India.
- ❖ **Masters – 64.10% (Biochemistry, 2006-2008)**, University of Allahabad, Allahabad, U.P. India.
- ❖ **Bachelors-- 66.10% (Bio-Chem, Chem, & Zool. 2003-2006)** University of Allahabad, Allahabad, U.P. India.
- ❖ **Certificate in computer applications, 2006;** University of Allahabad, Allahabad, U.P. India.

PROFESSIONAL AND RESEARCH EXPERIENCE

- ❖ **September 2015 – Continue – Independent Research/Tutor/Supervision:** Department of Biochemistry, VBS Purvanchal University, Jaunpur, Uttar Pradesh, 222003. India.
- ❖ **March 2009 to August 2015 - PhD. Thesis titled “Studies on antioxidant and membrane modulation effects of curcumin on cellular system”** under the supervision Prof. Syed Ibrahim Rizvi. Department of Biochemistry, University of Allahabad, Allahabad, India.
 - **2012-2015:** Senior Research Fellow- Council of scientific and Industrial Research (CSIR), New Delhi
 - **2009- 2012:** Research Fellow – UGC, Department of Biochemistry, University of Allahabad, India
- ❖ **January 16-22, 2015:** One week Self-finance short term course on **“Hands on training on molecular techniques in biotechnology”**, organized by Department of Biotechnology, **MNNIT, Allahabad, U.P., India.**
- ❖ **1st June 2006- 31st July 2006: Summer Training:** Various techniques and protocol for isolation of human genomic DNA & other molecular techniques. IQRA Biotech Services, Human DNA Bank, Biotech Park, Lucknow, U.P.

HONOURS & AWARDS

- ❖ **2022-2023: NAAC- Criteria – 1 (Curricular Aspect):** Associate Coordinator, VBS Purvanchal University.
- ❖ **2021-2022:** Assistant Central Superintendent (ACS): Examination, 2021-2022. VBS Purvanchal University (Campus Course)
- ❖ **2020- 2021:** Brand Ambassadors: Bentham Science Publisher
- ❖ **2012-2015:** Senior Research Fellow- Council of scientific and Industrial Research (CSIR), New Delhi
- ❖ **June 2011 (Life time):** CSIR-UGC-NET (LS): S.No.3061132393
- ❖ **2009:** GATE-XL(Life Sciences): SC No: 503558, Indian Institute of Technology Roorkee, Roorkee.
- ❖ **July 2008: CRET:** Department of Biochemistry, University of Allahabad, U.P. India

TECHNICAL EXPERTISE

- ❖ **Online Teaching Skill:** OBS Studio (Pen-Tab mediated Offline and Online stream) for recording tutorial. Editing video and audio by OBS and Audacity: OneNote 2013. https://www.youtube.com/watch?v=nyC52_yNFks&t=121s
- ❖ **Software Skill:** Prism 5.01 for statistical analysis, Chem-Draw, Photo-Shop, Coral, EndNote,
- ❖ **Bioinformatics:** Molecular Docking: Autodock MGL Tool, Autodock Vina, Pymol Visualization tool.
- ❖ **Writing Skills:** Research paper, Project, Presentation and Report Writing Protocol.
- ❖ **Protocol Design and Experience:** *In vivo*, *In-Vitro* and *In-Silico* protocol design and analysis.
- ❖ **Instrumental handling and Exposure:** Electrophoresis, PAGE, PCR, HPLC, Spectrophotometer, Gel Doc, Fluorescence spectrophotometer (Agilent Technologies), Olympus fluorescent microscope (Model: CX21i-TR-LED), Wistar rat handling, CBCs, Biochemistry analyzer, ELISA, Density Gradient Centrifugation etc.

PUBLICATIONS

Research Papers/Article:

1. **Singh P**, Rizvi SI, Pandey KB. Effects of curcumin in redox regulation, ions transporter activity and membrane integrity of human erythrocytes. **(In Process: 2022)**
2. **Singh P**, Rizvi SI, Pandey KB. Piperine protects oxidative modifications in human erythrocytes. *Journal of Basic and Clinical Physiology and Pharmacology* 33 (2), 163-167 **(SJR: 0.355; PubMed, Scopus, SCI)**
3. Mehdi M.M., Solanki P., **Singh P**. "Oxidative Stress, antioxidants, Hormesis and Calorie Restriction: The Current Perspective in the Biology of Aging" *Archives of Gerontology and Geriatrics*, **2021**; 95: 104413. **IF: 4.16. (Elsevier)**
4. **Singh P**, Singh S, Garg G, Singh AK, Rizvi SI, Curcumin has Protective Effects on ROS Production and Redox Imbalance in an Experimental Oxidative-Stressed Model of Rat. **2020**, *Journal of Biologically Active Products from Nature*, 10:6, 484-494, **Taylor & Francis (Scopus)**.
5. Kesharwani RK, Tripathi S, **Singh P**, Kumari M, Atal SKV. The Role of Methylation in Oncogene Regulation. *Proteomics & Bioinformatics*. **2020**. PB, 2(3): 161-163.
6. **Singh P**, Kesharwani RK, Misra K, Rizvi SI. Modulation of Erythrocyte Plasma Membrane Redox System Activity by Curcumin. *Biochemistry Research International*, **Volume 2016 (2016)**, **Article ID: 6025245, 1-8 (PubMed, Scopus, SCI), CiteScore - 6.00**
7. **Singh P**, Pandey KB, Rizvi SI. Curcumin: the yellow molecule in making life green. *Letters in Drug Design & Discovery*, **2015**, 13(2) 170-177. **IF: 1.15.**
8. **Singh P**, Rizvi SI. Modulation effects of curcumin on erythrocyte ion-transporter activity. *International Journal of Cell Biology*, **2015, Volume 2015, Article ID: 630246, 1-8. (PubMed, Scopus) CiteScore - 8.50**
9. Kesharwani RK, Srivastava V, **Singh P**, Rizvi SI, Adeppa K, Misra K. A novel approach for overcoming drug resistance in breast cancer chemotherapy by targeting new synthetic curcumin analogues against aldehyde dehydrogenase 1 (ALDH1A1) and glycogen synthase kinase-3 β (GSK-3 β). *Applied Biochemistry and Biotechnology*, **2015**, 176 (7), 1996-2017. **Springer. IF: 3.09**
10. **Singh P**, Kesharwani RK, Misra K, Rizvi SI. The modulation effects of curcumin on erythrocyte Na⁺/K⁺-ATPase activity. *Journal of Advanced Research*. **2015**, 6, 1023-1030, **Elsevier. IF: 12.822.**
11. **Singh P**, Rizvi SI. Role of curcumin in modulating plasma PON1 arylesterase activity and susceptibility to LDL oxidation in oxidatively challenged wistar rats. *Letters in Drug Design & Discovery*, **2015**, 12 (4), 319-323. **IF: 1.15.**
12. **Singh P**, Kesharwani RK, Misra K, Rizvi SI. *In silico* validation for the modulatory effect of tea catechins on erythrocyte Na⁺/K⁺-ATPase. *The Natural Products Journal*, **2014**, 4 (3) 173-182. **ESCI, Scopus**
13. **Singh P**, Rizvi SI. Curcumin activates erythrocytes membrane acetylcholinesterase. *Letters in Drug Design & Discovery*, **2013**, 10 (6), 550-556. **IF: 1.15.**
14. Mehdi MM, **Singh P**, Rizvi SI. Erythrocyte sialic acid content during aging in humans: Correlation with markers of oxidative stress. *Disease Markers*, **2012**, 32(3): 179-186. **IF: 3.434.**
15. **Singh P**, Rizvi SI. Anti-oxidative effect of curcumin against *tert*-butyl hydroperoxide induced oxidative stress in the human erythrocytes. *The Natural Products Journal*, **2012**, 2, 69-73. **ESCI, Scopus**
16. Rizvi SI, Kumar D, Chakravarti S, **Singh P**. Erythrocyte plasma membrane redox system may determine maximum life span. *Medical Hypotheses*, **2011**, 76: 547-549. **Elsevier. IF: 4.411.**

Book Chapters

1. Sahu S., Singh P. (2023) "Caloric restriction against aging disorders. In, Singh P, Kesharwani RK, Keservani RK. (Ed) "Obesity and Diabetes in Aging Patients" Bentham Book *(In Press)*
2. Singh P, Kesharwani RK, Keservani RK. (2023) "Therapeutic Application of Stem Cells in Diabetes. In, Singh P, Kesharwani RK, Keservani RK. (Ed) "Obesity and Diabetes in Aging Patients" Bentham Book *(In Press)*
3. Singh P., Mehdi M.M., (2023) "Chapter 14. Functional foods, bio-actives, and cognitive impairments during aging" Editors/Authors: Kanti Bhooshan Pandey, Maitree Suttajit "Plant Bioactives as Natural Panacea against Age-induced Diseases: Nutraceuticals and Functional Lead Compounds for Drug Development" Elsevier, 271-286.
4. Singh P., Tiwari S.P., Mehdi M.M., Sharma R. (2021) Role of Bacterial Infection (*H. pylori*) in Colon Carcinogenesis and Therapeutic Approaches. In: Vishvakarma N.K., Nagaraju G.P., Shukla D. (eds) Colon Cancer Diagnosis and Therapy. Springer, Cham. https://doi.org/10.1007/978-3-030-64668-4_6
5. Kesharwani R.K., Vishwakarma V.K., Kesharwani R.K., Singh P., Katiyar N., Tripathi S., "Role of ADMET Tools In Current Scenario; Application and Limitations" D. B. Singh (ed.), "Computer-Aided Drug Design" Chapter- 4, pp-71-87. Springer Nature, 2020 (Springer), eBook ISBN: 978-981-15-6815-2. Hardcover ISBN: 978-981-15-6814-5. DOI: 10.1007/978-981-15-6815-2
6. Kesharwani RK, Singh P, Kesharwani RK. "Green coffee bean extract and chlorogenic acids: Chemistry and novel antioxidant benefits", In, Bagchi D, Moriyama H, Swaroop A. "Health benefits of green coffee bean in human", CRC Press, Taylor and Francis, 2016, Chapter- 01, pp- 01-17. ISBN 9781498716376-CAT#K25397.
7. Singh P, Singh S, Kesharwani RK. "Resealed erythrocytes as drug carriers and its application in therapy", In "Recent Advances in Drug Delivery Technology" Kesharwani RK, Sharma AK, Kesharwani RK. IGI Global. 2016, pp. 341- 367. Chapter – 12. ISBN13: 9781522507512, DOI: 10.4018/978-1-5225-0751-2.
8. Singh P, Kesharwani RK, Keservani RK. Antioxidants and Vitamins: Roles in Cellular Function and Metabolism. In, Bagchi D. Edition 1st "Sustained Energy for Enhanced Human Functions and Activity", Section- 4: Antioxidant and B-Vitamins. Chapter- 24, pp- 385-407. Academic Press, Elsevier, 2017, ISBN: 9780128054130.
9. Singh P, Kesharwani RK, Keservani RK. Protein, Carbohydrates, and Fats: Energy Metabolism. In, Bagchi D. Edition 1st "Sustained Energy for Enhanced Human Functions and Activity", Section- 1: Introduction. Chapter- 06, pp- 103-115. Academic Press, Elsevier, 2017, ISBN: 9780128054130.
10. Yadav D, Tripathi YB, Singh P, Kesharwani RK, Keservani RK. Roles of AMP, ADP, ATP, and AMPK in Healthy Energy Boosting and Prolonged Life Span. In, Bagchi D. Edition 1st "Sustained Energy for Enhanced Human Functions and Activity", Section- 1: Introduction. Chapter- 02, pp- 31-51. Academic Press, Elsevier, 2017, ISBN: 9780128054130.

Book

1. Singh P, Kesharwani RK, Keservani RK, "Obesity and Diabetes in Aging Patients"2022 *(In Press)* <https://benthambooks.com/future-books-by-subject/medical-sciences/sub-category/endocrinology/>

MEMBERSHIP OF SCIENTIFIC SOCIETIES

1. Life Member: Indian Science Congress Association (L27194), India (2015)
2. Annual Member Indian Academy of Biomedical Sciences (2014-2015), India.

FELLOWSHIP

2012-2015: Senior Research Fellow- Council of scientific and Industrial Research (CSIR), New Delhi

2009- 2015: Research Fellow – UGC, Department of Biochemistry, University of Allahabad, India

REVIEWER OF JOURNAL AND BOOKS

1. National Academy Science Letters (Springer): Reviewer
2. Current Microbiology (CMIC) (Springer): Reviewer
3. Journal of Applied Pharmaceutical Science: Reviewer
4. Advances in Medical Sciences (Elsevier) : Reviewer
5. International Journal of Tropical Insect Science (Springer): Reviewer
6. Book Reviewer: Elsevier

SUPERVISE M.Sc. STUDENTS

1. **Aditya Singh** : Tuberculosis: An overview of Diagnosis, Treatment and Prevention
2. **Kunjilata Prajapati** : Graves's Disease: An overview of Diagnosis and Treatment
3. **Nivesh Tiwari** : Diabetes Mellitus: An overview of Diagnosis, Treatment and Prevention
4. **Nuzhat** : Hypertension: Classification, Diagnosis, Prevention and Treatment
5. **Shreyanshi Sahu** : Caloric restriction against aging disorders
6. **Sushmita Verma** : Cancers: An overview of Diagnosis, Treatment and Prevention

TEACHING ASSIGNMENT:

Paper Code	Paper Title
B110701T	Biomolecules and Bioenergetics
B110703T	Cell Biology
B110801T	Instrumentation and Analytical Techniques
B110902T	Intermediary Metabolism
B110903T	Biostatistics and Bioinformatics
B111001T	Clinical Biochemistry
B111002T	Pathophysiology of Human Diseases

CONFERENCE

- 1- **Oral Presentation** "Role of curcumin in regulation of Plasma Membrane Redox System (PMRS) activity of erythrocytes and antioxidant potential of plasma" **1st International Conference on Novel Frontiers in Pharmaceutical & Health Sciences (INNOPHARM 1)**, Oct. 10-11, **2015**.
- 2- **Oral Presentation** "Role of curcumin in regulation of ion transporters and integrity of erythrocytes membrane" National Seminar on Science and Technology for Human Development organized by the Allahabad **Chapter of The Indian Science Congress Association**, Department of Chemistry, University of Allahabad, India, March 14-15, **2015**.
- 3- **Poster Presentation** "The modulating effects of curcumin on erythrocyte membrane acetylcholinesterase activity" **3rd Annual Meeting of the Indian Academy of Biomedical Sciences & Symposium on Modern Trends in Human Diseases**, organized by Department of Biochemistry, Faculty of Medicine, JNMC, AMU, Aligarh, Uttar Pradesh, India. December 14 & 15, **2013**.
- 4- **Poster Presentation** "Curcumin mitigates oxidative stress induced impairment in Paraoxonase 1 arylesterase activity, antioxidant potential of plasma and susceptibility of LDL to oxidation in albino rats" **International Conference on Health, Environment and Industrial Biotechnology, BioSangam-2013**, organized by Department of Biotechnology, MNNIT, Allahabad, Uttar Pradesh, India. November 21-23, **2013**.
- 5- **Poster Presentation** "Effects of curcumin on various oxidative stress markers in human erythrocytes" **International Symposium on Chemistry and Chemical Biology of Natural Products (CCBNP-2012)**. Indian Institute of Chemical Technology, Hyderabad, Andhra Pradesh, India. August 2-4, **2012**.
- 6- **Poster Presentation** "Anti-oxidative effect of curcumin on erythrocyte membrane" **National Conference on "Emerging Trends in Biochemistry and Satellite Symposium of the Academy of Environmental Biology"** Department of Biochemistry, University of Allahabad, Uttar Pradesh, India. January 23 & 24, **2010**.

SYMPOSIUM AND WORKSHOPS

- 1- One day author's workshop on "**Writing research paper**" supported by **SAGE publication** India Pvt. Ltd. New Delhi on **30th November 2015**.
- 2- Self-finance short term course on "**Hands on training on molecular techniques in biotechnology**", organized by Department of Biotechnology, MNNIT, Allahabad, U.P., India. January 16-22, **2015**.
- 3- One week Participation in the "**4th Inspired Program/Science Conclave: A Congregation of Nobel Laureate and Eminent Scientist**", an MHRD-DST initiative at IIIT-Allahabad during November 26-December 02, **2011**.
- 4- Workshop on "**Scientific paper writing**" organized by The National Academy of Science, India (NASI), October 22-24, **2011** at Allahabad.
- 5- Training program in "**Molecular biology application in herbal drug design and diagnostics**" Department of Biochemistry, University of Allahabad. March 31, 2011- April 2, **2011**.
- 6- "**Summer workshop on assessment of antioxidant activity of foods**", Jointly Organized by Department of Biochemistry and Department of Home Science, University of Allahabad, July 13, **2010** at Allahabad.

RESEARCH EXPERIENCE

We have evaluated the effects of curcumin on membrane bound enzymes, transporters, exchanger, redox system activity as well as protective efficacy for antioxidant and biomolecule in erythrocytes and plasma of human and *wistar* rat. We have found that curcumin actively modulates the enzymes and ions channels/exchanger present on erythrocytes membrane through changing the K_m and V_{max} . Biphasic effects of curcumin on Na^+/K^+ pump activity has been validated through *in vitro*, *in vivo* and *in silico* experiments. PON arylesterase 1 activity has been correlated with LDL oxidation susceptibility and antioxidant potential. We have found that curcumin significantly induced antioxidant potential, reduced LDL oxidation susceptibility and modulate enzymes/ membrane transporters activity through lowering the K_m value.

We have also evaluated the effects of curcumin on sodium hydrogen ion-exchanger (NHE) and plasma membrane redox system (PMRS; an analogue to electron transport chain in mitochondria) activity of human erythrocytes (*in vitro*) and validated the finding through *in vivo* and *in silico* study. In addition, protective effects of curcumin against various oxidative damage marker of protein (protein carbonyl, advanced oxidative protein products, protein hydroperoxides, protein redox value, glutathione level), lipid (Malondialdehyde, Lipid hydroperoxides, LDL oxidation), carbohydrates (Sialic acids, Fructosamine, GAG) has been evaluated and correlated with antioxidant potential (FRAP, CUPRAC, DPPH• radicals and ABTS•• scavenging potential) and oxidant potential (DMPD•• synthesis potential).

Finally, I hypothesize that curcumin is critically involved in inducing antioxidant/redox potential, protecting biomolecule, regulating enzymes activity and ions homeostasis through modulating ions channels, transporter and exchanger activity of erythrocytes membrane in blood.

ALLIED RESEARCH ACTIVITIES EXPERIENCE:

Evaluation of the mechanism of cellular aging and animal aging with diabetes. Besides the core research activity, I have also been involved in various ongoing research projects in the laboratory as a team member. Few of the major research activities, where I am involved are:

1. *In vitro* as well as *in vivo* anti-aging and anti-diabetic effects of natural products.
2. Development of *in vivo* models of aging (D-galactose) to evaluate anti-aging disease (diabetes) and anti-aging effects of herbal drugs.
3. Development and validation of *in vivo*, *in vitro* and *in silico* models for oxidative stress assessment and modulation of ions-transporters, redox systems and enzymes activity through kinetic analysis.

AREA OF INTEREST:

“To study the mechanism of promising drugs in high fat diet induced and rejuvenation of pancreatic cells against aging”

- To develop the animal model (rat) of diabetes through high fat diet and diabetes (high fat diet) with progressive aging.
- To study the effect of high fat induced diabetes on various prominent markers mention in experimental endpoints and their comparison with D- galactose induced aging.
- To study the effects of curcumin (a promising drug) against high fat diet induced diabetes and diabetic rats with progressive aging. A standard anti-diabetic drug (Metformin) will also be used for a comparative study.
- Experimental endpoints including LDL oxidation, HDL associated enzyme PON1 activity and their kinetics, ions-transporters activity and redox status etc. Molecular profiling as m-RNA expression analysis and protein expression related to aging of brain, β -cell apoptosis, and biochemical behavior in freshly isolated liver cells and pancreatic cells. Histo-pathological (Light microscope and Immunohistopathology) evaluation of pancreas cells (Acinar cells, Islet of Langerhans) and dissecting signaling cascade of autophagy, apoptosis, genotoxicity, and cytotoxicity

NOTE: Highest Impact Factor: 12.822 (Journal of Advanced Research)

REFERENCES

Prof. Syed Ibrahim Rizvi, Department of Biochemistry, University of Allahabad, India,
Tel.: +91-9415305910, E Mail: sirizvi@gmail.com

Prof. Rajesh Sharma (Dean: Faculty of Science; Head: Department of Biochemistry)
Department of Biotechnology, Faculty of Science, V.B.S. Purvanchal University, Jaunpur, Uttar Pradesh, India, 222003,
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Place: Jaunpur
Date: 22-May-23



Dr. Prabhakar Singh